DEVELOPING A CONCEPTUAL INFORMATION SYSTEMS (IS) SUCCESS MODEL FOR INTELLIGENT VEHICLE TRACKING SYSTEMS USED IN DEVELOPING COUNTRIES – THE CASE OF GHANA

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DEVELOPING A CONCEPTUAL INFORMATION SYSTEMS (IS) SUCCESS MODEL FOR INTELLIGENT VEHICLE TRACKING SYSTEMS USED IN DEVELOPING COUNTRIES – THE CASE OF GHANA

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DECLARATION

I hereby certify that, this research, which I submit for evaluation is entirely my own work; and that, I have exercised reasonable care to make sure that the work is innovative. To the best of my knowledge, this work has not been published anywhere, and all sources of research materials used have been respectfully acknowledged and duly cited.

Signed:

Date: 15 January 2014

DEDICATION

First of all, this Dissertation is humbly and sincerely dedicated to the Almighty God, who by His Love, Grace and Mercy has seen me through to the successful end of this august PhD Programme. Secondary, this work is dedicated to my lovely family members, who have been on my side in all times. Lastly, this effort is whole heartedly dedicated to GTUC, CMI and AAU.

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LIST OF ACRONYMS

ABL	-	Application Business Logic
ACN	-	Automatic Crash/Collision Notification
AFC	-	Advanced Fair Collection
ANT	-	Actor Network Theory
APTS	-	Advanced Public Transportation Systems
ARSI	-	Automated Roadside Safety Inspections
ATIS	-	Advanced Traveller Information Systems
ATMS	-	Advanced Road Traffic Management Systems
ATMS	-	Advanced Traffic Management Systems
AVC	-	Automatic Vehicle Classification
AVCS	-	Advanced Vehicle Control Systems
AVHS	-	Advanced Vehicle & Highway Systems
AVI	-	Automatic Vehicle Identification
AVL	-	Automatic Vehicle Location
B-ISDN	-	Broadband Integrated Services Digital Networks
BoK	-	Body of Knowledge
BTS	-	Base Transceiver Station
CAS	-	Collision Avoidance Systems
CCPU	-	Computer Central Processing Units
CCTV	-	Closed Circuit Television
CEN	-	European Commission for Standards (Translated from French)
CFM	-	Commercial Fleet Management
CMS	-	Critical Management Studies
CN	-	Core Network
CNS	-	Collision Notification Systems
CVAS	-	Commercial Vehicle Administrative Services
CVO	-	Commercial Vehicle Operations

CVP	-	Commercial Vehicle Preclearance
CWS	-	Collision Warning Systems
D&M	-	DeLone & McLean
DAS	-	Driver Assistance Systems
DATEX	-	Data Text
DB	-	Data Base
DMT	-	Pedestrian Movement Detection
DSRC	-	Dedicated Short-range Radio Communication
EBSCO	-	Elton B. Stephens Company
ECTS	-	Electronic Cargo Tracking Systems
EPS0	-	Electronic Payment Services
ETA	-	En-route Transit Advisory
ETC	-	Electronic Toll Collection
ETSI	-	European Telecommunications Standards Institute
ETSI TC	-	ETSI Technical Committee
FECA	-	Front End Collision Avoidance
FlM	-	Fleet Manager
FrM	-	Freight Manager
FTM	-	Freight Tracking & Management
GAA	-	General Accident Avoidance
GC e-Track	-	Ghana Community electronic Tracking systems
G-CEPS	-	Ghana - Customs, Excise & Preventive Services
GHG	-	Green House Gas emission
GNetS	-	Ghana Community Network Systems
GNSS	-	Global Navigation Satellite Systems
GPRS	-	Global Packet Radio Services
GPS	-	Global Positioning System
GSM	-	Global System for Mobile communications

GT	-	Grounded Theory
HFLW	-	Hybrid of Fixed Line & Wireless
HICT	-	Head of ICT Dept
HOVL	-	High Occupancy Vehicle Lanes
I2I	-	Infrastructure-to-Infrastructure
ICIS	-	International Conference on Information System
ICT	-	Information & Communications Technology
IEEE	-	Institute of Electrical & Electronic Engineers
IETF	-	Internet Engineering Task Force
IS	-	Information Systems
ISO/TC2	-	International Standards Organisation/Technical Committee
ISP	-	Internet Service Provider
ISR	-	Information Systems Research
ISTWG	-	ITS Working Group
ITSSG	-	Standards Steering Group
ITS	-	Intelligent Transportation Systems
ITS-CG	-	ITS - Coordination Group
ITT	-	Information and Telecommunications Technologies
ITU - R	-	International Telecommunications Union - Radio Section
ITU-T	-	International Telecommunications Union - Technical Section
IVC	-	Inter-Vehicle Communication
IVTS	-	Intelligent Vehicle Tracking Systems
IVTS	-	Intelligent Vehicle Tracking Systems
IVTT	-	Intelligent Vehicle Tracking Technology
KMS	-	Knowledge Management Systems
KRA	-	Kenya Revenue Authority
LAN	-	Local Area Network
LM	-	Logistics Manager

MAC	-	Multiple Access Control
M2MC	-	Machine-to-Machine Communication
M2PC	-	Machine-to-Person Communication
MAN	-	Metropolitan Area Network
MANET	-	Mobile Ad hoc Networks
MIS	-	Management Information Systems
MPLS	-	Multi-Protocol Level Switch
NITSA	-	National ITS Architecture
OBSM	-	On-board Safety Monitoring
OFCS	-	Optical Fibre Communications Systems
OSI - RM	-	Open System Interconnectivity - Reference Model
PHY	-	Physical layer
PPP / (P^3)	-	Public Private Partnerships
PRTS	-	Public & Rural Transportation Systems
PSTN	-	Public Switched Telephone Network
R2VC	-	Roadside-to-Vehicle Communication
RAN	-	Radio Access Network
RECA	-	Rear End Collision Avoidance
RFID	-	Radio Frequency Identification
RM&R	-	Ride Matching and Reservation
RRT	-	Rapid Response Teams
RTTT	-	Real Time Traffic Transmissions
SCS	-	Satellite Communications Systems
SDOs	-	Standards Development Organizations
SERVQUAL	-	Service Quality
SotA	-	State-of-the-Art
TAM	-	Technology Acceptance Model
TC	-	Technical Committee

TCC	-	Traffic Control Centre
TDM	-	Travel Demand Management
TIS	-	Traveller / Traffic Information Systems
TM	-	Transport Manager/ Traffic Management
TMC	-	Traffic Management Centre
TMS	-	Transportation Management Systems
UMC	-	Universal Message Centre
V2I	-	Vehicle-to-Infrastructure
V2RC	-	Vehicle-to-Roadside Communication
V2V-CC	-	Vehicle-to-Vehicle Communication Consortium
V2VI	-	Vehicle-to-Vehicle Infrastructure
VAN	-	Vehicle Area Networks
VANET	-	Vehicle Ad hoc Networks
VC	-	Vehicular Communication
VMS	-	Variable Message Services
VNS	-	Vehicle Sensor Networks
VoIP	-	Voice over Internet Protocol
VPN	-	Virtual Private Network
VSAT	-	Very Small Aperture Terminal
VSC	-	Vehicular Safety Consortium
VTC	-	Vehicle & Traffic Controls
Wi-Fi	-	Wireless Fidelity
WiMAX	-	Worldwide interoperability for Microwave Access
WLAN	-	Wireless Local Area Network
WTO	-	World Trade Organization

LIST OF FIGURES

LIST OF TABLES

Table of Contents

ABSTRACT (ENGLISH)

This research sought to develop a conceptual Information Systems (IS) success model that can address problems experienced by users of Intelligent Vehicle Tracking Systems (IVTS) in developing countries, citing Ghana as a case study. The study identified and analyzed the concepts necessary to develop a conceptual IS success model, based on existing IS Success Models used to measure the performance, usefulness and successfulness of information systems; which is applicable to IVTS success evaluation, since IVTS emerged from the application of ICT into conventional vehicle monitoring and control systems. The exact problems addressed are that: users of IVTS in developing countries, especially in Ghana, are dissatisfied with the performances of IVTS and services provided by vendors of these systems, regarding system & service qualities, information quality, low user-perceptions, low system and service usefulness and successfulness, low system and service impacts & benefits. These phenomena in turn, impact adversely on several transport stakeholders (e.g., owners of vehicles being tracked at the time of data collection), in terms of: prolonged travel & waiting times; high fuel consumptions (resulting in environmental pollutions); and reduction in governments' road transport sector revenue generation, thus, causing financial losses to these nations. To address these perturbing problems, a conceptual IS success model applicable to measure the performance of IVTS deployed in developing countries is proposed in this research.

The methodological approach for this study is the qualitative & exploratory studies and the descriptive single case study methods. The qualitative Grounded Theory (GT) method is employed to collect and analyse data. The research population is the users of IVTS in Ghana – i.e., the research environment. The purposive sampling technique is employed to select the research participants and respondents. The research tools used to collect and analyse data are qualitative survey questionnaires and face-to-face interviews; recorded interviews were transcribed manually by the researcher into raw data. The research results suggest that, most of the IVTS deployed in Ghana have very limited communication network bandwidths, low speeds & capacities, poor GSM network coverage, etc. Hence, the qualities of the tracking systems & services, and vehicle information were far below users' perceptions as against their expectations prior to their decisions to subscribe and use these systems and services. The results further imply that, users of IVTS do not have platforms on which to address their problems on time. Moreover, users experience a lot of delays in getting their tracking system & service problems addressed by the operators of these systems. These delays are partly the causalities of the dissatisfaction of the users of these systems and services. The findings further establish that, seventeen core theoretical IS success concepts identified are relevant/essential to develop a conceptual IS success model that can address the problems studied.

The outcome of this IS and ITS study is that, the proposed conceptual IS Success Model has been developed, and the developed model has considerably extended the updated DeLone & McLean (2003) IS success model, making it possible to apply IS success model to evaluate the performance, usefulness, successfulness & the overall user satisfaction of IVTS users in developing nations. Six identified key IS concepts that have resulted in the outcome of this research are the Concepts of: 'Perceived Tracking System Performance', 'User Expectations', 'Overall User Satisfaction', 'Is User Satisfied'? (A feedback platform in the model that accounts for and ensures total user satisfaction), "User Reports System Problems" and "Vendor Addresses System Problems". Additional outcome of this study is the identification of separate twenty two IS Success Concepts designed into another IS success model that can be applied in IVTS by developing nations as guidepost to develop and deploy ITS applications into their transportation systems to address their transportation predicaments.

DANISH RESUME

Dette PhD projekt har sigtet mod at udvikle et koncept for en ’Information Systems (IS) Success model’ (jf DeLone & McLean (2013)). Modellen adresserer problemer, som brugere møder i anvendelsen af ’Intelligent Vehicle Tracking Systems’ (IVTS) i udviklingslande, herunder Ghana. Projektet har identificeret og analyseret begreber, der er nødvendige for at udvikle en sådan konceptuel IS success model, der bygger på modeller, der anvendes til at måle performance, brugervenlighed og graden af succes i informationssystemer. Sådanne modeller anvendes i IVTS succes evaluering, idet IVTS er opstået ud fra anvendelsen af IKT i overvågnings-og kontrolsystemer for køretøjer. De specifikke problemstillinger, der tages op relaterer sig til, at brugere af IVTS i udviklingslandene, her med eksempler fra Ghana, er utilfredse med udbuddet af IVTS og relaterede tjenesteydelser herunder system- og servicekvaliteter, informationskvalitet, lav system- og tjenesteanvendelighed samt ringe – system- og tjeneste fordele. Disse forhold skabte en negativ holdning hos flere interessenter, hvis køretøjer anvendte systemet på tidspunktet for dataindsamling på grund af: langvarige rejser & ventetider, højt brændstofforbrug - der også førte til miljømæssige forurening samt reduktion i statens vejafgifter. Med henblik på at løse disse problemer foreslås i denne afhandling en konceptuel IS succes model, der kan bruges til at måle effektiviteten af IVTS i udviklingslande.

Den metodiske tilgang i dette projekt er kvalitative og eksplorative undersøgelser samt beskrivende enkelt casestudier. Kvalitativ ’Grounded Theory’ (GT) -metoden er anvendt til at indsamle og analysere data. Forskningfeltet/populationen er brugerne af IVTS i Ghana. Målrettet prøveudtagningsteknik er anvendt til at vælge målgruppen for analysen samt respondenterne. Forskningsværktøjer, der anvendes til at indsamle og analysere data er kvalitative spørgeskemaer og interviews- båndede interviews er transskriberet manuelt af forskeren. Forsknings resultaterne tyder på, at de fleste af de IVTS, der anvendes i Ghana har meget begrænsede kommunikations netværks systemer & båndbredder, lave hastigheder og lav kapacitet, dårlig GSM- netværksdækning, osv. Kvaliteter i sporingssystemer og -tjenester og information i køretøjer var derfor langt under brugernes forventninger og de forhåndsformodninger, der lå bag deres beslutninger om at tegne for og bruge disse systemer og tjenester. Resultaterne viser yderligere, at brugere af IVTS ikke har platforme, som de kan bruge til at løse deres problemer i tide. Desuden oplever de en række forsinkelser i operatørernes adressering af problemer vedr. tracking-systemer og andre services. Disse forsinkelser er en del af årsagen til utilfredsheden hos brugerne af disse systemer og tjenester. Forskningsresultaterne identificerer desuden 17 centrale teoretiske IS begreber, som er relevante / vigtige i udviklingen af en konceptuel IS succes model, der kan løse de problemer, der er identificeret.

Hovedresultatet af dette IS og ITS studie er, at der er udviklet en konceptuel IS Success model, som har udvidet den opdaterede DeLone & McLean (2003) IS Success model betydeligt. Med denne udvidelse er det muligt at anvende IS Success modellen til at evaluere performance, anvendelighed, graden af succes samt den overordnede brugertilfredshed hos IVTS brugere i udviklingslandene. Der er identificeret fire centrale IS begreber i denne forskning: " Oplevet Tracking System Performance”", ”Bruger Forventning / skuffet forventning", "Samlet brugertilfredshed” og ”Er brugerne tilfredse? (en feedback -platform i modellen, som kontrollerer og sikrer fuld brugertilfredshed). Et yderligere resultat af denne undersøgelse er identificering af 22 IS Succes begreber indlejret i en anden IS Success model, der kan anvendes i IVTS i udviklingslande som pejlemærke til at udvikle og implementere ITS-applikationer i deres transportsystemer som løsning på transportproblemer.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

1.1.1 Overview

This research sought to identify and analyse Information Systems (IS) concepts required to develop a proposed conceptual IS success model for Intelligent Vehicle Tracking Systems (IVTS), that can address the problems experienced by users of these systems in developing countries, citing Ghana as a case study. Note: IVTS is a branch of Intelligent Transportation Systems (ITS) technologies. The proposed conceptual model is based on existing IS Success Models used to measure the performance, usefulness and successfulness of information systems for organizations, institutions, agencies and private individuals. This IS success model is equally applicable to IVTS success measurements, since IVTS emerged from the application of Information & Communications Technology (ICT) into conventional vehicle monitoring and control systems. Similarly, ITS emerged from the application of Telecommunications Technologies (TT) and converged with traditional transportation systems. For to that, this current study adopted various IS Success Mode development approaches as lenses to develop a replica of IS success model as a framework for measuring IVTS success that will differentiate the constructs of vehicle tracking "system Quality", "information Quality", "system use", "individual impact", and "organizational impact" (DeLone & McLane, 1992), which can address "user satisfaction" problems (Oliver R. L., 1997) for users of IVTS in developing nations, primarily, in Ghana.

1.1.2 Research Motivations

The motivations for this research are embedded in four factors. The first motivation factor is to contribute to the on-going IS success model development series by the IS research community. The second is that, from the literature reviewed in section three, it was noted that, no research works have been carried out on application of IS success models to measure the performance, usefulness and successfulness of intelligent vehicle tracking systems, particularly, in developing countries.

It is therefore motivational to explore the possibilities of employing IS success model to evaluate the satisfaction of users of these systems in developing nations. The third factor is that, initial/exploratory literature reviewed unearthed that, the Grounded Theory (GT) research method has not been used by researchers in the IS & ITS research communities as data collection and analysis method in IS and ITS studies; this constitutes a research methodological gap. It is therefore motivational to fill up this research gap by employing the grounded theory method to collect and analyze data in this current study. The fourth motivational factor is that, from the literature reviewed so far, no research works/activities have been conducted on how ITS applications can help to solve transportation problems in developing countries. Thus, it is interesting & contemporary to explore how ITS solutions can be employed to address transportation problems in developing nations.

1.1.3 Background Information about Ghana

Since this research is a case study of Ghana (a West African country, formally known as Gold), it is imperative that brief background information about Ghana is provided in this sub-section. Ghana is one of the utmost successful democracies in Africa; thus Ghana is frequently referred to as an "island of peace" in one of the most hectic regions on earth (gahanaweb.com, 2014). The geographical coverage area of Ghana is 238,535 square kilo meters (92,098 square miles). Accra is the capital of Ghana and it is the largest city and the most densely populated. The country is demarcated into ten administrative regions; it is further split into 138 districts, towns and councils. The Northern Region is the largest by area; the Greater Accra Region is the smallest.

Ghana shares boundaries on the east with Togo, on the west with La Cote d'Ivoire, to the north with Burkina Faso and to the south with the Gulf of Guinea. The advent of the discovery of oil and gas in the Gulf of Guinea could make Ghana a key oil producer and exporter in the next few years (ghanaweb, 2011). For the purpose of general interest of audiences and for the tenacity of easy referencing, the topographical and political map of Ghana is provided in figure. 1.1 below.

In terms of demography, Ghana is populated by 25. 37 million people, as at March 2013 English is the official language of Ghana, "a legacy of British colonial rule"; however, the people of Ghana communicate in about 75 indigenous languages. "Local languages spoken in Ghana include Akan, particularly Ashanti Twi, Akuapem Twi, Fanti, Kwahu, Akyem, Wale, Nzema; Dangme, Dagbani, Ga, Ewe, Kasem and Gonja". Notablly, about 69% of the population are Christians (Miguel Barrientos, 2011). The remaining 31% represent other religious faiths; these include: "indigenous African faiths, Muslim, Buddhism, Judaism, Hindu", etc.

Figure 1.1: Ghana Political Map with International & Regional Boundaries & Capitals, plus National Capital

Source: (Ghana Political Map, 2010)

The primary transport network in Ghana is "accomplished by road, rail (very small network), air and water". In Ghana, transportation and communications networks are aligned in the southern regions, principally the areas in which gold, cocoa, and timber are produced. However, the central & northern parts of Ghana are linked via highway road network infrastructure (Clark, Nancy L., 2014).

The state, i.e., the government of Ghana is responsible for the provisioning of national road infrastructure, operations and management of all modes of transport in Ghana. Road transport is very essential to the economy of Ghana; it is estimated, the road transport networks account for "96% of passenger and freight traffic in Ghana and about 97% of passenger miles in the country" (Ghana's Transportation, 2014).

Basically, road transport network in Ghana is categorized into 4 main segments, these are: Urban, Express Services, Rural-Urban and Rural. According to the Ministry of Roads and Transport, Ghana's road transport infrastructure is made up of 63,122km of road network linking the entire country. Nationally, traffic densities are low except in the large cities and regional capitals, particularly, Accra, Kumasi, Tarkoradi and Koforidua, where vehicular traffic is very alarming and peak hour densities are very high. The policy of the central government is to have many of the existing highways tolled and private-sector participation in road construction and ownership, but this is yet to be implemented in Ghana.

1.1.4 The Relevance of ITS Research in Developing Countries

Essentially, ITS technologies engulf a novel assemblage of tactics for tackling transportation problems experienced by developed nations, e.g., European countries, the USA and few Asian countries - Japan, Singapore, China, etc., (IMF Emerging & Developing Economics, 2010). Likewise, ITS technologies can expedite vehicular mobility by providing developing nations with useful information on choice, time and appropriate travelling routes. Invariably, ITS applications have emerged as widespread resolution to problems of vehicular jamming, protection, escalated fuel usage & mid-air contamination confronting developing nations, such as Ghana.

In principle, developing effectual ITS resolutions entail substantial futuristic metropolitan and ICT planning processes structured and maintainable economic capitals. Even though, developing nations are experiencing significant economic limitations, they must endeavour to introduce cost-effective ITS user facilities which are synchronous with the stride of their developmental agendum, so as to improve and advance the financial standing and living values of people in these countries. In accomplishing that, it is vital to under-study the present prominence of ITS solutions prevailing in developing nations, to ascertain the effect of their transportation calamities and to propose potential remedies, and these are partly the motivation factors underpinning this august research.

In fact, ITS solutions are absolutely backing road safety activities, safeguarding the environs, dropping transportation charges and mitigating surface road movement bottlenecks in first world countries. Nonetheless, organizations, political leaders and agencies from developing nations are really not exploiting diligently how to apply the abilities of ITS applications as instrument to mend citizens' lives in developing nations and to boost their economies, by way of deploying these popular pervasive ITS solutions to meet the overwhelming public demands for modernized transportation systems and services (Praveen Kumarm, et al., 2009). There is therefore the necessity for ITS research communities and other institutions studying in the areas of transportation and communications to generate cognizance of the universal capabilities of ITS solutions in emerging nations. Certainly, these endorsements additionally constitute the relevance of ITS studies in developing nations.

1.1.5 The Importance of ITS Deployment in Some Countries with Transitional Economies

1.1.5.1 ITS Deployment in Eastern Asia

Intensifying inducements for aggregating surface-road care & growing "socio-environmental and socio-economic" concerns of transportation utilization generally are proving to be the established rationales for undertaking studies in ITS technologies. For instance, the Eastern part of Asia presents utterly varying collection of transportation issues to manage, likened to the developed nations; thus, it's greatly vital to streamline ramifications in road traffic control or management by deploying intelligent vehicle tracking systems to meet user-and-stakeholder satisfactions in surface road transport operations. E.g., countries like Japan, South Korea, Singapore & China have stepped forward in developing and deploying ITS technologies at very high levels.

It is therefore time for other developing countries, such as, Ghana, South Africa, Kenya, Philippines, India, Brazil, Mexico, (to mention a few), to strive to draw alongside with developed nations and create smarter transportation systems by employing ITS solutions into their conventional transportation networks, e.g., in intelligent vehicle tracking systems (Seong J. Namkoong, 2011).

A typical case in point is India, where very great vehicular movement over-crowding is experienced, as a result of the absence of ITS applications and astronomical degrees of urbanization and motorization. Many metropolis and municipalities in that country are expected to experience excessive vehicular traffic congestions by the year 2030, as hypothesized by Khanal (2012). To mitigate these expected phenomena, India is endeavouring to implement customized and affordable alternate ways of ITS solutions in constructing fresh transportation infrastructures in existing commercial centres & in already developed residential areas in the municipalities (Khanal M, et la., 2012).

1.1.5.2 The Status of ITS Deployment in South Africa

The eminence of ITS applications in South Africa prior to 2010 was basically carried out in the Cities of Cape Town, Durban, as well as in Johannesburg. These metropolises serve as Urban Traffic Control & Management Centres. It was the advent of the 2010 World Cup soccer tournament organized in that country that called for urgent development and deployment of ITS applications into the existing conventional transportation networks. The present status of ITS solutions in Gauteng (another city in S. Africa) is realistically commendable. This ITS deployment strategy adopted by S. Africa is analogous to the treads followed by the front runners of ITS development and deployment in the developed world.

In S. Africa, there is a Five-year ITS deployment plan derived out of a Twenty-five year “Integrated Transport Master Plan” (ITMP25) conscripted in July 2012 which focuses on “Bus Rapid Transit” (BRT) systems, in addition to “public Demand Responsive Transport” (DRT) system. In the first Five-year blueprint, “ITS South Africa” is deploying an “Integrated Fare Management” (IFM) structure to direct the positioning of an allied “Electronic Fare Collection systems” (Jack van der Merwe, 2012).

The move is to safeguard compliance with Nationwide Regulatory issues on deployment of ITS applications. Nevertheless, there exist barriers connected with the execution of the very first Five-year strategy; these include, very crucial re-planning to resolve all holdups and precarious cracks affecting the progress of the planned ITS deployment. Notable among these bottlenecks were institutional disagreements and traditional differences.

These setbacks could be addressed by institutionalizing ITS programmes aimed at educating, training, monitoring, coordinating and evaluating progress of ITS projects and ITS activities. By way of resolving transportation difficulties in the countryside, just like other developing nations, S. Africa must create nationwide ITS Deployment Strategy; to add to that, S. Africa necessarily must standardise the entirely ITS facilities and operations.

1.1.5.3 Deployment of Intelligent Vehicle Tracking Systems (IVTS) in Kenya

Recent studies on ITS activities performed in Kenya demonstrate that, the tactics adopted by Kenya to deploy ITS solutions into her conventional transportation systems are in the form of "Piece Meal" approach (Khanal M., 2010), since Kenya lacks economic capacity and professional expertise to deploy complete ITS applications and one time ITS solutions (alike other developing nations). Kenya's transportation problems engulf: illegal use of unapproved routes; lack of efficient vehicular communication networks, causing ineffective operational communication, thereby hampering transportation business transactions (Dimitrakopoulos George 2010), (Musyoki Julius, 2010), (Christian S. Jensen, et al,2007), (UN, 2005), (Biesecker Keith, 2000). Kenya's approach to ITS solution is that, she has selected transportation predicament areas of national concern and applies ITS applications directly to those areas for one time solution. By this way, Kenya is deploying ITS applications systematically, though at very stumpy stride, as a result of financial constraints, and due to the deficiency of ITS proficiency in that country (Adjin D.M.O & Reza Tadayoni, 2011).

1.1.5.4 The Prominence of ITS Deployment in Ghana

Oddly, it is not quite easy to identify any good track records or demonstrations concerning the deployment of ITS solutions in Ghana. Currently, the capacity of the national road infrastructure is approaching its bounds due to uncontrollable, and perhaps, unpredictable demands and needs of modern transportation facilities, and utilization of private automobiles rather than communal / public transportation services. Conventionally, vehicular traffic control and management in Ghana is being done physically (by human interventions, e.g., traffic wardens), sustained by a bit of “actuated-electronic traffic light signals”; however, no ICT and vehicle location devices (GPS) are integrated, meaning that, ITS applications are regrettably not incorporated into Ghana’s national road infrastructure.

For instance, “Electronic Toll Collection points, Traffic Information System (TIS), Variable Message Signals (VMS), Fleet Management Systems (FMS), Traffic Management Centres (TMC) and Transport Terminal Data Centres (TTDC)" are not available. Just like many developing nations, Ghana similarly faces speedy motorization and uncontrollable urbanization, coupled with higher degree of vehicle utilization without corresponding development of modern transportation infrastructure. Vehicular Mobility and access to major road networks are blocked more often than not; due to perennial vehicular traffic congestions, principally, during commuting peak hours. Distressingly, this calamity is worsened during festivities (religious & traditional), typically, during Easter & Christmas celebrations. Fascinatingly, metropolitan developers and state institutions responsible for the transportation sector of the national economy have come to realize the exigency to deploy ITS technologies and solutions to address the awesome transportation problems facing Ghana before commercial cities and major road networks in Ghana are halted, due to overwhelming transportation problems and deficiencies facing the nation (Musah Yahaya Jafaru; 2012).

The single trait of ITS solutions deployed by operators and investors in the surface road haulage business in Ghana has to do with Intelligent Vehicle Tracking Technology (IVTT). To a very limited extent, IVTT is deployed by few private entities in Ghana; entangled with inefficient GSM network coverage, absence of transport monitoring and management systems, ineffective control of human attitudes. In view of these phenomena, Ghana must initiate nationwide ITS Deployment strategies, similar to other developing nations. Additionally, Ghana must endeavour to embark on standardization of all ITS applications and operations to ensure system interoperability & compatibility in her national transport networks.

1.1.6 Major Transportation Problems in Some Developing Countries

For brevity, a few developing nations are randomly selected for the purpose of this quantitative study, to discuss the foremost transportation hitches in some developing nations.

1.1.6.1 Major Transportation Problems in Ghana

The national economic products & commodities in Ghana, such as: agricultural products, petroleum products and other minerals are surface road-hauled for export to sustain Ghana's economy. Unfortunately, there exist disturbing transportation harms be-devilling Ghana as a nation. Critical transportation barriers facing Ghana are the following: "Lack of modern and efficient vehicle tracking systems; In-effective vehicular communication systems due to limited network bandwidths, coupled with the lack of modern ICT in the national transportation networks; inappropriate use of transportation resources by drivers and other personnel; more seriously, the practice of manual tracking of vehicles based on physical escort system which is unreliable, costly and out-dated; loss of vital production times and revenues to stakeholders in the transportation industry, due to the absence of ITS solutions in the conventional transport infrastructure in Ghana; lack of co-ordination, absence of scientific monitoring and evaluation of road safety programmes; inability to set ITS standards for vehicle tracking and road safety at the national level; lack of research and development (R&D) in the field of ITS studies in Ghana, etc." (Adjin D.M.O, Reza Tadayoni, 2011).

This repulsive transportation circumstances in Ghana have arisen in view of the fact that, the few private organizations undertaking transportation operations in Ghana have failed to deploy ITS applications to ensure the installation of efficient and intelligent vehicle tracking systems; hence, the prevailing alarming level of transportation problems in Ghana. These barriers can be resolved by applying efficient ITS tracking systems, employing Satellite Communication Systems, GPS, GSM Networks and Traffic Information Management Systems (TIMS) with efficient four, or even, five tier ICT data-centre networking systems.

1.1.6.2 Major Transportation Problems in Brazil

Some time ago, Brazil - another developing nation, faced severe challenges in providing quality transportation systems and services to her nationals, "due to the deficiency of ITS solutions as a tool for development of the transport sector of Brazil's national economy" (Transportation in Brazil, 2011). Brazil as a nation had obstacles in transporting people and consignments to-and-from main business centres. Occasionally, transportation was done by meanings of canoes, or on foot by land. When coffee production and trade in Brazil was recognized by the international coffee market, rail tracks were constructed to expedite commerce in coffee trading.

Unfortunately, "Brazil did not do much at that time to deploy vehicular communication systems & connectivity into her transportation sector"; and this short fall resulted in operating inefficient transportation system. Brazil's transportation sector has improved relatively over the last three decades. In spite of that, Brazil effectively requires proficient ITS solutions, such as; intelligent vehicle tracking systems "to ensure road safety, to shrink environmental degradation, to check detouring and the use of unapproved routes that lead to excessive delays in delivering transportation services and loss of revenues, and to enable economic development for the rural poor to access better facilities and jobs" (Dimitrakopoulos G., 2010), and to enjoy better lives.

1.1.6.3 Major Transportation Problems in Philippines

In Philippines, the transportation sector is an imperative integral part of the national economy (Transport in East Asia & Pacific, 2011). The good people of Philippines deeply depend on her conventional transport networks to effect both human and nonhuman mobility. The Aerodrome and railway-networks offer alternate methods of mobility to-and-from major commercial centres in Philippines. In this regard, notable challenges still linger with concerned consequences to meet her transportation needs and demands. Even though, Philippines' road infrastructure seems to be enormous, only half of it is effectively in good status. Greater parts of the major road networks linking several tourist terminuses are woefully deteriorated, thus exhibiting blockage to free movement of goods and people, coupled with human attitudinal and behavioural problems (Driving Behaviour, 2012). The "inter-city and intra-urban transportation and communication systems" are continually insufficient.

The principal transport hurdles are the results of the lack of ITS applications; for instance, Intelligent Vehicle Tracking Systems (IVTS) in the traditional surface road infrastructure in that country. Indeed, it is partly for this purpose that the current research is pursuing to generate a conceptual IS success model for deployment by IVTS operators in nations with least economies, such as Philippines.

1.1.7 Deployment of ITS Solutions to Transportation Problems in Developing Countries

Countries with transitional economies can take lessons from the great proficiencies and capabilities of ITS leaders in a bid to study and carefully embrace the ensuing steps to deploy ITS applications as posits the theory of modernization (Phil Sayeg & Phil Charles, 2005). The established prerequisites for preliminary ITS solutions, as well as the creation of novel influential agreements (e.g. establishment of Public Private Partnership (PPP)), regulatory, monitoring & evaluating bodies, by governments in developing nations; to deliver comprehensive and well organized ITS governance. The formation of elementary necessities; e.g., "government subventions, technical supports, user acceptance and preparation for operations under new environments", must be in place to precede the initiation of all ITS activities in developing nations. There is the need for such institutions and agencies to have and retain extraordinary degrees of independence from the central governments, without any forms of "political influences, traditional and cultural interferences" (Markus, M. and Robey, D., 1988), (Pinch, T. and Bijker, W. 1992).

According to Phil Sayeg & Phil Charles (2005), the following ITS solutions are worth accepting and implementing by developing nations; these include: "the establishment of public policies to promote public transport operations; enabling technologies for initial applications of Advanced Public Transportation Systems (APTS), together with vehicle location based services and navigation technologies; communication technologies; ITS standards; dispatching software; electronic fare collection & traffic signal pre-emption". In their opinion, prompt facilitating arrangements that must be put in place will embody: "developing consensus building among stakeholders; developing effective organizations for early and continuing actions; the running of pilot tests; taking lessons & precautions from previous experiences, including the need for high-quality information and service; user orientation and overall national ITS planning".

One of the crucial determination processes in implementing ITS technologies in developing nations is to develop first tailored ITS applications, and then to deploy appropriate ITS solutions, with the primary objectives of:- "Establishing ITS blueprints to meet national needs (and not individual needs as pertains now to many developing countries); Systematic implementation of ITS projects; Drawing clear targets and measures for deployment of ITS solutions; and Developing ITS technologies & standards that meet both local, regional and international technological advancement, requirements and market demands" (Phil Sayeg & Phil Charles, 2005).

In their attempts to react to the afore mentioned necessities of home-made ITS strategies and methodologies, transportation experts in developing nations can no more be content with conventional methods of constructing fresh or extra transportation systems/facilities. The reasons being that, these strategies require huge financial obligations and multifaceted "regulatory and environmental planning processes to manage" (IBM, 2012).

To provide solutions, transportation organizations and agencies worldwide are aggressively concentrating on the employment of "demand management with schemes like road user charging and information & customer management techniques including enhanced traveller information services", according to IBM (2012). The new and extensive solicitation of Information Technology (IT) offers outstanding prospects to generate and drive novelties into the deployment of ITS solutions. The key strategies discussed above are what developing nations must beckon on to deliver effective and efficient ITS solutions to their citizens.

1.1.8 Overview of ITS Technologies

1.1.8.1 Definitions of ITS

Among the numerous definitions of ITS given by various institutions and organizations, the ITS Standards Bodies' definition is the most outstanding, in the view of the researcher. These bodies define ITS as "a Technology that combines ICT to transport infrastructure and vehicles in an effort to manage factors that typically are at odds with each other" (Eichler S., 2007); such as vehicles, roads and routes, in order to improve road safety, save lives and reduce vehicle tear & wear; diminish travelling & waiting times; mitigate fuel consumption, environmental pollution and climate change, etc.

By this definition, ITS plays essential role, as it "can provide innovative solutions aimed at: realizing a vision of paperless information flow (e-Freight), increasing efficiency of traffic management and making more use of technologies for tracking and tracing vehicles", according to Eichler S. One area that offers significant research opportunities is the role ITS play in supporting complex multimodal logistic operations such as those involving road transport vehicle tracking, which is the focus of this study.

Technically, ITS are a family of services and technologies that apply ICT in the road and transportation sectors (De Wulff, Luc, 2005). It is the application of IT (computers, sensors, wireless communications, databases, etc.) to solve the problems of road transportation. It encompasses a broad range of wireless and wire-line communication-based information, control and electronic technologies. The underlying intents of ITS technologies are the development, deployment and operation of Advanced Road Traffic Management Systems (ATMS), Traveller Information Systems (TIS), Vehicle & Traffic Control Systems, Commercial Vehicle Operations, and lastly, Public & Rural Transportation Systems (PRTS).

Several key technologies stand to serve the synthesis of each and every one of these objectives. These technologies include: Wireless & Satellite Communications, GSM & Optical Fibre Communications Systems; Computers & Computer-networks, Digital Maps; Path Planning; Sensors & GPS Tracking Systems; Vehiclular Traffic Controls and Human Factors. The standardized Wireless Local Area Network (WLAN) Technologies designated for ITS applications are the famous IEEE 802.11 Series (Biesecker Keith, 2000). Universally, the primary goal of ITS has always been to improve the transportation system by reducing surface road traffic congestions, amending travel-safety, and mitigating negative environmental impacts related to transportation, and to make transport systems more effective, efficient, and safe to be enjoyed by all people at all times, for the general public good.

1.1.8.2 The Concepts of ITS

In recent studies, Fei-Yue Wang (2010) notes the initiation, development, deployment, and tremendous growth of ITS and their significant impacts on lives and societies in general, for over 3 decades now.

Today, transportation research and development is no longer a field dominated by civil, mechanical, operations research, and other traditional engineering and management disciplines. Rather, computer sciences, control, communication, the Internet, and methods developed in Artificial Intelligence (AI), computational intelligence, web sciences, and many other emerging information sciences and engineering areas have formed the core of new ITS technologies and have become integral and important parts of modern transportation engineering.

However, a few “road bumps” have been experienced over the last few years in ITS research and applications, especially in relation to system-level vehicular-traffic control and management. To overcome the current “road bumps” and speed up research and development (R&D) effort in ITS, particularly at the system level, researchers need new paradigm and a multidisciplinary approaches. Though, many efforts have already been made in this direction over the past two decades; still there is the need to direct research efforts that will lead to user-satisfaction of ITS technologies. So far, emphasis is being placed only on advancements and improvements of ITS technologies, but no consideration is given to issues bordering on system and service performances of ITS. Thus, it is the goal of this current research to investigate the phenomena that lead to system and service non-performances and user-dissatisfaction related issues in vehicle tracking systems of ITS.

The Role of Telecommunications in the Development of ITS: Transport is one of the pillars of modern society, and as such, exposed to growing demands for efficiency, security, reliability, cost-effectiveness and care for environment. Solution for satisfaction of all above-mentioned demands is generally seen in multi-layered infrastructure usually referred to as the Intelligent Transportation System - ITS (Drilo, et al, 2009).

ITS are the result of synergy between several existing technological components, integrated through carefully suited processes in order to reach solution for general transport control and transport information services provisioning. Recent developments show the re-thinking of ITS concept that is under way, which foresees the high-level system that enables interactions between vehicles, road infrastructure, drivers and traffic controllers in a way that mounting demands for new transport can be fulfilled. These rising demands for transport are calling for corresponding new-generation of ITS applications.

In such new-generation ITS, telecommunications have been concretely considered a reliable bearer of information in transport systems. Telecommunications technology is capable of taking more positive and pro-active approaches in defining and deploying the new-generation ITS.

The fundamental strength of telecommunications for ITS lays in the mobile technology awareness embedded in telecommunications networks by their nature. Recent advancements in provisioning of means and systems for exploitation of this awareness derived from telecommunications networks offer prospects for adding new value in efficiency, security, reliability and cost-effectiveness of the ITS technologies.

Setting up communication networks into transportation networks creates several means for provisioning of vehicular-traffic-related data for development of seamless and reliable Traffic Information System (TIS), based entirely on the already deployed telecommunications network infrastructure. The creation of efficient TIS provides backbones for further developments, aimed at obtaining national-level and regional-level efficiency, safety, climate-friendly and clean intelligent transport systems. The Broadband wireless communications technology is one important aspect of telecommunications that play very pivotal role in transportation-related applications involving public safety, traffic management, and advanced traveller information. Information flow within ITS Architecture is technologically supported by broadband wireless alternatives applied to different integrated services platforms (Keith Biesecker, 2000).

1.1.8.3 The Impacts of Telecommunications in Developing ITS Technologies

Drilo, et la, (2009) posit that, transportation systems are some of the mainstays of contemporary civilization/society; and thus, they are wide-opened to upwards “demands for efficiency, security, reliability, cost-effectiveness and care for the environment” (Drilo, et la, 2009). According to these authors, meeting these demands is primarily associated with multidimensional substructures, habitually denoted as ITS technologies that are created from a collaboration of numerous extant advanced electronic devices, incorporated into suitable processes to arrive at lasting solutions for universal transportation problems, as well as vehicular info-services provisioning.

Current developments in the transportation sectors highlight that, advanced transportation systems permit collaborations amongst automobiles, highway/road substructures, motorists and vehicular-traffic-flow regulators in a manner such that, increasing requests for modern transport services are satisfied. The alarming increases in demand for transportation services are requesting for consistent and new- ITS generation. In this regard, Telecommunications technology has the potentials to assume pro-active strategies in outlining the deployment of the new ITS generation.

The essential influence of telecom technology in deploying ITS applications rests in the cognizance of mobile technology entrenched in telecom systems traditionally. Integrating telecom systems with transportation systems generates numerous avenues for creating mobility traffic-data aimed at developing dependable Traffic-Information-Systems (TIS), centred wholly on existing telecom systems. Excitingly, the deployment of reliable ITS applications promotes supplementary financial & social progressions, intended to obtain universal effectiveness, protection, and climate-friendly ITS.

As suggests Biesecker K (2000), “the Broadband wireless communications technology is one important aspect of telecommunications that plays very pivotal role in transportation-related applications involving public safety, traffic management, and advanced traveller information”(Biesecker Keith, 2000). Deducing from Biesecker’s suggestion, it is clear that, “Information flow within ITS Architecture is technologically supported by broadband wireless alternatives applied to different integrated services platforms”, such as the Broadband networks, where optical fibre and digital microwave links are the transmission media which provide extreme network bandwidth, capacity, speed and high definition quality; required for developing the communication aspect of intelligent vehicle tracking systems of ITS technologies.

1.1.8.4 Enabling ITS Technologies and User Services

Conceptually, all technologies go to solve some technical and socio-economic problems, and ITS technologies are not exempted from these fundamental expectations of all ITS stakeholders. Thus, the prime objectives of ITS technologies are to ensure the development and deployment of advanced vehicular traffic management systems. Several key technologies stand to serve the synthesis of each and every one of these objectives.

As indicated before, these technologies include: Digital Maps, Sensors, Communication Systems, Vehicle Control & Traffic Control (Scott F. Belcher, 2008), (Eichler S., 2007), (A. Garcia-Ortiz, et la., 1995). It is therefore interesting to note that, many stakeholders in the transportation industry think that, improving a country's transportation systems solely means constructing new physical roads or repairing aging infrastructure, according to Eichler S (2007).

The infrastructure of transportation systems is a multifaceted, huge scale, and incorporated open systems, it involves multi stake-holders and comprises of different infrastructure facilities; as well as multi-modal operations in different spectrum of regulating environment, and it allows the addition of unlimited and different sub-systems into its operating space. All these sub-systems are inter-related and loosely 'integrated'; such that, they mutually affect and depend on one another.

It is no longer acceptable for a transportation agency to develop a system without considering and thinking about interfaces with other functions, e.g.; the National Security Agencies, Toll Concessionaires, Public Transport Owners & Operators, Traffic Signal Systems Operators, Local Authorities & Regulators, Etc. (MDOT, 2004).

The main components of ITS technologies are: Safety (Saving of Lives & Properties), Security, Efficiency, Economy, Mobility & Access, The Environment, and A Transport System for All (Hassim Bin Mat et al, 2005), **(**Peyrebrune Henry et al, 2002). ITS provide a proven set of strategies for addressing the challenges of assuring safety and reducing congestion, while accommodating the growth in transit ridership and freight movements management. These enabling technologies of ITS identified at academic and industrial levels are tabulated in table 1.1 below. Likewise, the enabling user services offered by these ITS technologies are also shown in table 1.2.

Table 1.1: ITS Enabled Technologies
Source: (Fei-Yue Wang, 2010)

Digital Maps	**Sensors**
Global Positioning System (GPS)	**Communications: -** - Wireless Networks - Wireless Access in Vehicular Environment (WAVE) - Vehicle Area Networks (VAN) - Vehicle Ad hoc Networks (VANET) - Dedicated Short-range Radio Communication (DSRC) - GSM Networks - Mobile Ad hoc Networks (MANET) - Worldwide interoperability for Microwave Access (WiMAX) - Global Packet Radio Services (GPRS) - The Internet - Etc.
Computer Systems	Vehicle Control
Path Planning	Traffic Control
Human Factors	Intelligent Vehicle Tracking

Table 1.2: ITS User Services
Source: (Fei-Yue Wang, 2010)

Pre-trip Travel Information	**En-route Travel Advisory**
En-route Transit Advisory (ETA)	Traveller Services Information (TSI)
Route Guidance	Ride Matching and Reservation (RM&)
Incident Management	Travel Demand Management (TDM)
Traffic Control	Electronic Payment Services (EPS0)
Commercial Vehicle Preclearance (CVP)	Automated Roadside Safety Inspections (ARSI)
Commercial Vehicle Administrative Services (CVAS)	On-board Safety Monitoring (OBSM)
Commercial Fleet Management (CFM)	High Occupancy Vehicle (HOV) Lanes
Electronic Toll Collection System (ETCS	Freight Tracking & Management (FTM)
Collision Avoidance Systems (CAS)	Road Transport Haulage Tracking Services (RTHTS)
Driver Assistance Systems (DAS)	Variable Message Services (VMS)

1.1.8.5 Vehicular Mobility with ITS Technologies

Invariably, vehicular mobility is a necessity and normal way of life; it is even a positive phenomenon in a growing economy, e.g., in transitional economies in developing countries (ITS European Commission, 2009), such as Ghana. Vehicular mobility increases economic efficiency through gains of trade and labour; in this context, mobility offers more social opportunities and developments to all citizens in a community or region through better access to a wide variety of amenities; thus, mobility is a prerequisite to the way people live their lives today. Vehicular mobility underpins citizens' lifestyle by "facilitating social interactions and the reliable distribution of resources, including human, goods & services"; across countries & continents with the application & deployment of the ubiquitous potentials of ITS.

ITS technologies for vehicular mobility including: smart mobile phone devices, Variable Message Signals (VMS), bus priority in urban traffic signal controls (e.g., Bus Rapid Transit – BRT), in-smart card technology for ease of payment of car parking and bus ticket purchase, etc. ITS clearly offer much potentials to deliver integrated solutions to contribute to the attractiveness and success of public transport, and with more consequential benefits to the environment. The critical potentials of ITS for all modes of mobility include: "improving service efficiency via travellers information, traffic congestion control, traffic demand management, innovative network capacity optimization tools; enhancing safety via traffic control, incident and emergency management systems and driver assistance; promoting inter-modality and collective transport via real-time traveller information services; integrated payment technologies; on-line tracking and tracing and novel scheduling techniques; ensuring interoperability of operations via open systems & architectures and standardisation initiatives; protecting the environment via integrated pollution monitoring and traffic gating strategies; developing citizen-oriented info-mobility and value-added services supporting all levels of urban, inter-urban, inter-regional and international travels" (Shiou-Fen Tzeng, et la., 2008).

1.1.8.6 Essential ITS Applications

Generally, ITS are computerised systems having diverse applications connected with vehicle transportation. Shiou-Fen Tzeng, et la. (2008) classified these applications into two broad categories, these are: Public ITS - maintained under the control of Governments, and Private ITS – owned by few individual organizations or institutions.

Public ITS can be designed as a highly integrated and distributed system having all the applications amalgamated. Private ITS on the other hand can be designed as small ITS structure maintained by organisations for their own needs, it is considered as a miniature version of Public ITS. Some of the popular applications of ITS are "Vehicle Theft Detection, Parking Lot Management, Access Control Systems, Traffic Management Applications, Highway Planning, Automatic Toll Collection Systems, Real time Traffic Management Systems, Security Management Systems, etc. A number of these application-components can be easily governed with Digital Image Processing (DIP) as a basic concept. Due to the technological advancements in Communication Networks and Computer Systems, even real time image processing solutions can be made available so that real time application-components of ITS which requires real time processing can be made, so that the entire system can be formed from a single platform.

1.1.8.7 Intelligent Vehicle Tracking

Basically, surface road vehicle tracking is the technique of installing or attaching electronic devices (trackers) to vehicles that communicate valuable transportation information by transmitting signals, which are gathered by orbiting satellites, through GPS, that returns the signals back to the screen of remote-computer monitoring systems via vehicular communication networks. Thus, vehicle tracking is the process of capturing and monitoring the precise and continuous locations and activities (actions & inactions) of vehicles and their occupants at a particular time & at all times, to ensure effective & efficient operations and management of vehicle mobility. GPS vehicle tracking system enables transportation stakeholders to monitor the activities of drivers and vehicles in real time using state-of-the-art satellite mappings and Google maps, via the Internet; this is how intelligent vehicle racking is undertaken.

1.1.9 Brief Synopsis of IS Success Model Development

Fundamentally, Information Systems (IS) are developed by employing IT as a means to support private individuals, agencies, communities, organizations, governments, etc., to perform very diverse and complex tasks (Heijden van der, 2004). Relatively, the IS field has short life-span, yet it remarkably deploys large varieties of system applications. For instance, there are information systems ranging from "Hedonic IS" (i.e., IS developed for the pleasure and enjoyment of society) to "Utilitarian IS" (i.e., IS developed to improve individual and organizational performance). Traditionally, institutions direct their attentions to, and focus on developing success models, using and evaluating "Utilitarian IS" rather than "Hedonic IS". In the view of Heijden (2004), Utilitarian IS deployed in institutions include: "Decision Support Systems (DSS), computer-mediated communications, Machine-to-Machine (M2M) communication, e-commerce, knowledge management systems", etc.

Conventionally, to better measure the success of information systems and to understand the "tangible and intangible benefits" of these systems, many institutions apply the "balanced scorecards" and "benchmarking" (Seddon et al., 2002), (Kaplan & Norton, 1996). Currently, innovative researchers have created contemporary models for measuring IS Success, e.g., DeLone & McLean (2003), Seddon, (1997), Ballantine et al., (1996), etc.

These researchers are making significant steps to understand the characteristics or nature of IS success, stressing on the necessity for improved and added-consistent IS success metrics, as a research field. A number of models have been developed to explicate what makes some information systems become successful and others not. E.g., Fred Davis (1989) used the Technology Acceptance Model (TAM) and applied the "Theory of Reasoned Action (TRA)" together with the "Theory of Planned Behaviour (TPB)" to clarify why some information systems are "more readily accepted by some users than others" (Fishbein & Ajzen, 1975). Operationally, IS are integral parts of IVTS; thus, IS success models are applicable to the measurements of the performances, usefulness, successfulness and benefits of IVTS – i.e., the field being investigated in this current study. Indeed, it is for these reasons that this current study has endeavoured to develop a conceptual IS success model that can be utilized to measure the performance of IVTS deployed in developing nations, selecting Ghana as a case study.

1.2 RESEARCH PROBLEM FORMULATION

1.2.1 Problem Selection

The problem for this research was selected as a result of literature reviews conducted on limitations & recommendations made in research papers, existing and related researches, journal articles, conference proceedings, theories/models of earlier studies on user satisfaction problems faced by users of Intelligent Vehicle Tracking System (IVTS) deployed in developing countries, and initial exploratory and observatory studies conducted on users of these systems in Ghana, as a case study.

1.2.2 The Research Problems

The problems addressed in this current research are in two fold; the first problem is that, users of Intelligent Vehicle Tracking Systems (IVTS) in developing countries, particularly in Ghana, are dissatisfied with the performances, usefulness and successfulness of Information Systems (IS) deployed in vehicle tracking systems operated in these countries; in terms of system quality, service quality, information quality, low system & service impacts and low system-benefits. These problems are the main causalities of the major transportation problems in Ghana and in some developing countries as discussed in sections 1.1.5 & 1.1.6.

These problems impact negatively on many individuals and organizations whose vehicles are being tracked by vehicle tracking vendors/operators in these countries. Operational costs are escalated by the day, and other related losses are also experienced by stakeholders in the road transport industry in developing countries. To address these challenges, a conceptual IS success model applicable in intelligent vehicle tracking systems deployed in these countries is proposed. The second problem tackled is that, there are a lot of factors influencing the development and deployment of the ubiquitous potentials of ITS applications/solutions in developing countries to solve their major transportation problems discussed above. To address this second problem, the persuading factors responsible for these problems are investigated, guideposts & a conceptual IS success model that can address these factors are also proposed.

1.3 RESEARCH OBJECTIVES

1.3.1 The Main Research Objectives

There are two prime objectives for this research. The first principal objective is to develop an IS success model that can be utilized to measure the performance, usefulness, successfulness and users' satisfaction obtained from the use of intelligent vehicle tracking systems deployed in developing countries. It is imperative to indicate here that, the DeLone and McLean IS Success Model, embedded with the Technology Acceptance Model (TAM) together with User Satisfaction Theories/Models (all detailed in the theoretical framework chapter) are being applied as lenses/mirrors to develop the proposed conceptual IS success model. The second main objective is to investigate, through literature review, the factors impacting development and deployment of ITS solutions in countries with transitional economies and to suggest possible guideposts and an IS success model that can be utilized in IVTS to address these impeding factors hampering the deployment of ITS applications in developing nations.

1.3.2 Detailed Objectives

Detailed objectives necessarily required to achieve the above primary objectives are to:

a) Identify and analyse IS success concepts of Independent Variables, Intervening Variables and Dependent Variables required to develop a conceptual IS success model (DeLone & McLane, 2003), (Olive R. L., 1980) for measuring the performance of Intelligent Vehicle Tracking Systems (IVTS) and services.

b) Develop a conceptual IS success model applicable in IVTS, based on the constructs of DeLone & McLane's IS Success Model and User-satisfaction Theories, that can be applied to measure the performance, usefulness and successfulness of IVTS deployed in Developing Countries;

c) Investigate the factors impacting development and deployment of ITS solutions in developing nations through literature review.

1.4 RESEARCH QUESTIONS

1.4.1 The Main Research Questions

The focal research questions that must be answered in order to achieve the above central objectives are in two fold; first, “What are the key IS success concepts required to develop a conceptual IS Success Model applicable in measuring the performance, usefulness and successfulness of intelligent vehicle tracking systems deployed in developing countries"? The second main research question is: "How can ITS technologies contribute in solving transportation problems in developing countries"?

1.4.2 Detailed-research Questions

The detailed Research Questions that must be answered in a bid to answer the key research questions are:

a) Which information system variables (independent, intervening & dependent variables) can be considered in developing IS success model capable of evaluating the performance, usefulness and successfulness of intelligent vehicle tracking systems and services deployed and operated in developing countries, particularly, in Ghana?
b) What kind of conceptual IS success model can be developed , based on the constructs of DeLone & McLane's IS Success Model and User-satisfaction Theories, that can be utilized in measuring the satisfaction of users of IVTS in emerging nations?
c) How can developing states effectively develop and efficiently deploy ITS solutions to address their national transportation problems?

1.5 RESEARCH SIGNIFICANCE

Precisely, this research sought to understand the contemporary phenomena of system performance, usefulness, successfulness and user satisfaction obtained from the use of IVTS, and more imperatively, to communicate the research findings/discoveries to the larger IS and ITS research communities.

Thus, this research was focused on solving IVTS problems experienced by users in developing countries, reflecting on existing IS Success Models developed by earlier researchers and theorists to measure the usefulness and performance of IS. Therefore, the main significance of this research is to improve the scientific community's current understanding of these phenomena and to contribute to augment the existing body of knowledge (BoK) in the field of IS research and ITS studies. The specific significance of this study is in twofold; first, the importance of IVTS, and second, the significance of developing a conceptual IS Success Mode that can measure the satisfaction of users of IVTS in developing nations.

Furthermore, vehicle tracking primarily maximizes productivity and optimizes business efficiencies. Practically, vehicle tracking enables both private and corporate institutions to unlock the potentials of their businesses and improves upon the overall operations of their entities. At least, vehicle tracking ensures real time access, controls and monitors the location of every vehicle and its occupants. It reduces operational costs, e.g., fuel consumptions, travel times and travel distances, reduces overtime claims, etc.

It further eliminates un-authorised vehicle use/mobility and puts stop to engine idling, optimizes the uses of organizational resources and extends the lives of vehicular properties/assets. Another important significance of vehicle tracking is attributed to environmental protection, e.g., reduction of pollution caused by Carbon Dioxide (CO_2) and Green House Gas (GHG) emissions. Also, vehicle tracking systems and services ensure user satisfaction by providing instant access to essential vehicle-operational information necessary for management decision making.

The second part of the significance of this research is directly linked to the development of the proposed conceptual IS Success Model that can be applied in existing IVTS. Many institutions or organizations have been continuously increasing their spending on ICT. Due to economic conditions and escalating business competitions, institutions require to measure and examine the costs and benefits of ICT operations. Hence, measurement of IS usefulness and benefits is paramount for all institutions. Thus, various researchers are stressing on the need for improved and extra consistent success metrics necessary to evaluate the various dimensions of IS success. It is for this reasons that many researchers are creating models for measuring IS success, and that is why this current research is beneficial.

Past research works have facilitated more understand of IS success, however, further studies need to be done in this field. Consequently, this current study is in response to the call by the IS research community to conduct further studies on IS success and to contribute to the research series in the field of IS success model development and to apply this approach to develop a conceptual IS success model that can address transportation problems in countries with low economies.

1.6 EXPECTED OUTCOME OF STUDY

The expected outcome of this research is the identification of innovative concepts of IS success variables (e.g., perceived system/service performances, perceived user-expectation, expected user-satisfaction etc.,), and the use of these concepts to develop the proposed conceptual IS Success Model, applying the DeLone & McLane's IS success model and user-satisfaction models as lenses. It is also expected that, two identified research gaps will be filled; these are, the use of Grounded Theory (GT) as data collection and analysis method in IS studies, and the application of DeLone & McLane's IS success model in ITS studies.

It is further anticipated that a second conceptual IS success model will be developed to suggest how developing countries can develop and deploy ITS solutions/applications into their conventional transportation networks, through literature review. Another equally important expectation is that, a very credible source of research material (literature) will be created from this study (i.e., a dissertation) for use as basis of reference for future researchers.

1.7 EXPECTED RESEARCH CONTRIBUTIONS

This research is expected to contribute to the on-going IS success model development series in the field of IS studies, by identifying new concepts of IS success models necessary to develop a conceptual IS success model that can measure the performance, usefulness and successfulness of vehicle tracking systems, as well as the satisfaction of users of these systems in developing states. It is further anticipated to contribute to existing body of knowledge in the areas of IS studies and ITS research.

1.8 OVERVIEW OF THE RESEARCH METHODOLOGY

In the context of this study, the road map underlining this research is referred to as the "Research Methodology" and it outlines the overall approach or strategy of activities undertaken in this research studies. The methodological approach to this research was the exploratory - qualitative research. The qualitative grounded theory method and the descriptive single case study method were employed to collect and analyse data. The research tools/techniques used to collect data were qualitative survey questionnaires and face-to face interviews; recorded interviews were transcribed by the researcher manually into raw data. The research universe or population for this study was the users of intelligent vehicle tracking systems in Ghana, as case study for developing countries. The purposive sampling method was employed to select the research respondents and participants from the chosen population. Details of the research strategy, processes and activities undertaken to solve the research problems are provided in the main methodology chapter, i.e., in chapter 4.

1.9 RESEARCH DELIMITATIONS (SCOPE AND ASSUMPTIONS)

1.9.1 Delimitations

This study is situated within the boundaries of: qualitative research, cross-sectional (not longitudinal) and single-case study. Thus, the population studied is limited to users of IVTS in developing countries, citing Ghana as a case study. The population is further limited to users who are decision makers in various institutions and organizations in Ghana where the data were collected. As mentioned above, since the field of study is very technical (i.e., IVTS) and the background requirements of the population are very specific (e.g., Transport Managers, Fleet Managers, Logistics Managers, Heads of IT Departments, etc.,), the purposive sampling method was employed to select the research respondents and participants, thus, the sample size was purposively limited to 25 participants/respondents.

Literature covering IS user-satisfaction models and intelligent vehicle tracking technology aspect of ITS were reviewed in this study, hence, literature covering other branches of ITS technologies (e.g., traffic modelling, traffic management, electronic toll collection, general accident avoidance, etc.) were not covered; the reason being that, they are outside the scope of this research. As indicated above, the approach to this study was a qualitative one; thus, neither the positivist/quantitative research tradition, nor the pragmatic (mixed methods) research strategy, was adopted in this study, since this research was uniquely positioned within the exploratory-qualitative single-case study (grounded theory method), and phenomenological research approach. Consequently, the results of this research could not be generalized to a broader population, rather, it is generalizable to IVTS users who are decision makers in various institutions, organizations, agencies, etc., whose vehicles are being tracked by IVTS operators in Ghana, and perhaps, in some other developing countries, in the context of this study.

Lastly, this study was not able to make any hypotheses from the conceptual IS success models developed in order to test them quantitatively/deductively; due to the purposive limited number of respondents which will not pass any quantitative-statistical validity tests (using SPSS software data analysis tool), and due to the lack of resources, e.g., time and finance to collect quantitative/statistical data using research assistants and research investigators. It has therefore been suggested in the recommendation section to undertake such empirical tests in further research studies by future researchers (including the current researcher) in the nearest future.

Also, it was not feasible in this current research to investigate the techno-economic implications of the developed IS success models (see Section 4.1.2, figure 4.2), due to the lack of the same resources mentioned above.

1.9.2 Research Scope and Assumptions

1.9.2.1 The Research Participants

In this qualitative study, it was assumed that, the selected research participants were relevant representatives of the population studied, i.e., the users of IVTS studied were willing at their own volitions and at their own accords to participate and contribute to this study; and that, they honestly and holistically responded to the research questions without any biasness or persuasions from entity. Based on this assumed trust, it is optimistic that, the responses and answers to the interview questions and data collection questionnaires from the research participants and responders did not influence the research results/findings in any way.

1.9.2.2 Methodology

The inductive logic approach adopted for this research was assumed to be appropriate and relevant to this qualitative research, to the problem tackled, to the research objectives and to the research questions for this study (e.g., how, why and what research questions were asked and answered in this study).

1.9.2.3 The Results

The research results (presented in chapter 5) were only bounded by the theoretical framework accurateness, and reflections on the phenomena studied. Based on these assumptions, the research results could be generalised a bit beyond the population investigated/studied. It is further assumed that, the findings from this research are important, relevant, appropriate and applicable to both stakeholders and users of IVTS deployed in Ghana, as well as in other developing countries.

1.10 STRUCTURE OF THE DISSERTATION

This dissertation is organized into seven main sections, namely: Introduction; Literature Review Part I – ITS Technologies; Literature Review Part II - Theoretical Framework; Methodology; Data Collection, Analysis and Presentation of Empirical Results; Discussions of the research as a whole, and lastly, the Conclusions. A schematic structure of these sections is presented in figure 1 below. The contents of each chapter are briefly summarized in the subsequent sub-sections that follow.

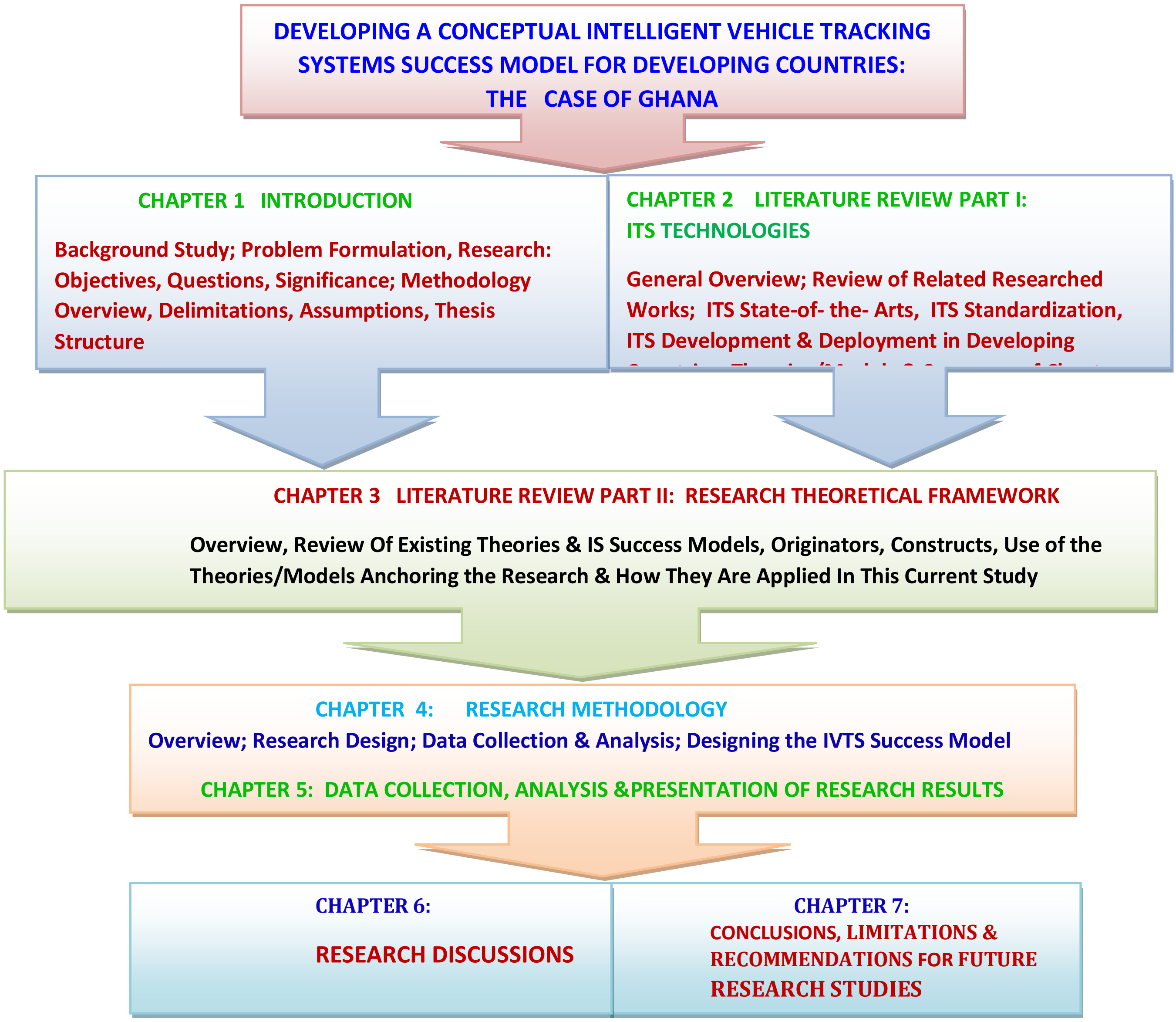


Figure 1.2: A Model of the Research Structure & Outline

Source: Field Work

1.10.1 Chapter One: Introduction

The introductory chapter gave the background of the whole research. It essentially contained the sections and subsections that discussed the background to the study, development of telecommunications, the role of telecommunications in the development of ITS, brief definitions of ITS, and explanations to ITS technologies, overview of IVTS, and the development of IS Success Models. The proceeding subsections discussed the research problem formulation, research objectives, research questions, significance of the study, expected outcomes & results, and research scope, delimitations & assumptions. The last section in this chapter outlined the composition of the dissertation document as a whole.

1.10.2 Chapter Two: Literature Review Part I: ITS Technologies (ITS)

This chapter gave a brief overview of the ITS technologies (beyond the explanations given in Section 1.1.7 above). The second subsection discussed the State-of-the-Art (SotA) in ITS technologies, whilst the succeeding subsection highlighted on standardization issues in ITS technologies and standards in intelligent vehicle tracking technology. The fourth subsection looked at how some developing countries have developed and deployed ITS to their advantages. The last subsection reviewed the factors influencing the development and deployment of ITS solutions in developing countries.

1.10.3 Chapter Three: Literature Review Part II: Research Theoretical Framework

This chapter was itemized into four subsections. The first subsection captured the general overview of IS studies; whilst the second subsection reviewed existing literature in the field of IS Success Model development series. The next section reviewed related studies conducted on IS success model development. In that subsection, a number of literature on existing IS Success Models and User-Satisfaction Theories were reviewed to learn more and to be able choose the most relevant theories/models to anchor this current research, with reflections on the research problems, objectives and research questions.

The last subsection summarized the outcome of the theoretical framework, lessons learnt, skills acquired from the reviews and how these lessons and skills could impact the current research and help to design the research methodology that guided this study.

1.10.4 Chapter Four: Research Methodology

This chapter delineated the general overview of the philosophical position for this research. Essentially, it discussed available research methods that are relevant to this study based on the outcome of the literature reviewed on ITS technologies in chapter 2, and the conclusions of the theoretical framework discussed in chapter 3. The selected research design, approach, methods of data collection and analysis, population selection & sampling methods, and what informed the choice of selection were all detailed in this chapter. The proposed conceptual IS success model was also developed in this chapter.

1.10.5 Chapter Five: Data Collection, Analysis & Presentation of Research Empirical Results

The data collection processes & techniques, data analysis procedures, the results of the data analysis and the developed conceptual IS success model are all presented in this chapter. Empirical analysis of the models was also performed in this chapter.

1.10.6 Chapter Six: Research Discussions

This section first discussed the research in general, then interpreted and explained the research findings. The section further discussed the contributions made in this research, the implications of the findings, evaluated the study as a whole, and eventually recapitulated the outcome of the study.

1.10.7 Chapter Seven: Conclusions, Limitations & Recommendations for Future Studies

The last chapter of this research summed up the research work as a whole and drew conclusions on the overall study. The chapter additionally discussed the research limitations, and gave appropriate recommendations for future research studies based on the fundamental research delimitations and on the inevitable methodological limitations. The last section of this chapter terminated all proceedings of this august study.

CHAPTER TWO

LITERATURE REVIEW PART I: INTELLIGENT TRANSPORTATION SYSTEMS TECHNOLOGIES

2.1 PREAMBLE

This chapter discusses literature relevant to the field of ITS technologies, focusing on Intelligent Vehicle Tracking Systems (IVTS) technology, and on factors impacting the development and deployment of ITS solutions in developing countries. Elaborating further on the brief introduction to the ITS technologies given in section 1.1.7, this chapter discusses into detail the concepts of ITS, development and deployment of ITS technologies, the key state-of-the-art technologies embedded in ITS applications - with emphasis on IVTS, for the purpose of this study. The chapter advances into ITS standardization issues; and finally, the section discusses how some developing countries have deployed some ITS technologies, paying attention to the factors impacting the deployment of ITS solutions in those countries. **Note:** for the purpose of easy reading and to avoid long duration for reading this section, supplementary materials for this chapter have been presented in Appendix A.

2.1.1 Boundaries of the Literature Review

Primarily, the search for literature for this study was centred on materials from existing research works and journals within the ITS disciplines, narrowing down on substances covering IVTS studies. In finding published research works in the context of this study, full-text searches were performed for various online catalogues or electronic library databases (e.g., EBSCO Host, ABI Inform, AUB ProQuest, IEEE Explorer, Elsevier SD Freedom Collection, Elsevier ScienceDirect Free Access Journals, Sago, etc). Hard copy materials (e.g., Printed pdf documents) of recognized and popular EU ITS Journals and Conference Proceedings/Papers, IEEE Vehicular Technology Magazines, IEEE Communication Magazines, etc., were equally reviewed to ensure that relevant, appropriate and contemporary research-materials are included and reviewed in this study.

The cited references and journal articles reviewed are those that have examined the conceptualization of ITS technologies and their development and deployment concerns in developing countries. For this study, only state-of-the-arts technologies, articles, papers, conference proceedings, etc., reporting on current and interesting issues on IVTS to the ITS research community were reviewed.

2.1.2 Reflecting on the Research Problem, Objective & Questions

To remain focused in this review, the targeted problems being tackled in this study as detailed in section 1.2 of the introductory chapter are recapped here; i.e., the problem of dissatisfaction of users of intelligent vehicle tracking systems in developing nations, e.g., in Ghana, where data for this study were collected. The main research objectives and detailed objectives necessary to achieve in order to solve the research problems are as outlined in section 1.3; and lastly, the research questions and detailed-questions essential to be answered in a bid to achieve the defined research objectives are as designed in section 1.4.

2.2 DEVELOPMENT OF ITS TECHNOLOGIES

2.2.1 Overview of ITS Background

Primarily, ITS are global technologies, attracting worldwide interest from transportation professionals, automotive industry and political decision makers (Lino Figueiredo, et la., 2001). ITS applies advanced communications, information and electronic technology to solve transportation problems such as, surface road traffic congestion, safety, transport efficiency and environmental conservation, as presented in fig. 2.1 below. The figure illustrates that, ITS are technologies that interplay among road networks, vehicles, and users of vehicles on road grids.

Figure 2. 1: ITS Conceptual Model

Source: (Lino Figueiredo, et la., 2001)

Thus, the purpose of ITS is to take advantage of appropriate/emerging technologies to create "more intelligent" road nets, vehicles and users (Figueiredo Lino, et la., 2001).

2.2.2 Primary Activities of ITS Development

There are a number of activities which complement the development of ITS and which lay the foundations for the successful introduction of ITS technologies. These activities include:

- Developing a common data model;
- Establishing communications standards;
- Using general purpose communications technology;
- Promoting ITS standardizations.

2.2.3 Major Components of ITS

2.2.3.1 Advanced Traffic Management Systems (ATMS)

ATMS are fundamental parts of ITS that are used to improve traffic service quality and to reduce traffic delays (Nelson John D., 2010). ATMS operate with a series of video and roadway loop detectors, variable message signs, network signal and ramp metering timing schedules, including roadway incident control strategies from one central location to respond to traffic conditions in real time. Three notable ATMS elements are: Data Collection Team: - Traffic Conditions Monitoring; Support Systems: - Cameras, Sensors, Semaphores, etc. These devices help vehicle tracking system operators to manage and control real time traffic.

2.2.3.2 Advanced Traveller Information Systems (ATIS)

The goal of ATIS is to supply real time traffic information to travellers. The information about the transport systems traffic congestions influence drivers, so that they make a better use of the system, allowing reduction of congestions, optimizing traffic flow and limiting vehicular pollutions. With this system, travellers from home, at work, or in stopping-places can decide on the most advantageous roads and routes to reach their destinations, the most favourable transportation service and the most appropriate schedule to adopt. This information can be provided through electronic panels, portable systems connected to the Internet (offering a diversity of information, such as, public transportation terminals, alternative highways, gas stations, parking lots and hotels), radio systems, in-vehicle systems (displaying the map with information of its location, the state of the neighbourhood traffic, traffic delays or incidents). In the most advanced systems, there is also the possibility of advising a driver on which is the most advantageous road to choose to reach a given destination.

2.2.3.3 Commercial Vehicle Operation Systems (CVOS)

CVOS use different ITS technologies to increase safety and efficiency of commercial vehicles and fleets (Figueiredo Lino, et la., 2001). They allow the management of all vehicles, while controlling speed, stopping-places & times. Moreover, ITS technologies increase the speed of goods delivery, patient transportation and improve cost reduction rates. Automatic weighing systems are also implemented with a high level of safety and efficiency. In fig. 2.2 is depicted a Centre for Commercial Vehicle Management (CCVN) using Global Positioning Systems (GPS) and Global System for Mobile communications (GSM) technologies.

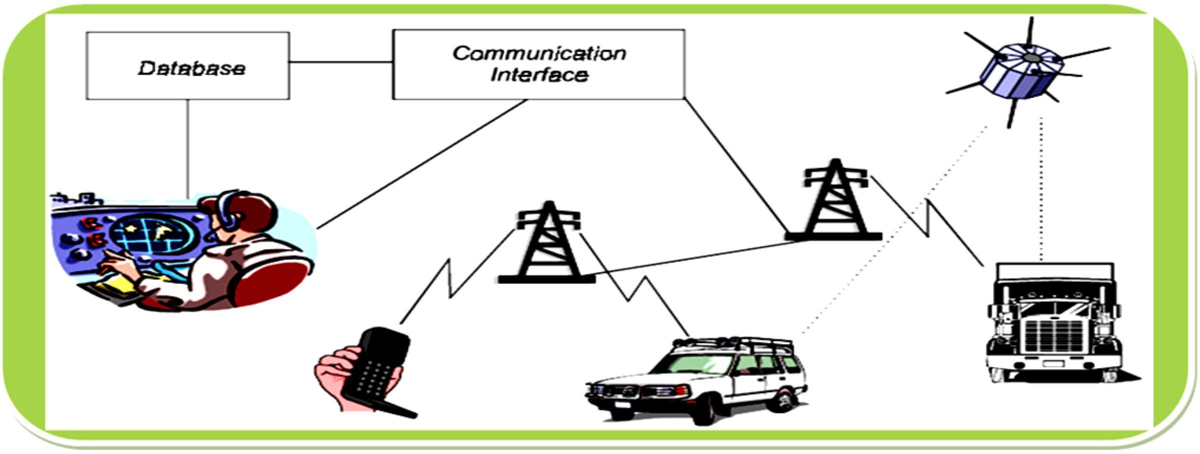


Figure 2. 2: CVO Management Centre

Source: (Lino Figueiredo, et la., 2001)

These systems include the technologies for traveller information, traffic management, vehicle control & management; such as: Automatic Vehicle Identification (AVI), Automatic Vehicle Classification (AVC), Automatic Vehicle Location (AVL), Pedestrian Movement Detection (DMT), On-board Computers, and Real Time Traffic Transmissions (RTTT).

2.2.3.4 Advanced Public Transportation Systems (APTS)

APTS use electronic technologies to improve the operation and efficiency of high occupancy transports, such as buses and trains (Nelson John D., 2010). They use technologies from ATMS and ATIS (discussed above) to improve mass transport services, by providing route information, travel schedules & costs, and real time information about change in transport systems. Through APTS one can control, plan and advance the services of a fleet, and foresee a more flexible services, with efficiency and safety, to guarantee customers satisfaction and trip control costs. In APTS are also included the automatic payment systems through the use of multiple usage smart cards which provide functions such as stored credit or automatic capture passenger information and journey profile. To increase safety, systems with Internet Protocol (IP) cameras are included to assist drivers and information centres to detect and react to any suspicious activity.

2.2.3.5 Advanced Vehicle Control Systems (AVCS)

AVCS are integration of sensors, computers and vehicular control systems to assess and alert drivers and other road users about traffic conditions. The main purposes of these systems are to increase safety and decrease congestions on roads and highways, and to improve road systems productivity. With in-vehicle sensors, the driver/users can receive visual and audible information about traffic dangers and all vehicle situations. On the other hand, automatic control allows systems to react in dangerous situations in faster and effective ways, e.g., actuators in the breaking or acceleration systems, which is useful for the aged drivers or drivers with less practices.

2.2.3.6 Advanced ITS Technologies

Further to the brief description given in the introductory chapter, ITS are a hybrid of ICT enabled Machine-to-Machine Communication (M2MC), connecting vehicles and transport infrastructures and Person-To-Machine Communication (P2MC). According to John D. Nelson, the major constructs behind the models forming the building blocks of ITS technologies that account for its ubiquitous potentials are: “Advanced Vehicle & Highway Systems (AVHS), Electronic Toll Collection (ETC), Advanced Fair Collection (AFC), Front End Collision Avoidance (FECA), Rear End Collision Avoidance (RECA), General Accident Avoidance (GAA)”, Etc.

2.2.3.7 Outline of ITS Communications Network

ITS Communications Network is comprised of “Network Elements such as IP Based Cameras, Routers, Switches, Firewalls, etc”. (Padmadas M., 2010). The composite network embraces: “GSM Networks with Base Transceiver Stations (BTS) connecting a Hybrid of Fixed Line & Wireless (HFLW) Router to a Multi-Protocol Level Switch (MPLS), with Virtual Private Network” (MPLS - VPN). The MPLS Core Network (CN) collects vehicular information captured by roadside infrared digital cameras via PSTN Leased Line and Broadband Wireless Routers. These Routers connect to the BTSs via Radio Access Networks (RAN).

The latter transmit and receive information from the vehicular roadside digital cameras. The Routers again connect the MPLS to ITS Traffic Management Centres (TMC) via "Switches and Load Balancers". Another set of Routers and Switches interface with ITS Web System, via Firewalls. The Web Systems connect directly to ITS Traffic Information Systems ((TIS), Traffic Control Centres (TCC), and TMC to gather real time traffic information, process it into traffic data and disseminate it to appropriate entities or authorities for various purposes, including effectual transport network operations, maintenance, control and for high level management decision making at all times. The structure of a typical ITS communication network described above is as shown in fig 2.3 below.

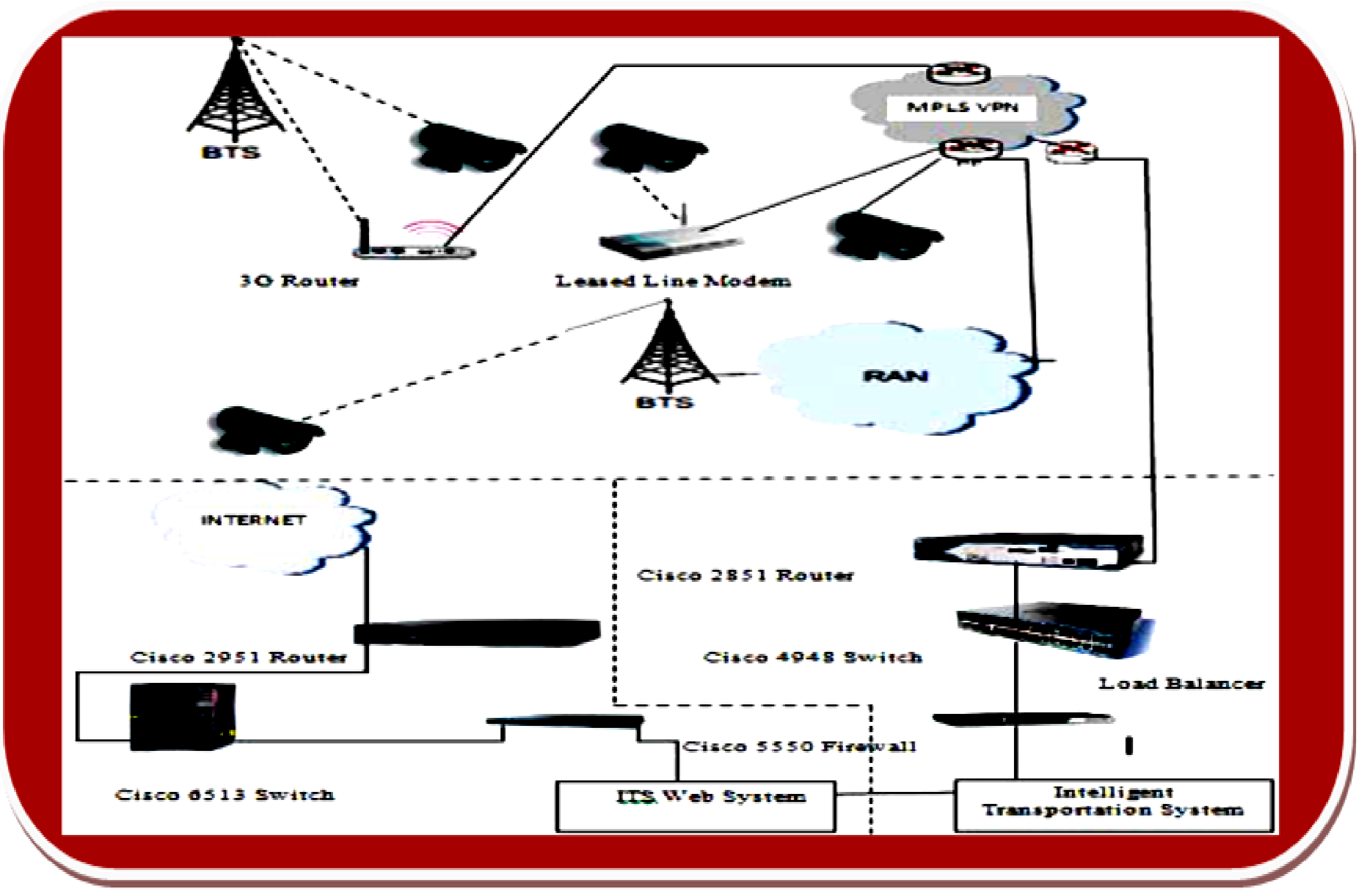


Figure 2. 3: Typical ITS Communication Network Platform

Source: (Padmadas M., 2010)

2.2.3.8 Review of Intelligent Vehicle Tracking Technology

a) Evolution of Intelligent Vehicle Tracking Technology (IVTT)

Technology is changing everything around us; it is affecting how we live our lives, communicate, drive on our roads and even manage our financial affairs. Technology has even changed the way people do businesses with each other. It is essential to guess that, technology has significant impacts on both road safety and on how much we pay to travel on our roads, and IVTT is the key to meet these expectations. IVTT is a telematics (i.e., a composition of electronic, electromechanical, and electromagnetic devices, operating in conjunction with computer controlled devices (microprocessors & microcontrollers) and radio or wireless transceivers to provide surface road transport precision repeatability functions, emergency warnings and validating performance reconstruction tasks). Vehicle tracking solutions were originally developed by the US military for surveillance purposes and they were not generally accessible to civilians for public use. Europe later developed the 'Galileo' GPS system which was made available to civilian haulage consumers and companies for the monitoring of fleets for business (Macadoy Tom, 2011).

Vehicle tracking technology has evolved from the developments in personal computers, smart IP phones, "all IP" networks (the Internet), GSM networks, the GPS, satellite communication systems and digital microwave terrestrial transmission system (R. Parsad, et al., 2005) into what is now described as “Vehicle Telematics”, which have the ability to speed up real time information dissemination about vehicular usage phenomena. In this context, “Vehicle Telematics” basically refers to the integrated use of Telecommunications and Informatics, for application in vehicles and with control of vehicles on the move (Adv J. W Jonck, 2011).

IVTT is a subset of ITS technologies, that enhance the functionality, productivity, security” and safety of both Vehicles and occupants on-board (Arrive Alive, 2011)”, it is the expertise or know-how of tracing the movements and/or status of a vehicle or fleet of vehicles and their occupants, through the use of vehicle tracking devices, typically equipped with GPS Locators, Global Navigation Satellite System (GNSS) and other wireless technologies, e.g., GSM, Global Packet Radio Services (GPRS) modems fitted in the vehicle, Radio Frequency Identification (RFID) and computer network management applications and advanced data centres to ensure consistent and efficient vehicle tracking activities.

These systems communicate with users and Personal Computers (PC) or web-based software. The data are de-processed into information by IT management reporting tools in conjunction with visual displays on computerized mapping software via Internet portals.

Primarily, the object of vehicle tracking is to allow precise journey planning (pre-defined travel route and travel time) from start to finish. The system also permits the use of alternate routes to counter stormy weather and hazardous road conditions. Some key benefits of intelligent vehicle tracking include: quick operational response times, improved productivity and vehicle life longevity. Economically, intelligent vehicle tracking saves time (it is said that, “Time” is Money) and regulates operational and recurrent expenditures.

Vehicle tracking systems can either be an active or a passive system. In a passive system, the device recording the vehicle’s positions and movements are triggered when the vehicle’s engine is turned on. The speed, distance and direction of the journey are then recorded by the device. When the vehicle is returned to base, the data from the tracking device can be downloaded and the software will show the details of the captured data.

On the other hand, an active vehicle tracking system is a live or real-time tracking system; i.e., the information from the device is relayed in real time to the software so the locations and movements of the vehicle can be constantly tracked. An active vehicle tracking system is usually utilized for tracking one or more vehicles in real-time through Internet software and portal (Vermillion MVT, 2014). Such real-time tracking enables simple fleet information management and offers sufficient customer service as a user can view the locations of the vehicles instantly and thus proficiently assign drivers to jobs and transactions. The complete transparency provided by active vehicle tracking systems can arguably afford organizations with supplementary benefits than passive ones, as instant evaluation and analysis is made promising. With some trackers, the device can be a mixture of both systems, so that, if data cannot be transmitted synchronously, then they can be stored to be reviewed at a later date (Navman Wireless, 2011). Typically, an active vehicle tracking system may consist of the elements shown in fig 2.4 below; the figure further illustrates the process by which a vehicle is tracked.

Figure 2.4: Typical Vehicle Tracking System & Tracking Process

Source: (VermillionMVT, 2014)

b) Benefits of Vehicle Tracking Technology

Vehicle tracking technology has become an important requirement for effective fleet management and safety improvement for company vehicle users and drivers (Ahmed-Zaid, 2011). The benefits of vehicle tracking include: reducing recurring/running costs by specifically targeting those who speed and waste fuel; trimming down time wasted through vehicle maintenance; encouraging safer driving and helping recovery if thefts do occur; increasing efficiency, accountability and productivity of workers, e.g., by being able to keep track of lunch hours, exposing unauthorized stops and breaks; helping businesses to become more "customer friendly"; limiting phone bills as it is no longer a necessity to constantly call staff to find out about their locations; providing easy access to answer enquiries rapidly and accurately; reducing the amount of paperwork that drivers must fill out and increasing the accuracy of records; refining customer satisfaction; improving health and safety conditions during driving, travel times, etc.

c) The Beginnings of Intelligent Vehicle Tracking Systems (IVTS)

Initially, vehicle tracking systems were developed for the shipping industry to determine where each shipping vehicle was located at any time (Muruganandham, et la., 2010). This tracking practice became necessary "when large fleet of shipping vessels were spread out over the vast expanses of ocean, whereby ship-owners found it difficult to keep track of what was happening" to their fleet of ships. To address these concerns, ship operators required some sort of follow-up systems to determine where each vessel was located, how long has it travelled, what is the status of it, etc. Thus, vehicle tracking systems take their roots from the practices of early shipping industry to track down shipping vessels. Sooner than later, the need for vehicle tracking mounted in many organizations to avert any theft, since security agencies (e.g., the Police) usually use tracking data/reports to trace and locate stolen vehicles.

Some vehicle tracking systems use some form of Automatic Vehicle Location (AVL), a technique used in determining the geographical locations of vehicles and sending their location information to remote servers. The location information is gathered and transmitted with the aid of GPS satellite systems (Parsad R., Ruggieri M. 2005), terrestrial microwave/radio links or mobile/cellular networks from vehicles to a radio receiver or architecture of base station transceivers (BTSs) of cellular networks. In situations where GPS coverage or illumination intensity is low/poor, active radio frequency identification (RFID) systems or inertial navigation systems are employed to generate vehicle information. Tracking data is then transmitted via wireless communications systems - GSM networks.

d) Vehicle Tracking System Design

In general, vehicle tracking systems are panelled into two main design units. These are: In-Vehicle Tracking Unit and Tracking Server/Monitoring Station. Both units are briefly discussed below.

i) In-Vehicle Tracking Unit

As its name implies, this unit is installed acutely & sensitively inside or onboard a vehicle. It constitutes the critical or key part of the tracking systems, and captures the following vehicular information: "Current location of vehicle, Speed of vehicle, Door open/close status, Ignition on/off status", etc. (Muruganandham, et la., 2010). The same unit is responsible for transmitting vehicle information to Tracking Server located globally". This information is accessible remotely via customized internet gateways or portals, dedicated and configured for vehicle tracking system users. For this In-Vehicle Unit to accomplish all these functionalities, the internal system modules discussed below are provided within the tracking unit. Basically, the design of in-vehicle tracking unit consists of input sub-unit, processing sub-unit and a GPS sub-unit. A simplified in-vehicle tracking unit using "OEM module Telit GM862-GPS GSM/GPRS modem and microcontroller" (Telit Wireless Solutions, 2007, 2008) is as shown in fig 2.5 below.

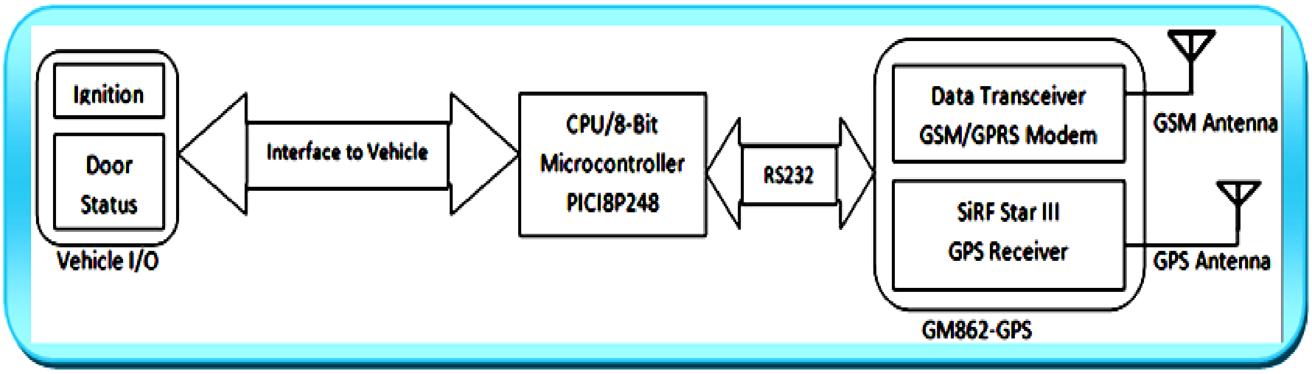


Figure 2.5: Block Diagram of a Basic In-Vehicle Tracking Unit

Source: Redrawn from (Muruganandham, et la., 2010)

The design is composed of both hardware and software sub-units; the structure of a typical hardware in-vehicle tracking sub-unit shown above consists of vehicle input/output devices (displaying vehicle ignition and door status), interfaced to a Central Processing Unit (CPU, an 8-Bit Microcontroller). The CPU is also connected to a GPS device, via an interface serial cable "RS232". The GPS device consists of dual "Data Transceiver (GSM/GPRS Modem) with a GSM antenna and a GPS Receiver and antenna. The GSM antenna sends and receives information to/from vehicle tracking system users via the GSM/GPRS modem, whilst the GPS antenna only receives information from satellite GPS located in space. Models of typical software for a typical In-Vehicle tracking unit are illustrated in fig 2.6 below.

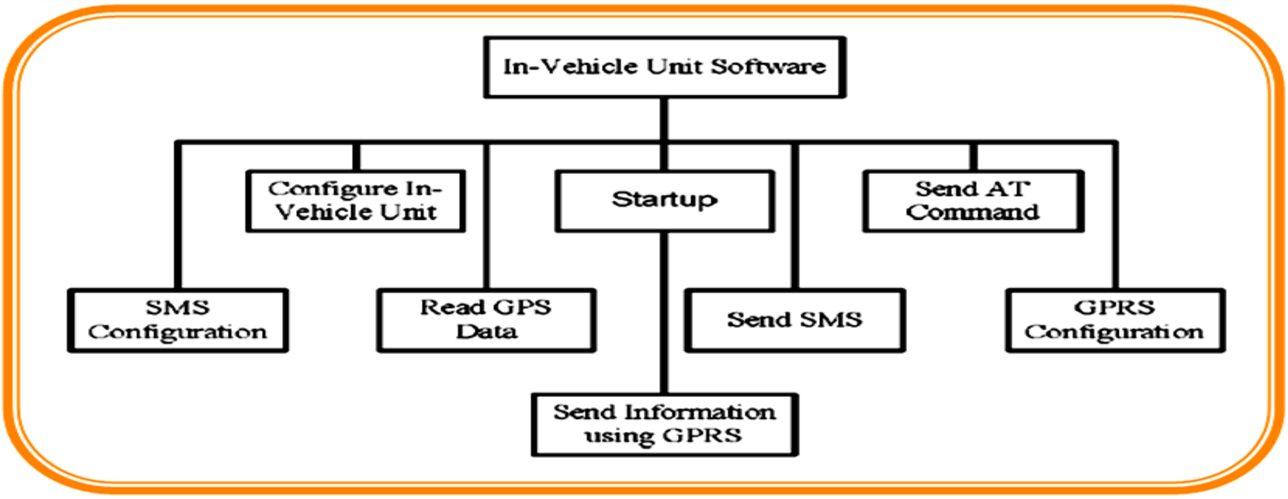


Figure 2.6: In-Vehicle Tracking Unit Software Models

Source: (Muruganandham, et la., 2010)

In the software, these modules are executed as subroutines, each performing sequences of assigned tasks. Details of how the software functions are well outside the scope of this study.

ii) GPS Receiver

In order to capture vehicle locations and speeds, in-vehicle units employ GPS receivers. Since the raw data relayed by the GPS "is not in a human-comprehensive-format" (i.e., non-intelligent to system users), the raw data is processed into "useful/intelligible information and displayed by a beacon on Google Maps" (Thong, S.T.S.; et al., 2007), utilizing computer Central Processing Units (CPUs). Usually, the GPS receivers are integrated with GSM/GPRS modems to transmit data (Halonen T., et al., 2003). Beside vehicle locations and speeds, the GPS receivers capture information on "altitude, time & status of "GPS fix", and number of satellites used to compute current location information and speed". In this context, the term "GPS fix" refers to last reported vehicle locations or vehicle data.

iii) Central Processing Unit

The received GPS raw data is transferred to the CPU; the latter then processes the raw data and extracts the required information. Furthermore, the CPU is responsible for examining / monitoring the "door open/close status" (Microchip, 2007), as well as “controlling the ignition on/off status” of vehicle under tracking; it also stores required information (e.g., travel times, waiting times, delays, etc.) for onward transmission to remote vehicle tracking servers. Centrally, this CPU “controls data transmission module to exchange information with remote servers”. The CPU is an interface device between “GPS receiver, vehicle and remote server”. The CPUs receive instructions/commands from tracking servers via data transceiver-modules and perform consequent actions required by tracking servers.

iv) Data Transceiver

After information has been extracted and processed, it is transmitted to remote vehicle tracking server which in turn displays any received information to system users. To do that, wireless communication networks are deployed to broadcast/transmit vehicle information remotely. Typically, existing GSM network infrastructures are deployed to transmit vehicle information (Microchip, 2007). For this purpose, GSM modems are installed in the data transceivers to transmit data over GSM networks. These modems send and receive data, SMS text messages and GPRS data over GSM networks.

v) Vehicle Tracking Server

The structure of the Vehicle Tracking Server (VTS - the last unit of the vehicle tracking system) is partitioned into four key components, namely: Hardware design - for GSM/GPRS Modem; Communication Software – for GPS operations; Database – for storing received information; and Web Interface – for accessing the Tracking Server, via internet portals. The VTS retains various information it receives from the In-Vehicle Units mounted in vehicles into a central database, accessible from the internet. Through web interface, authorized users can track their vehicles and view all previous information stored in the database. GSM/GPRS modem is attached to the Tracking Server which receives SMS from In-Vehicle tracking Units and sends those messages to the server through serial ports. As before, the VTS saves this information into the database.

e) IVTS Deployed in Some Developing Countries

i) Electronic Cargo Tracking System Deployed in Kenya

In a study conducted by Musyoki Julius, Kenya Customs Authorities uncovered phenomena of rampant diversions and smuggling of transit goods destined for neighboring countries in East Africa into the Kenyan local market (Musyoki Julius, 2010). These goods are imported through the port of Mombasa (a Harbour City in Kenya) and hauled by surface road transport networks to exit terminals at the Kenyan borders. However, some of these goods are falsely declared as transit goods with the aim of dumping them illegally unto the Kenyan local market; so as to evade payment of Customs' duties, taxes and other payable levies to Kenya's revenue collection authorities and agencies, thereby, causing financial loss to the Kenyan government.

To address these malpractices, Siror, Joseph et al., (2009) designed and deployed Radio Frequency Identification (RFID) based Electronic Cargo Tracking System (ECTS) to track transit-container goods in Kenya. Results from the pilot test demonstrated the effectiveness of the solution in curing the phenomena of road transport haulage diversions and reductions of turn-around periods of transit vehicles and consignments. The model of the KRA's ECTS (Musyoki Julius, 2012) is as illustrated below. It consists of a number of haulage cargo trucks operated by different road haulers in Kenya and fitted with RFID Seals and Readers with event listeners. The position and activities of each truck is captured in real time by GPS and Satellite Systems and relayed or transmitted to a Universal Message Centre via GSM, GPRS, VPN, WiMAX, wireless communication networks, Etc. The Universal Message Centre (UMC) which serves as both Application Business Logic (ABL) and Data Base (DB) also functions as an interface device between the cargo trucks and Kenya's Customs check points and KRA's Control Room.

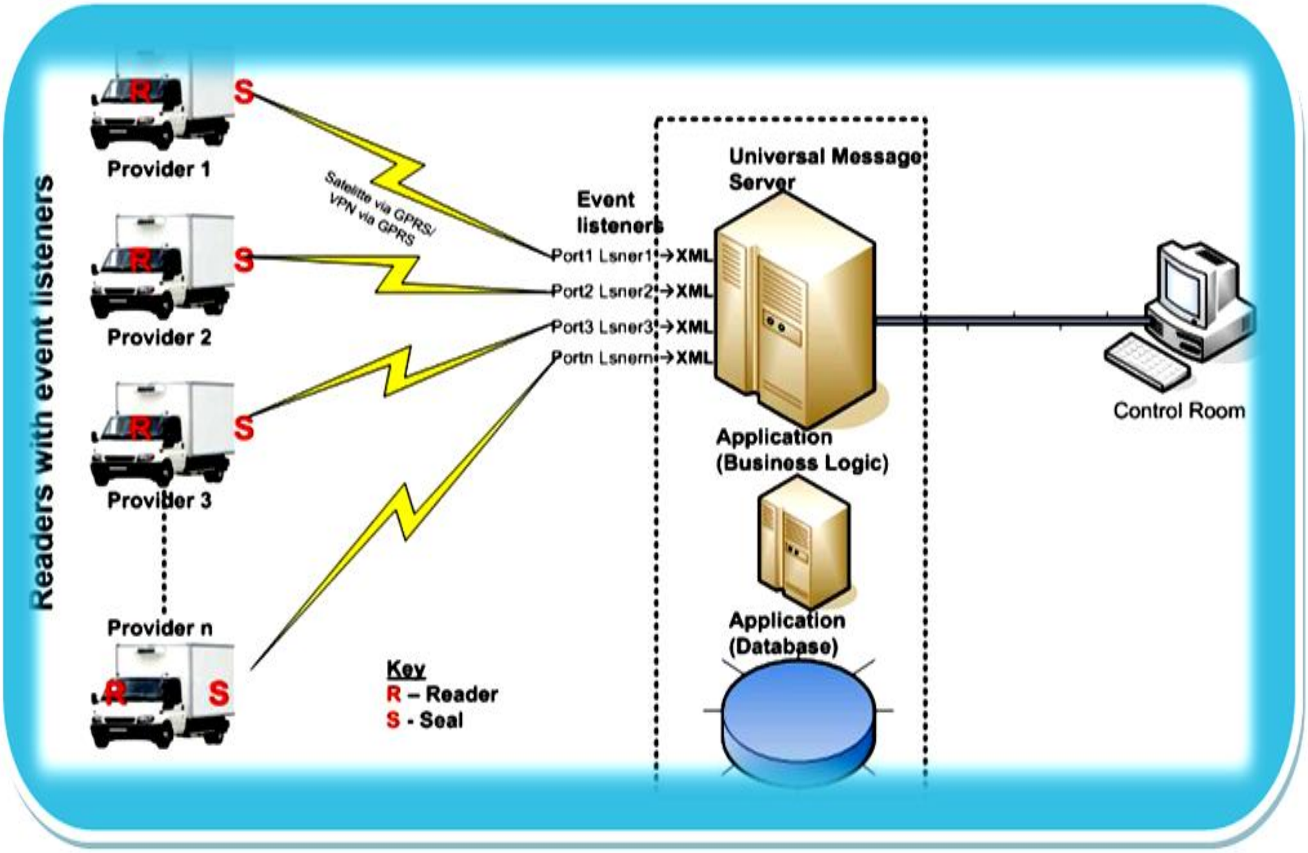


Figure 2.7: Model of ECTS for Kenya Revenue Authorities (KRA)

Source: (Musyoki J. 2010)

From the operational diagram below, at the instance of activation or alarming the electronic seal, the cargo is monitored from departure points to destination points, on one hand. On the other hand, the transit cargos move along the planned and geo-fenced routes. In the event of any violation, including mobility outside the geo-fenced routes or any act of tampering / meddling with the container will be detected on real time basis from the control room. Instantly, electronic alerts are received via e-mail or SMS to the Rapid Response Teams (RRT) deployed at strategic points and equipped with radio communication systems to enable them to intervene decisively and swiftly. To track the road haulage vehicles across Kenya's international borders, Joseph Siror, et al., (2009) deployed GPS and Satellite based tracking systems, this is illustrated in fig 2.8 below.

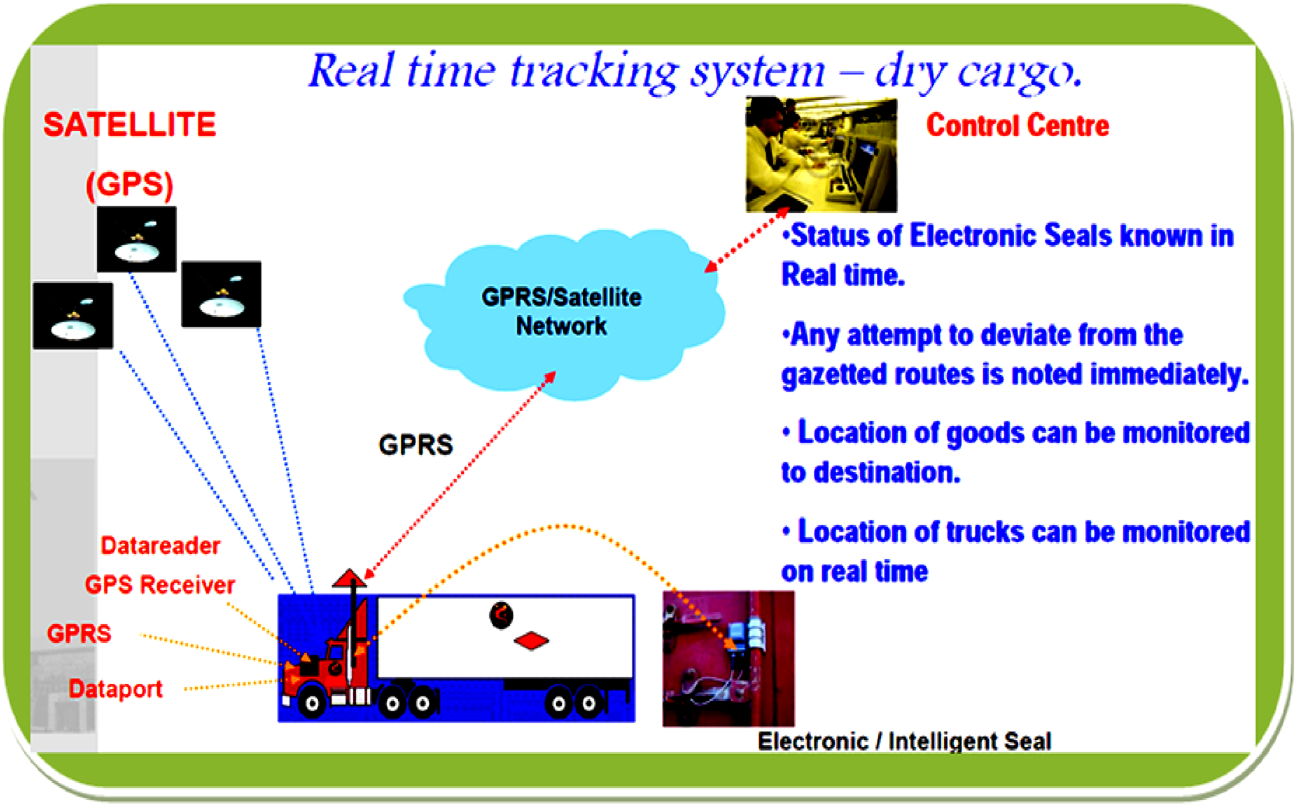


Figure 2.8: Illustration of Real Time ECTS for KRA

Source: Julius Musyoki (2010)

ii) GPS & Satellite Based IVTS Deployed in Ghana

In a Magnate Technologies GC e-Track Tracking System deployed in Ghana and shown in fig 2.10 below, tracking is achieved by attaching a tracker (an intelligent electronic device) to a road haulage truck to capture and record the precise and continuous (real time) positions of cargo trucks at predefined times and at all times (Magnate Technologies, 2009). The main components in designing these tracking systems included: the Freight or cargo truck to be tracked, tracking devices (GPS Satellite Transponders), Tracking Channels (GSM/GPRS, GPS, WiMAX, Etc.) and Monitors / Workstations (Computers with special software) are embedded in the systems.

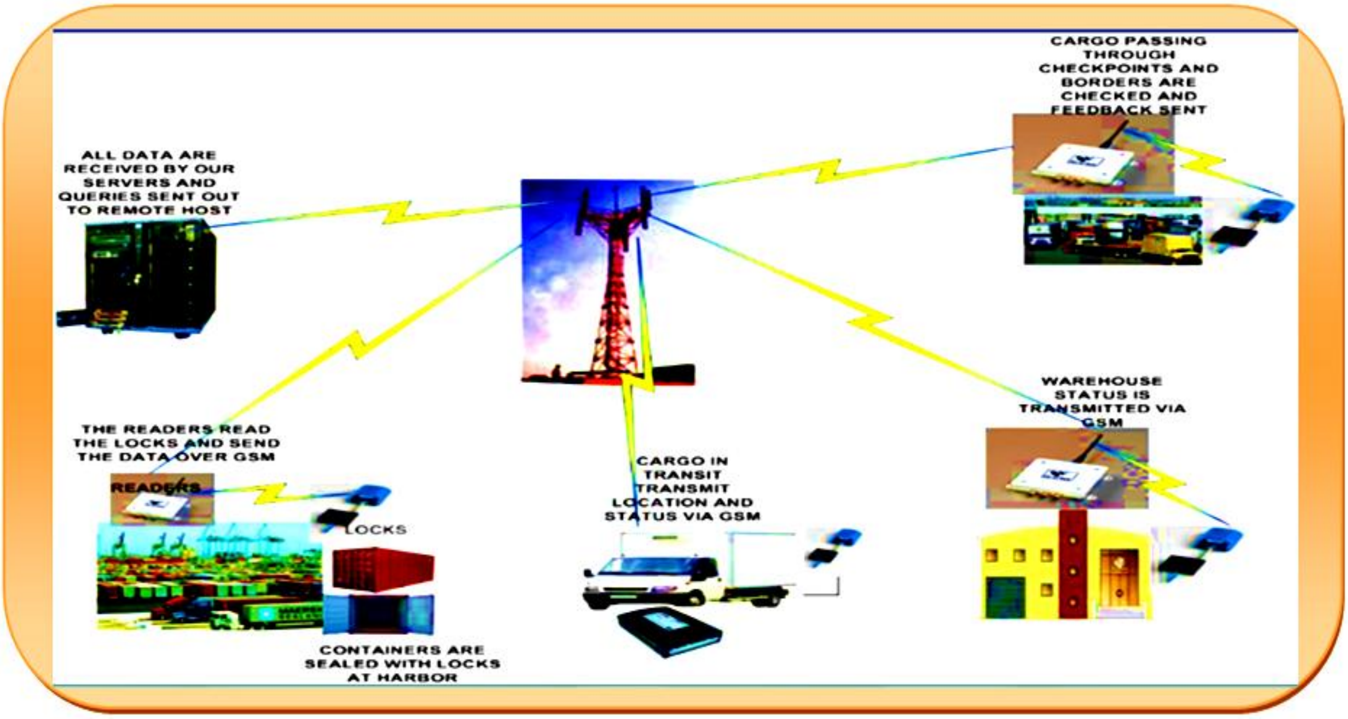


Figure 2.9: Magnate Technologies GC e-Tracking System

Source: Magnate Technologies In: (Gc-eTrack Training Manual, 2009)

The setup above illustrates a cargo truck transiting through customs check points and Ghana’s border pints between Togo, Cote d'Ivoire, or Burkina Faso). At any time, the location and status of the cargo truck is captured and transmitted by an on board GPS device via GSM Network, and received by servers at G-CEPS Control Room (Headquarters) in Accra, and at other dedicated remote-monitoring centres at the Accra International Airport and at Tema Harbour.

iii) Magnate GC-eTrack Communication Platform Deployed in Ghana

Communication channels deployed in this system include: RF, RFID, GSM/GPRS & GPS. All of the above are interconnected into a network (GCNetS, 2007). Every communication highway on this system has a backup, should the main channel go down. Fig 2.10 below demonstrates the GC-eTRACK set up for CEPS in Ghana. The set up consists of Base Stations, Data Centres, Checkpoints and Remote-warehouses. For the purpose of simplicity, only few devices are shown. The 18 GHz Microwave Backhaul interconnects the Base Stations and the Data Centre. The 4.5 - 4.9 GHz Dedicated Short Range Communication (DSRC) links the Base Stations to the Checkpoints remotely.

The Checkpoints are equipped with 450 MHz RF devices such as Readers, Tags, Electronic Seals &Electronic Locks to ensure effective security and monitoring.

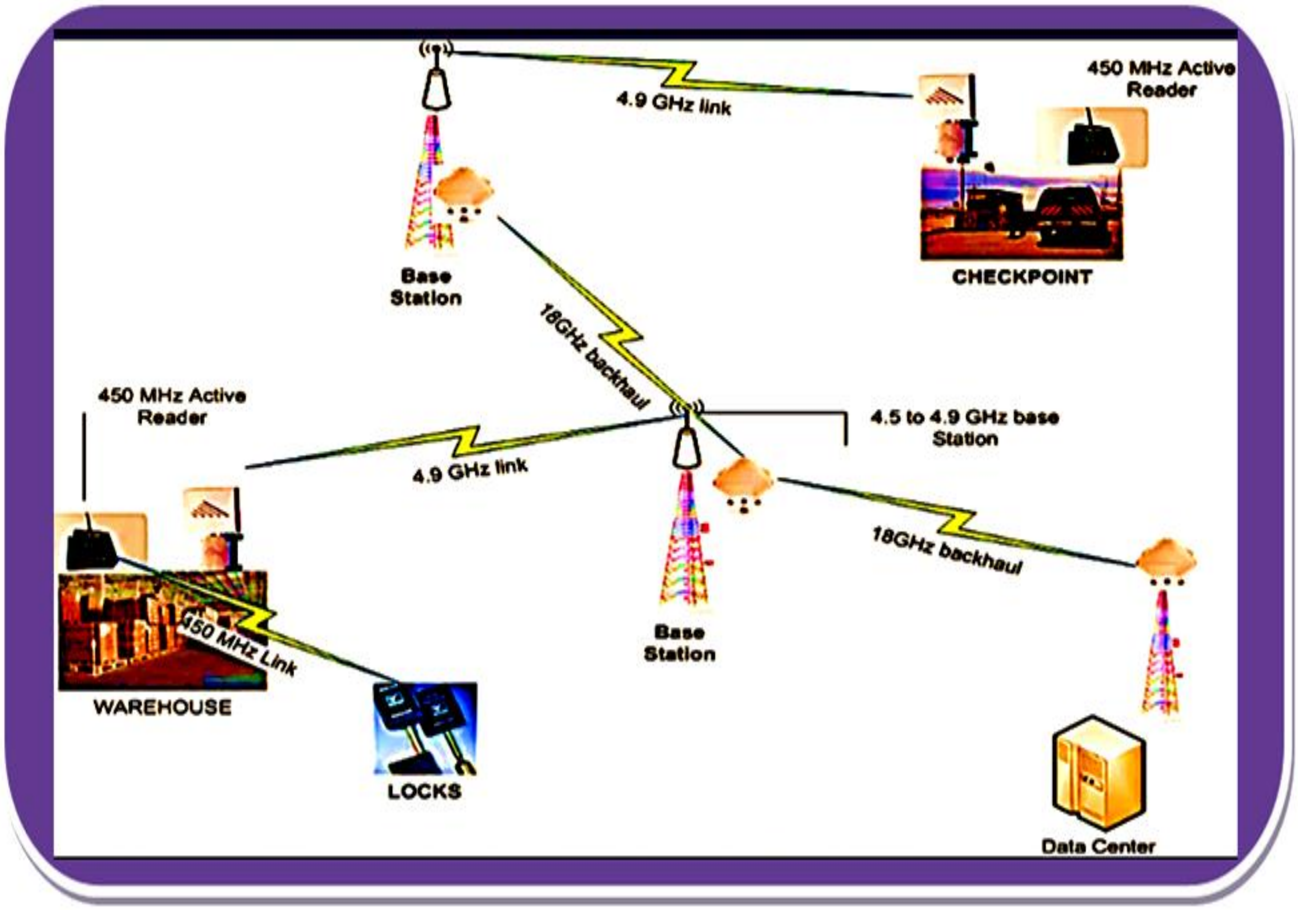


Figure 2.10: Communication Platform for GC e-Tracking System

Source: Ghana's CEPS GCNet Systems

The design of the Data Communications Network deployed in the GC e-Tracking system to interconnect the various CEPS revenue collection and monitoring points in Ghana is as shown in figure 2.11 below. The network is IT based (De Wulff, 2005), and the central access point is an internet portal. The network devices include: LAN, MAN, WAN and VSAT elements; Routers, Switches & Servers; Adaptive Security Appliances (ASA), Transparent Firewalls and Microwave Links. The network interconnects sea ports and border towns like Takoradi, Tema, Elubo, Paga, etc., to the CEPS's "Strong Room" at the CEPS Headquarters in Accra.

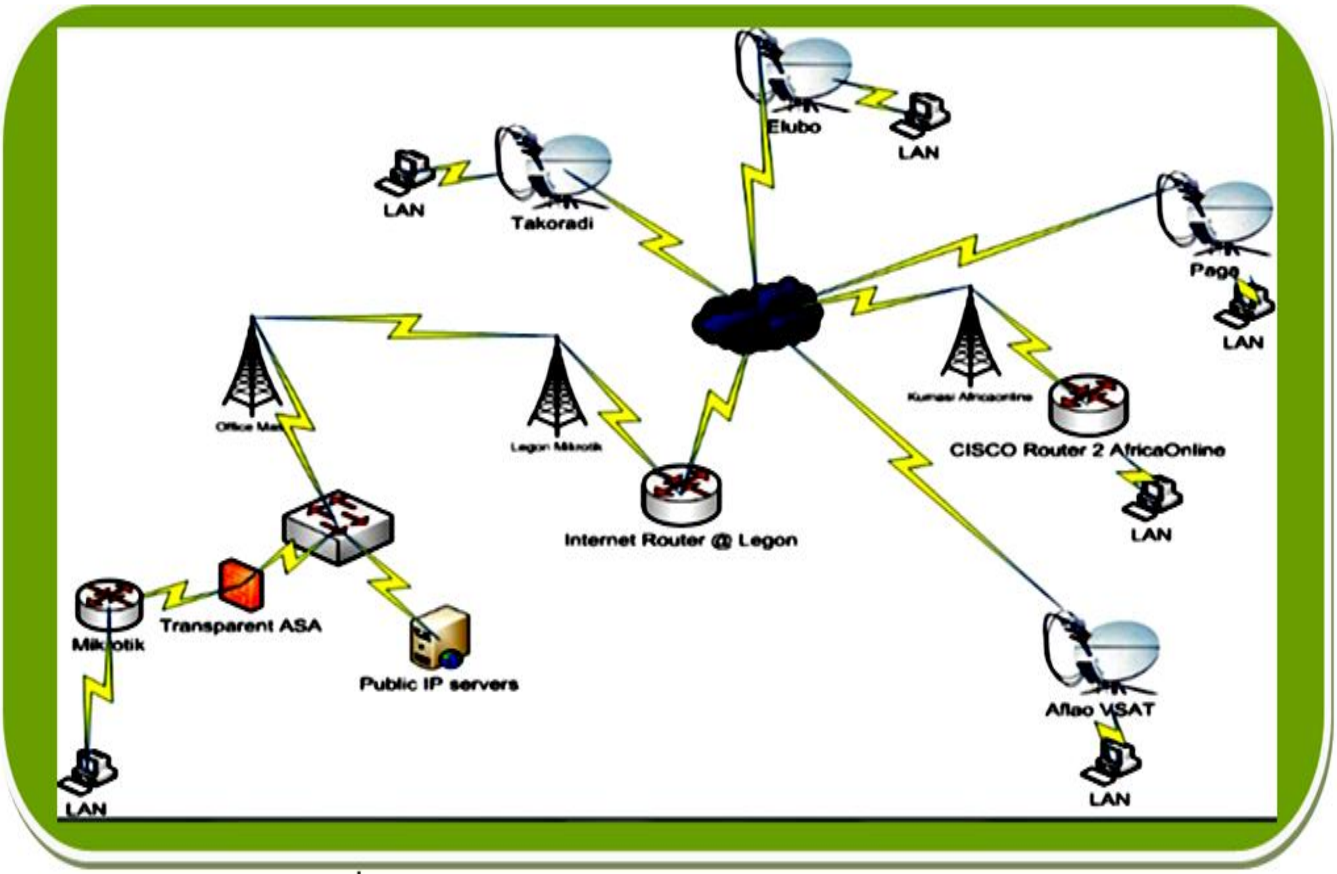


Figure 2.11: GC e-Tracking Data Communication Network

Source: CEPS ICT Plan

iv) Faster Transit with GCNet Satellite Tracking System Deployed in Ghana

GCNet is a surface road haulage tracking organization in Ghana. By means of electronic tracking, it is possible to determine from the CEPS transit management centre, whether a cargo truck had remained at any particular point/location over a period longer than scheduled and expected, or veered from its approved route. The information generated by the system is also accessed on the CEPS / GCNet websites (Ghana CEPS, 2007). However, this system has communication network bandwidth limitations as well as transmitting power limitations.

In order to combat these problems, GCNet introduced a new Satellite Tracking System into its infrastructural setup. With the advent of this introduction, transit consignments are exiting the borders and ports in Ghana faster than when physical escort methods were employed. The new GCNet setup is as shown in fig 2.12 below (GCNet, 2008), (Ghana CEPS Mgt Law, 1993).

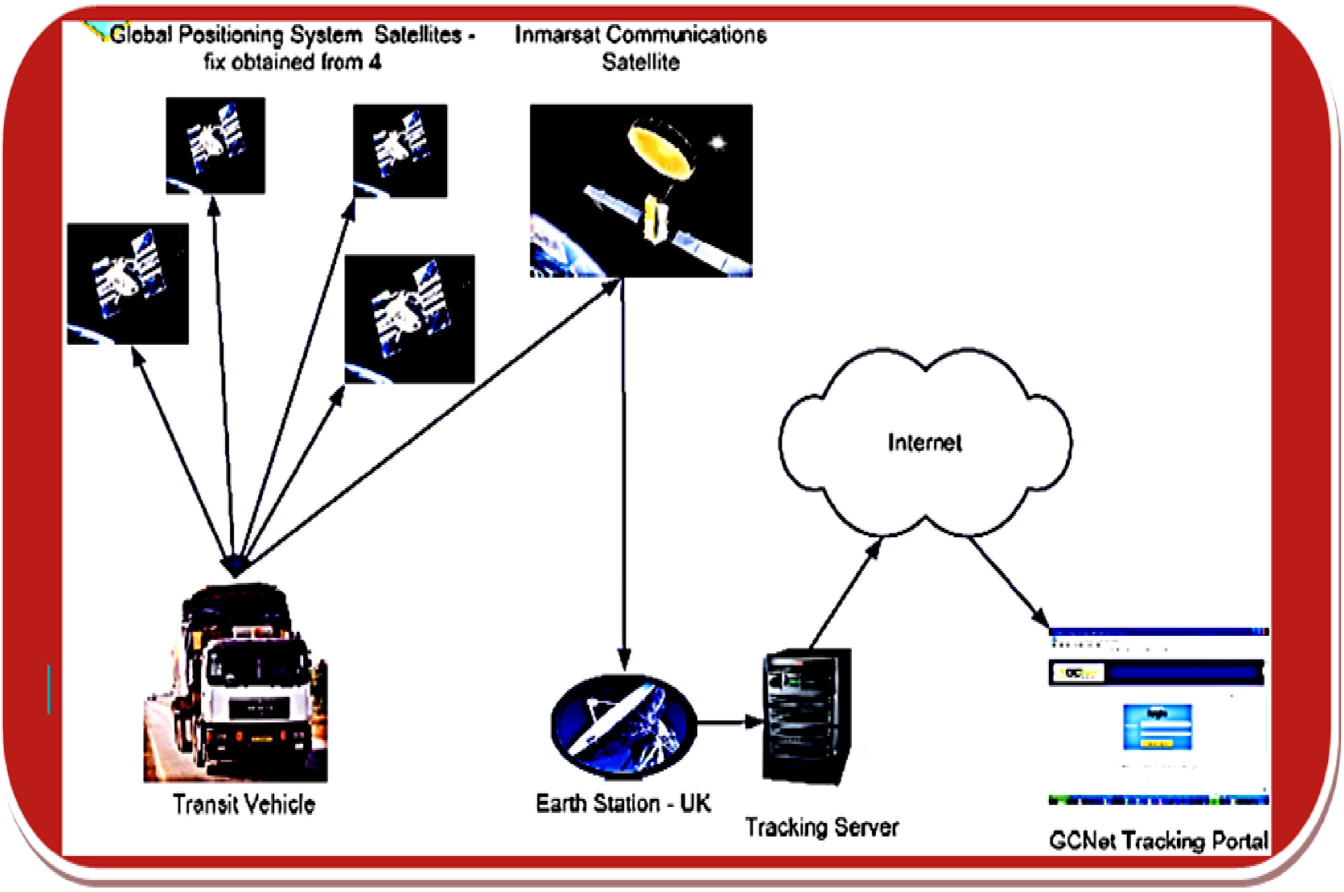


Figure 2.12: GCNet Satellite Tracking System

Source: CEPS Ghana

In the above setup, the positions and coordinates of cargo trucks are captured by four GPS and relayed to an IMARSAT Communication Satellite in space. The latter then transmits the captured information to a Satellite Earth Station in the UK.

The information is stored in a Tracking Server at the Earth Station for further processes. This information is received online via the Internet at the GCNet Tracking Portal terminals installed at the various CEPS entry and departure check points in Ghana. The stored information can always be read, studied or retrieved by browsing the internet anytime and anywhere.

CHAPTER THREE

LITERATURE REVIEW PART II: THEORETICAL FRAMEWORK

3.1 OVERVIEW

This chapter introduces and discusses the theories underpinning this research. These theories are chosen to explain why the research problems formulated in the introduction chapter exist in the road transport vehicle tracking industries in developing countries, notably in Ghana. The theoretical framework is situated within three relevant research theories discussed in the succeeding sections. The theories anchoring this study are: the DeLone and McLean IS Success Model series, the User Satisfaction Theories and the Technology Acceptance Model (TAM). For each theory, the following issues are discussed: the Origin / Background, Key Concepts/Propositions/Models, Criticisms and critics of the theories, Use of the theories in earlier researches/studies, and lastly, the Use of each theory in this current study.

The chapter reviews literature relevant to the field of IS studies and IS success model development. It further provides background information regarding the concepts or artifacts of IS success model development considerations, and necessarily reviews existing research works conducted in field of IS success model development series to study how a similar conceptual IS success model can be developed for use in intelligent vehicle tracking systems (IVTS). The theoretical framework and theories discussed in this chapter serve as groundwork or foundation to the proposed IS success model and the resultant discourse will highlight the correlation / relationships and the influences of these theoretical concepts in relation to the creation of the proposed IS success model. Finally, the chapter ends with a summary of the outcome of the reviews, lessons learnt & skills acquired, and how these skills can impact and aid in designing appropriate research methodology for this study.

3.1.1 Scope of the Review

Primarily, the search for literature for this study was focused on materials from text books, research papers, journal articles, conference proceedings, online libraries, etc., within the IS and MIS disciplines. In conducting this review, emphasis was placed on relevant literature on "utilitarian information systems" employed by organizations and individuals to address IS and their service performance problems. The cited references reviewed are those that have examined the developmental series of IS success, system and service user-satisfaction theories/models. For this study, only contemporary issues reporting on empirical studies and results of interrelationships among these models and theories were reviewed.

3.1.2 Organization of the Review

Due to the high reputation associated with the DeLone & McLean IS Success Model (D&M model) series by the IS research community and in academic literature (Stacie Petter, et al., 2008), as well as the Technology Acceptance Model (TAM), this literature review section is suitably organized around IS success studies and IS success model development series that are found using the D&M success model classifications. In addition to that, User Satisfaction Theories were also reviewed. In this current study, findings identified from IS success empirical studies and satisfaction theories are organized into constructs or measurement dimensions. The review is grouped into subsections based on the anticipated causal relationships linking harmonized success concepts, in order to examine potential support for each of the anticipated relationships contained in the D&M IS success models and user satisfaction theories, as posits the 2003 updated D&M IS success model. In IS studies, IS success models are examinable at diverse levels and from varying perspectives. Based on this proposition; this current review is focused on exploring the various IS success concepts and relationships associated with the IS success model development series to inform the development of the proposed IS success model stipulated in section 1.3 which discusses the research objectives.

3.2 THEORIES UNDERPINNING THE RESEARCH

3.2.1 User Satisfaction Theories

In view of the fact that, user satisfaction plays very critical role in measuring the performance and usefulness of systems or services, it is basically admitted that during system/service usage, user satisfaction determinants must be identified, analyzed and compared with perceived, expected and desired performance of a system/service. Thus, many researchers develop different models for determining various influencing variables of user satisfaction. Several researchers do apply user satisfaction theories developed by user behaviourists in different fields. These theories are built on structured models comprising the antecedents and consequences of user satisfaction. For the purpose of this current study, the following subsections discuss the origins and specific but relevant user satisfaction theories.

3.2.1.1 Origin of the User Satisfaction Theories

Propositions by earlier researchers of User Satisfaction, linking disconfirmed expectations to subsequent user satisfaction are advanced by Engel, Kollat, and Blackwell (1968) and Howard and Sheth (1969). These researchers conclude that, "user-satisfaction increases as performance expectation ratio increases". Their conclusion is based largely on the results of a seminal laboratory study by Cardozo (1965). Since then, further experiments in the laboratory (Olson and Dover, 1979, 1976), (Anderson, 1973), (Olshavsky and Miller, 1972), (Woodside, 1972),(Cohen and Goldberg, 1970), and longitudinal surveys in the field suggest that user satisfaction decision is very complex than perceived by many researchers (Oliver 1977; Swan 1977).

3.2.1.2 Expectation Disconfirmation Theory

A researcher, Vann Raaij (1991) posits that, user-expectations play key role in the user decision making process. Vann Raaij further posits that, "in the pre purchase/subscription stage of a system/service, expectations influence user decisions", with respect to the kind of system or service to install or subscribe, and more imperatively, the performance of the system/service. During system/service usage, expectations can be affected by the attitude of system or service personnel, other users and equipment performance.

Other prominent researchers of User Satisfaction studies – Oliver, Kurtz, Brown etc, similarly stress that, “in the post purchase/usage stage, expectations of system/service quality and performance form the basis of evaluations of user satisfaction” (Sprenge et al., 1993), (Kurtz and Clow, 1990), (Brown and Swartz, 1989), (Parasuraman et al., 1988)&(Oliver R. L., 1980). The expectation disconfirmation theory as modelled by Tse Wilton (1980) is as illustrated in fig 3.1 below.

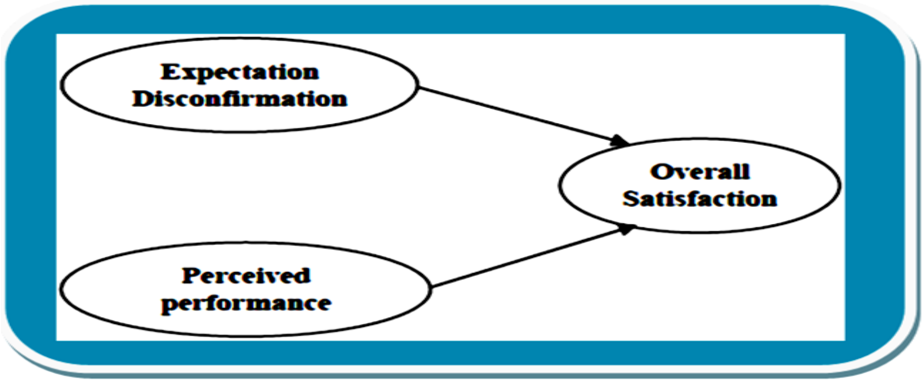


Figure 3. 1: The Expectation Disconfirmation Model

Source: Reproduced from (Setayesh Sattari, 2001)

The model is basically composed of three concepts: “The Concept of Expectation Disconfirmation”, “The Concept of Perceived Performance” and “The Concept of Overall Satisfaction”. The rational for this model is that, “if actual perceived performance as expected, is confirmed below expectation, it may negatively affect user-satisfaction and override the impact of confirmation, referred to as “positive disconfirmation”, resulting in user-dissatisfaction” of system performance (Oliver R. L., 1980). These theorists find “perceived system performance to be a direct and independent determinant of user-satisfaction”. The overall user satisfaction of the proposed IS success model for this current study is partly based on this very theory.

3.2.1.3 Expectancy Disconfirmation Theory– Oliver R. L.

The expectancy disconfirmation theory is researched and developed in the field of User Satisfaction studies. The model is deduced from the works of earlier researchers, namely: Oliver R. L., (1980, 1980b), Andreasen (1977), Day (1977), Engel, Kollat, Howard and Sheth (1969) and Blackwell (1968); a series of experiments were also conducted in that field (e.g., Oliver (1977); Anderson (1973); Olshavsky and Miller (1972); Woodside (1972);

Cardozo (1965); etc. Theories proposed to explain user-satisfaction decisions and reviewed by Oliver (1980a) suggest that Helson's (1964) Adaption Level Theory is an efficient explanation of satisfaction decisions. Oliver (1980b) suggests that expectations create a frame of reference for comparative judgments. These researchers agree that user expectation is a factor in post-usage and post-purchase evaluations, but disagreement exists regarding "the measures of the antecedents of satisfaction and satisfaction itself" (Oliver and Linda 1981).

3.2.1.4 Key Concepts of User-Satisfaction Theories

a) The Concept of User-Satisfaction

According to Oliver R. L. (1996), "Satisfaction as a variable, is the users fulfilment response", i.e., a verdict that a system or service features, has offered a "pleasurable level of user-related fulfilment (Oliver R.L 1996). Satisfaction entails the post-decision evaluation of a system/service experience. Such post-choice evaluations drive repeated choice and thus affecting a company's long-term profitability. Satisfaction determines intentions to patronize or not a system/service in the future; wherefore, intentions are a user's anticipation of future behaviour towards a system or service.

b) The Concept of User-Expectations

The first component of disconfirmation is expectation. Basically, disconfirmation is a predisposing prediction – sometimes stated as a probability or likelihood – of attribute or product performance. According to Kristin Diehl et al. (2010) user-satisfaction is intimately linked to user-expectations. It is an anticipation of future consequences based on prior experience and other varied sources of information. User-satisfaction is a comparative referent for system or service performance. Expectations are predictions about the future, the focus of which can range from general beliefs to specific system/service characteristics (Oliver 1996). The interest here is on users-predictions about how closely they will be able to match their established preferences when choosing from a given set of options (Oliver R. L. et al, 1999), (Baumol and Ide, 1956).

c) The Concept of Expectation Disconfirmation

Disconfirmation is the result of comparing pre-purchase and pre-use "expectations" about system/service performance to the experiences or outcomes actually realized in the use of the system/service. Based on this insight, Oliver R. L. (1996) posits that, when expected and perceived system/service offerings do not match, then users experience disconfirmation. In this sense, disconfirmation determines “a level of satisfaction with a system/service” performance (Oliver R. L., 1996). It can be negative, in the case of a worse-than expected outcome, or positive, in the case of a better than-expected outcome. Subsequently, Oliver posits that, “either less positive or more negative disconfirmation should lower satisfaction with a given system/service”.

d) The Concept of Moods

Within the antecedent categories, moods of users play a major role in creating user-satisfaction. These are “positive or negative feelings of a largely non-thinking nature, although certain events may have preceded their appearances” (Oliver R. L., 1996).

e) The Concept of Quality

One of the key antecedents preceding user-satisfaction of a system/service is “Quality”; it is a cognitive judgment that summarizes the exceptionally good (or bad) elements of the system/service, especially when compared with other direct alternatives or offerings (Boulding, et al., 1993).

f) The Concept of Service Quality

First of all, the factor “quality” refers to consistent delivery of system/services that fully meet user needs, wants, expectations and desires; it is the difference between expected and perceived performance of a system/service. Thus, service quality is the result of an evaluation process where users compare their expectations about the performance of a system/service with their perceptions obtained after usage. It is a logical driver of perceived system/service value.

Stonebraker and Leong (1994) uphold that, service quality requires a total system/service, which identifies user requirements, and establishes service delivery in conformity with predefined specifications; this principle also applies to system usage. Hence, "an organization's most significant success factor is the ability to deliver better user value than its competitors" (Bitner, 1990). Two concepts, the "Service Quality" and the "User Satisfaction" are conceptually distinct in developing system success models, (Boulding, et al., 1993). Thus, they are identified as part of IS variable for developing the proposed conceptual IS success model in this current research.

g) The Concept of Attitude

Another antecedent concept that is actually a hybrid of affective-cognitive judgment is attitude towards the use of systems/services. Attitude is a relatively stable judgment that "a system/service has desirable or undesirable properties" (Oliver R. L., 1996). Whereas moods can emerge as pure feeling states, attitudes result from deliberate processing of system/service-related information. Unlike satisfaction, "users do not have to experience attitudes toward systems/services; hence attitudes can exist prior to usage". In contrast, satisfaction is a post-usage phenomenon, it is purely experiential, and results from comparative processes, but attitudes do not require comparisons. Hence, in this present study, apart from user satisfaction, no details and comparisons are provided on the attitudes and behaviours of users of information systems and services, since such details are outside the scope of this current study.

h) The Concept of User Intentions

The term "Intention" refers to system/service user's "anticipation of future behaviour towards a service or system" (Oliver R. L., 1980). Primarily, perceived system/service quality has noteworthy effects on user satisfaction which in turn, has a considerable impact on system/service reuse (continuous usage) intentions. There exists straight affirmative relationship linking system/service quality perceptions and user intentions. Again, we experience positive interaction involving perceived system quality and user intentions. Adding to that; the "constructs of loyalty and switching come into play when determining user intentions", as suggested in Oliver's study.

That study also points to the fact that, "perceived system/service quality and perceived user satisfaction have direct effects on user intentions" (e.g., user loyalty or user switching to another system/service provider). Therefore, user intentions are one of the critical IS success variables identified for developing the proposed conceptual IS success model for IVTS in this current study.

i) The Concept of System Performance

The concept of system performance, as posits Oliver R. L (1980), is the "perceived amount of system or service attributes/outcomes received, usually reported on an objective scale bounded by good and bad levels of service" (Oliver R. L., 1980), e.g., courteous/discourteous service. This is frequently confused with quality, a judgment of performance excellence; although frequently substituted for satisfaction, recent data suggest that these concepts are separate and distinct. Thus, in the present research, IS system performance is identified as one of the key variables for developing the proposed conceptual IS success model that can be employed in measuring the performance of IVTS deployed in developing nations.

3.2.1.5 Criticisms of the Expectancy Disconfirmation Model

Oliver R. L. (1980) argues that disconfirmation alone is insufficient to explain user-satisfaction responses. Rather, Oliver proposes that "satisfaction is also directly related to pre-choice expectations, independently of the effect of disconfirmation; and that, pre-choice expectations act as a framework of reference for post-choice disconfirmation".

Oliver underlines that, system/service "outcomes poorer than expected are evaluated below the reference point, while those better than expected are evaluated above this baseline". Theoretical support for this proposition is derived from Helson (1959), whose seminal work in perception suggests that "stimuli are perceived only in relation to an adapted standard which sustains perceptions in the general vicinity of the standard". Oliver's proposition then reads that, "satisfaction results from an additive combination of the expectation level and subsequent disconfirmation" (Oliver R. L. (1980)". Empirical support for these propositions has been reported by (Linda and Oliver, 1979) and Swan (1977) respectively.

Arguably, the precise extent of user-satisfaction is a prerequisite for developing effective management strategies in every business. Thus, it is “only with reliable user feedback, gathered through adequate and appropriate assessment frameworks, can IS managers be in possession of facts that will allow them to implement user-satisfaction improvement programs”. In view of these facts, it is clear that “the Expectancy-Disconfirmation Paradigm (EDP) is a dominant framework that is employed in the assessment of user-satisfaction” concept. Irrespective of this dominance, researchers still have some unresolved issues” regarding this model. E.g., researchers Atila Yüksel of Adnan Menderes University and Fisun Yüksel of Sheffield Hallam University query the reliability of the expectancy disconfirmation model in assessing user-satisfaction, and challenge whether it is possible to apply the model in every situation (Atila Yüksel et al., 2001).

Oliver (1980) responses that, although it is agreeable that expectations are factors in post-usage evaluations; however, the “views of some researchers differ on the process of expectancy disconfirmation”. While some conclude that “the latter phenomenon exists implicitly whenever expectations are paired with unrelated performance”, at the same time, others view user expectation as a “comparative process culminating into an immediate satisfaction decision”. Others still pursue it as a “distinct cognitive state resulting from the comparison process and preceding a satisfaction judgment” (Oliver, 1980). However, these criticisms do not affect the utilization of user satisfaction theories in developing existing IS models, including the proposed conceptual IS success model in this current studies, since User-Expectation (a critical aspect of these theories) has been employed as one of the critical independent variables required to constitute the concepts of IS Use by earlier researchers.

3.2.1.6 Shortcomings of the User Satisfaction Theories

Deducing from the above reviews, it is observed that, the originators of User-Satisfaction theories limited the potentials of the user-satisfaction theories to IS study, telecommunications research, marketing research, educational research, etc.; but the theorists did not consider that these theories can be applied in studying the usefulness and successfulness of intelligent vehicle tracking systems and services.

Thus, this current study has strived to apply user-satisfaction theories to the study of ITS technologies, precisely, in identifying independent and intervening variables needed in developing the proposed conceptual IS success model in the methodology section.

3.2.1.7 How Earlier Researchers Used Expectancy Disconformation Model in previous Studies

a) The Effect of Expectations & Expectancy Confirmation/Disconfirmation on Motorists' Satisfaction with State Highways – by: Theodore H. Poister et al. (2011)

According to Theodore H. P. et al., scholars in the USA have being asking questions like "How Citizens' Satisfaction with Public Services Might be affected by the Expectations Citizens have for Service Quality?" (Theodore H. Poister et al., 2011). These scholars have been persistently trying to find out whether "satisfaction with public services may be affected not only by the perceived quality of those services, but also by the quality citizens expect the services to have". In their quest to find solutions to these concerns, the researchers realize that this "line of questioning" needs to employ the "expectancy disconfirmation model".

Contributing to the efforts of these scholars to find solutions to these agitations, Theodore H. Poister et al., extend this series of research works by examining the influence or "effects of expectations and expectancy confirmation/disconfirmation models or theories on motorists' satisfaction with road conditions, traffic flow, and safety on state highways in Georgia" - USA. The researchers find that user "expectations have consistent negative effects, though modest, on satisfaction, with satisfaction declining as expectations increase". They endorse that those consequences acquire expectancy confirmation/disconfirmation besides those of perceived performance.

In their view, these consequences offer extra "support for the expectancy disconfirmation model. Concluding, they suggest possible future research works in this area. The lesson taken from the above study is that, public service providers must not only consider the perceived performance of services, but also the expectations of users regarding their satisfaction; i.e., the expectations of motorists must be critical determinants of user-satisfaction in addition to perceived service performance.

The implication of this lesson on this current study is that, the expectations of users of intelligent vehicle tracking systems must be considered as a crucial independent variable of the concept of information system use. This lesson and its implication are very useful and relevant to the proposed conceptual IS success model in this current study, and are applied as such.

b) Application of Disconfirmation on User Satisfaction Determination Model in Mobile Telecommunications – The Case of Prepaid Mobiles in Iran, By: Setayesh Sattari (2007)

Setayesh Sattari (2007) underlines in a study that, "user-satisfaction is a critical issue in the success of any business system". Hence; one of the key challenges of the mobile market in Iran is "how mobile operators can satisfy and retain their customers and also manage service quality", which holds a "significant importance to users' satisfaction and their perceived performance". In that study, Setayesh S. tries to find a model which could best describe user-satisfaction formation in the mobile telecom sector in Iran. She applies and evaluates this model in the Iranian telecom market by conducting user-satisfaction survey (Setayesh Sattari, 2007). In the study, Setayesh S. chooses the refined "Expectation Disconfirmation Model" (discussed in section 3.2.1.2 and fig 3.1 above) to answer her first research question, i.e., "What is the model for determining user satisfaction in mobile telecom services in Iran?"In order to answer the second research question, i.e.; "How is the chosen model applied in the Iranian prepaid mobile market? To answer this question, Setayesh applied the updated Disconfirmation Model in her study. From that model, she identifies one proposition and five hypotheses to qualify the constructs of perceived performance. Setayesh concludes in her study that, three constructs; Expectation Disconfirmation, Desire Disconfirmation and Perceived Performance are vital determinants of overall user satisfaction in Iran's Mobile Telecom market".

The lesson gathered from this study is that, in addition to the concepts of perceived system & service performances and user-expectations, the concept of User-Desirability was considered as one of the key independent variables of IS use in developing User-Satisfaction model for Iranian Mobile Telecom Services. One more lesson picked out of the above research is that, the Expectation Disconfirmation Model can be employed to best describe user-satisfaction establishment in mobile telecom services.

The implication of this lesson on the current study is that, in order to satisfy users of intelligent vehicle tracking systems with respect to system & service performances, it is imperative to include the concept of User-Desirability.

This concept is embedded in the expectation disconfirmation construct which will be one of the input variables of the concept of IS use in the proposed IS success model in this current study.

c) Disconfirmation and Satisfaction with a Retail Service; By: John E. Swan & I. Frederick Trawick (1981)

In that study, two researchers, John E. Swan and I. Frederick Trawick of the University of Alabama in Birmingham investigate the applicability of disconfirmation model of user satisfaction / dissatisfaction in a retail setting (John E. S, et al., 1981). The result of their inquiry is that, positive disconfirmation increases as user-satisfaction increases (i.e., system/service performance exceeds user-expectation). This suggests that, their model is useful in understanding user satisfaction in retail and other systems and services settings, such as intelligent vehicle tracking systems. John E. Swan, et al. (1981) underscore that, the process that determines user satisfaction and dissatisfaction commences with expectations that users go through when making system/service usage choices. They posit that, “expectations involve an anticipation of how well the system/service will perform on some attributes of importance to the user”.

They further maintain that, “when the system/service is used and the user experiences how well the system performs, his/her expectations will be exceeded; i.e., satisfaction will be high; or matched with resulting satisfaction; or, if performance is short of expectations, dissatisfaction will result”. Summing up, John E. Swan, et al. (1981) conclude that, “satisfaction depends upon how expectations are confirmed or disconfirmed”.

These researchers propose a model that largely follows R. L. Oliver’s (1980a) concept of expectation-disconfirmation approach to user satisfaction. Referring to the studies of Day (1977), they conceptually define User Satisfaction as a “conscious evaluation or judgment that a system/service has performed relatively well or poor, or, that the system/service is suitable or otherwise for its use or purpose”. Finally, they simplified their model as shown in fig 3.2 below.

Figure 3. 2: Simplified Disconfirmation Model

Source: (John E. S, et al., 1981)

From their model, the researchers posit that, disconfirmation is a causality of user satisfaction, which in turn results in user's intention to reuse a system/service.

The insight gained from the about research work is that, for service providers to establish total satisfaction of users of retail services, the service providers must first determine the types and levels of user-expectations and strategize to meet such expectations. In relation to this current study, the intuition gained from the above study implies that, for vendors of intelligent vehicle tracking systems to satisfy users of these systems/services, the former must endeavour to identify empirically the expectations of users regarding system/service performance, usefulness and successfulness. Based on the lesson learnt from the above research, in this current study, data were collected on the concept of User-expectations as one of the key variables of IS use in IVTS.

d) Evaluating the Expectations Disconfirmation & Expectations Anchoring Approaches to Citizen Satisfaction with Local Public Services - By Oliver James (2007)

Oliver James of the University of Exeter (UK) uses the expectancy disconfirmation theory to analyze the "relationship between individual citizens and users' expectations of local public service quality, the performance of services and satisfaction and dissatisfaction with services" (Oliver James, 2007). Oliver J. assesses expectation disconfirmation hypotheses for two neighbourhood public service providers in England: the "Household refuse collection services", and the "Overall Public Services", provided by the local authority. Oliver notes that the relationship between users' satisfaction and dissatisfaction is not symmetric. He posits that, "the predicted probability of dissatisfaction falls more rapidly than the predicted probability of satisfaction, thus, satisfaction of users rises as performance increasingly meets expectations".

Oliver J. finds in his evaluation study that, user "expectations need to be taken into account alongside more conventionally understood factors in using satisfaction surveys as a performance measure, especially if performance is not potentially to be overestimated in areas with low expectations or underestimated in areas with high expectations" (Oliver James, 2007). Oliver concludes that dealing with expectations and perceived performance is efficient approach for local authorities to elevate user-satisfaction.

It is learnt from the above study that, to improve upon user-satisfaction, there is the need to consider user-expectations when measuring system/service performance, in order not to over-estimate perceived performance. By implication, this current research investigated the potentials of user-expectation as a concept of IS use, and thus, played a key role in developing the proposed conceptual IS success model in the methodology section.

3.2.1.8 The Use of the User Satisfaction Theories in Current Study

From section 1.3 in the opening chapter, the prime objective for this research is to develop a conceptual IS success model applicable in intelligent vehicle tracking systems. Thus, this study is reflecting on "User Satisfaction Theories" as lenses, through which the proposed conceptual model is being constructed from empirical data. This theory facilitates the design of the research questions, survey questions and face-to-face interview questions for data collection and analysis for this current research.

3.2.2 Review of Information Systems Studies

3.2.2.1 Information Systems as a Field Of Study

Historically, academic study of Information Systems (IS) originated from the USA in the 1960s by the Association for Information Systems (AIS). The main objective was to develop and study theories/models, methods and systems using IT to operate and manage organizations (Izak Benbasat and Ron Weber, 1996). IS studies employ socio-technical strategy, situating the study of IT into the framework of management, institutions, organizations and humanity/society.

In one of such studies, Vladimir Z. defines Information Systems as an "integrated set of electronic devices for collecting, processing and storing data and for delivering information, knowledge, and digital products" (Vladimir Zwass, 2013). Both academic and non-academic institutions/organizations depend on IS to accomplish their activities, operations and transactions. Individuals also depend on IS to conduct "their personal lives". The worldwide diffusion of the Internet has facilitated accessibility to information anyhow, anywhere and anytime. With the advent of the digital wireless communications systems, the potentials of IS now corroborate all kinds of human mobility activities, such as IVTS. Vladimir notes that, "information and knowledge" have assumed the role of "vital economic resources". Vladimir however contends that, IS dependency has created novel societal threats, in terms of "intensive industry innovation and academic research". Indeed, it is in the light of these threats that this current research is being undertaken to contribute to current academic research aimed at mitigating and containing these societal threats.

3.2.2.2 The Role of IS in Institutions

Generally, IS corroborate institutional "operations, work knowledge and management" in organizations (Vladimir Zwass, 2013). The basic structure of organizational IS can be modelled as illustrated in fig. 3.3 below. Basic elements identified with IS structure include (from top management level): Management Support (e.g., Executive Information Systems (EIS); Decision Support Systems (DSS) & Management Reporting System (MRS); Support of Knowledge Work (e.g., Professional Support Systems (PSS); Collaboration Systems (CS), Knowledge Management Systems and Operational Support (Efram Turban, et la., 2010), (Applegate Lynda M., et la., 2009), (Irma Becerra-Fernandez and Dorothy Ledner, 2008).

Figure 3. 3: Structure of Knowledge Work

Source: (Encyclopedia Britannica, Inc., 2012)

Traditionally, IS have been perceived in terms of their effects on individuals and organizations. Over the years, researchers have concentrated their efforts on delineating the nature of IS functions; such as, operational support and decision support, the impact of IS on end users (in this context, impact of IS on users of IVTS), or, the importance of IS to organizations as a whole. IS offers unique opportunities for competitive advantages in the new business climate. Descriptive IS models are classified for successful strategic applications and for evaluating the potentials of proposed applications. To a very large extent, many of these IS models are for general purpose business applications. In applying IS applications to IVTS, a more detailed IS success model is necessary, such as the one developed by DeLone & McLean (2003) and the replica proposed in this current study. Developing useful IS success model that meets the needs of users is one of the first and foremost important requirements of IVTS. If this is done properly, users of IVTS will have access to useful and relevant information, which can be critically essential for them. Thus, IS success models appropriately developed for users of IVTS will be antecedents to increased system use, as well as saving users' time in accessing information.

3.2.2.3 Theory Building in IS Studies

In a study, Cathy U. (2009) points out that, theory construction in contemporary IS research is a big concern to many researchers (Cathy Urquhart, 2009). It is for this reason that Gregor (2006) posits a structure of theory in IS studies which he categories as: "Theory for Analysing, Theory for Explaining, Theory for Predicting, Theory for Explaining and Predicting, and Theory for Design and Action". Both Gregor (2006) and Dey (1993) propose that, among other theories, the Grounded Theory (GT) possesses the ability to create theories in IS studies that encompasses identified categories, since GT is embedded with necessary "building blocks of any theory", including constructs, the structure of categories and associations linking identified constructs that form theoretical coding. It is partly for this reason that GT is employed as the main method of data collection & analysis, and to develop a conceptual IS success model in this current study.

More studies conclude that, IS research is characterized with the utilization of several theories adopted from different fields of studies (Baskerville & Myers, 2002); e.g., the use of TAM by DeLone & McLane (2003) in developing IS success model. These researchers advocate the use of GT to build theories within IS field of study, since it is usually helpful to import theories from other disciplines into IS research. They further suggest that, GT is useful in creating theories about phenomena experienced by users of information systems. Note: the guidelines for using grounded theory as a research method is also fully outlined in the research methodology chapter in this current study.

3.2.3 Information System Success Studies

Many researchers including, Rai et al., (2002), Seddon (1997), DeLone and McLean (1992), and Bailey and Pearson (1983) concede that, IS success together with its determinants or causal factors are believed to be crucial to the field of IS studies. Nonetheless, empirical findings from existing researches turn out to be "inconsistent", thus, continues empirical studies in IS field are much needed (Rai et al 2002). It is therefore the object of this current research to contribute to the on-going IS success studies with a view to gain more insights into IS success for more use by individuals, groups and organizations.

These researchers observe that relationships between the constructs of IS success may be the result of omission of some factors/features, and these may go a long way to affect the success of information systems. They further suggest that, this setback could be alleviated by studying IS success variables together with its probable determinants, by answering specific questions like; "How do the various constructs reflecting IS success affect each other?", and "How do these IS success variables depend on concepts characterizing the users and the context?" (Rajiv Sabherwal, et la., 2006). This current research has attempted to answer these and other related research questions in the succeeding subsections.

3.2.3.1 Six Constructs Of IS Success Model

In the views of DeLone and McLean (1992), the basic IS success model consists of six constructs, these are: System Quality, Information Quality, Service Quality, System Use, User Satisfaction and System Benefits. The following subsections discuss how each of these six constructs is measured.

a) The Construct of System Quality Measurement

In a research work, Davis Fred (1989) posits that, “perceived ease of use is the most common measure of system quality, owing to the large amount of researches relating to the Technology Acceptance Model (TAM)" (Davis, 1989). Besides perceived ease of use, the following eight factors developed by Rivard et al. (1997) are used to measure IS quality; these are: “system availability, reliability, portability, user friendliness, understandability, effectiveness, maintainability, economy, and verifiability”. Note: the survey questions and face-to-face interview questions designed to collect data for this current research were based on some of these variables/factors.

b) The Construct of Information Quality Measurement

One of the key dimensions of end-user satisfaction instruments is information quality (Doll et al., 1994; Baroudi & Orlikowski, 1988 and Ives et al., 1983). Thus, information quality is measured as “a component of user satisfaction” and not as unique construct of IS success. Realizing that “measures of this dimension are problematic for IS success studies”, Fraser & Salter (1995) develop basic scale of information quality. Utilizing literature that is relevant to the type of information system under study, other researchers develop their own scales to measure information quality. In the opinions of these researchers, information quality is the desirable characteristics of system outputs; e.g., the concept of "relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, and usability" exhibit the quality of information processed and produced by a system. These characteristics of information quality formed the themes of the interview and survey questions employed in collecting data for this current study.

c) The Construct of Service Quality Measurement

Jiang et al. (2002) establish that Service Quality (SERVQUAL) is indeed a satisfactory instrument for measuring IS success. Yoon & Guimaraes (1995) also identify "user skills, experiences and capabilities of support staff", as additional crucial measures of service quality (Yoon & Guimaraes, 1995). They highlight that; often, service quality "involves an external provider, since outsourcing for systems development and support" has become more popular nowadays. They further maintain that, service quality is the "quality of the support that system users receive from the IS department and IT support personnel". For instance: "responsiveness, accuracy, reliability, technical competence and empathy of the IT personnel are critical variables in measuring service quality. Thus, the factor "SERVQUAL", adapted from the field of marketing, is a popular instrument for measuring IS service quality" (Pitt et al., 1995). These service quality variables were considered in developing the survey questionnaire and interview questions for data collection in this current study.

d) The Construct of System Use Measurement

The following multiple measures of IS use have been suggested by earlier researchers through empirical studies. These measures are: "intention to use, frequency of use, self-reported use, and actual use". Usually, on one hand, heavy system users "tend to underestimate use"; whilst light system users on the other hand, "tended to overestimate use", as a measure of IS success. Earlier researchers argue that, "frequency of use may not be the best way to measure IS use" (Doll & Torkzadeh, 1998); they argue further that, "more use is not always a better" way of measuring IS use.

To support their position, they develop an instrument for measuring system use "based on the effects of use, rather than by frequency or duration" of use. Other researchers, e.g., Burton-Jones et al. (2007) further propose the need to examine system use from multilevel perspectives across the individual and organizational levels to enable a better understanding of this construct. After long debates, researchers have come to accept that, "System use" is the "degree and manner in which staff and users utilize the capabilities of an information system" (Burton-Jones et al., 2007). This refers to the "amount of use, frequency of use, nature of use, appropriateness of use, and purpose of use". These components of system use measurement were also employed to design the interview questions and the survey questionnaires.

e) The Construct of IS User - Satisfaction Measurement

User-satisfaction measurement consists of factors relating to "system quality, information quality, and service quality, rather than only measuring overall user-satisfaction with the system" (Rai et al., 2002), (Doll et al. 1994) and (Ives et al. 1983). These factors differentiate the diverse "quality dimensions from these instruments and use a single item to measure overall satisfaction with an information system". The above researchers conclude that "User-satisfaction is the users' level of gratification or pleasure" with the quality of the information produced and system/service performance experienced. The "most widely used multi-attribute instrument for measuring user information satisfaction" is outlined in Ives et al. (1983); details are not covered here since it is outside the boundary of this study.

User-satisfaction is generally applicable to information system users, as well as users of IVTS and services. Research works on user satisfaction measurement take the form of "how to generate satisfied users and alleviate any potential User-dissatisfaction" (Oliver R.L., 1997 Pg. 13). According to Oliver, interpretations in the "system-user" realm define satisfaction as a "Fulfilment Response". In this context, fulfilment means that, the objective of a system-user is identified and established, as in basic motives of safety in ITS.

In Oliver's explanation, "delightfulness" implies that "fulfilment gives pleasure or reduces pain, as when a problem in life is solved". Meaning that, users can be "satisfied just to get back to normalcy, as in the removal of an aversive state".

Furthermore, fulfilment is not essentially restricted to the case of meeting users' needs and wants only. Some phenomena such as over-fulfilments are satisfying if they offer extra "unexpected pleasures". Under-fulfilments on the other hand, are satisfying if they provide superior pleasures than one anticipates from a system or service usage. Oliver underscores that, any displeasures resulting from any under-fulfilment situations automatically result in user-dissatisfaction. Fascinatingly, over-fulfilments resulting from system usage are dissatisfying if they are unpleasant to system users.

f) The Construct of System Net Benefits Measurement

In a research work, Torkzadeh & Doll (1999) define system Net Benefits as the "extent to which information systems are contributing to business success of individuals, groups, organizations, industries, and nations" at large. According to them, net benefits of information systems are associated with the following success concepts; "improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, user welfare, creation of jobs, and economic development" at large.

They accentuate that, system net benefits are measured at individual and organizational levels; adding that, at the individual level, perceived system usefulness which results into "job impact" is the factor frequently used to measure system net benefits (**Note:** these levels and measure were considered in preparing the data collecting questions in the methodology section). Equally important variables for measuring system benefits are perceived ease of system/service use, and perceived system/service effectiveness. The researchers above claim that, a "three-factor construct (i.e., task productivity & innovation, user satisfaction, and management control)" are another set of instrument employed to measure different aspects of impacts of system usage on the individual. To them, the most widely accepted instrument for measuring system net benefits at the organizational level is "profitability", i.e., persistent profit maximization (this instrument was also considered in designing the survey questionnaire).

They posit that, information leading to the measurement of net benefits at organizational levels must not be elicited from system users' level, since most of the time; the majority of system/service users can neither take decisions nor answer profitability questions.

Rather, such information must be collated from senior managers and above. For this reason, research participants for this current study were duly selected from officers in decision making positions in some selected organizations who use vehicle tracking systems & services in Ghana, where data were collected (details are provided in the methodology chapter).

In one study, Chervany, et al., (1972) refer to cost reductions in system use as dependent variable for organizational performance measures. In another study, Emery (1971. p. 6) notes that: "Benefits from an information system can come from a variety of sources, e.g., reduction in operating costs of activities external to the information processing system as an essential measure of Organizational Impact" on IS; i.e., the effect of information on organizational performance.

3.2.3.2 The Composite IS Success Measurement Instrument

In yet another study, Sedera et al. (2004) propose a multi-dimensional IS success measuring instrument, see table 3.1 below. The instrument comprises of four measurement dimensions or success constructs (discussed above). The instrument further consists of "twenty seven measures, they include: nine measures of system quality, six measures of information quality, four measures of individual impact and eight measures of organizational impact" (Sedera et al., 2004). The research questions and data collection questionnaire for this current study were centered on the constructs and variables identified in Sedera et al. (2004) measuring instrument table, including user satisfaction and system use.

Table 3. 1: Validity Measures of IS Success

Source: Reproduced from (Stacie Petter, et al., 2008; Cited In: Sedera et al., 2004)

SYSTEM QUALITY	INFORMATION QUALITY	INDIVIDUAL IMPACT	ORGANIZATIONAL IMPACT
Ease of Use	Availability	Learning	Organizational Costs
Ease of Learning	Usability	Awareness (Recall)	Staff Requirements
User Requirements	Understandability	Decision Effectiveness	Cost Reduction
System Features	Relevance	Individual Productivity	Overall Productivity
System Accuracy	Format	-	Improved Outcomes/Outputs
Sytem Flexibility	Conciseness	-	Increased Capacity
System Sophistication	-	-	e-Government
System Integration	-	-	Business Process Change
System Customization	-	-	-

3.2.3.3 Future Research On IS Success Measurement

More empirical research is required to investigate the relationships between the constructs in table 3.1 above to ensure adequate research works on IS success measurement. This is one of the motivational reasons for undertaking this current study. However, there could be other more complex effects that could explain the relationship between these success-constructs at either the individual or organizational levels of analysis.

There are also a number of other boundary conditions that deserve attention, e.g., "the voluntariness of the system, the timing of success measurement and the type of information system examined" (Stacie Petter, et al., 2008). These researchers alert that, further studies are also required on the relationships among "information quality and use, user-satisfaction, and net benefits". To contribute to these further studies, this current research is aimed at collecting empirical data to analyze the effects of System Use on User Satisfaction and Net Benefits, to buttress the efforts initiated by Burton-Jones & Straub (2006) to improve the "measurement of system use, by incorporating the structure and function of Use" in the process of developing IS success models.

By implication, this current research considers system use as one of the key IS success concepts for developing the proposed IS success model for intelligent vehicle tracking systems.

3.2.4 IS Success Model Development Series

3.2.4.1 Development of IS Success Models

Over the years, seasoned and contemporary researchers have been deriving a number of IS success models to explain what makes some information systems successful and others not. The practical application of the "D&M IS success model" is naturally dependent on the organizational context. These early researchers suggest that any researcher wanting to apply the D&M's IS success model must have an understanding of the information system and organization under study. In their opinion, this will determine the type of measures used for each success dimension.

In this regard, Seddon et al. (1999) develop a contextual matrix that is a valuable reference for the selection of success measures based on stakeholders' satisfaction and levels of analysis (individual application or IS function). Ideally, the D&M IS Success Model is applicable in a variety of contexts; however, "the limits of the model are not well-known or understood" (Seddon et al., 1999). Since then, a lot more researchers have been working around the clock to examine potential boundary conditions for the D&M model and to identify areas that warrant additional research attention. Indeed, this is another motivational factor behind this current study.

3.2.4.2 Existing Research Studies in the "IS Success Model" Development Series

Early attempts to define IS success were unclear due to the "complex, interdependent, and multi-dimensional nature of IS success" (DeLone & McLean, 1992). To address this problem, D&M (1992) reviewed researches published between 1981 and 1987, and created taxonomy of IS success models based on the outcomes of reviews of literature available at the time. In a research paper published in 1992, D&M identify six interdependent variables or constructs of IS success.

These are: “System Quality, Information Quality, Use, User Satisfaction, Individual Impact & Organizational Impact. Not quite long after the publication of their success model, IS researchers began proposing modifications and extensions to the original D&M IS success model.

In one of those studies in response to D&M’s call for further development and validation of their original model, Seddon & Kiew (1996), studied four out of the six constructs of the D&M IS success model (i.e., the System Quality, Information Quality, Use, and User Satisfaction). A further well-known proposed modification to the D&M IS success model is the changes offered by Seddon (1997). In his modification, Seddon argues that the D&M success model in its original form “was confusing, partly because, both process and variance models were combined within the same framework”; Seddon claims that, “this was a shortcoming of the model”. In response to Seddon’s claims, D&M (2003) explain that, “this was one of its strengths, with the insights provided respectively, by process and variance models being richer than either is alone”.

Seddon (1996) additionally suggests that “the construct of System Use is highly ambiguous” and proposes that “further clarification was needed to this construct”. For this purpose, Seddon (1997) creates “three different potential meanings to the concept of system, as well as breaking down the process and variances portions of the original D&M model”. On the contrary, Seddon's modifications complicated the original simple D&M success model, thus, “reducing its impact” as an instrument for measuring IS success.

Beside the modifications proposed by Seddon, there have been other calls to revise or extend the original D&M success model further. For instance, some researchers have modified the D&M model to evaluate the success of specific applications such as knowledge management (e.g., Kulkarni et al., 2006; Wu & Wang, 2006; Jennex & Olfman, 2002) and e-commerce (e.g., Zhu & Kraemer, 2005; DeLone & McLean, 2004; Molla & Licker, 2001). Again, other researchers have made more general recommendations concerning the original D&M success model; e.g., Ballantine et al., (1996). Recognizing these proposed modifications to their original model; DeLone and McLean themselves, in a follow-up study, review empirical studies that had performed since 1992, revise and update their original IS success model accordingly in 2003 (DeLone & McLean, 2002, 2003).

3.2.4.3 Related Research Works on IS success Model Development

There have been a number of studies that have attempted to advance the understanding of the D&M IS success model by bidding to validate some, or all, of the entire model in a single study. Seddon & Kiew (1996) examine the relationships among four of the constructs and found good support for them. Rai et al. (2002) compare the original D&M success model (1992) to the re-specified model created by Seddon (1997) and find that, the D&M's IS success model stood up reasonably well to the validation attempt and outperformed the Seddon (1997) success model. Once more, Sedera et al. (2004) test several success models, including the D&M (2003) and Seddon (1997) models, against empirical data and conclude that the D&M's model provides the best fit for measuring enterprise systems' successes.

Still, McGill et al. (2003) examines the full D&M's model, but finds some paths in the original IS success model insignificant. For this reason, DeLone & McLean, (2003) and Grover et al., (2003) conduct literature reviews to examine if the results of empirical studies support the relationships posited by the original IS success model. Their reviews disclose that some relationships within the model have received consistent support (i.e., significant results across all studies), while others have received only mixed support (i.e., some studies find some results to be significant while others are non-significant). Many researchers still perform meta-analyses to examine one or more relationships in the D&M model, e.g., Sabherwal et al. (2006), Bokhari (2005) Mahmood et al. (2001), etc. The most comprehensive meta-analysis examining the D&M model is performed by Sabherwal et al. (2006). Their work has been "instrumental in synthesizing the quantitative research related to IS success and has validated a substantial portion of the D&M's success model.

The lesson gathered here is that, researchers in IS studies have not yet been consistent on what should constitute the constructs of IS success models; and have settled on the 6 concepts discussed in section 3.2.3.1 above. By way of implication, this current study seeks to contribute to the on-going research works on IS success model development series, by extending the 6 concepts of the original D&M IS Success Model to be applied in intelligent vehicle tracking systems deployed in developing nations.

3.2.4.4 The "DeLone & McLean IS Success" Model

This section reviews the origin of the DeLone and McLean IS success model as an investigative tool for this current research study. This model is reviewed to serve as a learning lens, through which a conceptual IS success model is developed in this current research. It is reviewed to find out what the model/theory believes are the variables and concepts that contribute to "User Satisfaction" for Users of IVTS.

3.2.4.5 Theoretical Background of the D&M IS Success Model

The original D&M IS success model, an adaption of studies performed by Shannon and Weaver (1949) and Mason (1978), received wide attention from researchers in the area of User Satisfaction Research (DeLone and McLean, 1992). The model posits that "An individual's attitude and subsequent behaviour toward the utilization of IS are preceded by his or her beliefs about the quality of the information system being used" (e.g., IVTS, in the context of this study). Behaviour (e.g., Actual Use) is influenced by attitude (e.g. Satisfaction), and an individual's attitude is formed through actual use. Actual use of systems and user's attitude produce an "Individual Impact", which in turn creates an "Organizational Impact". Obviously, behaviour and attitude are thus reciprocal constructs which produce two possible interpretations:

a) "Whether a user performs an activity or not, an actual user behaviour is determined by their previously perceived qualities and formed attitude towards the activity";
b) "Whether a user forms a positive or negative attitude towards a system/service or not, the attitude is in turn influenced by their perceived qualities and actual behaviour".

3.2.4.6 Origin of the "IS Success Model"

Presenting a research paper in 1980 at the 1st International Conference on Information System (ICIS), Peter Keen identifies the "Dependent Variable" in Management Information Systems (MIS) Research, "as an important concern that needs to be addressed in order for the field of MIS to establish itself as a coherent research area" (DeLone and McLean, 2003).

Peter Keen underscores that, “If IS research is to make a contribution to the world of practice, then a well-defined outcome measure is essential”; adding that, “the evaluation of IS practice, policies, and procedures requires an IS success measure against which various strategies can be tested”. He emphasizes that, “without a well-defined Dependent Variable, much of IS research is purely speculative”. **Note:** It is for this reason that the current research has strived to identify and analyze required dependent variables and employ them in developing the proposed conceptual IS success model.

It is at this juncture that William H. DeLone (an Associate Professor of Information Systems and Chair of the Information Technology Department at the Kogod School of Business in American, Washington, DC) and Ephraim R. McLean (a Regents' Professor and George E. Smith, Eminent Scholar's Chair in Information Systems in the Robinson College of Business at Georgia State University, Atlanta), take up the challenge to review literature on research carried out on IS success so far. During their reviews, literature unfolds that, several studies have been going on to identify variables that contribute to IS success. They find that, the Dependent Variable in those studies, i.e., “IS Success” has been an obscured one to define; and lament that, “different researchers have addressed different aspects of IS success, making comparisons of findings difficult” (DeLone and McLean, 2003).

To organize this diverse research, as well as to present a more integrated view of the concept of IS Success, D&M pioneered a taxonomy of a comprehensive IS success model, as a framework for conceptualizing and operationalizing IS success. Their innovative nomenclature posits six major dimensions of IS success illustrated in fig 3.4 below. In the end, they review conceptual empirical studies following these six dimensions and are able to draw together the many aspects of IS success into a descriptive model and its implications for future IS research.

In formulating their framework, the two researchers suggest that, “a temporal process model of an IS Success is first created, containing various features, which can be characterized as exhibiting various degrees of system and information qualities”. They claim that, “users and managers experience these features by using the system and are either satisfied or dissatisfied with the system or its information products”. Lastly, D&M submit that, “the use of a system and its information products impact on the individual user in the conduct of his or her work, and these individual impacts collectively result in organizational impacts". The framework as originally modelled by DeLone & McLane is as shown in fig 3.4 below.

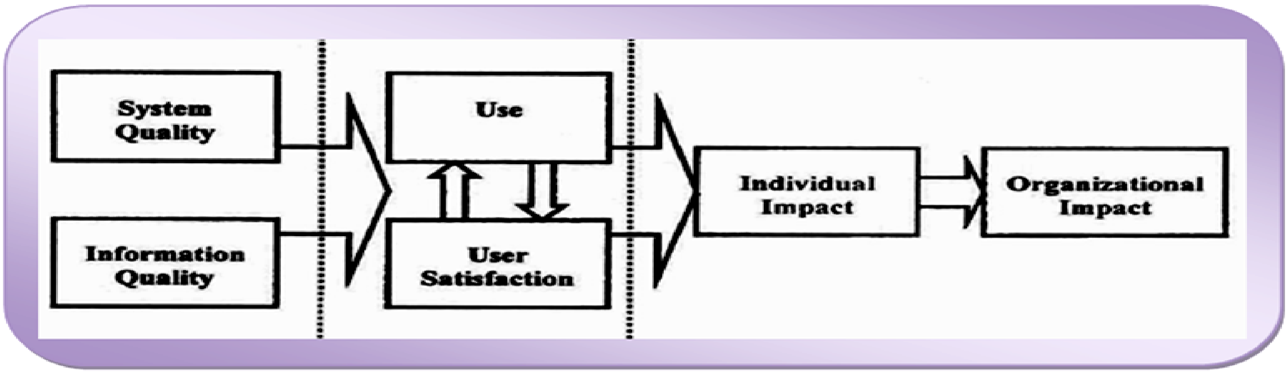


Figure 3. 4: A Model of the Research Structure & Outline

Source: Reproduced from (DeLone and McLean, 1992, Pg 87)

In their original work above, DeLone and McLean conclude that:

a) More field study research should investigate and incorporate organizational impact measures.
b) "This success model clearly needs further development and validation before it could serve as a basis for the selection of appropriate IS measures" DeLone and McLean, 1992, Pg 88).

In their 1992 studies, DeLone and McLean characterize system quality as "desired characteristics of the information system itself. More concretely, they incorporate four scales from the Bailey-Pearson's success measuring instrument into System Quality; these are: "Convenience of Access, Flexibility of the System, Integration of the System and Response Time (Bailey-Pearson 1983) and (Ives et al. 1983).

3.2.4.7 Criticisms & Debates on the D&M IS Success Model

Seddon (1997) claims that the D&M's IS model is ambiguous in the sense that, one variable of it –"Use", has three potential meanings; and argues that D&M must stick to only one meaning. Seddon further points out that, "some of the assumed causal relationships in the D&M's model are arguable and the model is incomplete". Seddon additionally signifies that, "the model misses the feedback loops from individual impact and organizational impact to user satisfaction and use".

According to Seddon et al. (1997), D&M (1992) conclude that their model clearly needs further development and validation before it could serve as a basis for the selection of appropriate IS Success measures" (DeLone and McLean, 1992, Pg 88). Therefore, Seddon et al., suggest that, D&M tried to do too much in their model, and as a result, it is both confusing and mis-specified. Another problem that Seddon et al. identify with the D&M IS Success model is the attempt by the latter to combine both "Process" and "Causal" explanations of IS Success.

In another development, Mohr (1982) criticizes the stance of D&M about their "distinction between a variance model and a process model" and suggests that, "it is obvious that even though IS use as a process is assumed to lead to individual impact and organizational impact, it is not necessary to regard it as a discrete event to be stated (use vs. non-use), as implied by process theories". Testing the D&M IS model, Iivari, Juhani (2005) find that, "there is much ambiguity related to the D&M model as a causal-explanatory model", adding that, "much of this culminates into the ambiguity of the concept of user information satisfaction".

On the positive side, many other researchers suggest that user satisfaction may be a reasonably good substitute for individual impact as long as it is confined to impact on work performance (Livari, 1997, Melone, 1990; livari, 1987, Goodhue, 1986). In the light of this, the D&M IS Success Model is being used in several IS studies, thus, this current studies also adopts the D&M IS success model, despite earlier criticisms.

3.2.4.8 Shortcomings of the DeLone & McLean IS Success Models

The updated D&M (2003) IS success model and various extension works by other researchers such as, Sedera et al. (2004), McGill et al. (2003), Grover et al. (2003), Delone & McLean (2003), Rai et al. (2002), Au et al. (2002), etc) considered only three independent variables (i.e., IS System Quality, Information Quality and Service Quality) as constructs of IS Use, but did not consider the Expectations of Users, regarding System & Service Performances, as well as System Usefulness & User-satisfaction, as salient and relevant independent constructs of IS use; this omission constitutes a theoretical gap which this current research has attempted to fill in.

Again, it is noted from the above reviews that, DeLone & McLean and the other researchers conclude that, their models are employed only in the field of information systems studies, but they did not indicate or even imply in any way that their model could be applied in other fields apart from IS studies. In these current studies, the constructs of IS Use have been expanded from three to five; the two additional relevant independent variables identified from the empirical data are, the concepts of: "User-Expected System Performance" and "User Expectation Disconfirmation". To address these short comings, this current study has applied the D&M IS success model to the field of IVTS studies; and to fill in the theoretical gap created by D&M (1992), the current researcher has identified "expected system performance" and "user expectation" as two new independent variables for the concept of IS use that can be considered in developing the proposed conceptual IS success model applicable in IVTS.

3.2.4.9 The Use of D&M IS Success Model in Earlier Research Studies

a) Extension of the D&M IS Success Model, By: Seddon and Kiew (1994)

After working with the DeLone and McLean's (1992) IS Success Model for some years, Seddon P. B. of the Dept of Information Systems – University of Melbourne - Australia, argues that, the model of D&M (1992) provides a scheme for classifying the multitude of IS Success measures into six categories. Seddon therefore, suggests that a model of "Temporal and Causal" interdependencies between these categories be incorporated into the 1992 D&M IS model.

Motivated by DeLone and McLean's call for further development and validation of their model developed in 1992, Seddon and Kiew (1994) test part of the D&M's model and assume in their result that, the causal model implied by D&M as shown in Fig 3.5 below, illustrattes "the relationships among the four variables in the dotted line box which D&M ((1992)did not specify in their model". By this way, Seddon et al. show that there are causal relationships between two "Independent Variables" ("System Quality" & "Information Quality"), two "Intervening Variables" ("User" & "User Satisfaction") and two "Dependent Variables (Effects) – ("Individual Impact" & Organizational Impact).

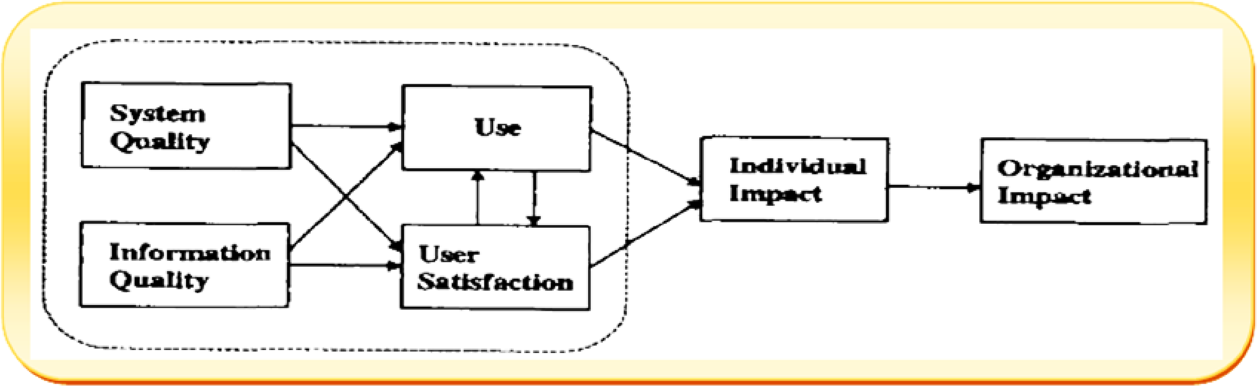


Figure 3.5: Path Model Implied by D&M IS Success Model

Source: Reproduced from (Seddon an Kiew, 1994)

Lessons drawn from the above study are that, there are always causal correlation amongst the concepts of system quality and information quality of an IS success model. Another set of causal associations exist between independent/input variables, intervening/bridging variables and dependent/output variables of an IS success model. There are two implications of these lessons in the opinion of this current researcher; firstly, the input variables of the proposed conceptual IS success model should include at least the concepts of system quality and information quality; secondly, the proposed model should have three main sets of variablles, namelly: the independent variables, the intervening variables and the dependent variables.

b) The Re-specified IS Success Model, By Seddon et al. (1997)

To contribute further to the series of IS Success Model development, Seddon et al. decide to specify some part of D&M's (1992) model by re-designing their model as shown in fig 3.6 below. This is a major modification by Seddon et al. to the D&M's IS (1992) success model.

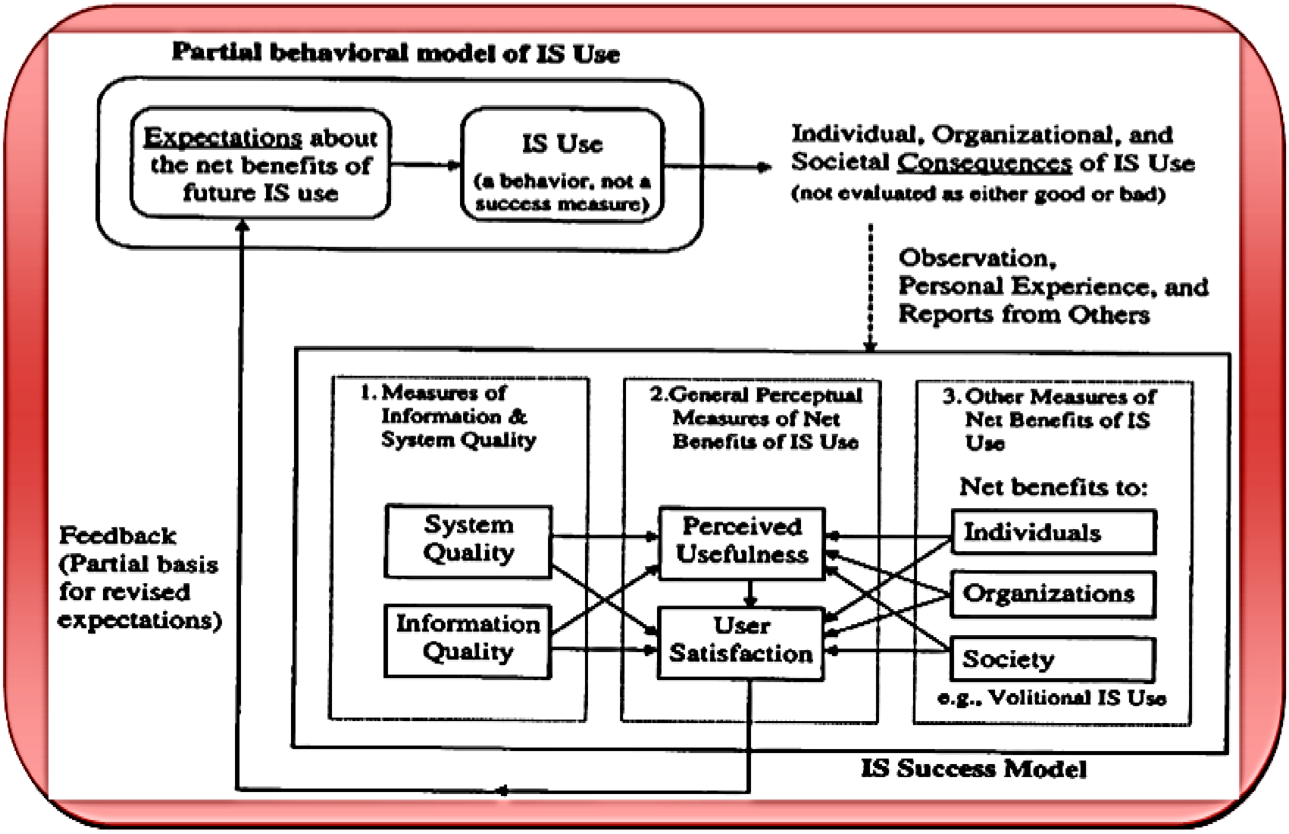


Figure 3. 6: Re-Specified Version of D&M IS Success Model

Source: (Seddon, P.B., 1997)

Table 3.2 below shows the Key Constructs of the Re-specified and Extended D&M (1992) IS Succcess Model by Seddon et al. as their contribution to literature and research.

Table 3. 2: Key Constructs of the Re-Specified D&M IS Success Model
Source: (Seddon, P.B., 1997)

Key Construct	Description
Rectangualar Boxes	IS Success Model
Rounded Boxes	Partial Behaviour Model of IS Use
Solid-line Arrows	Independent (necessary and sufficient) causality
Dotted-line Arrow	Influence (not causal, since observers' goals are unknown)

The Re-specified & Extended Model by Seddon et al assumes the existence of any IS, but it is not clear what an information system is in their model. In their-specified model, the interpretation process of D&M's model has been eliminated and replaced by two distinct variance models. The first variance is the "Partial Behaviour Model of IS Use", shown in the detached box at the top let of the model. The second variance model is the "IS Success Model" itself; i.e, the large rectangular box at the bottom. Lastly, the two variance models are linked through the path drawn from "Consequences of IS Use" to "IS Success Mode"l, and the feedback path from "User Satisfaction" (in the IS Success Model) up to "Revised Expectations" about the "Net Benefit of future IS Use" (Seddon and Kiew, 1994).

The lessons captured here are that, the above re-specification process has rather complicated the original D&M (1992) IS model which was very modest to a large extent; and the processes taken by researchers in developing IS success models need to be as simple as possible to ensure ease of model analysis, comparisons and to facilitate apparent understanding of such models. These imply that, precautions must be taken to simplify the processes taken in this current research to develop the proposed conceptual IS success model, in order to avoid complexity of the proposed model.

C) Cognitive Model of the Antecedents & Consequences of Satisfaction Decisions – By: Oliver Richard L. (1997)

The researcher has noted that, the curiosity in research on "user satisfaction has stimulated several thoughtful interpretations of the causes and effects of user satisfaction cognitions" (Day, 1977). According to some researchers, two constructs which play a major role in user satisfaction decisions are "Performance-specific Expectation" and "Expectancy Disconfirmation" (Latour and Peat 1979), (Olander, 1977), (Oliver 1977). Following this curiosity, Oliver R. L. (1997) extends this body of literature in a manner which allows one to incorporate the two suggested "antecedents and some hypothesized cognitive consequences into a coherent framework of user-satisfaction-related concepts". To Oliver R. L., user-satisfaction is a "function of the expectation level and perceptions of disconfirmation". Oliver models his proposition as shown in fig 3.7 below; according to him, "the revised post-use attitude is a function of the initial attitude and the influence of one's sense of satisfaction/dissatisfaction".

The prime aim of Oliver's study is to illustrate “a more substantial and simultaneous relationships among expectation, disconfirmation, satisfaction, and the traditional criteria of attitude and use intention than ever performed”. The Antecedents and Consequences of Satisfaction illustrating the Expectancy Disconfirmation Sequence model developed by Oliver R. L. are shown in fig 3.7 below.

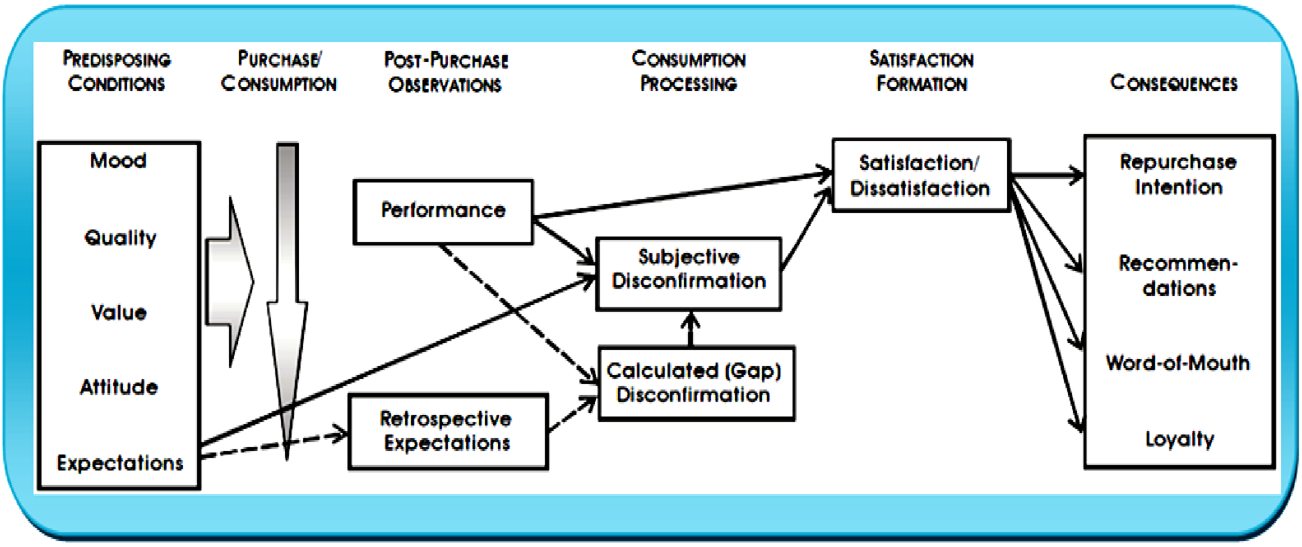


Figure 3.7: Expectancy Disconfirmation Sequence Model – Oliver R. L.

Source: Recaptured from Oliver R. L. (1997)

Contrally to the D&M IS success model, the independent construct of Oviler’s IS success model consists of the following concepts: “Mood, Value, Attitude, Expectations & Performance”. The lessons obtained from the above study are that Oliver has expanded the independent variables in the original D&M model by adding the concepts of Mood, Value and Attitude to existing IS success concepts (e.g., system performance, user-expectation, etc) as antecedents to user-satisfaction. He has also introduced new intervening variables and their effects on user-satisfactionin research. These lessons imply that, the original D&M model can be modified and applied in other fields of research such as ITS studies. Thus, the D&M IS success model is reflected on in this current research, by utilizing two concepts of independent variables (i.e., the concepts of system performance and user-expectation) to develop a conceptual IS success model for use in intelligent vehicle tracking systems.

d) Building a Knowledge Base for MIS Research: A Metal-Analysis of a Systems' Success Model – By: Mark I. Hwang, et al, (Mark I. H., et al., 2000)

Since the 1980s, the search for dependent variables in IS models has generated ongoing interests among Management Information System (MIS) researchers (Seddon 1997, Ballantine et al., 1996, Saarinen, 1996). Indeed, it is in this regard that, three researchers; Mark I. Hwang of Central Michigan University, John C. Windsor and Alan Pryor, both at the University of North Texas conduct a study to "create a knowledge base for MIS research" by extending the work of DeLone & McLean's model.

Building on two previous models, they develop a "success model by converting six independent variables (i.e., External Environment, Organizational Environment, User Environment, IS Operations Environment, IS Development Environment and Information Systems) to four success variables (use, satisfaction, individual impact and Organizational Impact)" as illustrated in fig 3.8 below. In their model, "each independent variable has varying strengths of relationships with different success variables" (Mark I. Hwang, et al., 2000). Their study also validates the positive correlation between systems success and independent variables, and their model can also be used to generate fruitful research opportunities. It also produces a means to discriminate among the success variables presented in the DeLone & McLean model.

Figure 3.8: An MIS Success Model – Mark I. H.

Source: (Mark I. Hwang, et al., 2000)

Their model above is an integration of the MIS research model proposed by Ives, Hamilton, and Davis (1980) and the D&M (1992) model. Their model includes five environmental variables that interact with one IS variable. These interactions are observed by three process variables or performance measures. Five environmental variables and the information system variable are shown as six independent variables in the model, and 3 process variables are replaced by the four success measures from the DeLone & McLean model. These four Success measures are the dependent variables of the Mark I. Hwang, et al., 2000 research model. The other 2 success measures of the D&M model, i.e., "System Quality" and "Information Quality" are combined to form the IS variable.

It is gathered from the above study that, besides information system variables (e.g. system quality, information quality, service quality, etc.) there are different sets of environmental variables that can influence the satisfaction of IS use.; these include external, Organizational, etc., environments. The implication of this innovation to this current research is that, new sets of variables can be searched for and employed to modify existing IS success models and apply them in measuring the usefulness and the succesfulness of intelligent vehicle tracking systems deployed in different environments, such as in Ghana and in other developing countries.

e) An Updated IS Success Model: By DeLone & McLean (2003)

The original D&M (1992) IS success model suffered criticisms from other researchers, thus DeLone & McLean themselves propose an updated version of IS success model in 2003, shown in fig 3.9 below. The critical purpose of their new model was to update the old one and evaluate its usefulness in the light of dramatic changes in IT evolution. The primary changes made to their original model were the addition of the concept of Service Quality, and a partial division of the "Use" concept into the concept of "Intention to Use" and "Actual Use" of systems. They also combine the concepts of "Individual and Organizational Impacts" of system use into a single concept called "Net Benefits". In their updated model; the construct of Service Quality was added to the existing concepts of systems Quality and Information Quality of the original model (see fig 3.9 below). They admonish that each concept should be measured or controlled separately, since they will affect subsequent Use and User Satisfaction. They also suggest the inclusion of the concept of Intention to Use systems and explain that, "Intention is an Attitude, but Use is Behaviour".

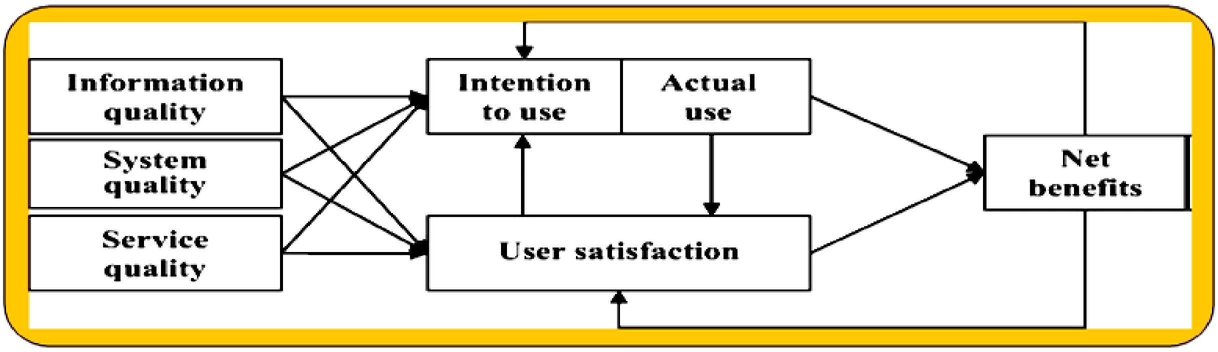


Figure 3. 9: The Updated D&M (2003) IS Success Model

Source: Captured from (DeLone and McLean, 2003, Pg 12)

DeLone and McLean lament that, attitudes and their associations with behaviour are notoriously difficult to measure; and researchers may choose to stay with Use, rather than attitudes and behaviours. Based on their admonishment, this current study does not cover behavioural aspects of system use or IS success. The new D&M (2003) IS Success Model now includes arrows indicating causalities and relationships/links among IS success concepts in a process sense. D&M caution that, the nature of these causal associations should be hypothesized within the context of a particular study, like this current IVTS study. Not quite long after their update, Wu and Wang (2006) note that, although the D&M (1992) IS success model has been updated, it clearly needs further validation before it can serve as a basis for the selection of appropriate IS measures (Wu and Wang 2006), thus, the need for further IS success studies; this is one of the motivation factors behind this current study.

It is learnt from the above study that, the core concepts of the intervening variables of IS use are the concepts of intention to use systems, the actual use of the systems and user-satisfaction. Another lesson picked is that, the authors bundled the impacts of the intervening variables into the consruct of net benefits for using information systems. The implications of the modifications in relation to this current research are that, the three primary independent variables (i.e., system, information and service qualities), the three core intervening variables and the concepts of net benefits can be the foundation lenses for developing the proposed conceptual IS success model for IVTS in this current study.

f) Review of IS Success Models, Dimensions, Measures & Interrelationships; By: Stacie Petter et al., (2008)

In that study, Stacie Petter et al. (2008) hint that both intention to use information systems and other measures of IS use have identical constructs in theory building (Stacie Petter, et la, 2008). They contend that, though in the updated D&M (2003) model, the concept of intention to use was distinguished from system use; for them, intention to use a system/service is basically an "individual level construct". In their opinion, separating the two constructs will yield complex data analysis processes. They illustrate the measuring of dimensions and interrelationships between basic IS concepts as presented in fig 3.10 and fig 3.11respectively.

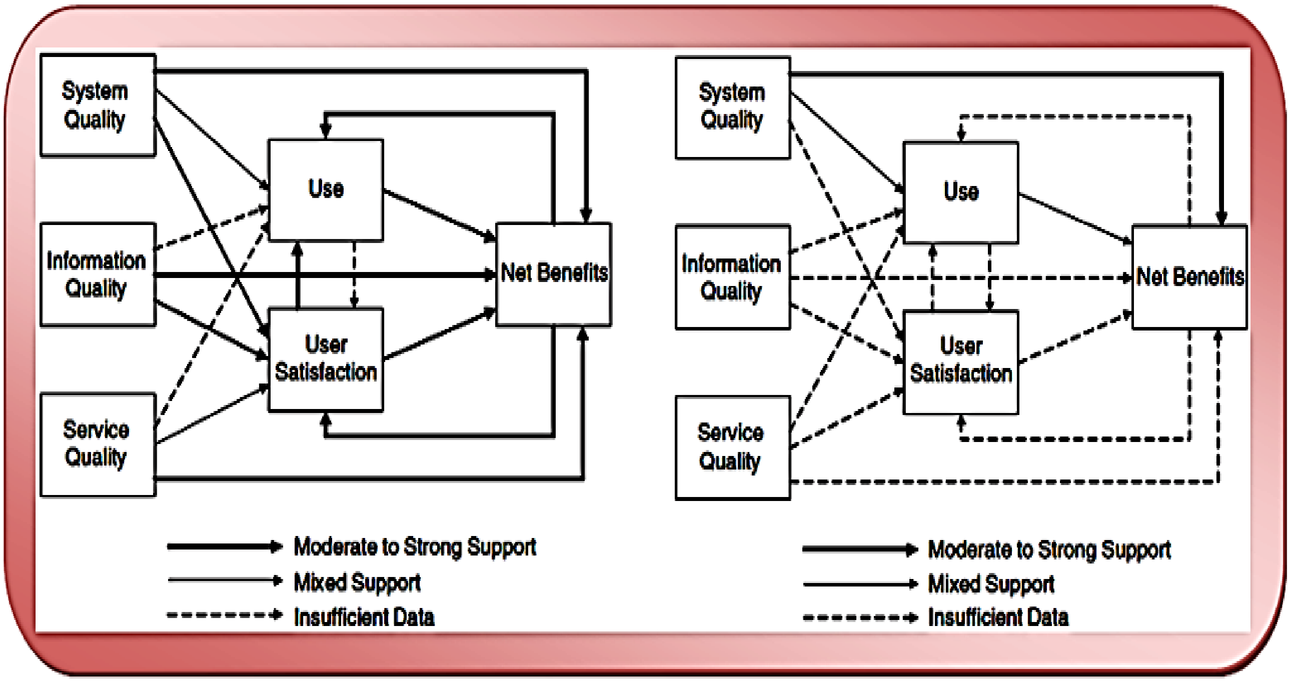


Fig 3.10 Fig 3.11

Figure 3. 10: Support for Tnter-relationships between D&M IS Success Concepts at Individual Level of Analysis

Source: (Stacie Petter, et la., 2008)

Figure 3. 11: Support for Inter-relationships between D&M IS Success Concepts at Organizational Level of Analysis

Source: (Stacie Petter, et la., 2008)

By comparing fig. 3.10 to fig 3.11 above, it is evidential that, inadequate researches at the organizational layer are eminent to assess the potency of relationships between fundamental IS concepts. Apparently, fig 3.11 shows that, steady support exists for the relationships between System qualities - Net benefits - Use, at the individual level. This translates to mean that, "high-quality systems lead to greater net benefits" (Stacie Petter, et la., 2008); in other words, systems that offer superior net benefits tend to be utilized very intensively.

Lessons acquired from the above study are that, the concepts of system quality, information quality and service quality levels of IS success have direct relationships with the net benefits accrued from using these systems. These net benefits in turn generate two concepts; firstly, they create the concept of User-satisfaction, and secondly, they generate the concept of more system use. The implications of these lessons on this current study are that, the rate of IS Use and the level of User-Satisfaction are antecedents and causalities of system net benefits. Thus, development of the proposed conceptual IS success model in this current study must necessarily incorporate these three concepts, namely: system quality, information quality and service quality.

3.2.4.10 The Use of D&M IS Success Model in the Current Study

As indicated in the introductory chapter (section 1.3), this current research reflects on the DeLone & McLean IS Success Model as lens through which the proposed conceptual IS success model is developed. The model is employed as the main backbone structure on which the proposed IS success model for use in intelligent vehicle tracking systems is developed. In this regard, the D&M IS success model is used in this study as a guide in identifying the independent variables that form the input parameters to the proposed conceptual IS success model. The D&M model is further employed in determining and selecting the dependent variables which form the output variables of the proposed IS success model. The Technology Acceptance Model (TAM) – the third relevant theory/model, is also applied to bridge the input and output variables of the IS success model developed in this current study. Note: Detailed review on TAM is presented in the subsequent subsection that follows.

3.2.5 The Technology Acceptance Model (TAM)

The term TAM refers to an information systems' concept that explains the manner in which system users "come to acknowledge", and eventually accept to use a given technology (Davis F., 1989). The model posits that, if users are introduced to a newly acquired technology, several factors or issues try to influence or act upon their decision making machinery, regarding "how and when they will use" the systems. Hence, TAM concentrates on the users of systems, with the notion of "system usefulness", offering extensions to include other factors to describe how users perceive system usefulness. According to Davis's TAM, the most fundamental factors that influence users' decision include, but not limited to: "Perceived System Usefulness (PSU), Perceived Ease of Use (PEoU), System Characteristics", etc.

3.2.5.1 Origin and Background of the TAM

Late in the 1970's, the need to use technology increased astronomically due to high demands for technological advancements and global industrialization. To combat this situation, Fred Davis (1985) propositioned the TAM in a doctoral dissertation (Davis, 1989). At that time, he posits that, "system use is a response that can be explained or predicted by user motivation", and is directly manipulated by exterior motivations composed of "actual system's features and capabilities"; Davis illustrates his proposition with a prototype model which he names as TAM, and is shown in fig 3.12 below.

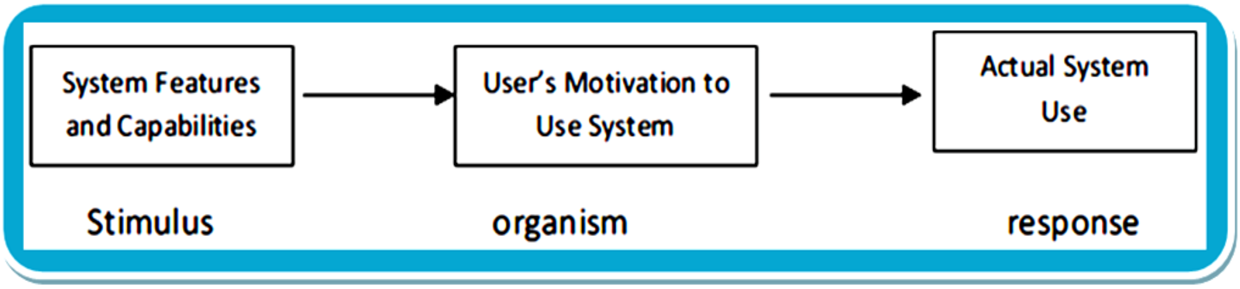


Figure 3.12: Conceptual Model of TAM

Source: (Davis, 1985)

Combining the "Theory of Reasoned Action (TRA)" originated by Fishbein & Ajzen (1975) in behavioural studies, including other associated studies", Davis Fred improved upon his conceptual TAM and proposed a more refined model presented in fig 3.13 below.

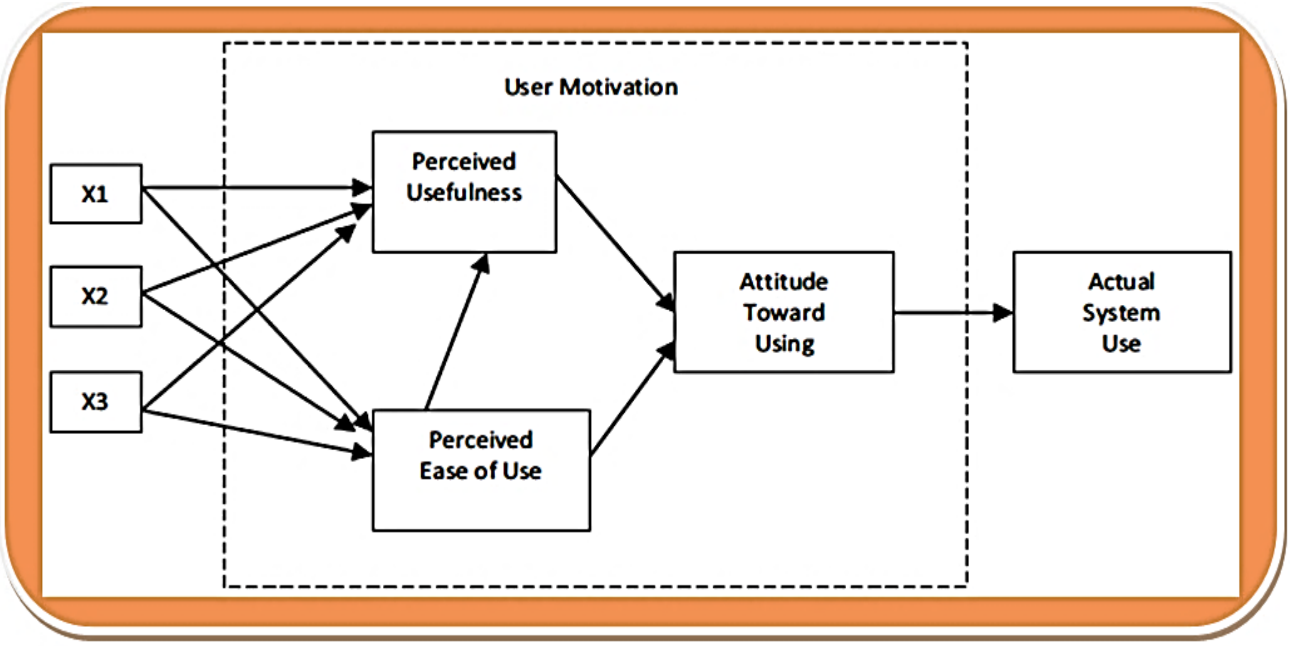


Figure 3.13: The Proposed Original TAM:

Source: (Davis, 1985)

In his new proposition, Davis (1985) suggests that "user's motivation" can be explicated in three variables: PEoU, PSU, and "Attitude towards Using the System". In his new proposal, Davis hypothesizes that, the attitudes of users toward systems are the main deciding factors of whether they will "actually use or reject a system" (Davis, 1985). He claims that, attitudes are really persuaded by two cardinal beliefs: Perceived Ease of Use (PEoU) & Perceived Usefulness (PU), with PEoU directly influencing the PU. According to Davis Fred, both variables are directly manipulated "by the system design characteristics", resulting in a third causality-variable to use a system. These characteristics are denoted by X_1, X_2 and X_3 respectively in the proposed original TAM, shown in fig 3.13 above.

3.2.5.2 Evolutions of the TAM

Davis et al., (1989) posit that, situations would arise when a particular system is perceived to be useful though, a person may create a solid "behavioural intention" to utilize a system devoid of any attitude. This thought called for a modification to the original TAM to include a novel variable; i.e., the concept of "Behavioural Intention", discarding the construct of attitude.

This variable is influenced directly by a system's PU variable (Davis, Bagozzi and Warshaw, 1989), and this called for modification of the original TAM, shown in fig 3.14 below.

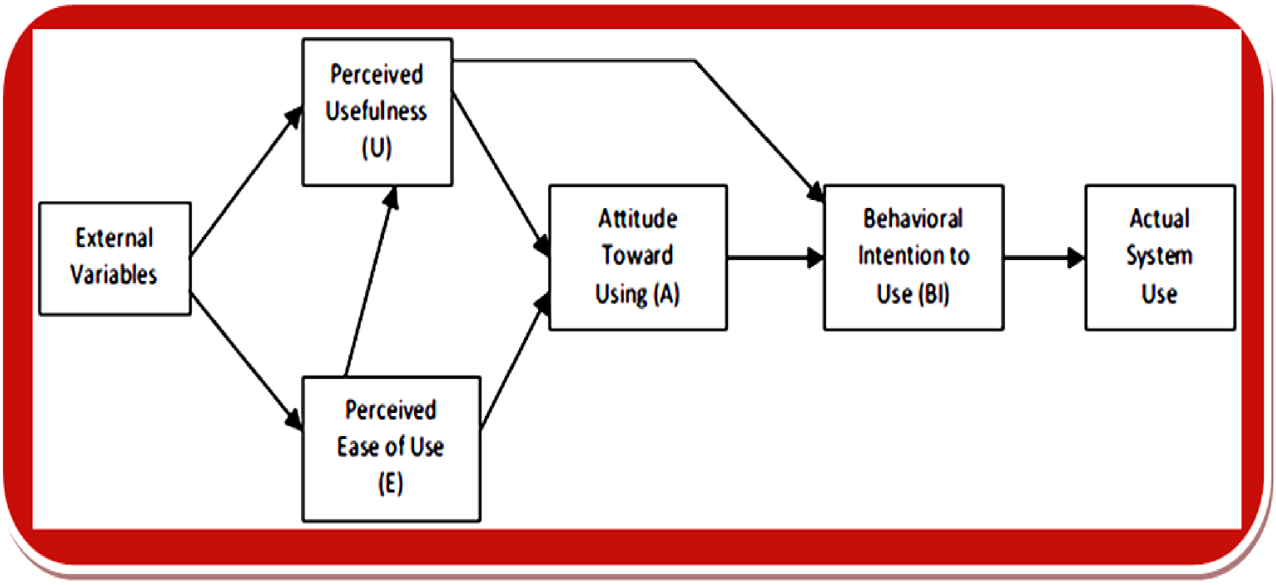


Figure 3.14: The First Modified Version of TAM

Source: (Davis, Bagozzi and Warshaw, 1989)

Davis, Bogazzi and Warashaw (1989) conducted further studies and find that, both PU and PEoU have direct influence on intention to use systems, hence abandoning the need for attitude to use system from their proposed modification in fig 3.14 above. This gives birth to new a model which they name as "Final Version of TAM", shown in fig 3.15 below.

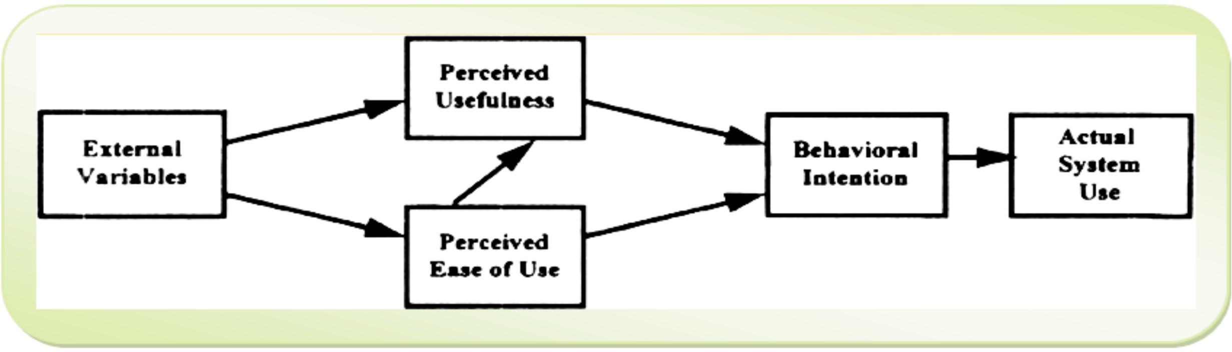


Figure 3.15: Final Version of TAM

Source: (Venkatesh & Davis, 1996)

Venkatesh and Davis add other factors to their final version; they refer to these factors as "External Variables" (Venkatesh & Davis, 1996). They posit that these variables influence beliefs of individuals towards system use. They identify the external variables to include "System Characteristics, User Training, User participation in Design, and Nature of Implementation Process".

3.2.5.3 Adopting and Extending the TAM Further

Many attempts are being made to extend the final TAM from diverse approaches. It is in one of such attempts that Venkatesh & Davis (2000) introduce important extra "Variables as Antecedents" (predecessors) to the PEoU variable in their final TAM and develop what they term as "the TAM 2 model". In that model, they detail the reasons why individuals find systems useful. Notable extensions initiated by Venkatesh (2000) are two major sets of antecedents to PEoU, they are: "Anchors and Adjustments". Notwithstanding these extensions, Venkatesh & Davis merged TAM2 and the replica of PEoU determinants proposed by Venkatesh (2000), and develop an amalgamated model of TAM, which they name as "TAM3" (Venkatesh & Davis, 2000). In fact the graphical illustrations and the details of both TAM 2 and TAM 3 are well beyond the boundaries of this current study.

Nonetheless, majority of the researches conducted at the time (including TAM 2 & TAM 3) could not produce dependable means capable of explaining "system acceptance, rejection" or use. To address this situation, more extension works are done on TAM to provide series of manifestations to confirm that, TAM is a reliable "model for predicting system usage behaviour". The most current ones include studies conducted by: Venkatesh et al. (2007, 2003,). Yousafzai, Foxall, and Pallister (2007), Sharp (2006), King and He (2006), Ma and Lui (2004), Lee, Kozar and Larsen (2003), Mathieson, K., et la., (2001, 1991), and many more. Following the results of these studies, predicting or envisaging "system use" and system usefulness drew attention to the academic community, and therefore created research interests for several researchers (Chuttur M.Y., 2009). Indeed, it is this research interest generated in the realm of the academic community that partly motivated the current researcher to employ the principles of TAM to study the usefulness of intelligent vehicle tracking systems deployed in nations with least economies.

3.2.5.4 The Constructs of the TAM

a) The Concept of External Variables

In the final TAM, external variables are some other factors aside the PEoU and PU that could have effects on the beliefs of individuals towards the use of systems (Venkatesh & Davis, 1996). These variables have to do with "perceptions of external control" on system use, as seen by users. This external control is actually the level to which a person believes that managerial and technological resourcefulness are available to sustain the use of systems (Venkatesh et al., 2003). Examples include system quality, information quality, service quality, design characteristics, etc.

b) The Concept of PEoU

This concept is the degree at which individuals belief that using a given system "will be free of effort", physically and mentally (Davis, 1993). The concept also covers "perceived enjoyment" derived from the activities of using a given system and perceived as pleasing or "enjoyable in its own right", besides PEoU of a system (Venkatesh, 2000, p. 351).

c) The Construct of PU

Perceived usefulness (PU) is a fundamental causality of users' acceptance of systems. The concept is defined as the degree at which individuals' belief that using particular systems will improve the general performances of their organizations (Davis, 1993). PU is applied to obtain feedbacks from users on system features, analyze problems pertaining to users' acceptance, and appreciate factors that affect system successfulness **(**Adams Dennis A., 1992).

d) The Concept of Behavioural Intention

This concept refers to the level at which an individual formulates cognizant plan/purpose "to perform or not perform" conceived specific futuristic actions or behaviours (Davis, 1993). It aactually borders on attitudinal issues;

e.g., a person's negative or perhaps positive sentiments regarding the execution of a planned behaviour; in this context - the use of systems, such as information systems deployed in vehicle tracking environment.

e) The Construct of Actual System Use

This concept is defined as a type of extraneous "psycho-motor response quantified by individual users' real course of action" towards system use (Davis, 1989).

f) Criticisms of TAM

In spite of the wide popularity of TAM, it has been criticized by a number of researchers; thus, the originators of it have redefined and modified it severally. The general criticisms raised against TAM include: "questionable heuristic (set of rules) value, limited explanatory and predictive power, triviality, and lack of any practical value (Chuttur, 2009). Researchers like Benbasat & Barki argue that TAM "has diverted researchers' course from other significant research areas". Moreover, attempts by individuals to extend TAM have caused a "theoretical chaos and confusion" (Benbasat & Barki, 2007). In the opinions of these critics, TAM basically considers users' perceptions and system usefulness, but neglects the important "social processes of IS development and implementation"; they argue that, TAM does not interrogate which technologies are really better, and it does not enquire the social implications of IS use. The current researcher views these criticisms as rather unfortunate and non-productive to academic endeavour; since, despite these criticisms, TAM is broadly employed in IS studies, IT, ICT, E-Learning, M-Learning, Mobile Banking, e-Commerce, e-Governance, human resource management, and many more.

g) Shortcomings of TAM

Deriving from the various reviews above, it is noticed that, the originator of TAM, Davis Fred did not specify or give any examples of the input variables or antecedents to his two intervening variables (i.e., the concepts of Perceived System Usefulness and Perceived Ease of Systen Use). Rather, Davis generalized these external variables, which he refers to as "System Design Characteristics", and represents them symbolically with letters "X_1, X_2 & X_3" (Davis, 1985; Venkatesh & Davis, 1996; Pg 453). Again, earlier TAM researchers limited the potentials of TAM to IS system study, telecommunications research, marketing research, educational research, etc.; however, they did not recognize that TAM can be applied in ITS studies and to study the usefulness and successfulness of intelligent vehicle tracking systems and services. Thus, this current study has strived to apply TAM as used in the D&M IS model to study IVTS technologies; precisely, in identifying intervening variables needful in developing the proposed conceptual IS success model in the methodology section.

h) How TAM has been used in Earlier Research Studies

i) Using the TAM to Explain How Attitudes Determine Internet Usage; By: Constance E. P., et al. (2006)

Two researchers, Constance E. P. and Naveen Donthu used the TAM in 2006 to describe how the attitudes of individuals are used to determine their Internet usage in the USA. Employing the potentials of the TAM, these researchers found that, though majority of Americans utilize the Internet a lot in their day-to-day activities, the aged, the lesser educated ones, the minority group, and low income groups have internet usage rates far less than the young ones, the extremely educated, and the well to do individuals. What they did was that, they developed, tested and expanded the original Davis (1989) version of TAM to collate and analyze the differences in internet usage between these groups of American individuals. They further discovered that, "age, education, income and race are associated differentially with beliefs about the Internet, and that, these beliefs influence users' attitudes toward Internet Usage" (Constance Elise Porter, Naveen Donthu, 2006).

Besides that, they established that, even though access challenges pose considerable adverse effects on the concept/model; both perceived ease of internet use and internet usefulness exhibit stiffer effects on the groups studied. Their results demonstrate that, expanding Davis' original TAM to incorporate "perceived access barriers" aids to describe "demographic-based differences in Internet use" by some groups of American individuals. The extension they did to the original TAM is as shown in fig. 3.16 below. The dotted line (Age to AB) illustrates the key extension they incorporated into the existing TAM model. Details of the hypotheses (Hs) and the causalities (the arrows) are well outside the scope of this study.

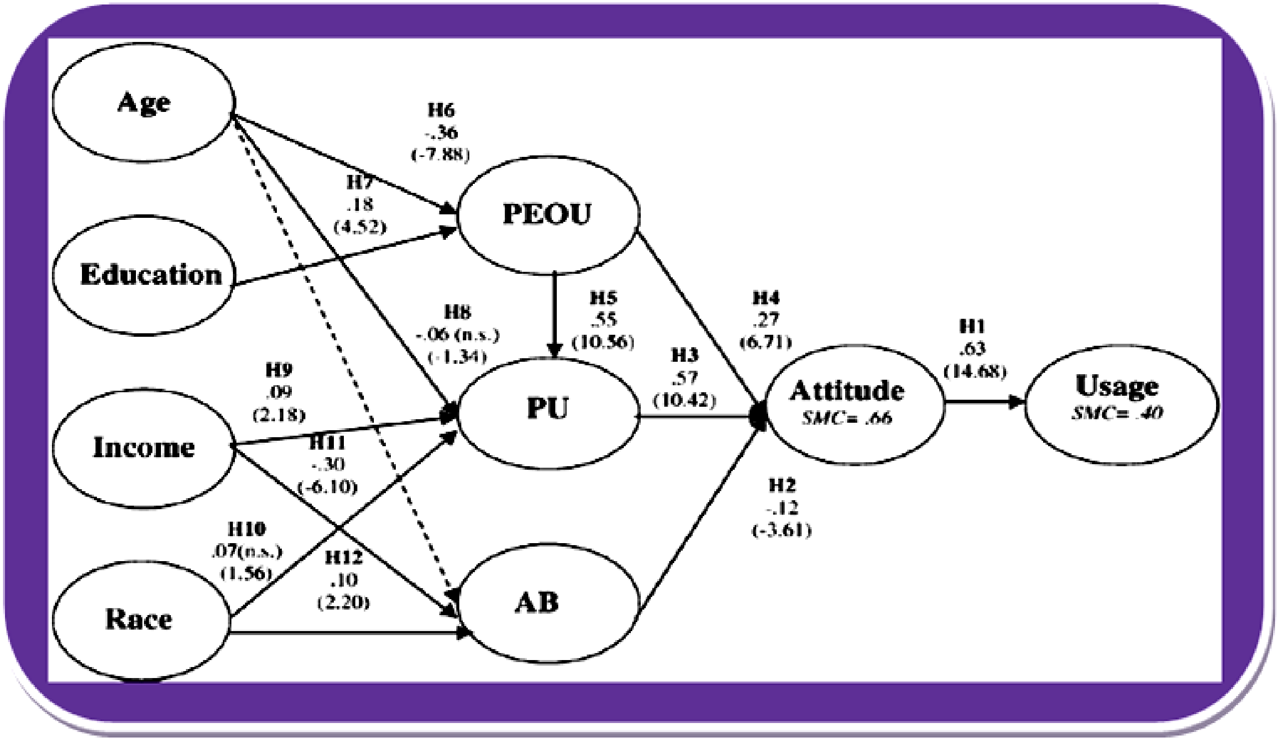


Figure 3.16: A Model of Internet Use Based on TAM

Source: (Constance Elise Porter, Naveen Donthu, 2006)

The lesson taken from the above study is that, these researchers have represented the system charactersitics (i.e., X_1, X_2, X_3, ... X_n or external variables, see figs 3.13 & 3.14) of the original TAM by Age, Education, Income and Race, as the input variables or antecedents to PEoU and PU of their extended TAM, and used the latter to describe internet usage in the USA. This innovation implies that, in this current study, relevant external variables can be identified empirically and employed as input/independent variables antecedent to PEoU and PU in the proposed conceptual IVTS success model to explore tracking systems' user satisfaction in developing countries.

ii) Application of TAM in M-Banking Adoption in Kenya by: Lule Isaiah, et la. (2012)

Recently, Lule Isaiah, et la. conducted a cross-sectional study to assess the recognition and acceptance of Mobile Banking Technologies, with the aim of identifying factors hampering or enhancing the reception/acceptance of M-Banking in Kenya. In that study, TAM was applied to analyse the factors influencing M-banking adoption. Their study was centred on examining "M-Kesho, an M-banking application" (Lule, Isaiah et la., 2012).

Their analysis discloses that, PEoU, PU, "Perceived Self Efficacy and Perceived Credibility significantly influenced users' attitudes towards the usage of M-banking". They employed the research works undertaken by Julio, et al, (2010) and Luarn & Lin's (2005, 2004) versions of TAM as guidelines in developing their research model shown in fig. 3.17 below. Detailed discussions of their model is well beyond the scope of this current studies, since this section only gives a brief account on the use of TAM in other research works.

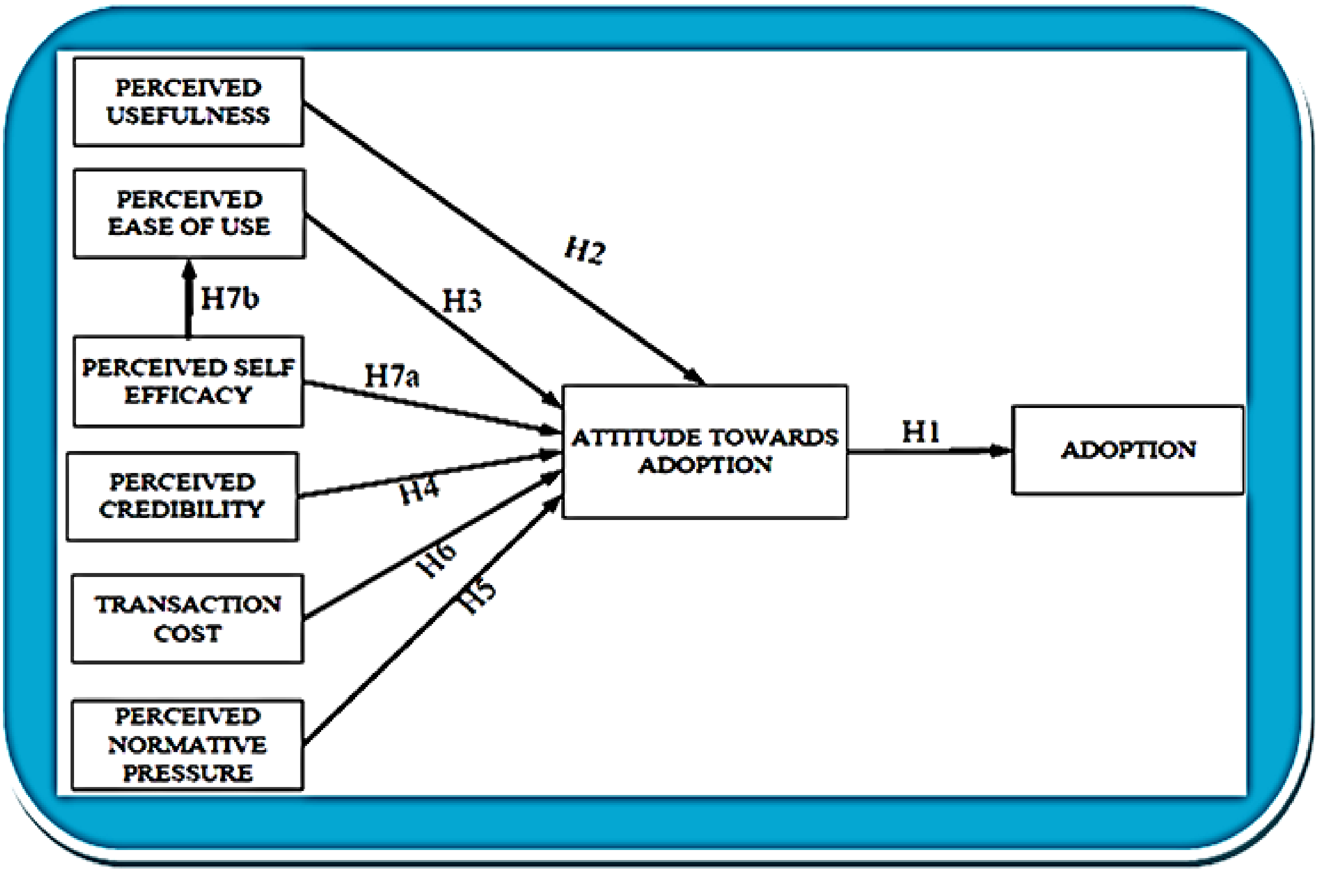


Figure 3.17: The Proposed Research Model

Source: (Lule, Isaiah et la., 2012)

By way of contributing to existing body of knowledge, their data analysis results demonstrate that, the identified variables above are very crucial in determining individuals' attitudes towards M-banking usage, not only in Kenya, but perhaps, also in other developing nations. Their research results constitute a sound foundation for offering pragmatic commendations to the banking commerce, and opportunity for future studies in the field of M-Banking.

It is learnt from the above research that, in addition to PEoU, PU; the authors identified "Perceived Self Efficacy and Perceived Credibility" as new external variables which they introduced into their model to modify the original TAM and created their own TAM; implying that, new factors/variables can be identified and selected through impirical studies to modify some aspects of the D&M IS success model to develop the proposed conceptual IS success model in this current study.

iii) Using TAM for E-learning, BY: Maslin Masrom (2007)

In another research work, Maslin Masrom studied "TAM for work-related tasks with e-learning" technology (Maslin Masrom, 2007). Maslin M. employed TAM to hypothesize the influence that the variables in the concept of TAM have on e-learning applications. The study focused on investigating the acceptance of individual users of e-learning technology as useful learning means/tool in Malaysian universities. Researcher Maslin developed a "technology usage model for the e-learning". The model was employed to facilitate the discovery of whether users and/or learners could accept e-learning technology, and how will they do that. The study also aided in determining the significant factors necessary to explain users' intentions towards the acceptance of e-learning technology. In the study, attempts were made to establish "whether attitudinal believes such as PEoU and PU have relationships toward the e-learning adoption". The model used in the said study is shown in fig 3.18 below.

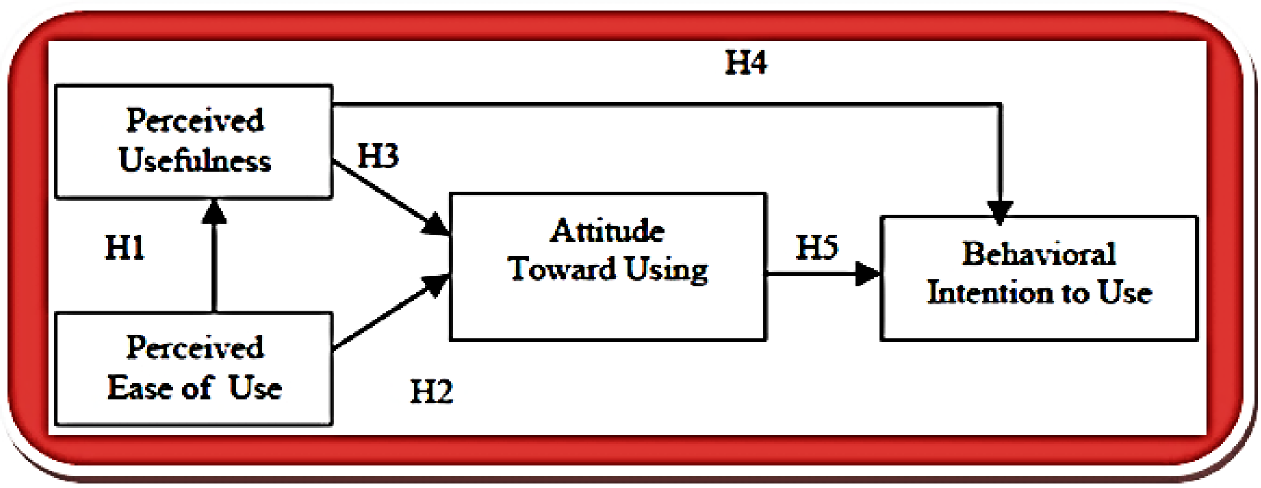


Figure 3.18: Using TAM for e-Learning

Source: (Maslin Masrom, 2007)

Based on the framework of e-learning format and the TAM diagram above, Maslin M. posits that: PEoU has a vital effect on the PU of e-learning system (Hypothesis H1); PEoU has a critical consequence on attitude towards system usage (H2); PU has keen outcome on attitude towards system usage (H3); PU has vibrant results on intentions to use e-learning systems (H4); and lastly, Attitude towards system usage has a considerable influence on intentions to system usage (H5), (Maslin Masrom, 2007).

Lessons gained from the above study is that, the behavioural intentions of users towards the acceptance of e-learning technology depend on their attitudes towards the use of the technology, which in turn reckons on the ease of use of the technology, as well as its usefulness. The implication of the study above on this current study is that, in developing the proposed conceptual IS success model, the researcher has to carefully consider (through data collection and analysis) the intentions of tracking system users, their actual system usage, their usage satisfaction, and eventually, the positive net benefits that will ensue from the usage of these systems.

j) The Use of TAM in the Current Research

In this present study, the TAM is being employed as an interface between the independent variables of the construct of system use (identified as the input variables to the D&M's IS success model) and the construct of intervening variables (i.e., perceived system usefulness, perceived ease of system use, intention to use systems, and actual system use). Precisely, the TAM is being utilized in this current research, in amalgamation with the D&M IS success model to develop the proposed conceptual ITS success model. This study duly acknowledges that, the TAM is primarily designed for quantitative research, but TAM has been applied in this current qualitative study due to the purposive sample size (25 participants/respondents in all) as a result of the specific professional background requirements of the participants.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 OVERVIEW

This chapter discusses the big picture of this research; it describes the various approaches taken to answer the research questions posed in the introduction chapter, with a view to achieve the research objectives by answering the research questions in order to solve the research problems studied. The chapter further provides a comprehensive description and explanation of the research approach (the research design) taken to address the problems. The chapter gives an overview and outlines the philosophical ontology and epistemological positions underlining this research. This is closely followed by discussions on the research population (unit of analysis) selection methods; including sampling techniques applied in selecting the research participants and respondents; methods for data collection and analysis are detailed as well. In the end, some methodological issues are discussed into details.

4.1.1 Research Methodology Defined and Explained

Broadly, the research and academic communities define research methodology as "a process of systematic inquiry that is designed to collect, analyze, interpret and use data to understand, describe, predict, or control phenomena" (Mertens Donna M, 2005). Supporting this definition, other scholars also submit that research methodology "is a systematic and organized effort to investigate specific problem that need solutions" (Rose, 2002), (Mertens D. M, 1998).

Furthermore, research methodology is the underlying and unifying phase of any research project; it controls the study, dictates how the data are acquired, arranges them in logical relationships, refining and synthesizing the raw data so that the meaning underlying the data emerge. This in turn gives expected conclusions that lead to expansion of knowledge amongst research communities and the academic environment at large. This phase of the study discusses the methodological selections made, it is then followed by the research approach and descriptions of how data were collected and how preliminary results were checked in order to secure quality research outcome.

There are a number of factors that inform the choice or selection of the most suitable methods or procedures to apply to a specific research approach or strategy. These include: the research problem being investigated, the population or unit of study, internal and external validity issues, reliability, credibility, transferability, dependability, triangulation, generalizability, etc. The decision on which research design to apply in a particular research is determined by the worldview or philosophical position (epistemological logic) of researchers and the intrinsic "strengths and weaknesses" of different approaches taken by the researcher.

In assessing a fitting process and its outcomes, a researcher must consider the characteristics and organizational situation of the critical problem to be explored, obtainable resources (literature, time, finance, etc.) and probable moral, i.e., research ethical issues. Lastly, the prime research apprehensions must be focused on the suitability or appropriateness of the methods of inquiry into a particular research problem.

4.1.2 Reflecting on the Research Problems, Objectives and Questions

To remain focused, the problems tackled in this study summarized in section 2.1.2 are being reflected on here for consistency; whilst the main research objectives are modelled in fig. 4.1 below for the purpose of simplicity and easy referencing.

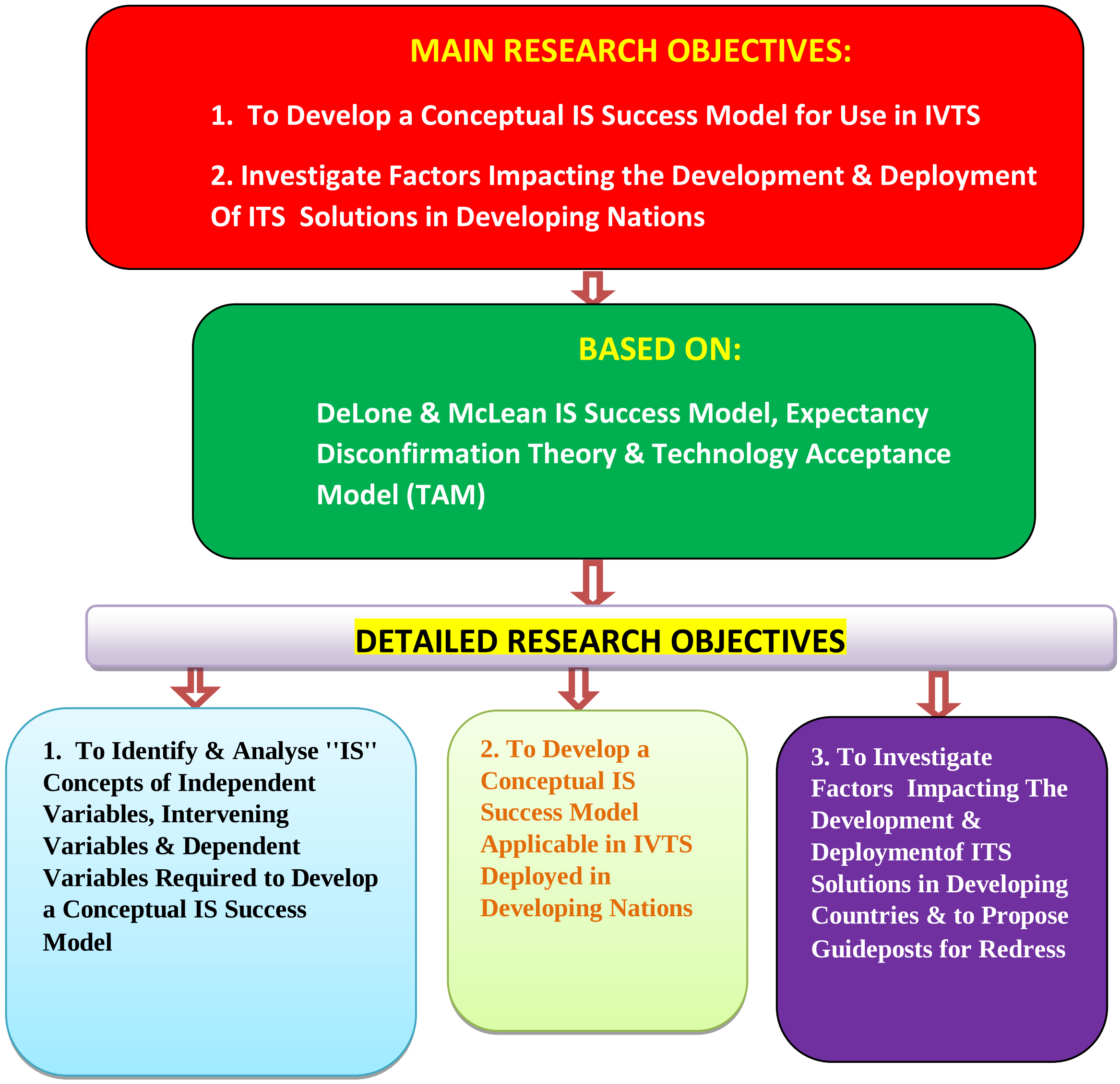


Figure 4. 1: A Model of the Research Objectives

Source: Field Work

For the same purpose stated above, the research questions designed in section 1.4 are modelled as shown in fig 4.2 below.

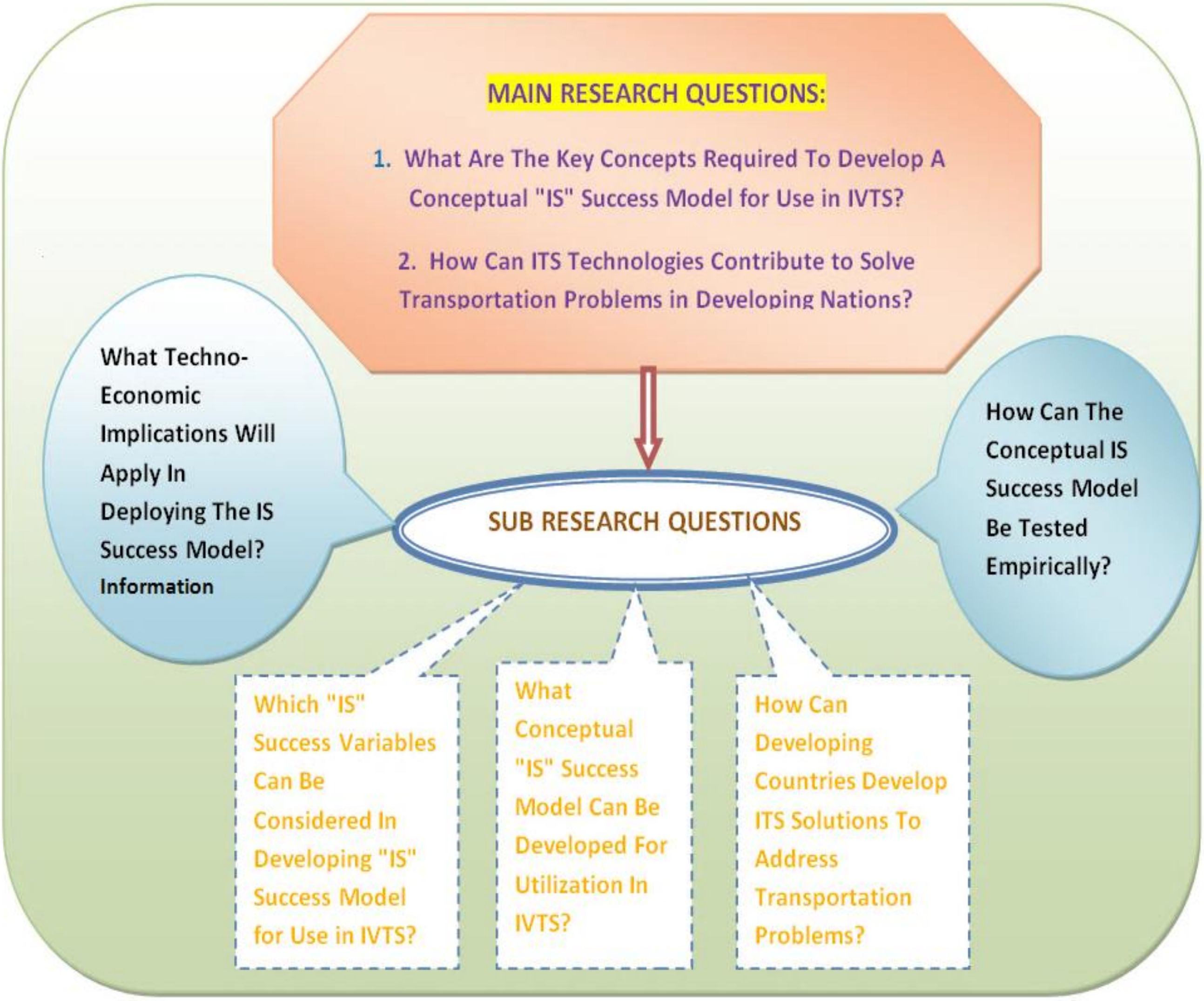


Figure 4. 2: A Model of the Research Questions

Source: Field Work

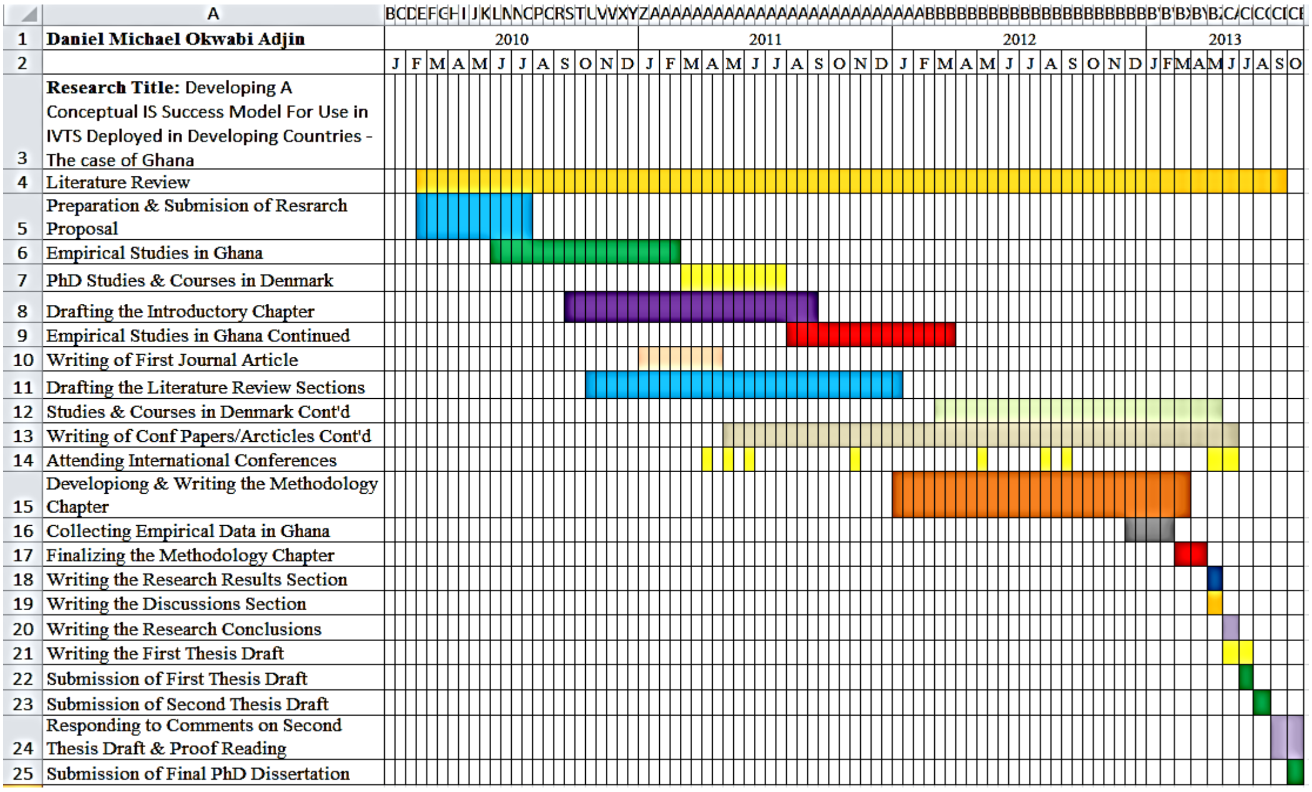
Note: In the model above, there are two background sub-questions which may not be necessarily investigated due to none availability of resources, e.g., time, finance, etc. The first background sub-question has to do with economic issues, e.g., cost benefit analysis that can be performed to ascertain the financial-viability of developing the proposed conceptual IS success model for intelligent vehicle tracking systems (IVTS). The second background sub-question is about creating a hypothesis from the proposed conceptual IS success model, and then collecting quantitative data to test the model statistically/quantitatively, and applying the deductive logic research approach to test the proposed model; however, this is a whole research work requiring a sizeable research budget; thus, it is well beyond the scope of this current study. These background sub-questions are therefore recommended for future research studies.

4.2 THE RESEARCH PROCESS

4.2.1 Overview of the Research Timeline

The research programme was undertaken through a series of phases and activities; these are summarized and presented in the Gann Chart shown in table 4.1 below.

Table 4. 1: Gann Chart Showing the Research Timeline and Deliverables



4.2.2 The Selected Research Area and the Research Procedure

The process taken to accomplish this research commenced from a very modest beginning. Based on the motivations behind this study, coupled with the problems experienced by users of IVTS in developing countries, observed in Ghana, the research problems were selected and formulated, with the aim of collecting empirical data to solve them.

Wanting to understand the origins and the nature of the selected problems, a number of relevant literature sources were reviewed, as well as pre-exploratory studies with users of IVTS in Ghana as a case study, to gain more insight into the problems and to capture wider perspectives of the selected problem area.

Relevant literatures in the areas of information system studies, vehicular communications, vehicle tracking systems and ITS technologies were searched for and reviewed to provide academic foundation for the pre-exploratory studies conducted earlier on. The next step in the process was a search for relevant theories or models such as the "DeLone & McLean IS Success Model", User Satisfaction Theories, and the Technology Acceptance Model (TAM), as lenses to guide the research, selection of the research methodology (e.g., to select the methods and techniques of data collection & analysis), and the development of the proposed conceptual IS success model. These searches were performed in the second part of the theoretical framework developed in sections 3.2.4 & 3.2.5, to preview what attempts have been made, and how existing theories/models have contributed to the solution of the selected problems.

Empirical studies were then conducted to collect data for processing and analyzing to arrive at the research results/findings which were utilized to generate theoretical categories and core IS concepts that were employed to develop the proposed conceptual IS success model. Thereafter, the research results/findings were presented and discussed, contributions made to knowledge and literature were also discussed, research evaluation was also performed. To end the process, research conclusions were drawn, research limitations and implications were also stated, and possible future research studies were duly identified and recommended. The research findings and the developed model will be published as soon as the thesis is evaluated externally and accepted. Fig 4.3 below illustrates a pictorial model of the research process described so far.

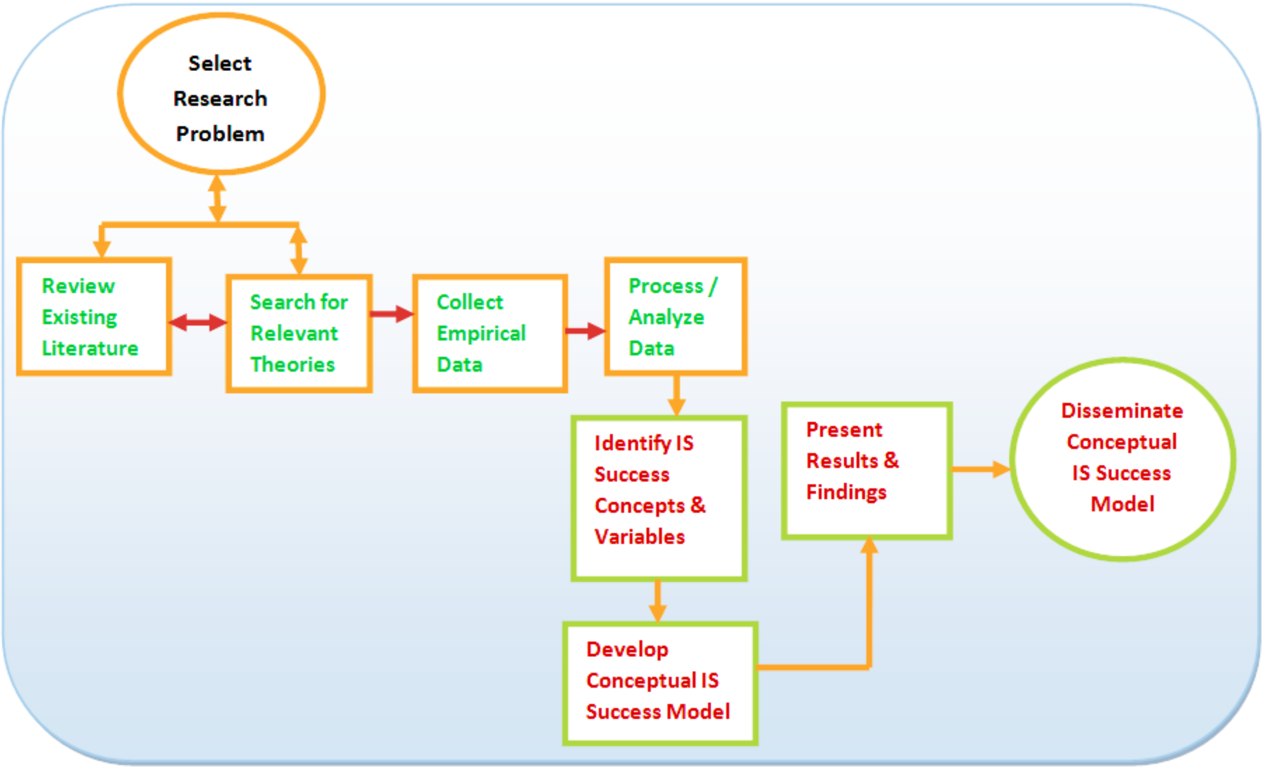


Figure 4. 3: A Model of the Research Process

Source: Field Work

4.2.3 The Role of the Researcher in the Research Process

There are at least three different means to approach a research field (Kørnøv et al., 2010); in other words, three different modes of knowledge production are widely associated with three related roles of research (Lyhne et al., 2010). The first is the "Classic Researcher"; in this mode, "knowledge is produced solely by researchers, i.e., research objectives and techniques of "knowledge production is defined solely by researchers, and knowledge production is independent of practice in terms of economy and information". The second mode is the "Entrepreneur". As in the first case, aspirations and scheme of "knowledge production are defined mainly by practice; that is; knowledge production is a dependent process in terms of economy and information, between researchers and practice".

The third mode is termed as "Change Agent": In this mode, "knowledge is produced in cooperation between researchers and practitioners"; i.e., knowledge production becomes an interdependent relation between researchers and practice".

In the light of these insights, the role of the researcher in this current study is principally associated with the Change Agent mode; in the sense that, this research strived to apply IS success model to solve problems in transportation systems, which is a big change to ITS practitioners and innovative in the traditional IS studies, since IS studies is performed mostly on information systems deployed in financial, academic, marketing, telecom organizations, and many more institutions, but not yet in ITS studies.

4.3 THE RESEARCH DESIGN

4.3.1 Choice of the Research Design

By definition, research design is a "plan and procedure for research that involves several resolutions, and the overall judgment entails - which design should be used to study a given research topic. This decision should involve the worldview assumptions that a researcher brings to the study; procedures of inquiry (i.e., research strategies); and specific methods of data collection, analysis and interpretation. The selection of a research design is also based on the nature of the research problems or issues being addressed, the researcher’s personal experience and the targeted audience/readers of the study. In this context, there are three types of design paradigms employed by the research community when doing research; namely: Quantitative Research Method, Qualitative Research Method and the Mixed Research Methods (i.e., Pragmatism).

A study tends to be more qualitative than quantitative and vice versa. Mixed methods research resides in the middle of this continuum since they incorporate elements of both qualitative and quantitative approaches (Newman & Benz, 1998), (Denzin, N., & Lincoln, Y. (2005). More often than not, the distinction between qualitative and quantitative research is framed in terms of words; e.g., qualitative research refers to textual data (rather than statistical figures); and quantitative research on the other hand, refers to statistical data (rather than textual explanations and interpretations).

A more complete way of viewing the graduations of the differences between them is in the basic philosophy underpinning the study, the research strategies or logical approaches, and research methods as modelled in the three deign paradigms illustrated in fig 4.4 below, which informs the formulation and modelling of the conceptual framework for this current research.

Details of this distinction and further characteristics of these research design components are discussed in subsequent subsections.

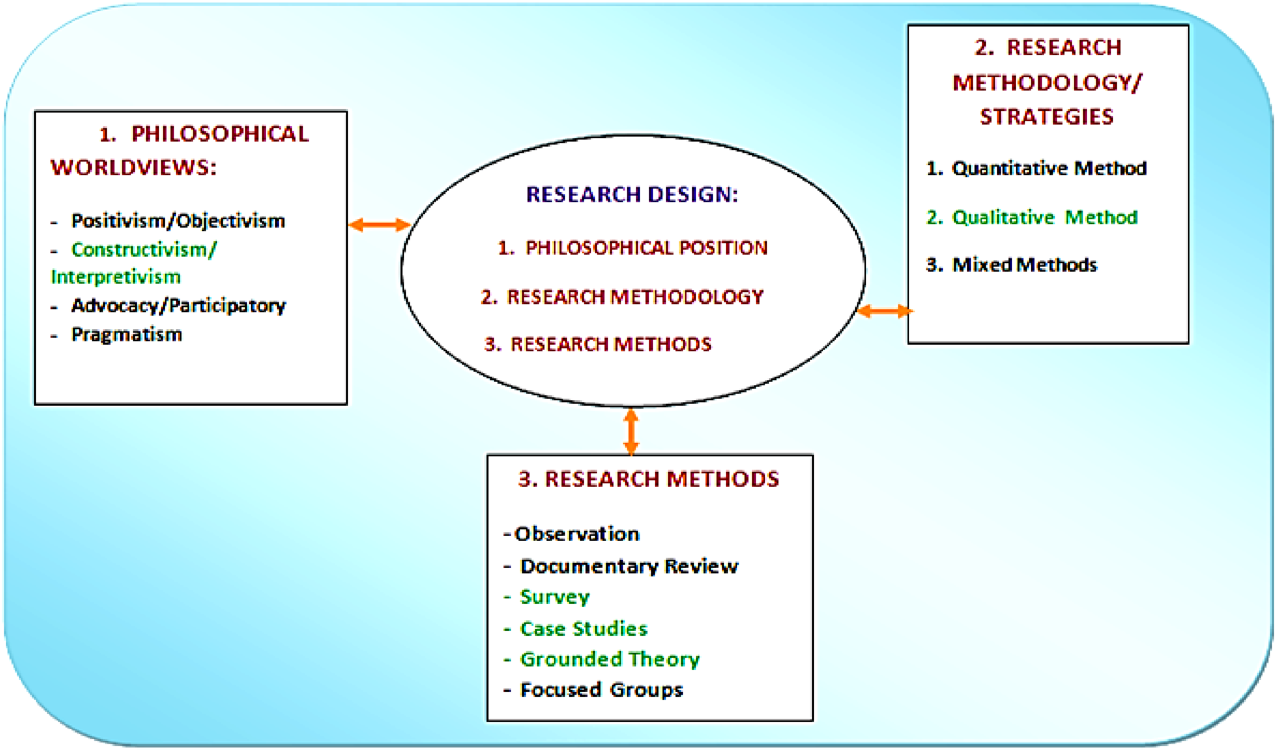


Figure 4. 4: The Research Design

Source: Replicated From (Creswell J.W., 2009)

These three paradigms in the diagram above constitute the research design on which this current research is based. This design foundation is formulated and modelled into a system of research conceptual framework and is discussed in the next section. **Note:** The selected concepts for the research design for this study are shown in green letters.

4.3.2 The Research Conceptual Framework

A conceptual framework is an interconnected set of ideas (theories) about how a particular phenomenon functions or is related to its parts. The framework serves as the basis for "understanding the causal and correlational patterns of interconnections across events, ideas, observations, concepts, knowledge, interpretations and other components of experience" (Marilla D., 2010).

Conceptual frameworks also influence how events are interpreted. Based on the explanations above, the approach to this research strategy involves philosophical worldview assumptions, distinct data collection methodologies and practical methods used in collecting the data, in line with the research design concept proposed by Creswell (2008).

The conceptual framework consists of assumptions, concepts, expectations, beliefs and theories that underpin a study (Mills, et al., 1994), (J. W. Creswell, et al., 2007). The framework for this research is therefore formulated as follows: The Worldview of this study is based on "Constructive"/"Interpretive" research tradition; the research approach follows the Exploratory, Descriptive & Interpretive Qualitative strategy; the Qualitative Data Collection and Analysis method was employed, using the Inductive Logic research as well as the Grounded Theory (GT) research method and Single Case Study data collection and analysis method.

The practical data collection techniques/tools employed was survey questionnaire (for the GT approach) and face-to-face interviews (for the single case studies), transcription, interpretation and thick/deep qualitative descriptions and explanations. A model of the conceptual framework formulated above showing the relationships and interplays between the three research paradigms and their sub-activities constituting the research design for this study is as shown in Fig 4.5 below. The model was developed from the basic three research paradigms theorized by Creswell J. W. (2008).

This framework illustrates the main materials/items studied in the research, these include; the key variables or factors, concepts and the presumed relationships between them. From the above framework, the selected worldview concepts for this research are indicated by the green-lettered words. The constructs forming the conceptual position of the current researcher are: the understanding of the phenomena that cause dissatisfaction of users of IVTS in developing countries, interpretation of the views and concerns of participants and respondents and the use of multiple research participants for data collection and analysis to generate a conceptual IS success model from empirical data.

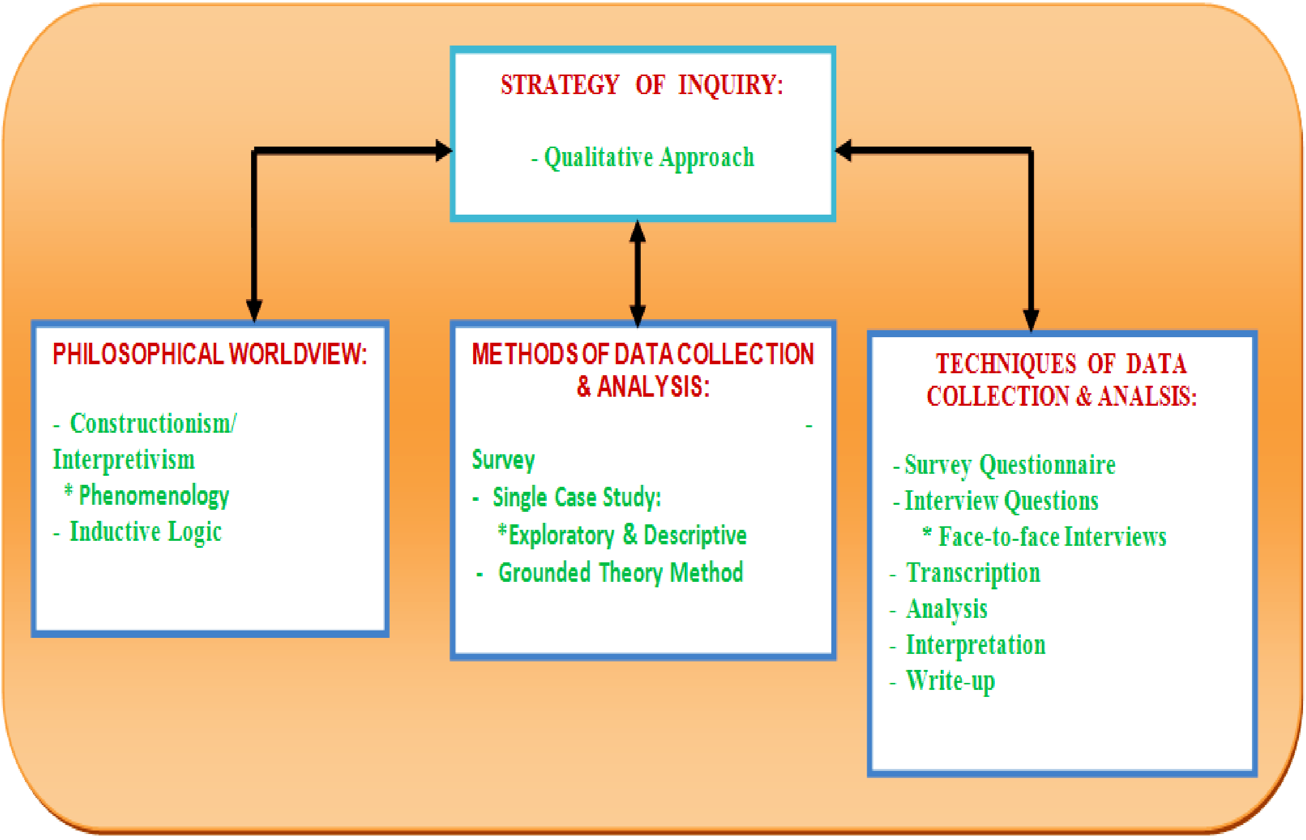


Figure 4. 5: The Research Conceptual Framework

Source: Mirrored From (Creswell J. W., 2008)

4.3.3 The Qualitative Research Strategy

McMillan and Schumacher (1993, p. 479) define qualitative research as, "primarily an inductive process of organizing data into categories and identifying patterns (relationships) among categories." These researchers hold the view that "data and meaning emerge organically from the research context". According to them, this tradition of research is undertaken "in natural settings" within six fundamental strategies, namely: "Case Study, Focus Group, Phenomenology, Grounded Theory, Ethnographic, and Historical Research Perspectives"; and they all utilize a mixture of "observations, interviews, and document reviews", etc., as data collection and analysis techniques.

From another perspective, Olds et al. (2005) submit that, "qualitative research is characterized by the collection and analysis of textual data (Olds et al., 2005). In their views, qualitative studies answer questions like: "What" (e.g., "What is occurring?" or “What is going on here”?), "Why" (e.g., "Why does something occur?") and "How" (e.g., "How does one phenomenon affect another?"). Even though figures can represent a summary of qualitative data, normally, scholars recommend the use of "rich/thick contextual descriptions of the data" to answer these questions (Creswell, 2007), (Denzin and Lincoln, 2005), (Merriam, 2002), (Patton, 2002).

Contributing to these discussions, Neuman (1997) underlines that qualitative inquiry usually necessitates reasoning from inductive data collection perspective and obtaining "conclusions from a multiplicity of interpretations and perceptions". Qualitative research is connected to "the quality of various people’s subjective experiences" to search for detailed or deeper perceptive/understanding of diverse phenomena. It follows the constructivist philosophical worldview and is deeply grounded in the epistemological-interpretive paradigm. This qualitative methodological approach is relatively rare in literature inquiring into problems experienced by users of intelligent vehicle tracking system (IVTS) in the transportation industry. To comprehend the prospective advantages/benefits in this field, the philosophical and institutional perspective of qualitative method is described, together with reviews of current literature supporting qualitative research method and research design as a whole.

Going by the definition of McMillan et al. (1993), it is clear that in qualitative research, data and their meanings materialize naturally from the context of inquiry, thus, variables are not permitted to be manipulated. These authors posit that, the process of qualitative research is composed of the following concepts: "Common Assumptions, Common Reference Points, Perception Codes, Process Codes, Perspectives for Designing the Qualitative Study, Establishing a Qualitative Study’s Validity, Reliability & Generalizability" (McMillan et al., 1993, p. 479). All these qualitative research processes have been performed in this current study in different sections in this document.

4.4 RESEARCH ONTOLOGY

Basically, the term "ontology" refers to the image (envision or paradigm) of social realness (i.e., realities of the world) by which a research theory is founded. In the research community, ontology is accepted as the genesis (the starting point) of every research. This is immediately followed by the epistemological position, and then the methodological stance of the researcher, respectively. Several researchers have attempted to elaborate on the meaning of ontology to the best of their knowledge. E.g., a researcher Norman Blaikie (2000) suggests that, ontological arguments/claims are presumptions or deductions made or constructed by individuals or a group of people in a society, regarding social reality of nature; it is a claim "about what exists, what it looks like, what units make it up and how these units interact with each other, and what we believe constitutes social reality" (Blaikie, 2000, p. 8). It is for these reasons that different traditions, believes, cultural & traditional groups have fundamental differences in their views about the world. Hence, different scholars and researchers have divergent assumptions underlining their specific strategies to social research.

As examples, ontological stances are embedded in the perceptions of objectivism (i.e., positivists' tradition or research) & social constructivism (i.e., subjectivists' research tradition). Generally, objectivism as an ontological stance claims that, social occurrences (phenomena) and what they mean are independent of what society does (social actors). They believe that, social phenomena exist independent of what society thinks about these phenomena.

On the other hand, constructivism as an ontological stance, think that, "social phenomena and their meanings are continually being accomplished by social actors; thus, social phenomena and categories are not only produced through social interactions, but that, they are in a constant state of revision" (Bryman, 2001, pp. 16–18). These two examples demonstrate how the ontological positions of researchers are formed and these positions impact on their research approaches. As ontology refers to what people/society can know, epistemology therefore, concerns itself with how individuals/society come/comes to know the very things they claim that they know.

4.5 RESEARCH EPISTEMOLOGY

The term "epistemology" (originated by James Frederick Ferrier - a Scottish Philosopher) was derived from two Greek words: "episteme" (knowledge) and "logos"(to reason), (Encyclopedia of Philisophy, 1967), (Encyclopedia Britannica Online, 2007), (John Bengson and Marc A. Moffett, 2011). Epistemology has to do with the process of gathering knowledge regarding the generation of new theories, the development of new models, or to reject/improve upon existing theories/models; since knowledge and the process of discovering it are very dynamic at all times. Simply put, epistemology is a philosophical justification of what we believe in (i.e., a scientific proof of how we come to know what we claim we know). It pertains to the theory/guess of knowledge (the science of knowledge), peculiarly in the area of methods, proof/validation, as well as "the possible ways of gaining knowledge of social reality, whatever it is understood to be, and how what is assumed to exist can be known" (Blaikie, 2000, p. 8).

Epistemology contains two philosophical positions, namely: the perspectives of "positivism" and the perceptions of "Interpretivism". Positivism is "an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond". Interpretivism on the other hand, is an epistemological stance that "a strategy is required to respect the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action" (Bryman, 2001, pp. 12–13).

For these reasons, different researchers choosing dissimilar epistemological positions are bound to use different research methodologies. It is for all the above reasons that the ontological stances and the epistemological positions of researchers result in diverse philosophical worldviews about a given social phenomenon.

4.6 RESEARCH RELATIONSHIPS BETWEEN ONTOLOGY, EPISTEMOLOGY, METHODOLOGY, METHODS & SOURCES

It is important to understand how a researcher's worldview impacts on his/her research approach. This understanding can be very clear by mapping out the interrelationship / correlation amongst whatever researchers/investigators think or believe are researchable, i.e., their ontological stances relating to what they can know about specific phenomena, or, their epistemological stances; i.e., how they can proceed to know what they intend to know, i.e., their methodological approaches (Grix Jonathan, 2002). Frequently, ontology is wrongly crumbled with epistemology, as if ontology is a part of epistemology. Though they are tightly related, the two are separated from each other, since a research inevitably commences from one's worldview about what he/she wants to research into (i.e., her/his ontology). This view is reformed or moulded by the experience the researcher carries into her/his research process.

The methodological strategy/approach of a researcher reflects on the exact ontological supposition and epistemological postulations in choosing the approach, and in selecting the appropriate research methods for a particular study. In citing Blaxter et al. (1997, pg. 59), Grix Jonathan (2002) states that, methodology refers to "the logic of scientific inquiry", i.e., "investigating the potentialities and limitations of particular techniques or procedures". Blaxter et al. further posit that, methodology concerns itself with "the science and study of methods and the assumptions about the ways in which knowledge is produced, and is logically linked to the research methods employed". In quoting Blaikie N. (2000, Pg 8), Grix J. (2002) additional underlines that, research methods are the "techniques or procedures used to collate and analyse data".

For the fact that research methodology is logically linked to research methods, the two are often confused with each other, and are wrongly interchanged sometimes; but in reality, methodology is not the same as method, the former is a strategy/approach towards a research, whilst the latter is tactics/tools for collecting and analyzing data. Conventionally, the selected research method is explicitly linked to the defined research questions, as well as to the sources/objects of data collection. The relationships discussed so far can be modelled as illustrated in Fig 4.6 below.

In the model, the top elements (i.e., the Ontology, Epistemology, Methodology, Method and Sources) form the Building Blocks of Theories (BBT), and the down components constitute the "Mortars" for holding the blocks together.

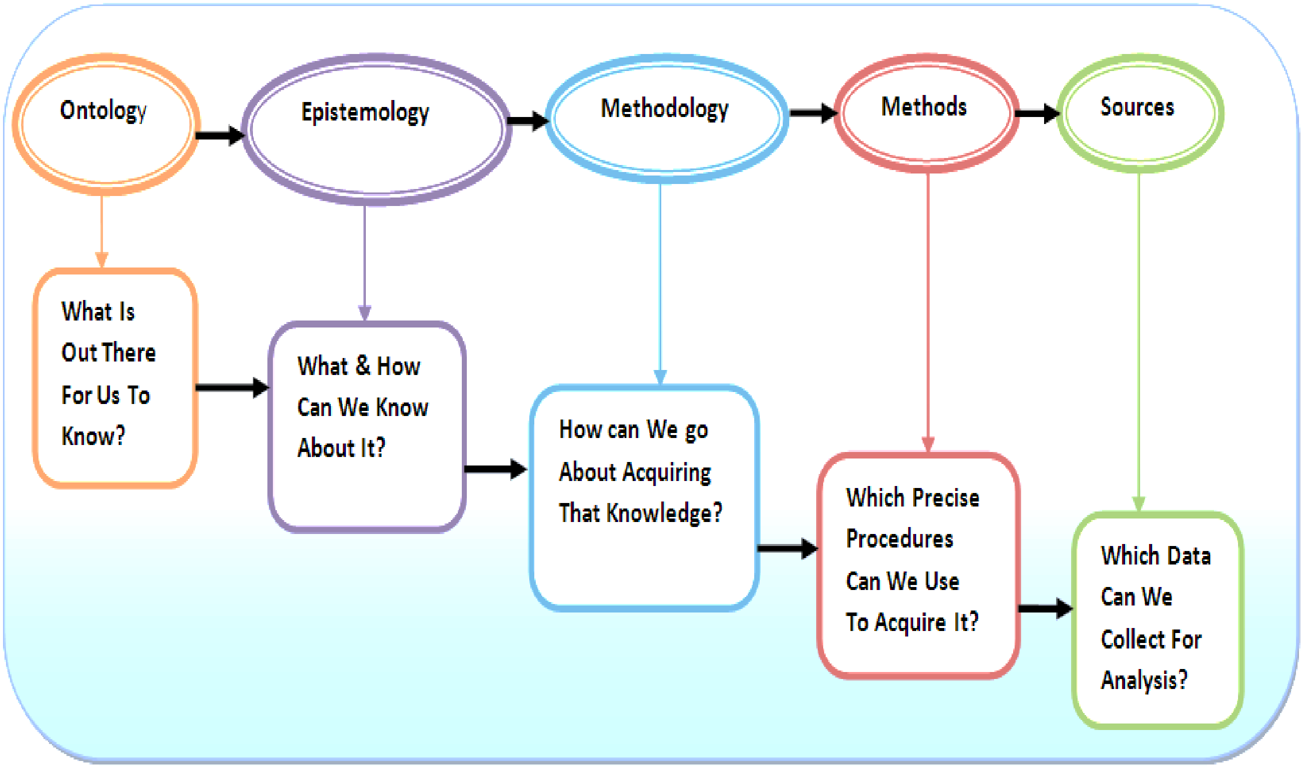


Figure 4. 6: Inter-relationship between Research Building Blocks

Source: (Hay, 2002)

4.7 THE METHODOLOGY

Just as there is a plan for any activity under the sun, in the same way, there are plans for all researches conducted. In supporting this proposition, Crotty (1998) shows that there exist diverse forms of research framework based on their epistemological grounding. This grounding provides the basis for research, and hence, "theoretical perspectives" of research study is built on this foundation. This is followed by the selection of methodology, and lastly, the method of data collection and analysis is also chosen. Data processing is a sequential one, with each step forming the basis for the subsequent step. In research studies, these plans are referred to as Methodology. Invariably, it is the "overall strategy of action" for undertaking research studies; these plans include, Ethnographic Research, Survey Research, Phenomenological Research, Exploratory Research, Explanatory Research, Descriptive Research, and many more. At the tail end of the sequence in these research plans lays the definite method used in collecting and analyzing research data. Table 4.2 below tabulates the strategy of research actions discussed so far.

Table 4. 2: Higgs' Approach to Research Design
Source: (Higgs J., 2001)

RESEARCH PARADIGM	PHILOSOPHICAL STANCE	RESEARCH GOALS	RESEARCH APPROACHES	METHODS
Empirico-Analytical Paradigm	Positivism/objectivism (Knowledge & meaning exist objectively in the world independent of human concerns, & wait to be discovered.)	Measure, test hypotheses, predict and control, explain, generalize, identify cause and effect.	Scientific approach, operationalism, observation	Experiment, survey, sample, Randomized controlled trial (RCT)
Interpretive Paradigm	Idealism (Knowledge and meaning are constructed by people)	Understand, interpret, seek meaning, illuminate	Phenomenology, hermeneutics, narrative inquiry	Case study, Grounded Theory, textual review participant & non-participant observation,
Critical Paradigm	Historical realism (social practice and culture shape practice)	Improve, empower, liberate, raise consciousness	Action research, collaborative research, critical hermeneutics	Interview, focus groups

Crotty's approach to methodology corresponds to "research goals and approaches" in a scheme of research paradigm (Higgs J., 2001). The rationale for taken note on these constructs is to be able to select appropriate research methods. In Crotty's view, this will ensure coherence and consistence with "the underlying epistemology or paradigm"; but more imperatively, it will aid rigour in a research study. Contributing to Crotty's approach to research methodology, Higgs J. (2001) followed a comparable but somewhat diverse approach, regarding research pattern, by differentiating between "three core research paradigms, namely; the "empirico-analytical", the interpretive, and the critical paradigm". Higgs' approach to research methodology is as illustrated in Table 4.2 above; the green coloured concepts form the methodology followed in this current research.

This research followed the descriptive, interpretive and phenomenological approaches to illuminate specifically, the performance, usefulness, successfulness and user-satisfaction issues, pertaining to the use of intelligent vehicle tracking systems (IVTS) in developing nations. The aim here was to identify the on-going phenomena leading to unsatisfactory usage of these systems and how users perceive and interpret these phenomena. This was achieved by collecting "deep information" and perceptions of research respondents and participants by conducting inductive research through deep descriptive qualitative approach, employing survey method (questionnaire), case study method (face-to-face interviews) and Grounded Theory (GT) method of data collection and analysis.

4.7.1 The Research Methods

From philosophical worldviews, there are three cardinal research traditions relating to research methods, these are: Quantitative Method (i.e., positivism - the positivist research approach), Qualitative Method (i.e., constructivism / interpretivism - the interpretive research approach), and Mixed - Methods (i.e., pragmatism - the pragmatic research approach, i.e., a hybrid of both quantitative and qualitative research methods). This research purposively follows the qualitative research approach. For lack of space, only the qualitative method is discussed further.

As shown in the last sub-section, the research methods of this study purposefully took the forms of: Survey, Single Case Study, Descriptive and interpretive Analysis. The design of any research study depends on the nature of the research questions and the expected data for analysis. This dependency is in turn based on the following six fundamental research components, namely: the Purpose of the Study, Types of Investigation, Extent of Researcher Interference, Study Settings, Unit of Analysis (the population) and Time Horizon. The design of this study was based on each of these six research elements. For this reason, the roles of these research elements essentially reflect on the discussions of the selected data collection methods detailed in subsequent subsections.

4.7.2 Methods of Investigation

The Methods of investigation employed in this current research were carefully chosen based on insights gained from a number of PhD courses attended. The exploratory research, i.e., qualitative data collection and analysis approach was used, these were: Survey (Questionnaire), Descriptive Case single Study (face-to-face interviews) and Grounded Theory (GT) method. The interpretive approach was used to provide meanings to the perceptions of research respondents and participants on the problems studied. This choice was informed by the main objectives of this study, the philosophical position, the epistemological perspective underpinning this study, and the nature of the research questions (the research questions were qualitative in nature, since attempt was made to answer "Why", "How" and "What" research questions, in corroboration with Robert Yin (2009). To add to that, only open-ended questions were designed to collect data for analysis, both survey questionnaires and interview questions were purely open-ended. Due to the lack of space, few samples of the survey & interview questions and responses are attached in Appendices B.1, B.2, B.3 and B.4 respectively for the purpose of referencing.

4.7.3 Selecting the Research Population and Sampling Method

In research works, a population is any group of people or set of subjects with a universal recognizable attributes or features. In this qualitative and a single case study research, the unique population purposefully selected was the users of intelligent vehicle tracking systems in Ghana (as a case study to represent users of these systems in developing nations).

Five participants were purposefully sampled from five organizations that offered accessibility to their premises and gave audience to the researcher, given a total of twenty five participants and respondents. Actually, the twenty participants met the minimum number of research participants/respondents required traditionally in case study and qualitative research; i.e., "between five and thirty participants" (Kahlib J Fischer, 2003). Additionally, this number met the tradition of grounded theory method of data collection and analysis which requires a minimum of 5 participants according to Kahlib J.F (2003).

Again, the purposive sampling method was utilized to select the participants, due to their unique professional and technical backgrounds and management practices at their various organizations. They were officers who report to top management of their respective organizations and whose reports, suggestions and recommendations do influence top management decisions in their institutions. The names of the institutions and research participants are withheld anonymously as part of the ethical issues addressed in this research. The backgrounds of the research participants were: Transport Manager (TM), Freight Manager (FrM), Logistics Manager (LM), Fleet Manager (FlM) and Head / ICT (HICT). These acronyms were used to refer to all the sampled participants throughout the data collection and analysis processes, instead of their real names for ethical purposes.

4.7.4 Data Collection Methods

4.7.4.1 The Survey Method

The survey data collection method was used in this research to collect data by designing and distributing questionnaires to the purposively selected twenty-five research respondents, and key officers (who take part in decision making) using intelligent vehicle tracking systems operated by the five different vehicle tracking service providers selected in Ghana.

4.7.4.2 The Single Case Study Method

One of the case study research experts - Robert Yin (2003), underscores that, a case study is an experiential or empirical investigation that inquires into current occurrences within real life time frames. It is a research method whereby researchers investigate or survey thoroughly an event, incident, process, or activities of individuals, or group of people/objects. According to Bryman (1989), Eisenhardt (1989) and Robert Yin (2003), (Hartley, 2004), case studies can either be qualitative or quantitative or both (i.e., mixed methods) at the same time. These Researchers emphasize that case study approach is suitable for "describing, analyzing and understanding formal and informal processes in organizations" and institutions. Eisenhardt underscores that case study is a suitable data collection method to generate theory from scratch. It is from these insights that the research strategy adopted in this study is the qualitative single case study approach.

The case study approach is essentially useful in situations where contextual conditions of the events being studied are critical and where the researcher has no control over the events as they unfold. It should entail specific data collection and analysis techniques based on clearly stated theoretical assumptions. In case studies, data needs to be gathered from several sources with high level of integrity. This was one of the reasons why the research participants were sampled from five different institutions to ensure data triangulation and credibility.

Yin R. (2003) posits that, there are "five components" constituting a case study; they are: "the research question(s)", also known as "propositions"; unit(s) of analysis, i.e., research population / universe; "determination of how the data are linked to the research questions / propositions" and lastly, "criteria to interpret the findings". In Stake (1993), three kinds of case study methods are discussed, these are: Intrinsic case study, Instrumental Case study and Collective case study. When a case is not a representative of others but rather unique to a specific entity, then intrinsic case study is conducted. This type of method is not a theory building one; it is done mainly for inherent interest. Intuitively, instrumental case study is undertaken to acquire insights into the building of a new theory as well as developing/ modifying existing theory. For this reason, this study follows the instrumental case study method, since it seeks to generate a theory or develop a model from scratch. Conversely, the collective case study is classified as instrumental, since it covers more than a unique case study.

Three types of case study put forward by R. Yin (1993, 2009) are: Exploratory, Causal and Descriptive Case Studies. In the first instance, data is collected before theories and research hypotheses are determined, it is then followed by the usual data analysis. The causal case study approach searches for "cause-and-effect relationships", it seeks for theories that can explain a given phenomenon. Traditionally, the descriptive case study necessitates a theory that will guide the data collection and analysis techniques, and it is required of the researcher to explicitly state the relevant and appropriate theory well in advance, so that theory will be the subject of review and debate in the design on which the study will be based. Table 4.3 below depicts the various case study types described so far. R. Yin further explains that, one can conduct a single case study or multiple case study (R. Yin 1994); he declares that, "case studies are either embedded or holistic". A case study with more than one sub-unit is termed as embedded.

A holistic case study is the one in which a "global programme of organization" is considered. This research follows the embedded case study, since it is a case study of Ghana and has no global dimensions.

Table 4. 3: Classification of Different Types of Case Study
Source: (R. Yin, 1994)

CRITERIA	TYPE OF CASE STUDY
Nature of the Case	• Intrinsic: Unique & Extraordinary • Instrumental: Developing Theories/Models& Insights • Collective: More than one Instrumental Case
Theoretical Aims	• Exploratory: Data Collected Before Theory • Descriptive: Requires Theories to Guide Data Collection • Causal: Search for Causal & Explanatory Theories
Number of Cases	• Single • Multiple
Units	• Embedded: More than One Sub-unit, has no Global Dmensions • Holistic: Global

This study follows the instrumental, descriptive & explanatory, single embedded case studies research design, as indicated in green letters in the above table.

4.7.4.3 Case Study as a Research Method in IS

Case study plays a major role in Information Systems (IS) research. Based on the ontological and epistemological assumptions in a given research, IS case study can be viewed as "positivist, critical or interpretive". Case study method is being criticized due to its "non-representativeness and the absent of "statistical generalizability" in IS (Conford and Smithson, 1996). These authors contend that, the affluence and complexity of collected data infers that data is frequently exposed to several "interpretations" and possible "researcher bias". In this regard, Miles and Huberman (1994) and Pettigrew (1985) argue that, in spite of the lack of specific "step-by-step data analysis" coupled with inability to generalize research findings statistically, case studies are extremely valuable in "refining generalizable concepts".

These authors show that "multiple case studies can lead to generalization in terms of propositions". For these same concerns, Walsham (1993) argues that, the legitimacy of the case study method developed via "interpretive and epistemological stance" is founded on the credible, and coherence of the "logical reasoning" related to the description and presentation of the findings and conclusions from the cases.

Yin R. (1994) further discloses that the case study approach allows for sharp explanations of the phenomena studied. This kind of depiction offers the researcher admittance to the refinement of varying and "multiple interpretations" (Walsham, 1995). Such refinement/fine tuning will not be obtained in experimental/quantitative research. When events are studied in their natural settings, case study method then allows data collection through multiple methods; including: reviews of documentary sources, interviews, archival records, participatory and non-participatory observations (Yin 1994, 2009). Contemplating the interpretive epistemology assumed for research, coupled with the type of the research questions posed to comprehend how vehicle tracking systems are used, employing IS initiatives, it is trusted that the single case study method of data collection and analysis is the suitable research method for this current research theme.

In summary, the single case study method was selected due to its merits in generating originality, philosophical insights, and focus on evaluating the affluent social and cultural manipulations of the use of domestic IS initiatives in the context of intelligent vehicle tracking systems in Ghana and in other developing countries.

4.7.4.4 The Case Study Approach to the Current Research

In this current study, the single case study method has been used to evaluate phenomena in their natural settings that were causing dissatisfaction of users of vehicle tracking systems in developing countries, typically in Ghana. A number of factors were considered before employing the single case study method for this current study. E.g., there was the need to focus on current phenomena (contemporary issues) in their raw circumstances in terms of system usefulness and user-satisfaction resulting from the utilization of vehicle tracking systems; in this situation, the case study "is advantageous".

4.7.5 The Grounded Theory Research Method

John Creswell enumerated a number of steps towards data collection and analysis employing the grounded theory method (Creswell J., 1994, Pg. 12). According to him, the first step to start with is the purpose of the research. In this context, Creswell posits a "naturalistic iterative data collection and relationship analysis processes; this is developed/derived from collected data by the researcher. These processes eventually lead to theory creation/generation and this is the anticipated end-product or the result of the research work as a whole. Creswell points out that the next step in the process is to continually identify and filter the correlations/relationships linking emerging concepts required to develop a theory. Data collection is the next step in the process.

The Grounded theorists recommend that data collection tools/techniques used in qualitative research be employed in grounded theory method **(**Glaser B., Strauss A.L, 1967), (Strauss, A., & Corbin, J., 1990), (Glaser B.G, 1992), (Strauss, A. *&* Corbin, J.,1994*)*, (Strauss A Corbin J, 1998), Glaser B.G (2001), (Glaser B.G,2008), and many other researchers. For this reason, the qualitative survey & ingle case study method, survey questionnaires and face-to-face interview tools/techniques were employed in this current research. In these processes, data collected earlier were compared and contrasted iteratively with new data "to refine, discard, generate, or extend questions, or conclusions".

The fourth step in the process is data analysis. In this step, researchers strive to classify "patterns" of relationship among data and try to link two or more of them logically to form categories (i.e., group of words or phrases having common meanings, dimensions and interpretations). The actual activity done in this process is termed as "data coding". According to Strauss & Corbin, researchers need to employ the following three key data coding approaches implemented in grounded theory method (Strauss and Corbin, 1990); these are:

Opening Coding: It is also known as "initial coding" or "microanalysis". In this coding step, original data (i.e., responses from participants) are disintegrated into "simplest forms possible, examined for commonalities, and sorted into categories".

Axial Coding: In this transitional/intermediary coding step, data is reconstructed "based on logical connections between categories". It is also referred to as focus coding in which substantive categories are generated.

Selective Coding: In this last coding step, core categories begin to emerge. It is also referred to as theoretical coding. The relationship linking them and the second level categories are defined, propositioned and validated later. These categories require supplementary modifications for enhancement. Two or more of such core categories are condensed to form several conceptual relationships, referred to as "Concepts", which form the building blocks of the emerging theory/model, that is, the end product of the grounded theory method.

The fifth and the last step in the coding process is to strive to attain data integration (Strauss and Corbin, 1990). For this purpose, the defined and refined core categories (from which theoretical concepts are generated) are show-cased or "presented as the story line" for developing the targeted grounded theory or model, per the research objective.

4.7.6 The Use of the Grounded Theory in the Current Study

This study was located in the Qualitative Research Design approach for the following reasons: first, the researcher sought to know and understand the constructs (i.e., independent, intervening and dependent Variables) that can be considered for measuring the performance of IS applied in intelligent vehicle tracking systems.

Thus, the grounded theory was chosen for this study to inform the research methodology and data collection & analysis methods used. As discussed in the conceptual framework, GT was used to develop analytical interpretations of collected data to focus on further data collection to inform, develop and refine theoretical analysis, which resulted in the final development of the proposed conceptual IS success model.

4.8 METHODOLOGICAL ISSUES IN THE RESEARCH

In this section, some salient issues of concern associated with the methodological approach to this research are discussed. These are: Research Ethical issues, Data Validity, Reliability, Generalizability, Triangulation methods, Procedural Limitations and Reflexivity. How each of these issues was addressed in this research is briefly discussed in the following subsections.

4.8.1 Ethical Issues Addressed in the Current Research

The data collection part of the research was conducted with cognizant attention to some vital ethical principles required to be observed in the academic and research environments. Informed consent of participants was a key principle in the data collection process. In observing this aspect of research ethics, the researcher submitted introduction letters in advance to all research participants to seek audience and to explain the purpose of the whole research project and the need for the data collection exercise in the research process. This purpose and needs were reiterated when survey questionnaires were administered, and re-echoed orally at the start of each face-to-face interview sections to re-assure participants of the adhesiveness of the researcher to laid-down institutional regulations in respect of academic data collection, the comfortability of research participants, as well as their freedom to decide to participate or not in the research process. The research respondents were encouraged to ask for any clarifications on any question posed, if the need be.

Another essential research ethical issue observed critically was confidentiality. All participants were assured of their anonymity to uphold their identities and protect any information they provided during the data collection processes. Participants were further assured of the exclusive use of the information or experience they share with the researcher, solely for the purpose of academic work and nothing else. The consents of participants were sought to employ audio tape to record discussions and responses. They were once again assured that the researcher was the only one to listen to the recordings and to transcribe all recordings personally.

By this step, participants felt free and were gratified to express their judgments and perceptions on the performances of the vehicle tracking systems they were using, i.e., the usefulness of the IVTS, the successfulness and their satisfaction as users, devoid of any hesitations, intimidations or apprehensiveness of being recognized / identified thereafter in any circumstances that might be to their disadvantage or to their displeasures and detriments.

In fact, participants were made to understand that, participation in the research was voluntary, as such, there was not going to be any remuneration in any form (since the research had no component for any financial disbursement), as such no request for any monetary rewards was made from any participant or respondent.

4.8.2 Methodological Limitations in the Current Research

It is established in the research community that any research study may or can face some limitations in one way or the other, regarding methodological approaches. Hence, this current research was not exempted from this proposition, as it faced some obvious and necessary constraints in connection with the methodological approach as with any qualitative research strategy. To start with, in view of the fact that information was elicited from a comparably miniature number of research participants (i.e., 25 in all), the outcome of the research findings was not generalizable to a larger population, even though, the developed model can be generalized relatively to a larger number of users of vehicle tracking systems in Ghana, and perhaps, can be applicable to users in other developing countries.

Additively, the use of purposive sampling may compromise, somehow, the generalizability of the research outcomes in relation to random sampling method. According to (Bailey 1978; cited in Gobo 2004), these kinds of research limitations faced by qualitative researchers are traditionally natural and are evil-necessities in qualitative studies.

Notwithstanding that, a consolation is found in (Coffey and Atkinson 1996) and (Bogdan and Bilken 1992) as they argue that; "qualitative research is not primarily concerned with producing scientifically generalizable findings". This translates to mean that, qualitative researchers are not necessarily required to generalize their research findings to the general public. In supporting the argument of Coffey and Atkinson, (Gobo, 2004) further hints that research generalisation is of two types:

- "A generalisation about a certain population, which is based on statistical logic". To them, the positivist/objectivist traditionalists are free to choose this kind of generalisation of research results/findings.
- "A generalisation about the nature of a certain process/phenomenon, which is based on theoretical sampling". Similarly, Gobo advises that, the constructivist/interpretive

traditionalists are also "free" to undertake this second type of generalization of research results/findings.

In buttressing Gobo's relieving submission, Yin R. (1994: 122) highlights that "analytical generalization", described as “the generalization of data to theory, not to a population”, is a very good pointer or "indicator for qualitative research" rather than "statistical generalisation", hence, data generalization to theory is accepted in qualitative studies.

The main reason for undertaken small number of single case studies was due to the delimitation placed on the research population and the uniqueness of the professional backgrounds of the research participants, coupled with financial constraints as discussed in the introduction chapter (section 1.9.1). Additional difficulties encountered during the data collection process included: limitations on accessibility, reluctances and postponements by respondents and participants to provide information, even though agreements, understandings and consensuses were far reached, and well in advance. This situation was attributed to the importance and the degree of confidentiality, information proprietorship and customization of vehicle tracking information in almost all organizations, including other private institutions in Ghana, and perhaps in many other developing nations.

The third limitation worth discussing is about the use of interviews for qualitative data collection. Usually, interviews depend heavily on research-participants’ attitudes and behaviours. The truths of the information given are actually founded on assumptions that research participants or interviewees report their opinions/views, thinking, meanings, experiences, interpretations and behaviours sincerely or honestly. Certainly, this researcher had no evidence/prove to ascertain that participants in this current research had intentionally or unknowingly upheld any information, had misinformed or erred in their "self-reporting behaviours" during the interview process.

Besides, even though the coding procedure offers an assessment track connecting raw data to research findings, the researcher is with the view that; grounded theory coding, as a process, is very subjective and its outcome depends on the interpretive skills and thinking of the researcher. E.g., a researcher might interpret a given data from diverse perspectives and therefore assign a dissimilar code to a given data fragment.

This imply that, two or more researchers might scrutinize/analyse a given data but may arrive at different decisions or even present varying conclusions for the same given data set. Nevertheless, (Miles and Huberman, 1994) console qualitative researchers by positing that, "this is the nature of interpretive inquiry" and it is acceptable, thus, qualitative researchers cannot do much about that.

Adding to the above mentioned constraints, one critical limitation worth discussing has to do with how a researcher is able to prove the theory/model that emerges from the data and the findings. In addressing this particular limitation on behalf of researchers, Seale (2004: 413) cites (Cook and Campbell, 1979: 22); and state that, "It is our inescapable predicament that we cannot prove a theory". Similarly, in this current research, it is a dilemma to attempt to prove the model (in the context of this research) which has been generated from the empirical data. Nonetheless, there is some calmness somewhere packaged by (Taylor and Bogdan 1984: 126). In their proposed solution to the limitation of theory proving, Taylor & Bogdan state that, "in grounded theory studies, researchers are not seek to prove their theories or models, but merely to demonstrate reasonable and believable support for their theories/models".

Within this current research, this reinforcement/support was testified by the scripts written by survey respondents, the raw voices of the individual participants/interviewees recorded on audio tapes, the codes generated, the emerged categories and core categories, and eventually, the seventeen core IS success concepts created and developed into a conceptual IS success model at the end of the data analysis processes.

4.8.3 Testing of the Developed Conceptual IVTS Success Model

The researcher recognizes the importance of testing a newly developed model from an inductive research of this kind, to validate and support the new model with empirical data, and sometimes to point out some shortfalls of the model. In order to test a model/theory, theoretical statements in the theory/model are translated into propositions or research questions and hypotheses; empirical data is then collected and analyzed. Basically, the interpretations and meanings of the empirical data establish whether the study holds or opposes the propositional statement made from the created theory/model.

The theory/model testing process necessitates detailed validation or examination of theoretical relationships between the constructs of the created theory/model. The results are then compared with the propositions or hypotheses made from the existing theory/model to search for any gap between the existing theory/model and the collected empirical data. If no gap is identified, then the theory/model is supported, if any gap is established, the theory/model is then disputed. In some cases further research studies are conducted to either modify the new theory/model or extend it.

The researcher of the current study acknowledges that, this study did not quantitatively test the developed conceptual IS success model as discussed above. However, it is clear that, the theory/model testing process described above can only be undertaken as a complete quantitative research study, and traditionally requires a deductive research logic approach, from a philosophical worldview and epistemological point of view. Agreeably, this is a full grown and complete new research that requires a whole research budget incorporating additional research investigators/assistance at a considerable cost (e.g., to organize focused group discussions to collate expert opinions, etc), extending timelines and financial components to collect and analyze wider and credible quantitative data that will pass all research validity and reliability tests (using e.g., SPSS software) to be able to generalize the results and finings to a larger population. It was for these challenges that this newly developed conceptual IS success model could not be tested empirically in this current research. Therefore, this study hereby documents that, the testing of this new conceptual IS success model for IVTS is highly recommended for future studies.

4.8.4 Reflexivity Requirements in Grounded Theory Research

Defining "reflectivity" in research, (Finlay, 2002: 532) states that, "reflexivity is a thoughtful conscious self-awareness" observed and experienced during research. Finlay hints that, it is an essential means by which researchers are able to recognize the consequence of "self in researcher-participant relationships". Theorists of GT conceive that, because the fundamental worry of GT research is frequently "the cause/nature of personal interactions, it is obvious that researchers review and reflect on the real investigator-respondent relationship, resulting from interactional practices in data collection processes Hall and Callery (2001). In supporting this proposition, (Neill, 2006) claim that, in research works, reflexivity and relationships should be preserved, to enhance rigour in GT research. Reflexivity on one hand; is a way of responding to the consequences of participant-researcher interplays on how data is constructed. Neil concludes that, relationality on the other hand is the “power relationship and trust relationship between researchers and participants”, thus awareness of matters of this sort is very crucial to enhance the quality of research.

In the view of Charmaz K. (2005: 510), reflexivity necessitates researchers to reflect on their "own biases". It persuades researchers to acknowledge that “No analysis is neutral – despite research analysts’ claims of neutrality”. Charmaz K. again hints that, by “simply being there" (i.e., being at the premises of participants) "we influence the research that is being carried out”. Another key point Charmaz K. raises is that, in the process of analyzing data, "subjective coding decisions are made, and to some extent, this may lead to a little biasness or not". The question now is; how was the issue of reflexivity addressed in this current research? In an attempt to address the issue of reflexivity in this qualitative and GT research; during interview sections, the researcher conducted himself as expected of any academic researcher and interviewer in order not to create difficulties in building rapport that could create some potential obstacles/barriers to the deeper understanding of the perceptions, experiences and interpretations that participants assigned to the phenomena understudied. To crown it all, throughout the coding process the researcher intuitively and repeatedly disputed himself to rationalize or validate all judgments for coding any data fragment in a particular manner.

One more area in which reflexivity was observed in this current research was in the memo-writing activities in which the researcher constantly reflected on the data analysis processes to ensure consistency and rigour in the creation of the theoretical concepts and the generation of the ultimate grounded theory/model in the end.

4.8.5 Establishment of Qualitative Research Validity

In discussing research validity, it is vital to review the various definitions of validity presented by past qualitative researchers from their earlier studies. The general definition of research validity is: "the best approximation to the truth of a given proposition, inference or conclusion" (Lincoln & Guba, 1985) of research activities.

These qualitative researchers dispute that "the term validity is not applicable to qualitative research", though, they do recognize the necessity to perform some type of "qualifying check or measure for their research".

It is therefore known that, many contemporary qualitative researchers replace the term validity with: "Credibility, Transferability, Dependability, Confirmability, Repeatability, and Comparability. Other researchers have further adopted appropriate terms to refer to qualitative validity, such as: "Quality, Rigour and Trustworthiness as a measure of qualitative validity of their research works" (Davies & Dodd, 2002). In qualitative research, the concept of validity is about discovering and measuring trustworthiness and creating self-confidence in the findings and being able to defend it, as Mishler (2000) and Johnson (1997, Pg. 282) suggest. Three key validity issues addressed in this current research are Internal Validity, External Validity and Interpretive Validity, each of these is briefly discussed in the ensuing subsections.

4.8.5.1 Internal Validity

In qualitative research, "the design integrity of the study" is referred to as "Internal Validity" of a research (Altheide and Johnson 1994). These authors note that, since it is "virtually impossible to control data variables in natural settings" validity in qualitative research rather depends "on logical analysis" of the data. For this reason, "full descriptions of the research site, subjects, data collection devices and procedures", were importantly discussed and duly presented in the thesis write-up, to ensure internal validity in this current study. Two internal validity strategies associated with qualitative research are "Interpretive Validity and Trustworthiness".

4.8.5.2 Trustworthiness of Qualitative Research

The trustworthiness of qualitative study consists of two main factors; "Dependability and Confirmability" (Lincoln and Guba 1985), Here, dependability has to do with “the coherence of the internal process and the way the researcher accounts for changing conditions in the phenomena” being studied (Bradley, 1993). Confirmability on its part, relates to “the extent to which the characteristics of the data, as posited by the researcher, can be confirmed by others who read or review the research results”. Usually, auditing of the research proceedings and the findings are the main method to ascertain dependability and confirmability.

In the view of Lincoln & Guba, to establish dependability, reviewers verify "the consistency of the research processes"; in establishing research confirmability, readers verify "the internal coherence of the research process", such as "the data, the findings, the interpretations, and the recommendations". The following materials (but not limited to) are used to audit research processes and findings: "raw data, field notes, theoretical notes and memos, coding manuals, process notes", etc. Gall et al. (1996) emphasize that, in a study of this kind, “trustworthiness” is enhanced "when data analysis and conclusions are triangulated; subjects’ perceptions are verified in a systematic manner; and the project’s data chain of evidence is established. In this current research, the issue of trustworthiness has been addressed by the detailed research procedures provided in sections 4.6. and 4.9, together with the research triangulation methods employed, and by providing data chain of evidence as presented in Appendix B.1 to I.3.

4.8.5.3 Interpretive Validity

Interpretive validity basically refers to "the degree to which data interpretation and conclusions are considered accurate, so as to be reflective of the subjects’ or phenomenon’s reality” (Altheide and Johnson 1994). Altheide & Johnson posit that there exist "four dimensions to interpretive validity" associated with qualitative research; they show that, "the greater the degree of acceptance by other researchers, the more valid the original researcher’s interpretation is perceived". Altheide et la. list the four dimensions as: "Usefulness of the Thesis Report", "Contextual Completeness of the Thesis Report", "Research Positioning" and "Thesis Reporting Style". In their view, the thesis usefulness parameter is established "by the extent the report informs and stimulates further research" or future studies.

This first dimension of internal validity has been addressed in this study, in the sense that, this thesis report is rigour, robust, informative and stimulates future study by recommending quantitative data to be collected to test the developed IS Success model, and this is documented in the recommendation section of this thesis.

Altheide et la. further indicate that, the contextual completeness of a thesis report has to do with the "fullness and richness of data description (usually in narrative form)". This second dimension of the internal validity has been addressed by the deep/thick description of the data in section 4.7; additionally, the thesis report is complete, educative, academic and scholaristic in coverage.

Regarding research positioning, "the researcher must document the direct and indirect effects on the research sites, and on participants" (Bradley, 1993). Bradley cautions that, this is crucial since researchers employing qualitative methods are "referred to as data collection devises, given the centrality of the researchers". This aspect of the internal validity was addressed by documenting that; population for this research was selected based on professional practices. In this context, users of intelligent vehicle tracking systems were purposively selected, and not from the general public or general stakeholders in the transportation industry. Bradley further suggests that the reporting style is linked to "the extent the description of the authors' research report is perceived as authentic". This last dimension of internal validity was addressed in this current study by following due processes, providing required, expected and relevant materials in terms of thesis content, acknowledging all sources of materials, providing appropriate and standard referencing, writing style, presentation and documentation.

4.8.5.4 External Research Validity

In Qualitative research, external validity pertains to "comparability" and "translatability" (Altheide and Johnson 1994). The term comparability refers to "the ability of other researchers to extend knowledge based on the "richness and depth" of the description" of the research process, methodological approach and the research results and findings. In this research, room for external comparability was created for future researchers to collect quantitative data to extend knowledge to the research community by testing, modifying or extending the model that has been developed from this study. Translatability on the other hand concerns itself with "the extent to which other researchers understand the results, given the theory and procedures underlying the study". In this current research, a conceptual IS Success Model has been developed and other researchers with IS studies and TAM backgrounds can easily accept the conceptual model and even replicate it, if they so wish.

4.8.5.5 Research Credibility

The research community refers to research validity in qualitative study as "Credibility Criteria" (Lincoln and Guba 1985). It helps to ascertain that the outcomes of qualitative enquiries are "credible or believable" relative to the perceptions of research participants, readers and reviewers. Since the aim of qualitative study is to explain and comprehend the phenomena of interest from the participant's views & eyes, participants are the only individuals who can legitimately judge the credibility of the results and findings (Trochim W, 2009). Bradley also submits that, credibility in research study is the “adequate representation of the constructions of the social world under study” (Bradley, 1993, Pg 436).

From another perspective, Lincoln and Guba (1985) again suggest a set of actions that would aid the enhancement of research credibility in terms of results and findings; these actions are: "prolonged engagement in the field, persistent observation, triangulation, negative case analysis, checking interpretations against raw data, peer debriefing, and member checking". They advise that, researchers must plan their data gathering strategies to sufficiently enhance "the credibility of qualitative content analysis"; including the design of transparent coding processes that will help to arrive at credible conclusions on collected information (i.e., raw data). The knowledge and experience that coders/researchers bring on board during data analysis encompass considerable impact/influence on the credibility of research results and findings, more importantly, coding definitions and procedures must be precise and clearer respectively (Weber, 1990).

To achieve research credibility in this current study, there were prolonged engagements in the field of intelligent vehicle tracking, by way of interactions, informal meetings and discussions, with users of IVTS in Ghana. In addition to that, multiple triangulation methods were employed to establish credibility, these included methodological, data and theoretical triangulation. Moreover, the interpretations of the results were checked against the raw data to establish true representation of research participants' views and perceptions on the phenomena that lead to the unsatisfactory usage of vehicle tracking systems in Ghana, and perhaps, in some developing countries.

4.8.5.6 Research Transferability

This type of qualitative validity relates to the extent to which the outcome of qualitative research can be transferred to other contexts/settings. Viewing transferability from a qualitative perception, it is basically the responsibility of the person generalizing research results. To improve transferability, a qualitative researcher must critically explain the research situation, including any key assumptions to the study. Thereafter, the "transferee" then takes up the responsibility to decide on how feasible and viable the transfer will be. To establish transferability in this current study, the context under which this study was conducted has been described extensively in several sections of this dissertation, the situation under which this current research was conducted has well be explained in earlier sections, and critical assumptions underpinning this research have well been outlined in the introductory section.

4.8.5.7 Research Dependability

Dependability is one of the key standards for judging qualitative studies. It basically relates to the degree of "stability or consistency of the inquiry processes" (Williams David, 2011) employed over a given period. In checking for dependability in a given qualitative inquiry,
one scrutinizes to ascertain whether a researcher had been uncaring or conceded some mistakes in conceptualizing an enquiry, in gathering the data, in deducing/interpreting the discoveries and communicating findings. The judgment used to choose the population, participants and phenomena to investigate or interrogate, all must be detailed and documented.

In this current research, dependability has been established through the systematic and consistent manner in which the data were processed, the research results were deeply described and constructively interpreted and research findings have been communicated by way of writing this report or dissertation for audiences or readers in the IS and ITS research communities. Furthermore, it is planned to publish the outcome of this research, both electronically and in the print media.

4.8.5.8 Research Confirmability

This aspect of qualitative research validity pertains to the extent to which research results might be or corroborated by other researchers. The following are some strategies that can be performed to augment research confirmability. A document prepared by the researcher showing "the procedures for checking and rechecking the data throughout the study". After the study, one can conduct a data check to scrutinize the data collection and analysis processes and pronounce judgments on any probable biasness. This current research can stand the test of all these confirmability checks of research validity as a result of the deep descriptions of the data analysis processes given in sections 4.6. & 4.7 respectively, as well as the non-biasness of the researcher in the data collection and analysis processes.

4.8.5.9 Testing Research Validity

Qualitative validity; in order words, research trustworthiness is tested by "maximizing the credibility and dependability of research results" (Johnson, 1997, p. 283), (Stenbacka, 2001); and this may eventually culminate into research generalizability. By implication, the testing of qualitative validity or trustworthiness is linked to the generalizability, methodological and data triangulation of research results (Mathison, 1988). Mathison further remarks that, triangulation is typically "a test strategy for improving the validity of research or evaluation of findings". Triangulation validity is discussed in details in the subsequent sections that follow.

4.8.5.10 Research Triangulation Validity

Julius Sim & Keith Sharp (1998**)** define triangulation as a data collection method aimed at "enhancing the process of empirical research by using multiple approaches". They assert that; by employing hybridized data collection methods, the vigour of one method will indemnify the limitations of the other method, hence, improving data excellence/credibility with respect to validity and reliability of data. The term triangulation originated from survey activities and denotes "the use of a series of triangles to map out an area", according to Julius Sim et al.

It is an analogy of a procedure accepted in the field of navigation, in which locations of objects are precisely established by identifying two or more coordinates/ bearings of the objects. In the context of research studies, triangulation maps up research quality parameters (e.g., reliability, validity, credibility, trustworthiness, dependability, transferability, confirmability, comparability, translatability and lastly acceptability) of the research results/findings. Triangulation reinforces trust/confidence in research findings. These researchers emphasize that, if a research is based on "single research method, it will contain some methodological limitations. To address these methodological constraints, triangulation provides the possibilities of improving credibility, confidence and quality in research inquiries.

The initial thought of research triangulation was expanded further than its established relationship with research design and methods (Denzin, 1970). Denzin's studies show that there exist four kinds of research triangulation, these are:

Data Triangulation- This refers to the process of collating data via a number of sampling methods, as a means to combine slices of data collected at various times, under different conditions and from diverse people.

Investigator Triangulation -This relates to the employment of more than one researcher to collect and construct data by interpreting them, e.g., the use of research Investigators and research Assistants.

Theoretical Triangulation- This kind of triangulation assumes the use of two or more theories to interpret collected data;

Methodological Triangulation- This type deals with the utilization of more than one method to collect data, e.g., using qualitative method and quantitative method in one study. Researchers commonly prefer to employ this type of triangulation method. The triangulation methods discussed above can be modelled as illustrated in fig 4.7 below.

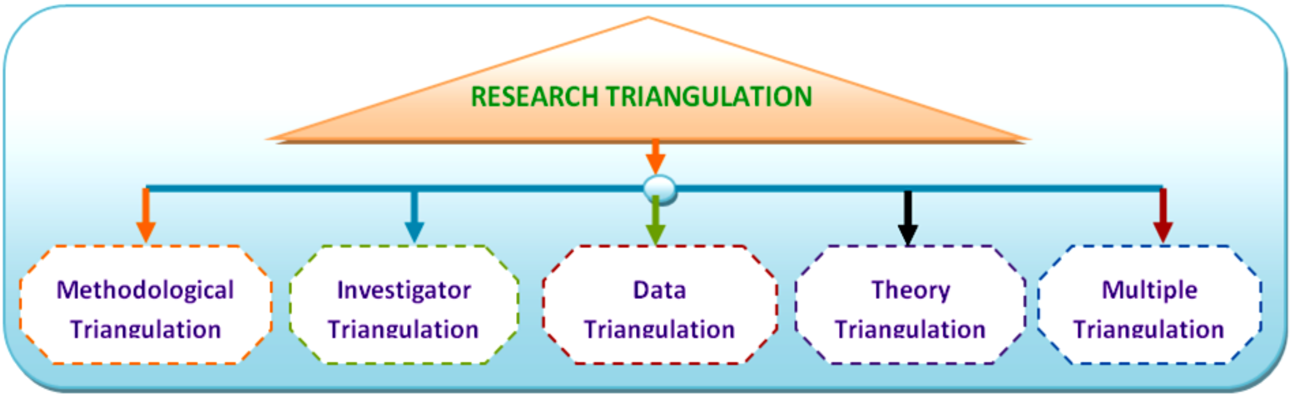


Figure 4. 7: Research Triangulation Techniques

Source: Replicated from (Denzin, 1989)

As seen from the figure, Denzin (1989) places "Methodological Triangulation" at the first position of his penta-triangulation model; arguing that, it is the most common triangulation method carried out by many researchers. Denzin N. K. further distinguishes between "within-method" triangulation & "between-method" triangulation.

Within-method uses a mixture of the same method to collect data (e.g., open-ended and close-ended questions in a single self-completion questionnaire). The "between-method" uses complementary inquiry techniques, e.g., observation and focus group methods). This study used the between-method, i.e., survey method and single case study method.

In other studies on triangulation methods as a research strategy, a sixth research triangulation – "Philosophical Triangulation" was also identified by (Wendy Oslen, 2004). Lisa A. and other researchers extend Denzin's penta-triangulation model and that of Wendy Oslen and posit that, there is a seventh type of research triangulation method which they name as "Environmental Triangulation" (Merriam, S. B. (2009), (Lisa A et al., 2011). It entails empiricism, constructivism and realism positions of researchers. All seven types of research triangulation methods identified in this current study can be modelled as shown in fig 4.8 below.

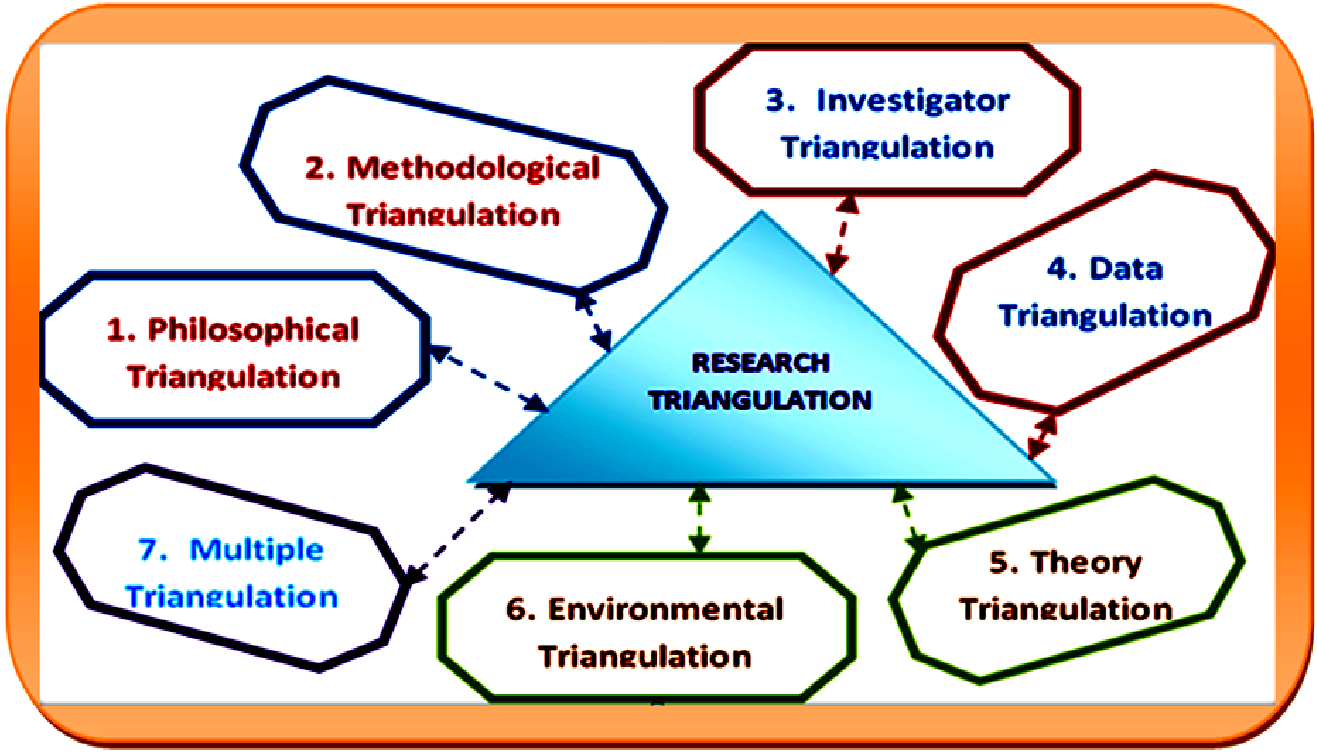


Figure 4. 8: Seven Research Triangulation Methods

Sources: Replicated From: (Denzin (1970, 1989), (Wendy Olsen, 2004), (Alan Bryman, 2004)

4.8.5.11 Triangulation Strategies Performed in the Current Research

Sincerely, four methods out of the seven identified triangulation strategies have been performed in this current research. They are: Methodological, Data, Theory and Multiple Triangulations. Methodological triangulation was performed by using qualitative single case study method and grounded theory method to collect and analyse the research data. Data triangulation was performed in two fold, first by distributing survey questionnaires (open-ended questions) and secondly, by conducting face-to-face interviews with different research participants, to ascertain "internal validity" of the research findings. Theory triangulation was performed by employing 3 theories (i.e., the DeLone & McLean’s IS Success Model, Expectancy Disconfirmation Theory and the Technology Acceptance Model - TAM) in this study. Lastly, multiple research triangulations methods were performed since more than two of the seven research triangulation methods were employed in this current study.

4.8.6 Reliability in Qualitative Research

Hitherto, the term 'Reliability' was research concepts employed to test or evaluate quantitative research, but it is now used in qualitative and mixed methods as well. Reliability in qualitative studies connect to the "concept of evaluating research quality" with the idea of creating thorough understandings of the research results and findings (Stenbacka, 2001, p. 551). Healy and Perry (2000) also assert that, "Reliability" and "Validity" are essential criteria for quality in quantitative models; whereas in qualitative research approach, "Credibility, Neutrality/Confirmability, Consistency, Dependability, Applicability & Transferability" are the fundamental measures for quality in qualitative studies (Lincoln & Guba, 1985).

Specifying reliability in qualitative study, Lincoln and Guba employ "Dependability"; this is equal to the concept of reliability in quantitative inquiry. Lincoln et al. additionally stress that "research audit" is one evaluation tactics that heightens dependability in qualitative study. Reliability is employed to evaluate mutually the "process and the product of the research for consistency". Both Clont (1992) and Seale (1999) sanction the concept of dependability with the idea of "consistency or reliability" in qualitative inquiry. In their view, data consistency is realized if procedures taken in the research are validated via assessment of "raw data, data reduction products, and process notes" (Campbell, 1996).

4.8.7 Qualitative Research Generalizability and Transferability

Primarily, generalizability is a concept in which research findings and conclusions on a smaller population can be extended to a larger population. It is traditionally related to quantitative inquiries. In qualitative studies, this concept is substituted with the term "transferability". Customarily, quantitative study is centred on "generalizing to the larger population" irrespective of situation/context. Here, the emphasis is on "random sampling and statistical significance" (Foor et al., 2007). Conversely, qualitative study strives to generalize a study via thick/deep description in a particular circumstance. Foor et al. indicate that, quantitative inquiry puts responsibility of "demonstrating generalizability on the researcher". However, this responsibility is placed on the readers/audiences of qualitative studies to identify/recognize suitable frameworks/contexts for transferability.

They again note that, undertaking a single case study will not offer generalization from quantitative perception, since it is not possible to discern whether that single case is peculiar to warrant generalization. However, thick description of that same single case will permit audiences to recognize transferable components for their own context, from qualitative viewpoints.

Research reports based on qualitative paradigm are both specific and detailed. More often than not, such reports reflect on "only one subject or one group" (Foor et al., 2007). For this reason, researchers who perform these type of study "rarely generalize their results to other populations". Nonetheless, the detailed characteristics of their results and findings render them "ideal for transferability". Agreeing with the proposition of Foor et al. (2007), this current study is a single case study performed in Ghana, and the thick description that this study has been subjected to allows the results and findings discussed in chapter 5 to be transferable (not generalizable) to other users of intelligent vehicle tracking systems in other developing countries. Again, transferability of this study is possible through the trustworthiness established in this study.

CHAPTER FIVE

DATA COLLECTION, ANALYSIS & PRESENTATION OF EMPIRICAL RESULTS

5.1 OVERVIEW

This chapter discusses the procedures by which data was collected and the processes through which the collected data was analyzed. The section further presents a summary of the empirical results obtained from the data analysis processes. For the purpose of smooth and ease of reading of this dissertation, details of the data collection procedures, data analysis processes and details of empirical results are located in the appendix section. To facilitate understanding of the research results, the research problem underpinning this study is hereby summarized as follows: Users of Intelligent Vehicle Tracking Systems (IVTS) in developing countries were experiencing problems (at the time of data collection) relating to unsatisfactory system and service performances. To address these problems, this current research sought to identify and analyze the concepts required to develop a conceptual IS success model for use in IVTS deployed in these nations. The result of this research, packaged in the form of tabulated core IS success concepts and models are presented and analysed in the succeeding subsections. Finally, the chapter produced empirical data from which the proposed conceptual IS success model (the ultimate objective of this research) for utilization in IVTS was developed.

5.2 DATA COLLECTION PROCEDURES EMPLOYED

Initial exploratory research through discussions and informal meetings with a number of users of IVTS in Accra - Ghana was undertaken (i.e., the environment where data was collected), with a view to ascertain from first hand, how satisfied or otherwise were these users in the process of utilizing their vehicle tracking systems in relation to what literature presents in ITS studies reviewed in Section 2.

To start with the data collection phase, seven organizations in Ghana that use vehicle tracking systems in managing their fleets of vehicles were contacted with letters of consent, out of which five granted access and audience to the researcher. The remaining 2 organizations did not respond to the letters of consent submitted to them.

A series of discussions with each of the five responded-organizations took place and ultimately agreed on interview dates, times and venues to distribute / administer survey questionnaires and to conduct face-to-face interviews. The data collection techniques employed was structured into three key phases and are modelled as shown in fig 5.1 below.

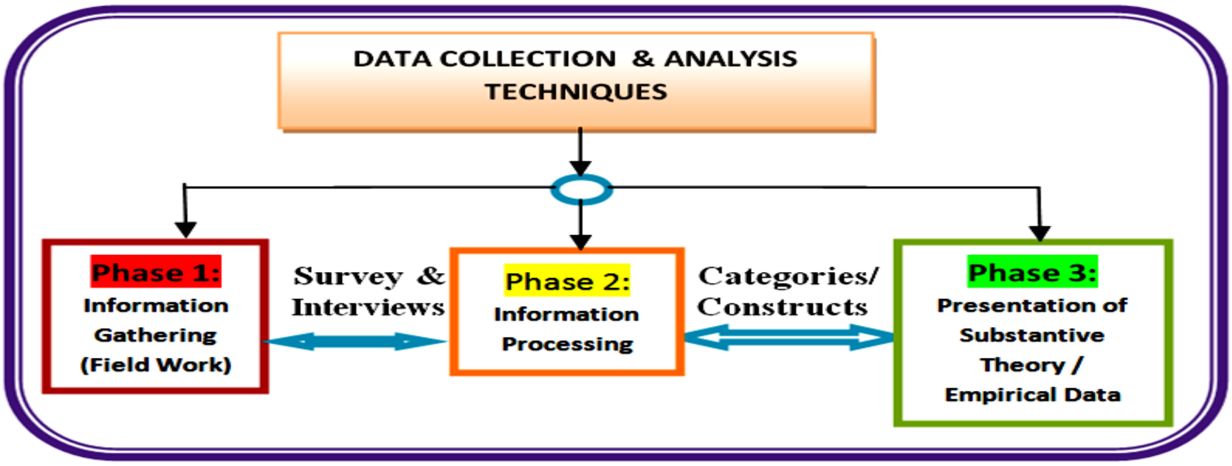


Figure 5. 1: The Data Collection and Analysis Phases

Source: Field Work

5.2.1 Designing & Relating Interview Questions to the Research Questions

Due to the large numbers of pages involved, detailed materials covered in this section have been presented in Appendix B.1, which shows samples of how the interview questions were mapped unto the sub-research questions in a bid to answer the latter by collecting data. Appendix B.2, B3 & B.4 present survey questionnaire and interview questions and responses/scripts from research participants and respondents respectively. In all, thirty-four interview questions were posed; follow-up questions were additionally asked intermittently to obtain feedbacks and clarifications to some perceptions and meanings that participants attached to some statements they made during the interviews. Those feedbacks & clarifications were necessary in order to gain detailed interpretations and descriptions of the phenomena studied.

5.2.2 Data Collection & Analysis Techniques Employed

The principles of grounded theory method requires that, a set of data must be collected and analysed simultaneously and continuously, sorted into tentative categories and then filtered into core categories. These first core categories are compared with a second core categories emerging from a second set of collected and analyzed data, the process then continues until data saturation point is reached. This principle is detailed in the data collection and analysis phases discussed in the subsections that flow. Beginning with Phase 1, information was gathered from the participants and respondents to study the nature of the phenomena associated with the problems experienced by users of IVTS in Accra - Ghana, where data were collected as a case study.

This information was processed into opening/initial codes. In Phase 2, the gathered information was subjected to second level coding process and the outcome was provisional categories which were then filtered further into substantive categories. The latter were then compared with new categories that emerged as the data collection process progressed towards theoretical saturation point. These substantive categories were compiled, compared and refined to create core categories which were organized to create concepts that formed the building blocks for generating tentative theory from the empirical data that emerged from the analysis processes.

The tentative theory was then refined again by collecting only few but specific and critical relevant data, with purposefully re-designed interview questions, from a smaller number of specific research participants (theoretical sampling) who were capable of giving relevant information necessarily required to augment and enrich the emerged core categories which were organized into building blocks of the emerged theoretical concepts. This last process continued until no new categories emerged from any new data collected. The refined concepts were then structured into abstracts constituting the basis for generating the ultimate substantive theory grounded in empirical data; this was the kind of theory that Glaser & Strauss (1992) codified as: "Grounded Theory" (GT) and confirmed by Strauss & Corbin (1994), Chalmaz Karthy (2006) and many other authoritative authors of GT method.

Finally, the generated substantive theory was presented in the discussion chapter for further analysis. Each phase of the data collection and analysis techniques was divided into various stages; each stage was then subdivided into seven steps. Details of each phase and step are discussed in the following sub-sections.

5.2.2.1 Information Gathering Process

The stages worked out in the information gathering process included: description of the research method, designing trial interview question; securing cooperation, accessibility & audience, and conducting interviews. These stages are represented in a form of framework and illustrated in fig. 5.2 below.

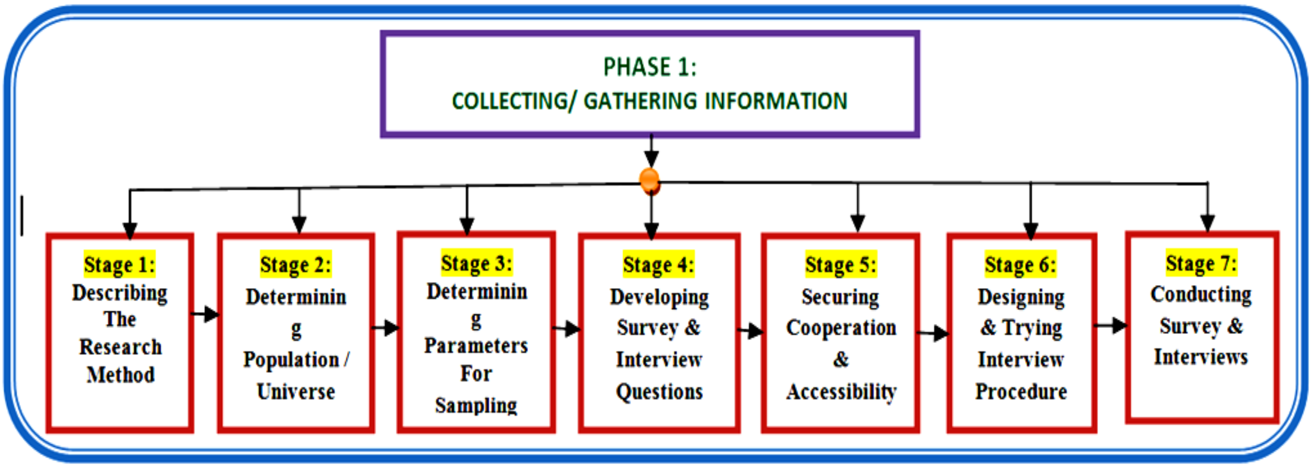


Figure 5. 2: Data Collection Process – Phase I

Source: Field Work

5.2.2.2 Designing the Survey & Interview Questions

In all, three batches of interview were conducted; interview questions were designed for all three batches of interviewees. Based on the emergence of categories from the data, the interview questions were modified for the second and third batches of interviewees as data were collected and analyzed simultaneously in the process. To start with, one set of thirty four questions was designed for both the survey-questionnaire and the face-to-face interviews. For the survey phase, qualitative open-ended questionnaire was designed. These same questions were employed for the facr-to-face interviews during the single case study phase.

Some additional probing questions were asked during the interviews to facilitate in-depth data collection and analysis, for the purpose of clarity and to enrich the data as required by the grounded theory method.

5.2.2.3 Pilot-testing of Survey and Interview Questions

To ensure consistency and data credibility, all respondents and participants answered the same open-ended questions. The survey questionnaire was pilot-tested with three users of IVTS in Ghana who have been using these systems (with two to six years user-experience). Two of the pilot-respondents expressed their satisfaction with the design of the questionnaire regarding the number of questions on the questionnaire, ease of reading, ease of understanding and ease of answering of the questions. One of the trial-respondents suggested that, a question on "How accurate is your tracking system able to capture positions of your vehicles at any time", must read, "To what extent is your tracking system accurate in capturing vehicle locations?" The laudable suggestion was considered, thus, that question was consequently modified as such in the final interview questions.

5.2.2.4 Securing Cooperation & Accessibility

As part of the ethical consents addressed in this research, introduction letters well submitted well in advance to seek audience with seven institutions whose vehicles were being tracked by seven different vehicle-tracking organizations in Ghana, to conduct academic surveys and interviews with them. The letters explicitly stated that, the purpose of the data collection exercise was purely academic, and that, institutional regulations and ethics regarding data collection would be observed accordingly. A copy of the introduction letter or letter of consent is shown in Appendix C for reference purposes.

5.2.2.5 Survey Questionnaires Administered

The survey questionnaires were semi-structured and pre-structured in accordance with the research objectives and directly linked to each of the three research objectives and questions respectively. They were distributed and administered personally to the twenty five respondents, composed of five groups of five participants each.

5.2.2.6 Designing and Employing the Interview Guide

Generally, an interview guide, or "aide memoire", is a written record/list of topics, questions, themes, or "areas to be covered in a semi-structured interview" (Jennifer Mason, 2002). Researchers usually design it well ahead of interview schedules. Its structure permits flexibility or variability/fluidity in the chosen themes intended to be covered in the interview, the preferred approach and sequence for each interview. It is always connected to the research questions guiding the study and engulfing the arena expected to breed/generate required data that will answer the questions to achieve predefined research objectives. It is a means to assist interviewers to carry out "effective semi-structured interview". In this current research, an interview guide was designed to facilitate critical questioning relevant to the purpose of the study; samples are provided in Appendix B2 to B4. It facilitated on-the-spot decision making on the sequence of proceedings as the interview progressed.

At the end of the first batch of interviews, variations were effected in the interview guide and as the data collection process progressed, the researcher became less reliant on the guide and got used to the questions and was also exploring themes as they emerged. As part of the theoretical sampling approach, the interview questions were reviewed and few changes were made to increase understanding of the problem being studied, and to comprehend diverse perspectives of the problems from different participants. Even though it was tedious, time-consuming and protracted, all interviews were transcribed personally and manually to secure "confidentiality" of all the interviewees. This transcription step was actually the start of the data analysis process and facilitated critical intimacy with the data at a very high level and also allowed the researcher to familiarize himself with details of the data.

5.2.2.7 The Interview Process

In all, twenty five interviews were conducted on different days, times and premises, with three batches of interviewees. All the interviews were scheduled and conducted on the premises of the organizations of the interviewees. McCracken (1988) disputes that transcribing interviews personally will “invite not only frustration but also a familiarity with the data”; however, Darlington and Scott (2002) disagree with McCracken and contend that, "it is imperative to transcribe the interview yourself as it stimulates engagement with the phenomenon being researched".

Invariably, the researcher acknowledges the pains-taking nature of the personal transcription, but differs from McCracken's opinion on frustration and rather, strongly advocates the "do-it-yourself" principle, due to the familiarity and intimacy gained with the data. In the end, data analysis memos were prepared, which noted down reflections and intuitions on the outcome of the whole interview process and core concepts that emerged from empirical data.

The interviews were conducted iteratively, i.e., batch-after-batch. All recorded interviews were manually transcribed and analyzed in batches as the interview progressed. The first interview was conducted with five participants from five different organizations to elicit information in a more general form. The second interview was focused on eliciting in-depth information on system quality, information quality and service quality of vehicle tracking systems, to confirm or discard some of the provisional categories that had emerged from the first slides of data.

Conduction of the third batch of interview became necessary to verify and to confirm some substantive categories that had emerged during the selective coding process in relation to issues concerning overall system usefulness, the impact of system performance on users and the net benefits that accrue from the usage of vehicle tracking systems. This level of grounded theory coding is termed as Theoretical Coding. It was at this stage that no new categories from the new data could be added unto the existing categories. This stage is also referred to as the theoretical saturation point. At this stage the core categories constituting the core concepts required to build the grounded theory/model emerged.

5.2.2.8 Audio Tape Recording Technique

Employing a digital voice recorder (Type: OLUMPUS - VN.713PC), all interviews were recorded with permissions from the research participants. Digital recording technique was undertaken to ensure high fidelity of sound quality, efficient data copying and storage. In addition, voice recording aided interactions such that, the researcher wasn't all that engaged in note-taking. Though audio recording is recommended by Lofland and Lofland (1984); however, they caution against "over-dependence on recording and still encourage note-taking".

Coming from another perspective; (Thomas et al., 2005) remark that, there is a probability/potential for recording apparatuses to create anxiety/nervousness amongst interviewees; however, they encourage that this can be surmounted during the interview process. Audio tape-recorder technique proved to be vital data collecting tool in this study; since it allowed volumes of information to be taken and also aided the researcher to fully participate in the interview discussions simultaneously.

However, this technique had two major limitations in the context of this study; first, it could not record non-verbal prompts, signs or cues, e.g., facial expressions and body languages. The second problem had to do with the tediousness encountered with the manual transcription of all audio recorded interviews, since the researcher could not succeed in using the NVivo10 software to aid in transcribing recorded interviews. Nevertheless, these difficulties were put behind bars by briefly describing the impressions of participants in the data collection journal and in the margins of the transcripts (in the form of memos). In order not to omit or forget any significant information/ideas, all audio-tape-recordings were transcribed personally, manually and immediately after an interview section, as much as possible or at the end of the day's activities, whichever way was applicable. All transcripts were re-checked by listening to the recorded-tapes repeatedly to ensure that accurate and correct transcripts were produced. These exercises were necessarily conducted to overcome possible and residual transcription errors and to maintain a high degree of accuracy in the transcription process.

5.2.3 Data Analysis Process: The Grounded Theory Method

In explaining what data analysis is all about, Strauss and Corbin (1998) hypothesize that, data analysis is the "interplay between researchers and data, it is both science and art". In view of this, this section discusses the process by which the collected data was analyzed and to provide details of the coding process employed. Pursuing the Grounded Theory (GT) data analysis method during this study, the process took the form of "deconstruction and reconstruction of the data" as a means to generate theory from scratch (Coyne and Cowley, 2006: 503).

The process was "non-linear" in accordance with GT tradition and was performed in three main steps, namely: "initial (opening) coding, focused (axial) coding and theoretical (saturation) coding".

Furthermore, a lot of iterative activities were necessarily performed. It is imperative to note that all three steps were performed "concurrently in varying degrees" and are discussed briefly in subsequent subsections. The guidelines for GT data analysis recommended by Charmaz K. (2006) was the one followed in this current study. As a means to observe the principles of "constant comparative analysis", proposed by Charmaz K., the researcher transcribed the first batch of interviews and analysed them separately before embarking on the second and third data collection phases respectively.

5.2.3.1 The Opening/Initial Coding Process

This first stage of the data analysis is called "Initial Coding" or Opening Coding". In this process, interview transcripts and responses from the first batch of interviews were systematically and cautiously coded "using line-by-line coding", this process is termed as "microanalysis", according to Charmaz Karthy (2006). The process was performed manually by employing the tactics of "gerunds" (i.e., nouns formed from verbs, such as the "-ing" forms of verbs when used as nouns), as admonished by Charmaz K. (2006, Pg 49). This action aided in identifying the various coding procedures and helped in gluing the researcher deep into the data". Honestly, the initial coding exercise was not simple and sometimes it was very demanding, when trying to generate a suitable code for a fragmented data.

In all, the opening/initial coding process produced six hundred and thirty two codes, all generated manually. This large number of opening/initial codes was created in order not to "force the data into emerging categories at an early stage", as advised by Charmaz K. (2006). Each of these opening codes was assigned a reference Number (1), indicating the first step of the data analysis process. This process is illustrated diagrammatically in fig 5.3; and these codes are shown in Appendices E.1 to E.3 respectively for the three batches of survey and interview conducted, to ensure that data triangulation is established in this research.

5.2.3.2 The Focused Coding Process

The next level of the data analysis process is termed "Focused Coding" or "Axial Coding", it is also referred to as "Macroanalysis" (Charmaz K. 2006). In this process, the huge number of opening/initial codes generated was classified under broader Provisional Categories to initialize and ease theoretical development. At the end of the focused/axial coding process, a total of one hundred and thirteen Provisional Categories were generated out of the six hundred and thirty two opening/initial codes. In producing these provisional categories, the existing opening codes were compared, grouped, summarized and then categorized by giving the grouped and summarized codes refined and unique representative statements, with reference Number (2), indicating the 2nd level or step in the data analysis process. A number of these codes were carrying numerous but minor sub-categories; non-correlated categories were discarded, whilst categories with common meanings, properties/characteristics and dimensions were merged. This was the reason why the six hundred and thirty two opening codes reduced to one hundred and thirteen Provisional Categories, which resulted from the focused coding process. These provisional categories are presented in Appendix E; and this process is also illustrated in fig 5.3.

This activity was the main object of the focused coding process and it was the preliminary point of manifestation of "theory building from qualitative data" and grounded theory method traditions (Coffey and Atkinson 1996: 48). Noticeably, some provisional categories were identifiable within the emerging data in the process of the initial coding. While initial coding was progressing, focused coding was initiated, this resulted in the generation of smaller number of categories; hence, the total number of provisional categories were far lesser than the opening codes.

Expectedly, the factors of these categories became apparent during the data collection and analysis, since each interview gave the opportunity to discover/explore new themes and ideas that emerged. Throughout this axial coding process, some codes generated during the opening coding phase were combined in line with the proposition of Maijala et al. (2003), because they related to each other in meaning, and a few non-correlated ones were discarded to further refine the emerging data. This situation really confirmed the idea of Creswell (1998), which suggests that, not all coded data must be used to develop the theory, since some codes will not fit into the "emerging conceptual categories".

Practically, such codes manifested at this stage and were discarded from the data. This made the remaining codes more manageable, meaningful and promising.

5.2.3.3 Selective Coding Process

The focused coding process which yielded the provisional categories created a platform for the third phase of the data analysis process; this is termed as the Selective Coding Process. In this process, all existing provisional categories were compared with emerging opening codes produced from the second batch of the data collection phase. Those emerging initial codes having similarities in meaning, property and dimension with the existing provisional categories were clustered under newly emerged categories and were coded as Substantive Categories (i.e., a hybrid of provisional categories and newly emerging opening codes). In all, fifty nine Substantive Categories were generated; these categories are shown in Appendix F; and this process is also illustrated in fig 5.3.

5.2.3.4 Saturation Coding Process

The generation of the Substantive Categories at the end of the third step of the data analysis process marked the beginning of the fourth step in the data analysis process. This step is referred to as Saturation Coding Process. In this 4th step, the existing substantive categories were compared with the third and the last initial/opening codes created from the 3rd batch of collected-data. At the end of this phase, no significant and new opening/initial codes were generated, and no significant substantive categories were generated. This situation signified that, information or data being collected had come to a saturation point, hence the name, "Saturation Coding Process" (Charmaz K., 2006).

As before, the existing substantive categories were compared with newly emerged and the last opening codes. Here again, those that had some commonalities were grouped, summarised and categorised under newly emerged categories, and were coded as Core Categories. In all, thirty four Core Categories were generated from the fifty nine Substantive Categories. These core categories are shown in Appendix G. and this process is also illustrated in fig 5.3.

5.2.3.5 The Theoretical Coding Process

The theoretical coding process (the 5th and the last step of the data analysis process) was characterised with the refinement and purification of the emerged 34 core categories. These categories are really central to the comprehension of the phenomena being studied, and they summarized earlier categories created at the focused coding, substantive coding and saturation coding stages. This process unearthed any relationships or links among earlier generated categories; and this is what Dey (1993, Pg 47) expresses analogically that, "the process of interconnecting categories is the analytical equivalent of putting mortar between the building blocks". At the end of the theoretical coding process, seventeen core IS success categories were generated, and they are presented in Appendix H. This last process is also illustrated in fig 5.3 below. The ultimate goal for the theoretical coding activity was to generate concrete concepts around which the intended theory/model could be developed and showcased or presented.

This moment was really a challenging one and compelled the researcher to persistently return to the data to verify or confirm emerging factors, associations or properties and dimensions of categories that were considered fundamental to the performance, usefulness and overall satisfaction of users of IVTS. The theoretical coding at this stage was synonymous to theoretical saturation", which signified that collecting new data would not generate new codes, categories and insights that would further enhance the overall theoretical development.

At this point, the researcher was confident that logical, coherent and fundamental ideas were evidentially present within the data. Therefore, the researcher ceased collecting any new data and kept on pruning and refining the 17 theoretical categories, that had emerged until "theoretical articulation" was achieved (Charmaz K., 2006). This step marked the end of the data analysis process and is also illustrated in fig 5.3 below. The overall result of the data analysis is based on these 17 theoretical categories which were purified further till the ultimate 17 core IS success concepts emerged; these are presented in the next chapter for further discussions.

5.2.4 Information Processing / Data Organization

This section discusses how the collected data was analyzed. For ease of explanation, the stages in analyzing the collected data as discussed in the sub-section above are modelled and presented in fig 5.3 below.

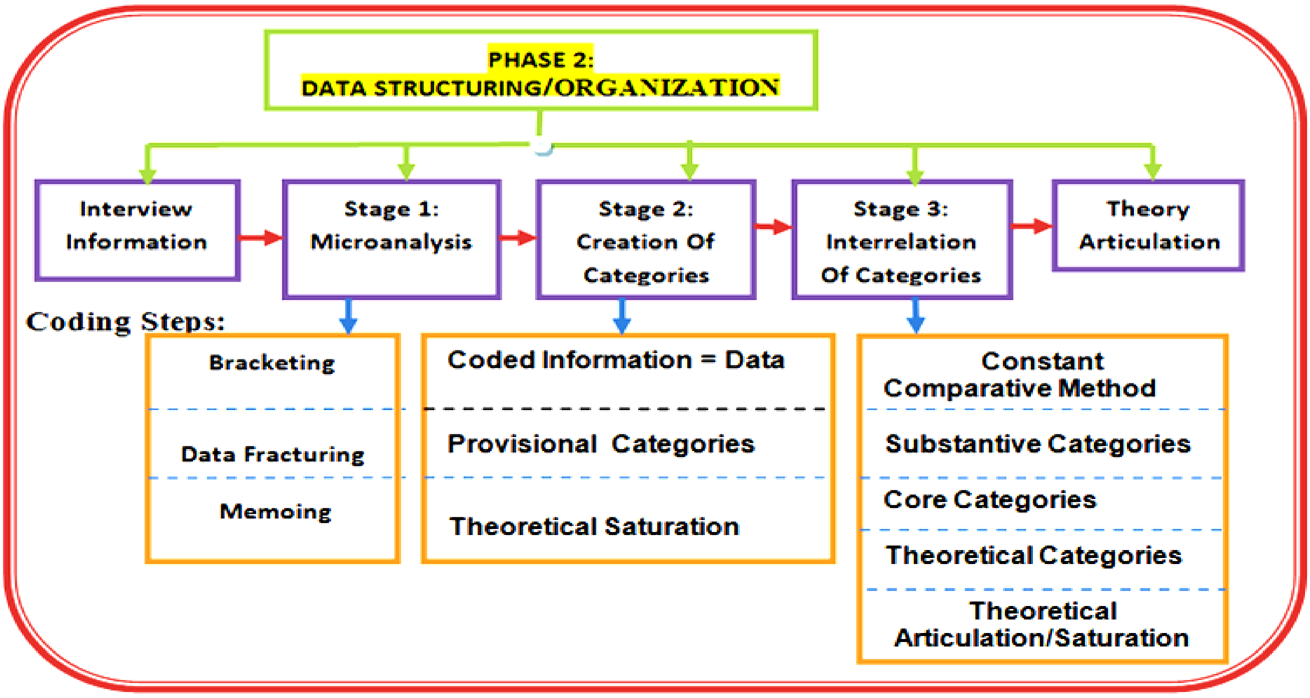


Figure 5. 3: Data Collection & Analysis - Phase 2

Source: Field Work

5.2.4.1 Microanalysis of Collected Data

Non-disputably, the purpose of data analysis is to guide the researcher to "observe behaviours, situations, interactions in environments and phenomena", according to Cresswell (1998). In practice, this activity in research allows the researcher to examine/scrutinize phenomena for "patterns and categories" and respond to research questions from research findings. It is the tradition of GT method to collect and analyze data simultaneously. Following this convention, data collection and analysis was undertaken as part of the interview procedure and during the interview process. Information elicited from the interviewees was analyzed in steps.

The first step was the "Microanalysis" process – i.e., a qualitative data analysis process whereby "data are analyzed line-by-line, in order to create sound categories" at the initial stage (Creswell, 1998). This process requires that personal presumptions of the researcher are blocked (bracketed) "in order to step inside the context of the participants being studied without research bias". Three interviews were conducted during the first series/batch of the interview section through this microanalysis process.

At this stage, the collected data were broken down (fractured) into lesser parts of transcript/text "for richer content analysis" (Krippendorff, 1980), (Locke & Weber, 1990). As Creswell (1998, Pg 88) enlightens, the data collected and analyzed from the first case showed the "properties and dimensions for looking at all cases, enabling researchers to move from description to conceptualization and from the more specific to the general or abstract". Primary patterns were developed out of the first batch of interviews and initial notes were taken from the fractured smaller texts - this was the "memoing" process, according to Creswell J. W. (2009). Initial observations were then recorded during the memoing process and initial data categories were created from these early observations. These categories or notes contained blueprints/patterns, terminologies, typical & persistent phrases and essential themes (arguments, ideas, frequently suggested opinions, etc) discovered from the interviews.

5.2.4.2 The Memoing Process

In grounded theory method, the term "Memoing" refers to the process in which concepts and their relationships are identified and recorded (Charmaz K, 2006) in data collection journals. This is the reason why Charmaz K. points out that "Memo-writing represents the first attempt to articulate ideas and relationships" noted in the process of data analysis. During the initial coding stage, several autonomous memos were written, capturing emerging ideas and insights about the broader picture or nature of the problem studied. The memo written at this stage was comparatively unstructured. Indeed, during the focused coding process, these memos were progressively structured and thus became productive, useful and helpful in constructing the theoretical concepts required to aid theory building. In fact, the memos were written on a category-by-category basis and this assisted the researcher to refine every category, investigate correlations amongst codes in each category, identify where the category fitted into the overall phenomenon. These memos aided in identifying gaps in data compilation and apparent contradictions lodged in the categories.

The memos were used to draft the data analysis sections. During the memoing process, a considerable amount of conceptual data analysis was recorded. Similarly, potential interview questions worth pursuing surfaced for future possible interviews; this eventually necessitated the conduction of the third batch of interviews and data collection. Linkages existing in the data were hypothesized and used to draft tentative theory, from which a prototype model of conceptual IS success model was developed, to start with.

5.2.4.3 How the Categories Were Created

The memoing process made it possible to code information gathered from the interviews. This information coding step marked the beginning of another process called "data categorization and organization", in the words of Charmaz K. (2006). These categories were classified as provisional categories; they were actually created by assigning names to the fragmented data in the first batch of collected data set, and were used to start the ultimate theory construction process. The second batch of the interview process was treated similarly to derive another set of categories and to refine or upgrade the existing categories.

This process of simultaneous data collection and analysis continued until no further new categories of data emerged. At this point, the emerged categories became adequately enough to describe concepts discovered so far, thus achieving the state of "category delimitation and theoretical saturation" of data collection and analysis (Creswell J. W., 1998), (Locke, 2001). At the end of this stage, traces of concepts began to emerge from the derived categories; this marked the end of the creation of the categories.

5.2.4.4 Interrelating the Categories

At this stage, the relationships between the categories derived in stage two of this phase were determined and the critical elements that provided the basis for creating the categories required to build the expected model were also identified.

At the end of this process three kinds of novel categories were generated from the provisional categories and were codified as: "Substantive Categories", "Core Categories" and "Theoretical Categories". The interrelationships between these categories are illustrated diagrammatically in fig 5.4 below.

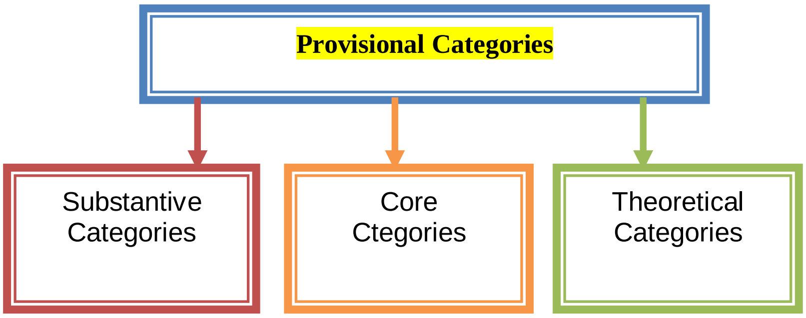


Figure 5. 4: Strategic Empirical Categories Derived from the Provisional Categories

Source: Field Work

From the diagram above, the Substantive Categories are abstracts of the main problems experienced by, and as given by the users of vehicle tracking systems in Ghana. Again, categories derived from each data set were compiled, refined and analyzed, this created the core categories. By their nature, the last categories, i.e., the theoretical categories, are broader in range, they are abstracts of the core categories.

In this context, all categories are related to the core categories. On the whole, all categories were "developed to the point where their properties and dimensions reasonably accounted for the data incidents indicating that concept" (Locke, 2001). All redundancies were removed and items were re-categorized in the process to ensure rigorous theory building. This step brought the data collection and analysis process to an end.

5.2.4.5 The Use of Computer-Assisted Qualitative Data Analysis Software (CAQDAS)

It is recommended by the academic research community to employ "Computer-Assisted Qualitative Data Analysis Software (CAQDAS) package to facilitate data analysis in a research of this kind. This laudable approach to qualitative data analysis was proposed by (J. Creswell, 1998). Other authors suggest that, this type of software is progressively being used in contemporary qualitative studies (Bringer et al. 2004).

In order to manage the data analysis processes in this current research, attempts were made to employ a Computer-Assisted NVivo10 software package to analyse the data. However, this could not be materialised, due to difficulties faced during a four-week self-learning deadlock, trying to learn how to use the software. The non-ease of use of the software prolonged the learning process and alarmingly time was considerably consumed.

Eventually, the data was analyzed manually over a period of three and a half weeks. Although the manual analysis of the data was very tedious, it gave the researcher the opportunity to immerse deeply into the insights of the data and got to know the data better. The various processes taken to analyse the interview and survey data are presented in Appendixes D.1 to D.3, details of which are given in the succeeding chapter.

5.3 DEVELOPING THE PROPOSED IS SUCCESS MODEL APPLICABLE IN IVTS

In view of the fact that, grounded theory studies have varied nature or characteristics, methods of presenting results of GT studies also take diverse forms. In one study, Smith & Biley (1997) hint that, the end result/product of a GT data analysis process habitually follows "a set of completely saturated fundamental core categories and concepts, in addition to a list of definitions, large quantities of theoretical memos, possible linkage suggestions and a model (or number of models) that describe and explain the data" (Smith and Biley, 1997, Pg 24).

Thus, the data analysis process undertaken in this current GT study resulted in generating seventeen core IS success concepts with their associated memos and links required to develop the emerged conceptual IS Success Model that can be applied to measure the performance of information systems deployed in intelligent vehicle tracking systems.

Furthermore, many other researchers posit that GT studies are “articulated toward the end and can assume the form of narrative statements, visual pictures, series of hypotheses or propositions" (Creswell 1998: 56), (Strauss & Corbin, 1990), (Creswell & Brown, 1992), (Morrow & Smith, 1995).

Regarding the use of models to present the results of GT data analysis, McCann and Clark (2003a: 14) applaud and acclaim that models and diagrams have the abilities to “visually represent the conceptual relationship that develop among categories” or concepts, and quite easy to follow and understand, relative to raw textual representation of theories.

Indeed, this position is also commended and upheld by two other researchers in the community of GT studies, namely: Charmaz K. (2006) and Coyne & Cowley (2006). Lastly, one more researcher, Orona, disputes that: “If the researcher is unable to graphically depict “what at all is going on here,” he or she is probably not genuinely clear of the GT data analysis process yet” (Orona (2002: 377). Agreeing with these earlier researchers on their positions and recommendations on how the results of GT studies could be presented, a conceptual IS success model is appropriately employed in presenting the research results of this current GT study. Based on the preliminary and theoretical studies conducted on the three models reviewed in the Theoretical Framework Chapter (i.e., the DeLone & McLean IS Success Model, the Expectancy Disconfirmation Model, and the Technology Acceptance Model (TAM)) as lenses to develop a conceptual IS success model that can be used in IVTS, as the outcome of this research.

The model consists of three simple theoretical constructs: Independent Variables, Intervening Variables and Dependent Variables. The Independent Variables are composed of five core IS concepts, the Intervening Variables are comprised of nine core IS concepts and the Dependent Variables contain three core IS concepts. The proposed IS success model developed from the seventeen core IS concepts that resulted from the data analysis process is as shown in Fig. 5.5 below.

The model and its seventeen core concepts form the outcome of this current IS and ITS research, and are discussed further in the next chapter to explain the findings and their implications in relation to existing literature, Body of Knowledge (BoK), practices in the vehicle tracking industry; as well as research contributions to academia, IS and ITS research communities and to the general society at large.

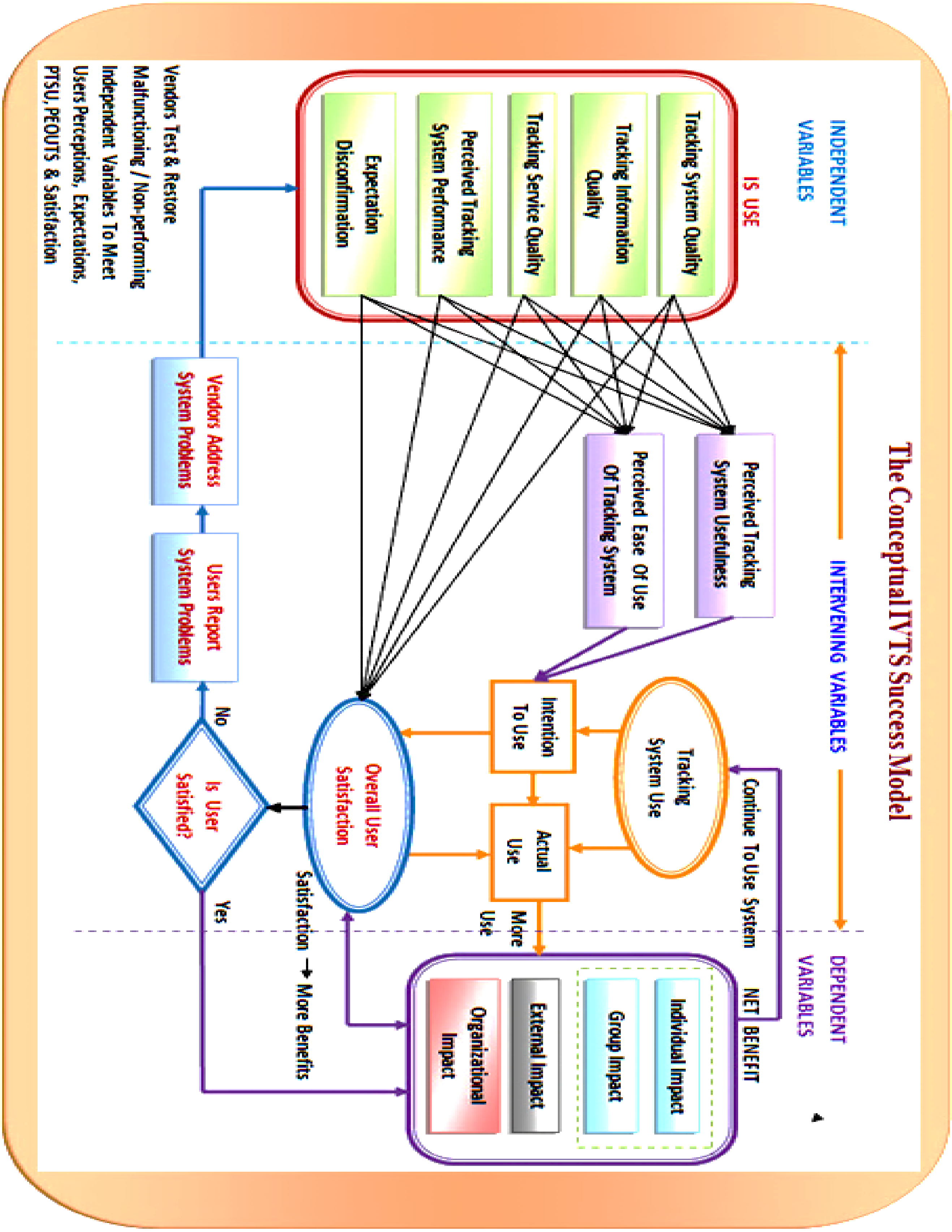


Figure 5. 5: The Proposed Conceptual IS Success Model for Use in IVTS Deployed in Developing Countries

Source: Field Work

5.4 ANALOGY OF THE GROUNDED THEORY METHOD EMPLOYED

An analogy of the GT method is purposefully and essentially presented here as an energiser and an amplifier of the data collection and analysis processes discussed so far, by way of explaining further the logic behind the processes of the GT method employed in this study. In this analogy, the essential GT processes performed so far have been represented as three engine gears that can steer an engine (in this context, that guided the researcher in the current study) to generate a model from scratch, using the grounded theory method of research. As shown in fig 5.6 below; the largest gear comprises of "purposive sampling, initial coding, concurrent data generation, data collection and analysis, theoretical sampling, constant comparative analysis and category identification" (Birks Mills, 2010). The same largest gear accomplishes utmost direct and simplest techniques of the processes. Actually, it is the brain child behind the GT research method, permitting researchers to generate and purify data.

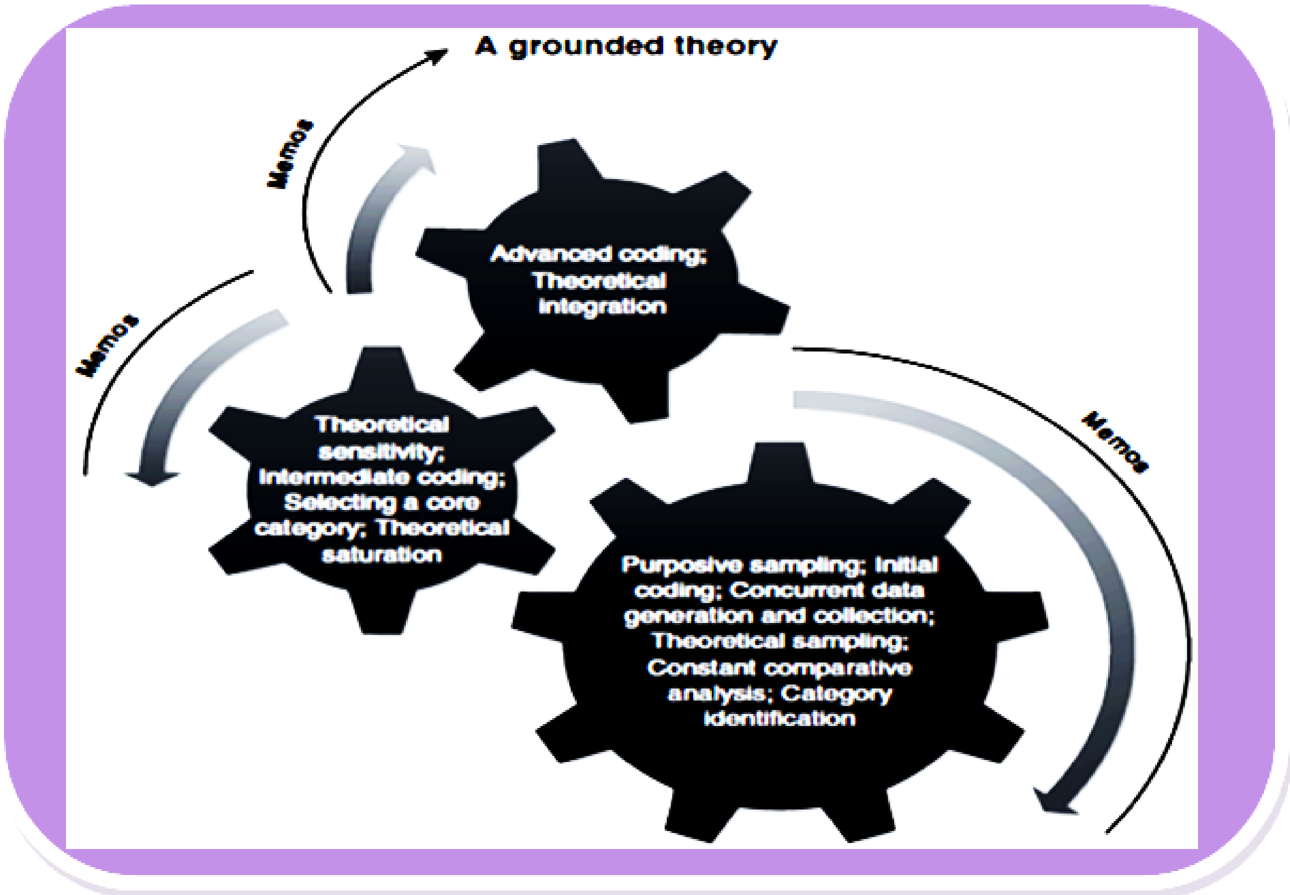


Figure 5. 6: Analogy of Grounded Theory Method of Data Collection & Analysis

Source:(Birks Mills, 2010)

Birks M. (2010) explains further that, the other two lesser gears represent "concepts and techniques" which are very crucial in the GT method of data processing. Though little and small as they are, those two "small-cog methods" elevate research to sophisticated levels and raise the data analysis "beyond qualitative description". Birks M. maintains that, the lower unit of the small gears represent "theoretical sensitivity, intermediate coding, identifying a core category and theoretical saturation". These smaller-cogs or methods are used to further cleanse the analysis and to enhance its completeness, the results and the findings, i.e., the final product. Birks M. further points out that, the upper unit of the small-cog consists of "complex methods of advanced coding and theoretical integration". At this stage of the process, the final product, i.e., the grounded theory/model is either produced, or not, as the case may be. He hints that, analogically, written memos lubricate every cog/gear rotating about themselves during each evolution of the research process. In the absence of "high-quality memos" (i.e., high grade lubricant), the engine/machine will "grind to a halt" in less than no time. Should any of the small gears/cogs jam up, or, if any part/component of the small-gear damages, the whole of the engine breaks down, i.e., "a grounded theory/model will never be produced", thus states Birks M (2010).

5.5 PRESENTATION OF EMPIRICAL RESULTS

5.5.1 Research Results In Respect of Literature Review

5.5.1.1 Development of ITS Technologies – Intelligent Vehicle Tracking Systems

The outcome of the literature reviewed in Section 2.5 showed that, the master brain behind the development of ITS is the application of advanced wireless communications systems, ICT & electronic technology, to address global transportation problems, including safety of human lives, road traffic congestions, surface road transport efficiency and environmental preservation. From the literature, ITS technologies create interplays between road networks, vehicles; and users of both road infrastructure and vehicles. The literature further underlined that, fundamental activities usually taken to develop ITS technologies include: the creation of a common traffic data model, development of communications standards, deployment of general purpose communications technology and the establishment of ITS standards to ensure vehicle tracking system compatibility and interoperability in developing nations.

The reviewed literature additionally showed that, in developing national ITS architectures, developing countries must acquire the potential to define ITS activities which are critical to efficient and effective ITS operations. The outcome of the literature review further educated ITS stakeholders on the key tripartite components that must be employed to develop national ITS architectures, these components are: Transportation Systems, Communication & Institutional Structures, with communications infrastructure as the principal interface linking transportation infrastructures to institutional structures.

One more key factor that came out of the literature reviewed was that, developing countries need to critically adopt sets of approaches initiated and followed by ITS leaders to efficiently develop and deploy ITS applications into their transportation infrastructures, particularly, into their vehicle tracking systems. The literature further disclosed that, governments in developing countries must establish institutional arrangements to provide effective ITS leaderships. These institutions must function autonomously without any political influences, cultural differences and traditional interferences.

5.5.1.2 Results of Reviews of ITS / IVTS State-Of-The-Art

Revelations that resulted from the review of ITS/IVTS state-of-the-art (section 2.6) indicated that, the European Commission (EC) is doing extremely very well in developing several technological innovations into ITS solutions, by instituting a ten year ITS Digital Agenda which commenced from 2010 till 2020. The objective has been to increase the speed of ITS development for road and urban transportation sector to support ITS interoperability and rapid standardisation; and to solve the problem of high energy consumption in the transportation industry in Europe. The review disclosed further that**,** the EC has decided to develop specifications for vehicluar traffic data acquisition and procedures for the provisioning of road safety and traffic information free of charge to users, where possible. The researcher is with the view that; if European countries who are already developed are thinking this way, then this kind of agenda are what developing nations need to set before them, in order to contribute their developmental-quota to the ongoing global studies and reserach activities in the field of ITS.

The review further showed that, vehicle tracking practices have become inevitable and very imperative in our daily lives, especially, in private, commercial and industrial environments; thus, critical ITS tasks facing vehicle tracking system operators in the developing countries are the tracking of vehicle locations in rural areas and in remote areas around urban vicinities, since tracking networks in such areas are a bit complex. For this reason, the development of precise vehicle tracking methods have attracted the attention of several ITS researchers in the transport industry and in the information systems industry. Some insights that resulted from the review relating to recent research works are: enhancement of driver assistance systems, development of vehicle detection and tracking systems, vehicular data correlation processes and sharing of such information.

It was noticed from the literature review that, researchers have generally paid little or no attention to the concept of overall satisfaction of users of vehicle tracking systems in developing nations, apart from the concepts of vehicle tracking system quality, information quality & service quality. Another factor detected from the review was that, researchers in developing countries have not contributed much towards the on-going innovative activities (state-of-the-art) in ITS technologies, e.g., in ITS standardization studies. It is for this reason that, the present research sought to study, identify and analyse the concepts required to develop a conceptual IS success model that can assess the performance and usefulness of intelligent vehicle tracking systems deployed in countries with transitional economies.

5.5.1.3 Results of Reviews on ITS Standards in Developing Countries

The results of reviews conducted on the concerns of ITS standards demonstrated that; recommended ITS standards ensure consistent ITS solutions, enable system users to achieve the least ITS performance, assist ITS stakeholders to cooperate and interact successfully, and to guarantee system compatibility and interpretability between vehicle tracking systems operated in developing nations. The reviews unearthed that, development of ITS standards results in establishing open markets in developing world, registers good system quality, and promotes ITS technological advancement. Interestingly, sixteen international standards are recommended for use in ITS/IVTS, details of which are provided in Appendix A, Section A.4.4, Table A.2.

The review disclosed further that, key ITS/IVTS standards are readily available that can be adopted by developing countries, instead of developing their own standards, this approach will avoid non-interoperability / incompatibility of tracking systems with existing ITS technologies deployed in countries with transitional economies.

5.5.2 Results in Relation to Research Objectives and Research Questions

5.5.2.1 Results in Connection with the Research Questions

Another dimension of the research findings was to analyse the research results and see whether the research questions designed in section 1.4.1 have been answered or not, and why. The first main research question was answered by Table 5.4 and by the developed conceptual IS success model shown in fig 5.5. The second was answered by the discussions on the road map for developing countries to deploy ITS solutions. One more aspect of the research results was to establish whether the detailed research questions, designed in section 1.4.2, that supported the main research questions, have been answered or not and why.

The first sub-research question was addressed by answers and responses provided by the research participants and captured in the empirical data, showing IS success variables required to develop a conceptual IS model for use in IVTS. The second sub-research question was answered by the development of the conceptual IS success model, by using the seventeen core IS success concepts that emerged from the results of the data analysis. The last sub-research question was answered by the guidepost provided in Appendix A, Section A.5.3 and summarized in Table A.5, on how developing nations can deploy ITS solutions to address transportation problems in their countries. In the guidepost, diverse options and approaches have been offered to developing nations, and a suggested IS success model shown in fig A.11 has also been proposed. Thus, both the main research questions and the three sub-research questions have all been answered in this study.

The perceptions and the responses from the research participants interpret to mean that, users of IVTS in developing countries were not satisfied (at the time of data collection) with the performances of the systems they were using, partly due to the un-satisfactory performances of the first three concepts of the independent variables, and partly due to the absence of the last two concepts of the independent variables, both concepts are associated with the concept of IS Use (see fig 5.5). According to the opinions of the research participants, users will continue to utilize the tracking systems they were using basically due to their high spirits of customer loyalty, and not necessarily due to the performances of the vehicle tracking systems and services they were utilizing.

5.5.2.2 Results Relating to the Research Objectives

The first of the two main research objectives was achieved by the emergence of the seven core IS success concepts from the empirical data shown in Table 5.4 below, and the development of the conceptual IS Success Model, using the seventeen IS success concepts. The second key objective was fulfilled by providing a number of guidelines or guidepost for developing countries to develop and deploy the ubiquitous potentials of ITS applications into their existing and conventional transportation networks. Hence, both the main and the sub-research objectives have been achieved in this study, since the main research questions have been answered.

5.5.3 Results Relating to Reviews on ITS Deployment in Developing Nations

5.5.3.1 Results Regarding Factors Impacting ITS Deployment in Developing Countries

The result of literature reviewed in Section A.5 (Appendix A) reveals that, learning from the rich experiences of world leaders in ITS technologies, countries with transitional economies will have to study, pursue and closely adopt existing rich experiences to deploy ITS solutions into their conventional transportation systems. The establishment of basic ITS solution requirements must necessarily include government subventions, technical supports, user acceptance and preparation for operation under new environments must be in place before the start of any ITS projects.

Institutionalization of public policies to promote public transportation operations is very crucial in this context. Early enabling actions that could be taken by leaders of these nations must include: the development of consensus among stakeholders, lessons on protections from previous experiences, including the need for high-quality information and service; user orientation and overall national ITS planning processes and implementation procedures.

5.5.3.2 Reviews on How Developing Nations Can Develop & Deploy IVTS Solutions

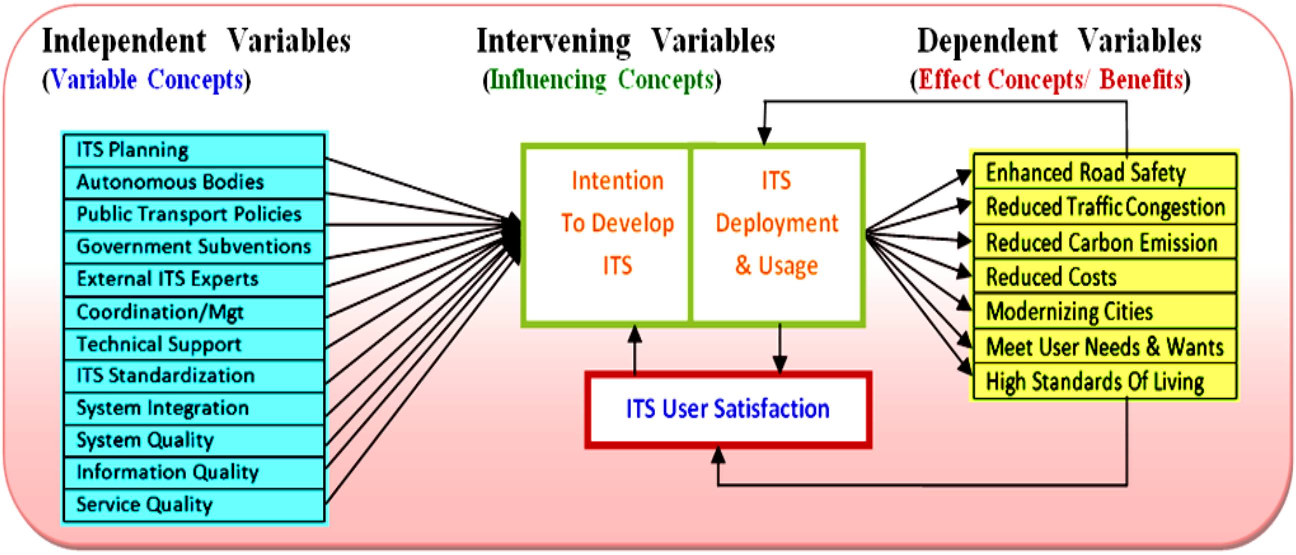
The outcome of the literature reviewed regarding, how developing nations can develop & deploy IVTS solutions, shows that planning to develop and deploy IVTS solutions are very critical and perhaps difficult decision making process for many developing nations, since the authorities of the transportation sectors in these countries can no longer depend solely on their traditional approach of building new or more infrastructures, as this approach demands high political willingness (which many of them do not have and are not even ready for it), significant financial commitments, as well as complex regulatory and environmental planning processes to manage. Therefore, the way forward is for transport authorities in these countries to progressively focus on the use of traffic demand management with schemes such as road user charging, information & customer management techniques, and enhanced traveller information services.

From the inductive reviews, three IS concepts and twenty two variables required by developing nations to develop and deploy IVTS solutions into their existing traditional transportation systems were identified. These concepts and variables are re-presented below for easy referencing (recapped from Section A.5.3, Table A.3).

Referenced From Table A.3 for Ease of Reading: Identified Guideposts for Developing & Deploying ITS Solutions in Developing Countries

VARIABLE CONCEPTS	INTERVENING / INFLUENCING CONCEPTS	EFFECT / BENEFITS CONCEPTS
IVTS Planning	Intention to Develop IVTS	Enhanced Road Safety (Saving Human Lives) Reduced Traffic Congestion Reduced Carbon Emission Reduced Costs Modernizing Cities Meet User Needs & Wants Higher Standards of Living (Benefits to Society)
Autonomous Bodies		
Public Transport Policies		
Government Subventions		
External IVTS Experts	IVTS Deployment & Usage	
Coordination & Management		
Technical Support		
IVTS Standardizations		
System Integration	IVTS User Satisfaction	
System Quality		
Information Quality		
Service Quality		

The resulting conceptual IS success model created from the above table, that can be utilized by developing nations as a guidepost, to develop and deploy IVTS applications/solutions into their existing transportation systems is as shown below (referred from Section A.5.3, Fig. A.11). The model that resulted from the three IS concepts and the twenty two variables or artefacts showing causalities and interrelationships between the concepts are discussed in Section A.5.3.



Suggested conceptual IS Success Model for Developing and Deploying ITS Solutions in Developing Nations

(Referred from Figure A.3 for ease of reading)

5.5.4 Presentation of the Resulting "IS" Success Concepts Required to Develop the Conceptual "IS" Success Model for Use in IVTS

5.5.4.1 The Resulting Provisional Categories

As many as one hundred and thirteen Provisional Categories resulted from six hundred and thirty two opening/initial codes. These provisional categories marked the beginning of the construction of the theoretical categories necessary to develop the conceptual IS success model. To mention a few, the resulting provisional categories included: Tracking System Quality Depends on System Flexibility, Ease of Tracking System Use; 24/7 System Availability Ensures Tracking System Quality; Tracking System Quality Requires Good Communication Flow; Accurate Vehicle Location Information Determines Tracking System Quality, and many more. To facilitate ease of reading, a cross-section of this result is presented in Table 5.1 below, while the complete resulting provisional categories are provided in Appendix I.1. Memos were written to describe / explain the dimensions, links & relationships and the role of each provisional category in the IS success variables and concepts.

Table 5. 1: Resulting Provisional Categories

PROVISIONAL CATEGORIES (CLUSTERS OF RELEVANT MEANINGS)	**MEMOS**
Tracking System Quality Depends on System Flexibility, & Ease of Use	Property & a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
System Availability 24/7 Ensures Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Tracking System Quality Requires Good Communication Flow	A property & a Subset of the concept of Tracking System Quality
Accurate Vehicle Location Information Determines Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
System Durability, Usability & Usage Satisfaction Establishes Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Quality of GPS images Directly Links to Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Vehicle Location Info Conciseness & Contemporariness , determine Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Frequent Information Availability &Updates Result in Good Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Interests Progresses Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Detailing Information Purpose Augments Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Information Needs & Demands Reckons on Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Information Completeness generates Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Accurate & Timely Vehicle Location Information delivery amounts to Tracking Information Quality. Users Perceive Very Reliable &	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Supportive Tracking System Service	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.

System Outages/Breakdowns hamper Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
Short service restoration-duration Boosts Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Effective & Efficient response to service failures & breakdowns result in high Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Recuperating Tracking Service Quality generates user satisfaction	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Ensuring & Improving QoS Influences Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Users Perceive Excellent System Performance & Proofing Concept	Property & a Subset of the concept of Tracking Service Quality, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU &OUS.
Tracking system Users Perceive High System Usefulness	Property &a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users have High Perceptions on Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Competitive & Perpetual Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Outstanding & Agreeable Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use Tracking Systems	Property & a subset of the concept of PEOU & a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU & a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables.
Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceive Easy System Usage as a Decision Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use	Property & a subset of the concept of PEOU in the Intervening

Tracking Systems	Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceive Easy System Usage as a Decision Determinant	Property & a subset of the concept of PEOU in the Intervening Variables & Independent Variables, an antecedent to the concept of Intention To Use System.
Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Tracking System Use is Important &Beneficial	Property & a subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking System Use Saves Lives, Protects Properties, Impacts on Individual Performance & Increases Productivity	Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking System Use Impacts on Group & Organizational Performance, Internal & External Customers & Business Transactions	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Organizational, Internal, External Productivities	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System &Actual System Use.
Tracking system Use Impacts on Group, Internal, External & Organizational Profits & Business Transactions	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Internal, External & Organizational Benefits	A Property & a Subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System& Actual System Use.
	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept

System Usefulness, Performance &User-satisfaction Trigger Intention To Use Tracking Systems	of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.

In the views of the respondents, tracking system flexibility, ease of use, continuous system availability, effective communication, location update & accuracy, and many more system characteristics determine the quality of intelligent vehicle tracking systems operated in Ghana.

5.5.4.2 The Resulting Substantive Categories

Fifty nine Substantive Categories emerged from the one hundred and thirteen provisional categories presented above. These substantive categories were intermediary categories from which the core categories were created. The following are but a few of the substantive categories that resulted from the data analysis: Tracking System Flexibility, Tracking System Durability, Usability, Usage Satisfaction, Insignificant System Outages, Perceived Long-term System Performance, Expected System Usefulness, High Information Relevancy and Retrievability, Regular Vehicle Information Refinements, Persistence System Reliability, and the rest. As before, a cross-section of this result is presented in table 5.2 below for ease of reading, the full resulting substantive categories are enshrined in Appendix I.2. Again, memos have been attached to each substantive category to explain their roles in identifying the required “IS” success variables and concepts.

Table 5. 2: Resulting Substantive Categories

SUBSTANTIVE CATEGORIES	MEMOS
Tracking System Quality Reckons on System Flexibility, Availability & Reliability	Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of "Intervening Variables) & OUS.
Improved Communication & Information Accuracy Determines Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
System Durability, Usability, Usage Satisfaction & Historic Data Establishes Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
High System Quality &High Usage Satisfaction Levels Result in High Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Relevancy, Conciseness & Updated Vehicle Location & Status Information Enhance Tracking System Information	Property & a Subset of the concept of Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular Vehicle Information Refinements, Updates, Retrievability Maintainability Guarantee Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Tracking Information Quality is Augmented by Meeting User Interests & Purpose	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Real Time Information, its Completeness & Accuracy Warrant Tracking System Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Users Perceive High Level of Tracking system service Reliability & Supportiveness	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.
Insignificant Service Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
Effective Responses & Efficient Restoration of System service Generate High Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Ensuring & Improving QoS Influences Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Users Perceive Excellent System Performance & High System Usefulness	Property & a Subset of the concept of Perceived System Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Users Perceive High Speed System	Property & a Subset of the concept of Tracking Service

Connectivity & Satisfactory Performance	Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Users Expect High System Quality & Performance; High Information Quality	Property & a Subset of the concept of Expectation Disconfirmation,& a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
Users Expect High Tracking System Stability, Speed, Accuracy & Performance Upgrades	Property & a Subset of the concept of Perceived System Performance, in Independent Variables. Subset of antecedents to the concepts of PSU, PEOU&OUS.
Users Perceive High Reliability, Competitive System Usefulness& High Information Quality	Property of the concept of PSU& a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Users Perceive High, Perpetual, Dependable, Persistent, Commendable, Achievable, Enterprising & Profit-driven System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Outstanding & Agreeable Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Ease of Use of Tracking Systems is a Deciding Factor	A Property & a subset of the concept of PEOU& a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Users Highly Perceive Easy System Usage in Making Decisions	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceptions of Ease of System Use Inform Intentions& Decisions to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Aggressively Perceive Easy Tracking System Usage as a Resolution Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Tracking System Use is Beneficial in Saving Lives, Protects Properties, &Increases Performance/Satisfaction &Productivity Levels	Property & a subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System & Actual System Use.
	Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the

Tracking System Use Impacts on Group, Internal, External & Organizational Performances, & l Customers & Business Transactions	O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Credible System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems	Property of the concept of Intention To Use System &a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use &OUS. It will take three inputs: the concepts of PSU, PEOU& Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
System Suppleness, Performance & User Interests Stimulate Users' Intentions To Use Tracking systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
Low -Medium System Costs, Vendor Credibility, High System Performance &Benefits Generate Intention to Use Tracking Systems	Property of the concept of Intention To Use System& a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
High System & Information Qualities, Usefulness & Ease of Use Leads to Actual System Use	Property of the Concept of Actual System Use & a Subset of the Construct of the Intervening Variables). It is an antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit.
High System & Information Qualities, High QoS Performance, Usefulness & Ease of Use Create Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Tracking Information Quality, Relevancy, Comprehensiveness & Interpretiveness Induce Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Users Perceive & Expect High Tracking Information Relevancy & Competitive System Usefulness, Leading to High Overall User-Satisfaction	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility & Comprehensive-ness Increases OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.

Good System Quality &High Level System Performance Motivate OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Relevancy, Credibility &Comprehensiveness Information Cause System User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors& Net Benefits.
Improvement in Information Quality, Credibility, Comprehensiveness & Relevancy Causes System User Satisfaction	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors.
System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Information Interpretiveness & Comprehensiveness originate System Tracking User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Tracking System Users Report System & Service Faults, Breakdowns & Performance Status to Vendors / Operators	Property of the Concept of Report To Vendors / Operators; the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).
Alerting & Reporting System & Service Failures To Head/ Operations & Vendors	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System / Service Problems, Etc.

In this context, the research participants inferred from the empirical data that, users of vehicle tracking systems in Ghana are with the opinion that, these substantive categories are among the basic user expectations that will meet minimum tracking systems user satisfaction in Ghana.

5.5.4.3 The Resulting Core Categories

Further analysis of the fifty nine substantive categories resulted in thirty four core categories; these included: Real Time Tracking Information, Tracking System Vendor Credibility, Tracking Information Comprehensiveness, Tracking System Quality of Service (QoS), Tracking Information Completeness & Interpretiveness, Detailed Reports on Tracking System & Service Failures, High Tracking Service Performance, High System Net Benefits, Instant Tracking System Restoration, Overall User Satisfaction, Etc. This result is briefly presented in table 5.3 below to enhance ease of reading; the full resulting core-categories are captured in Appendix I.3. As before, memos are provided for every core-category to clarify their relations and the roles they play in the identified IS success variables and concepts.

Table 5. 3: Resulting Core Categories

CORE IS CATEGORIES	MEMOS
Tracking System Quality Reckons on System Flexibility, Availability, Reliability, Improved Communication & Information Accuracy.	Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
Tracking System Quality System is Achieved by System Durability, Usability & Maintainability	A property & a Subset of the concept of Tracking System Quality
Information Quality in a Tracking System is Attained through System Performance &User Satisfaction	Property & a Subset of the concept of Tracking System Information Quality; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular Vehicle Information Refinements, Updates, Retrievability, Meeting User Interests & Purpose Guarantee the Quality of Tracking Information; Real Time Information, its Completeness & Accuracy Augment Tracking System Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P. System Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
High Levels of Tracking service Reliability, Supportiveness, Insignificant Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality Effective Responses & Efficient Restoration of System service & Improving QoS Generate High Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS. Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Tracking System Users Perceive Excellent System Performance, High System Usefulness & Simplest Usage Process	Property & a Subset of the concept of Perceived System Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU,

	PEOU &OUS
Users Expect High Level System, Service & Information Quality; High Degree System & Service Performance; &High Level User Satisfaction	Property & a Subset of the concept of Expectation Disconfirmation, & a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
Users Perceive High System Reliability&, High Service Quality & High Information Quality to Trigger Their Intentions to Use Systems /Services	Property of the concept of PSU& a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Tracking System Users Perceive Outstanding& Agreeable System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Ease Of Tracking System Use to Create their Intentions To Use Tracking Systems	Property & a subset of the Concept of PEOU It Links to the Concept of Perceived Ease Of Use, an antecedent if the Concept of Intention Tracking To Use Systems. It Originates from the Concepts of Perceived System Performance & Expectation Disconfirmation- all from the Constructs of the Independent Variables
Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems	A Subset of the Core Category which belongs to the Concept of PEOU in the Construct of the Intervening Variables. It is the 2nd Antecedent of the Concept of Intention To Use Tracking Systems. The 1st Antecedent is PSU.
Tracking System Use is Beneficial in Saving Lives, Protecting Properties, &Increasing Productivity Levels	Property & a Subset of the Concept of Tracking System Use, connected to the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System& Actual System Use.
Tracking System Use Impacts on Group, Internal, External & Organizational Performances, Profits Margins & on all Aspects of Business Transactions	A Subset of the Core Category which belongs to the Concept of Tacking System Use, in the Construct of the Intervening Variables.
Reliable Tracking System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems	Property of the concept of Intention To Use Tracking Systems& a Subset of the Construct of the Intervening Variables; an Antecedent of the Concept of Actual System Use & OUS. It will take three I/Ps: Concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
Vendor Credibility, High System Performance, Affordability, User Interests, Perceived & Expected Benefits Stimulate Users' Intentions To Use Tracking systems	A Subset of the Core Category which belongs to the Concept of Intention to Use Tacking System Use, in the Construct of the Intervening Variables.
High System & Information Qualities, High QoS& Performance; System Usefulness & Ease of Use Lead to Actual Tracking System Use	Property of the Concept of Actual System Use,& a Subset of the Construct of the Intervening Variables. It is an Antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit.

Tracking System Information Quality, Comprehensiveness, Relevancy & Interpretativeness Persuade Actual Tracking System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an Antecedent & Causality System Benefit, Etc.
Users Perceptions & Expectations of their Overall User-Satisfaction is Determined By High Tracking Information Quality, Relevancy, QoS& Competitive System Usefulness	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility &Quality, Comprehensiveness & High Level System Performance Motivate OUS	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Tracking Information Relevancy, Credibility & Comprehensiveness Generate System User Satisfaction	Property of the Concept of Is User Satisfied?& a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS, with 2 O/Ps (Report to Vendors & Net Benefits.

These resulting core categories show that, the overall satisfaction of users of intelligent vehicle tracking systems in Ghana is linked to the completeness, comprehensiveness and interpretiveness of real time tracking information received, as well as the QoS of the tracking systems. Respondents also indicated that, the communication networks operated by mobile service providers in Ghana, used by vehicle tracking vendors are characterized with low network bandwidths, capacities & speeds, frequent breakdowns & outages, but with astronomic user-charges.

5.5.4.4 The Resulting Theoretical/Core IS Success Concepts

The resulting theoretical/core IS success concepts that formed the building blocks of the conceptual IS success model registered seventeen IS concepts. These concepts were the ultimate outcome or results of the data analysis that emerged from the thirty four core categories. Table 5.4 below shows the resulting seventeen core IS success concepts required to develop the conceptual IS success model that can be used in IVTS. Expectedly, memos were written to describe the relationships, links, dimensions and the functions of each core concept in developing the overall conceptual IS success model.

Table 5. 4: The Resulting Seventeen Core IS Success Concepts

CORE IS CONCEPTS (Building Blocks of the Emerging Model)	MEMO/DESCRIPTION
Tracking System Quality (TSysQ)	The 1st Core Concept, a Subset of the Construct of the Independent Variables,& an Antecedent of Perceived System Use (PSU), Perceived Ease Of Use (PEOU)&Overall User Satisfaction (OUS);Has No I/P Variable.
Tracking Information Quality (TIQ)	The 2nd Core Concept, a Subset of the Construct of the Independent Variables,& an Antecedent of Perceived System Use (PSU), Perceived Ease Of Use (PEOU)&Overall User Satisfaction (OUS); It Has No I/P Variable.
Tracking Service Quality (TSerQ)	The 3rdCore Concept, a Subset of the Construct of the Independent Variables,& an Antecedent of Perceived System Use (PSU), Perceived Ease Of Use (PEOU)&Overall User Satisfaction (OUS); Has No I/P Variable.
Perceived System Performance (PSP)	The 4th Core Concept, a Subset of the Construct of the Independent Variables,& an Antecedent of Perceived System Use (PSU), Perceived Ease Of Use (PEOU)&Overall User Satisfaction (OUS); Has No I/P Variable.
Expectation Disconfirmation (EDiscon)	The 5th & the Last Core Concept, a Subset of the Construct of the Independent Variables,& an Antecedent of Perceived System Use (PSU), Perceived Ease Of Use (PEOU)&Overall User Satisfaction (OUS); Has No I/P Variable.
Perceived System Use(PSU)	The 1st Core Concept of the Construct of the Intervening Variables,& the 1st of the 2 Antecedents of the Concepts of Intentions To Use Tracking Systems. It will take the 5 Core Concepts of the Independent Variables as its Inputs.
Perceived Ease Of Use (PEOU)	The 2nd Core Concept of the Construct of the Intervening Variables,& the 2nd Antecedent of the Concept of Intention To Use Tracking Systems. It will take the 5 Core Concepts of the Independent Variables as its Inputs.
Tracking System Use (TSU)	The 3rdCore Concept of the Construct of the Intervening Variables,& an Antecedent of the Concepts of Intention To Use Tracking Systems & Actual Tacking System Use. It will take its Input From the Output of a Concept of Net Benefits.
Intention To Use Tracking Systems (ITUTS)	The 4th Core Concept of the Construct of the Intervening Variables, an Antecedent of the Concept of Actual System Use & OUS. It will take three Inputs: i.e., the Concepts of PSU, PEOU &Tracking System Use, with two outputs: the Concepts of Actual System Use & OUS.
Actual Tracking System Use (ATSU)	The 5th Core Concept of the Construct of the Intervening Variables& a Causality of the Concept of System Benefits. It will Have 3 Inputs: the Concepts of Tracking System Use, Intention To Use Tracking Systems & OUS, with a Single Output - i.e., The Concept of "Net Benefits.

Overall User Satisfaction (OUS)	The 6th Core Concept of the Construct of the Intervening Variables& a Causality of the Concept of System Benefits. An antecedent& causality of the concept of System Benefit & Actual System Use. It will take 7 Inputs (5 from the Independent Variables, 1 from the Intention to Use Tracking Systems&1 from the Net Benefits Constructs). It will Have with 3 Outputs (i.e., the Concepts Actual Tracking System Use, Is User Satisfied? & Net Benefits").
Is User Satisfied? (IUS)	The 7th Core Concept of the Construct of the Intervening Variables& a Causality of the Concepts of User Reports to Vendor &Net Benefits. A Platform for Testing Whether Tracking System Service & Information Users are Actually Satisfied with the Qualities, Performances & Usefulness, to Either Continue Benefiting from More Usage Or Report Performance Status & Quality Levels to Vendor/ Operator / Supplier For Redress.
User Report To Vendor (URTV)	The 8th Core Concept of the Construct of the Intervening Variables& an Antecedent to the Concept of Vendors Address Tracking Problems & Net Benefits. It Will Take 1 Input (from the Concept of Is User Satisfied?)& 1 Output: the Concept of Vendors Address Tracking Problems. A Platform For Users To Report Their Un-satisfactory System & Service Performances To Vendors For Redress.
Vendors Address Tracking System Problems (VATSP)	The 9th & the Last Core Concept of the Construct of the Intervening Variables. It Will Take 1 Input (from the Concept of Users Report Tracking Problems To Vendors)& 1 Output: the Construct of Independent Variables. A Platform For Vendors To Address Reported Tracking Problems.
Individual & Group Impacts	The 1st & 2nd Core Concepts of System Net Benefits; a Subset Dimensioned to the Construct of Dependent Variables. They Will Have 3 Antecedents as Their Input Variables:-The Concepts of Actual Tracking System Use, OUS &Is User Satisfied; With 3Output Variables: - the Concepts of Tracking System Use, OUS&Is User Satisfied?
External Impacts (EI)	The 3rd Core Concept of System Net Benefits, a Subset Related to the Construct of Dependent Variables. It Will Have 3 Antecedents as it Input Variables:-The Concepts of Actual Tracking System Use, OUS & Is User Satisfied; With 3Output Variables: - The Concepts of Tracking System Use, OUS&Is User Satisfied?
Organizational Impacts (OI)	The 4th Core Concept of Organizational Impacts, a Subset Linked to the Construct of System Net Benefits, Embedded in the Dependent Variables. It Will Have 3 Antecedents as it Input Variables: The Concepts of Actual Tracking System Use, OUS& Is User Satisfied; With 3Output Variables: - The Concepts of Tracking System Use, OUS&Is User Satisfied?

In the views of the research participants & respondents, these seventeen core IS concepts are quite sizeable and representative in measuring vehicle tracking systems & service performance, usefulness & successfulness, as well as user-satisfaction. The various codes, categories and core concepts that resulted from the data analysis are summarized and presented in table 5.5 below.

Table 5. 5: A Summary of the Resulting Categories & Core IS Success Concepts

Opening / Initial Codes	Provisional Categories	Substantive Categories	Core Categories	Theoretical Categories	Core IS Concepts
632	**113**	**59**	**34**	**17**	**17**
Memo	It can be seen that, the emerged Core Concepts are equal to the Theoretical Categories. This resulted, when the latter were refined, purified and conceptualized for the purpose of obtaining the former; i.e., the Core Concepts are the concretized and transformed versions of the Theoretical Categories.				

These seventeen core IS Concepts are the required concepts that formed the foundation pillars of the proposed conceptual IS Success Model usable in IVTS, which was the prime objective of this study. These concepts emerged from the empirical data and represent the researcher's interpretations to the perceptions and worldviews of the research participants & respondents and the meanings they attached (at the time of data collection) to the phenomena of un-successful, and un-satisfactory performances of vehicle tracking systems and services, experienced by users of these systems in developing countries, using Ghana, where the data were collected, as a case study.

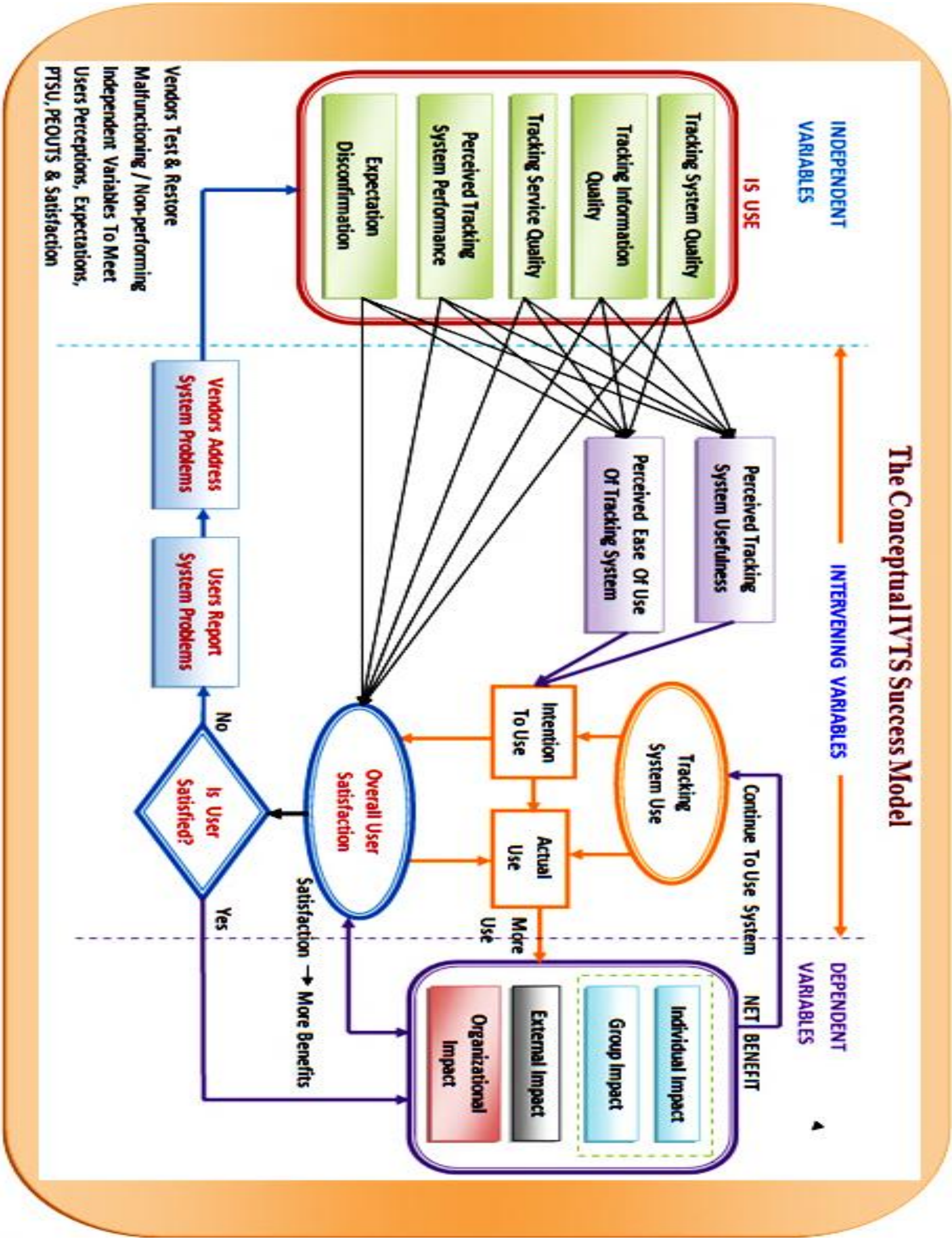
5.6 PRESENTATION OF THE RESULTING CONCEPTUAL "IS" SUCCESS MODEL FOR USE IN INTELLIGENT VEHICLE TRACKING SYSTEMS

The resulting seventeen core IS success concepts were utilized (Utilitarian IS – see Section 1.1.8) to develop the conceptual IS success model in a bid to answer the main research question posed in section 1.4.1. To facilitate easy referencing, analysis and understanding of the research results, the conceptual IS success model developed in Section 5.3 is re-presented in this section, as shown below. The first two concepts in the intervening variables link directly to all the five concepts of the independent variables; these first two concepts are, ‘Perceived Tracking System Usefulness’ (PTSU) and ‘Perceived Ease of Use of Tracking Systems’ (PEOUTS). These variables create ‘’Intentions’ for users to use vehicle tracking systems before they decide to actually use the systems.

Normally, users experience the impacts and benefits of the tracking systems when they actually use the systems. These impacts are classified as the concepts of: ‘Individual Impact, Group Impact, External Impact and lastly, Organizational Impact’. When put together, they are referred to as the ‘Concepts of Net Benefits’ which belong to the dependent variables.

The next concept of the intervening variables that link directly to the independent variables is the concept of ‘Overall User Satisfaction’. It is directly linked to the constructs of ‘Net Benefits’, and accounts for the level of satisfaction that users derive from the benefits they accrue from ‘actual use’ of the tracking systems. Another interesting point worth mentioning is the concept of: ‘Is User Satisfied?’

Two more fascinating concepts in the intervening variables are: ‘User Report System Problems’ and ‘Vendors Address System Problems’ (the latter has direct feedback link to the construct of ‘IS USE’, of the Independent variable). Details of these nine concepts associated with the intervening variables are discussed in chapter five.



The Proposed Conceptual IS Success Model for Use in IVTS Deployed in Developing Countries (Referred from Figure 5.7 for Easy Reading)

CHAPTER SIX

RESEARCH DISCUSSIONS

6.1 OVERVIEW

This chapter discusses the outcome of the research as whole; with emphasis on the research results in relation to the research problems studied, literature reviewed, research objectives achieved, the research questions addressed and in relation to research contributions made at the end of this august study. The chapter further discusses the research findings in the context of knowledge extension in the area of IS success model development, and the use of this type of models in addressing problems experienced by users of vehicle tracking systems, and to propose guidepost by which countries with transitional economies can develop and deploy ITS applications to address transportation predicaments in their respective nations. From different perspectives, the chapter further looks at how the research findings relate to what are already known in IS success model development series in the IS research community, how this research had reinforced existing concepts of IS use & user-satisfaction, and the practices of vehicle tracking which are already known; and how this current research differs from, reflects on, or extends current knowledge in IS research and ITS studies.

Lastly, the chapter provides a link between the research results and the research conclusions drawn at the end of the whole study. In this section, attempt has been made to explore and explain how the research findings fit into the existing body of knowledge in the field of IS research and in the area of ITS studies. The goal here is to ascertain whether the findings are consistent with existing IS success models or not and why. Another goal of this section is to demonstrate the innovations and implications derived from the research findings; to do that, literature reviewed in chapter two is mapped onto the research results to determine whether a new and relevant literature, including interesting implications, had been established and how.

6.2 DISCUSSING THE DISSERTATION CHAPTERS

The introductory section, i.e., Chapter 1, laid the foundations or groundwork for the remaining sections of the whole research processes. It mapped out the broad domain of the research, the motivations for the study, and then focused on the research tasks and achievements. The section covered a bit of historical and technical backgrounds to the research area. It sketched out the formulation/conceptualization and presentation of the research problems, the objectives, and the principal investigation questions underpinning this study. This chapter gives a brief overview of the research methodological approach and the scope of the study, as well as possible research delimitations and research assumptions. The chapter is terminated with highlights on the structure of the remaining sections or divisions in this dissertation as a whole.

The Literature Reviewed on ITS technologies (i.e., chapter 2) basically covered the technological background of ITS, state-of-the-arts technologies in ITS and IVTS, ITS Standardization issues, how ITS have been deployed in some developing countries, and the investigation of factors impacting the development and deployment of ITS solutions in emerging countries. The section identified 22 concepts and proposed a typical IS success model through which developing countries can deploy ITS applications to address their national transportation challenges.

Chapter three reviewed issues surrounding research theoretical framework, it reviewed existing research efforts and acknowledged the works of earlier researchers and scholars in the fields of IS and ITS studies; this helped in identifying and recognizing the knowledge and ideas that had been established amongst IS and ITS research communities. The chapter additionally reviewed extant theories relevant to IS success model development, and facilitated the construction of theoretical foundations on which the whole research was anchored. The chapter further discussed how the identified relevant theories had been employed in other studies. Research gaps in those studies were noted, and the implications of the outcomes and gaps in those studies to the current research were also outlined. The review of existing theoretical concepts/models aided in discussing the research findings at an informed theoretical realm.

Chapter 4 details the methodological approach employed in this research. This was closely followed by chapter 5 which gave accounts on data collection and analysis methods employed in the study, and rationalized the method by which the research population and participants were identified, selected and sampled. The non-linear processes of data collection and analysis, and the continues-comparisons of emerging codes with existing categories characterized with the grounded theory method were well detailed. The section identified seventeen core IS success concepts which were used to develop the proposed conceptual IS success model for use in IVTS.

The research results presented in these chapters were empirically grounded in the raw information collected from research participants and respondents (i.e., the raw data). These raw data were articulated by employing opening/initial codes, provisional categories, substantive categories, core categories & theoretical concepts that emerged from the data analysis processes. Findings on the development and deployment of ITS technologies by developing countries were anchored on reviews of contemporary journal articles, relevant research papers, conference proceedings, etc.

Chapter six, which discusses the research findings, essentially contextualized the emerged empirical core IS success concepts for the developed IS success model; and the findings suggest that, at least, three IS Use variables and seventeen core IS success concepts are appropriate and relevant in developing the proposed conceptual IS success model for vehicle tracking systems; likewise, the findings show that, twenty two IS success concepts are necessary to deploy ITS solutions in developing nations.

These findings further hypothesized that, little or no studies have been conducted on the application of IS success models into the practices, operations and management of intelligent Vehicle tracking systems deployed in developing nations. The chapter demonstrated how the research findings were fitted into existing literature and theories reviewed in chapters 2 and 3. This aided in highlighting the implications of the research findings in the light of academic knowledge building, existing literature & contributions made, and the importance of the current research to existing theoretical concepts. The concluding section, i.e., chapter 7, summarized the study as a whole, and outlined the research limitations and recommendations for future studies.

6.3 DISCUSSIONS ON THE RESEARCH FINDINGS

This section discusses what have been found and achieved from this research, what contributions have been made to existing academic knowledge and the body of knowledge (BoK) in IS research and ITS studies, and what interesting innovations have been revealed to the research community in the field of ITS studies and in the area of IS research. The section further discusses whether: the research problem formulated in the introductory chapter (section 1.2), the research objectives posed in section 1.3, and the research questions designed in section 1.4 have all been addressed or not, and why. In all, fifteen findings were made, and for the purpose of clarity and to avoid ambiguity, each of them is briefly discussed in the succeeding sub-sections that follow.

6.3.1 Findings in Relation to the Research Problems

The problem studied in this research was about the phenomena in which users of vehicle tracking systems in developing countries were not satisfied with the performance of the systems being used; e.g., these users had not been benefitting fully from the use of the said systems. From the emerged empirical data, it was found out that, most of the tracking systems used in these countries have very limited bandwidths, speeds, capacities, poor GSM coverage and low receive signal strengths; due to the fact that many of the GSM network operators were still operating the 3G generations of the GSM evolution (at the time of data collection), instead of deploying the next generation mobile networks, such as the 3.5G, 4G, and All IP networks. It is inferred from users' perceptions that, the existing communication networks have seen little or no meaningful expansions and technological advancements and upgrades (both software and hardware) since their initial installations. For these reasons, the qualities of the tracking systems, vehicle information and tracking services were far below users' perceptions and impressions, as against their expectations prior to their subscriptions to these systems and services.

Deducing from the empirical data presented in section 5, these situations occurred as a result of the failure of vendors/operators to consider and factor in the perceptions of users of vehicle tracking systems in Ghana and perhaps, in other developing nations, in respect of system & service performances and user- satisfaction.

Additionally, it was found that, users did not have platforms to communicate in real time the poor system & service performances including their dissatisfactions as users; they did not also have avenues to address their system & service performance problems "just in time" (JIT) by the vendors. The empirical data pointed to the fact that, there were a lot of delays in restoring tracking system & service outages by the vendors/operators. These delays and outages also accounted partly for the dissatisfaction of users. Generally, after sales services rendered by these vendors to vehicle owners have not been encouraging. The findings discovered further that, these problems could be resolved by incorporating five new core IS success concepts (see fig 5.3) into existing IS success models.

6.3.2 Findings in Respect of the Research Objectives

This research had the overall objectives to develop a conceptual IS success model to address the research problems, and to propose a road map for deploying ITS solutions in developing countries. To achieve these main objectives, three sub-research objectives were achieved. Firstly, five-core IS success concepts forming the construct of independent variables required to develop the success model were identified from the empirical data and analyzed. Secondly, nine core IS success con cepts constituting the construct of "Intervening Variables" were also identified and analyzed. Thirdly, three core IS success concepts representing the construct of "Dependent Variables" were also identified and analyzed. Lastly, the conceptual IS success model was successfully developed; utilizing the seventeen core IS success concepts that emerged from the empirical data. The model displays how the new seventeen problem solving concepts are interplayed; showing their causalities, correlations and their inter-relationships with the existing concepts in earlier IS success models. Per the objectives, another set of twenty two concepts were identified and used to model a guidepost for deploying ITS solutions in developing nations; these include overall user satisfaction, “is user satisfied”, etc.

6.3.3 Findings Regarding the Research Questions

This section discusses the research findings in the light of the research questions for this study. In view of the large number of concepts, links, relationships and causalities identified from the empirical data, it is imperative to briefly reflect on how these outcomes relate to the research questions posed in the introductory section. From the findings regarding the first sub research question, three critical IS success variables were identified, and they actually constituted the foundation pillars on which the conceptual IS success model for IVTS was developed. These IS variables were: the Independent Variables (Variables of IS Use), the Intervening Variables (effects of the independent variables) and the Dependent Variables (the resulting Net Benefits of IS use).

The Independent Variables were composed of five core IS success concepts as presented in Table 5.4. Due to system imperfections, the performances of these concepts are subject to variations with time; these variations may cause corresponding changes in users' perceptions on tracking systems & service performances and system usefulness; these changes may in turn influence their intentions to continue to use the systems, which may determine their actual use of the systems. Any changes that occur within the independent variables may impact on the net benefits of using the tracking systems, and these impacts may in turn affect the overall user-satisfaction. The findings further indicated that, the intervening variables have effects on the independent variables, thereby causing the creation of three key dependent variables, comprising of the concepts of: Individual & Group Impacts, External Impacts and Organizational Impacts.

Concerning the second sub research question, this study found that, the kind of conceptual IS success model that can be used to measure the performance of vehicle tracking systems deployed in developing nations is the one presented in section 5.5.4 above, details of which are discussed in section 6.3.14 below. In respect of the third sub research question, it was established that, the factors impacting the development and deployment of ITS solutions in developing nations include political unwillingness by governments, lack of ITS expertise and good leadership, poor ITS project management and control, misappropriation of funds for ITS projects, etc. Details of these factors are discussed in section 6.3.15 below.

6.3.4 Findings Regarding Reviews on the Development of ITS Technologies

Reference to the discussions made in Section 2.2, it was found that, key activities underneath the development of ITS technologies in developing countries, especially in Ghana, need to include: the creation of vehicle tracking data model, establishment of vehicular communication standards, promotion of ITS standardizations in general, and lastly, planning of national ITS architectures. Such ITS architectures must be defined and designed around wireless communication infrastructures, fixed-point to fixed-point communication and wide area communication networks, Global Positioning System (GPS) and cellular-based communication systems. These architectures must be complemented by Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) communication technologies that can provide physical devices, subsystems and ITS functions like vehicular traffic, travel information and traffic data flow.

From the literature reviewed, these technologies are already existing, deployed and operated by the leaders of ITS technologies in the developed world. Thus, developing nations need not "re-invent the wheel" by developing their own ITS technologies; rather, what they need to do is to go in for (acquire) these technologies, in the form of tailored ITS hardware and software that will meet their economic capabilities, but at the same time, that will suit/satisfy their transportation needs & demands; and deploy appropriate ITS technologies through effective and efficient planning, implementation and management of ITS projects in their respective countries.

6.3.5 Findings Relating to the Review of Intelligent Vehicle Tracking Technology (IVTT)

Referring to the discourse in Section 2.4, IVTT has been uniquely integrated from Personal Computers (PCs), Smart/IP phones, GSM networks, the 4G "All IP" networks, GPS, Satellite & Wireless communication systems into Vehicle Telematics that provide real time vehicular information to vehicle tracking users. It was further discovered from the review that, today's IVTT must have at least the capability to trace vehicular/fleet mobility by deploying vehicle tracking systems embedded with GPS Locators, Global Navigation Satellite Systems (GNSS), wireless technologies (GSM, GPRS, EDGE, WAVE, DSCR, etc), RFIDs, computer network management applications linked to efficient data centres to provide effective & efficient vehicle tracking operations and management. IVTT must offer precise journey planning guides from start to finish. The review disclosed that, users of IVTT must benefit from safety, fast response times, increase in productivity & revenue generation, as well as extended vehicle life spans.

6.3.6 Findings Regarding the Benefits of Vehicle Tracking in Developing Countries

Literature reviewed in Section A.5.3 (see Appendix A, Table A.5 and Fig A.11) demonstrated that, the deployment of vehicle tracking systems in developing nations can enormously provide bulk viable solutions to transportation problems in these nations; typically, counties with difficult fleet management predicaments, such as Ghana, as well as protecting other users and stakeholders against similar transportation problems. The review unfolded that; intelligent vehicle tracking systems keep the costs of fuel, wages and recurring expenditure very low. With vehicle tracking systems, transportation managers are able to map out fleet locations by using integrated GPS and satellite tracking systems and geo-location devices, coupled with digital microwave links and Location Based Services (LBS) technologies. The literature further emphasized that, vehicles are very valuable assets; thus, the rate of vehicle theft is always on the increase, but the deployment of tracking systems ensures security of all vehicles.

Again, installing vehicle tracking systems assures stationing and monitoring of vehicles at vantage points to respond, attend and meet customer demands just in time. With the advent of fleet tracking systems, users are informed about possible delays to receive services, as a result of vehicular traffic and some other exterior circumstances beyond control. Another factor identified from the literature review was that, vehicle tracking systems record date, time & duration of all transactions performed at all times; hence, there are no such incidents like business disputes concerning the location and swiftness of works undertaken. These tracking systems also provide information about all unsafe-driving occurrences, since such incidents turn to tarnish the hard won public images and perceptions of institutions / organizations in the logistics industry.

Lastly, work productivity greatly improves when tracking systems are deployed in vehicles; in the sense that, drivers are on their alerts that they are required to execute specific daily/weekly tasks; as such, they are discouraged from loitering about, once they get to know that they are being monitored remotely/electronically wherever they are, and at all times. By using vehicle tracking systems, organizations are reassured that drivers will always ply approved routes (without any attempts to detour from their demarcated zones & areas, and they will only stop at their planned destinations. These approaches limit the level of air pollution/harmful fumes emitted by vehicles into our environments, resulting from unmonitored and uncontrolled vehicular activities.

6.3.7 Findings Relating to State-Of-the-Arts in ITS Technologies

This study discovered that, knowledge and expertise in the development of ITS technologies are very contemporary globally; unique ideas, updated knowledge and practices in vehicle tracking systems, technological advancements in ITS architectures and literature are made available in different media (e.g., ITS Journals/magazines, Research Papers, Conference Proceedings, Workshops/Seminars, etc) and in diverse forms (e.g., print media, electronic, video, etc) to the ITS research community, the transportation industry, academic institutions, commuters and to the general public at large. The objective is to expand the knowledge, potentials, importance, benefits, etc., of ITS & IVTS technologies and to meet the needs, requirements, demands and wants of all categories of users of these technologies, anytime, anywhere, but at the lowest costs.

The study further disclosed that, top on the "Digital Agenda" of the European Commission (EC) on ITS development and deployment is: lifesaving, reduction of deaths through vehicular accidents, and mitigation against environmental pollutions; this laudable and fashionable ITS agenda for EU is code named ‘Europe 2020’. Well, it is rather unfortunate, but the fact is that, the study did not find meaningful push (if any) towards the development & deployment of ITS & IVTS state-of-the-arts technologies by nations with least economies. Thus, this current study suggests that developing countries must endeavour to undertake keen interests in ITS research and in ITS technological advancement activities.

6.3.8 Findings Associated with ITS/IVTS Standardization in Developing Countries

From diverse perspectives, all technologies, including ITS/IVTS, require very high and updatable standards to ensure system compatibility and interoperability in their own domains. However, this study established that, it is likely not practicable and economically viable for emerging nations to develop their own ITS/IVTS standards; firstly, due to the multidisciplinary characteristics of ITS technologies themselves, as well as the complexity of the standards involved; and secondly, due to the relative low economic capabilities and the lack of ITS expertise in these nations. Similarly, the study underscores that, developing states are advised not to autonomously develop ITS standards which already exist elsewhere, except when such standards are unsuitable for their local use considerably.

It was also gathered that, developing countries need to team up with leaders of ITS technologies (e.g., Japan, Europe, USA, etc.) to develop customized standards which do not exist anywhere. These admonishments are in line with the fact that, many developed nations (typically in Europe), are dispensing with national programs to develop ITS/IVTS standards, and rather, supporting participation in regional EU ITS standards development activities.

Additional significant discovery made from the review was that, developing countries still find it very difficult to categorize or determine precisely which ITS/IVTS standards can meet their critical requirements and needs. In this regard, the study suggests the following possible solutions: national ITS agencies/advisory bodies in charge of ITS/IVTS standardization in developing countries must assist by:

a) Clearly defining ITS/IVTS standard needs on country basis;
b) Investigating existing ITS/IVTS standards and examining how well they meet these needs;
c) Considering and recommending ITS/IVTS standards that are good fits to local needs and compatible to existing standards;

d) Communicating any changes in ITS/IVTS standards to all stakeholders; etc.

Again, the study points out that, a number of possibilities exist whereby developing nations can develop appropriate ITS/IVTS standards for use;

these include: Adopting national and/or international standards developed by experts elsewhere; Participating in international standards development agenda and activities; Etc.

6.3.9 Findings Regarding Existing Literature & Theories

In this section, how the research findings recount or relate to existing models or theoretical conceptions are discussed. The section is a central component of the overall research; since involvement of relevant or appropriate literature and theories has permitted the researcher to situate the research findings amongst literature and theoretical contexts of IS Success research and ITS studies.

The intention or aspiration here is that, the discourse of existing literature and theoretical concepts have provided helpful and constructive perspectives that have aided the researcher's profound understanding of the findings. This engagement with extant theoretical concepts is to reflect on, and keep to the tradition of qualitative strategy of research and grounded theory method of data collection and analysis in relation to the review and use of existing literature. For this purpose, Table 6.2 below provides a comparison of the research findings on the concepts of IS success model development with the concepts of existing IS research and User satisfaction studies identified during literature review for this study. The table further portraits the extent of involvement of existing literature and extant theories in developing the conceptual IS success model for use in IVTS.

Table 6. 1: Comparison of Identified IS Success Concepts with Existing Concepts in Literature & Theories

CURRENT FINDINGS	MINIMUM COMPARABLE FINDINGS FROM EXISTING STUDIES
	The DeLone and McLean model of information systems success: a ten year update (DeLone & McLean, 2003)
	User-developed Applications And Information Systems Success: A Test Of DeLone ad McLean's Model (McGill, T. & Hobbs, V., 2003)
	Assessing the Validity of IS Success Models (Rai, et al., 2002)
	Testing the DeLone and McLean Model of IS success in the user developed application domain (McGill, T.J., et al.,2000)
	Extension of the DeLone and McLean Model of IS Success (Seddon et la., 1997)

IS Success Models	Development of the DeLone and McLean Model of IS Success (Soddon et al., 1994)
	Converging End-user & McLean's Model of IS Success (McLean, E. R., et la., 1993)
	Beyond information quality: Fitness for purpose and electronic information resource use (Klobas, J. E., 1995).
	A Short-Form Measure of User Information Satisfaction (Baroudi, 1988)
	The Measurement of User Information Satisfaction (Ives, et la., 1983)
Tracking Systems Quality	An empirical Test of DeLone–McLean Model of Information System Success (Iivari, J., 2005)
	"Information Systems Success: The Quest for the Dependent Variable," (DeLone, W.H. and McLean, E.R., 1992).
Perceived Tracking System Performance (PTSP)	Measuring the Performance of Information Systems: A Functional Scorecard. Journal of Management Information Systems (Chang, J.C.J. and King, W.R., 2005).
	Building a Process Performance Measurement System: Some Early Experiences (Kueng, P. and Krahn, A. 1999)
	Process Performance Management (Heckl, D. and Moormann, J. 2010)
	Limitations of Performance Measurement Systems based on Key Performance Indicators (Pidun, T. and Felden, C. 2011)
Expectation Disconfirmation (EDiscon)	Evaluating the Expectations Disconfirmation: Anchoring Approaches to User Satisfaction with Local Public Services (Oliver James, 2007)
	Expectancy Disconfirmation Sequence Model (Oliver Richard L., 1997).
	Disconfirmation Effects On User or Consumer Satisfaction and Decision Making Processes (Ellen M. Moore et la., 1984)
	Disconfirmation of Consumer or User Expectations through Product Trial, (Olson, et al., 1979)
	Effects of Expectation Creation and Disconfirmation on Belief Elements of Cognitive Structure (Olson, et al., 1976),
	Positive Disconfirmation of Expectation and the Effect of Effort on Evaluation (Woodside, Arch G., 1972)
	Great Expectations?! Assortment Size, Expectations & Satisfaction (Kristin Diehl et la., 2010)
	Expectation processes in satisfaction formation: A field study (Oliver R. L. & Burke, R. R., 1999)
Perceived Tracking System Usefulness (PTSU)	Perceived Usefulness, Perceived Ease Of Use, And User Acceptance Of Information Technology (Davis, F.D. Jr., 1989)
	Consumer Expectations, Product Performance, and Perceived Product Quality (Olshavsky, et la., 1972)
	Overview of the Technology Acceptance Model: Origins, Developments and Future Directions (Chuttur M.Y. (2009)

	Creation of Favourable User Perceptions: Exploring the Role of Intrinsic Motivation (Venkatesh V., 1999)
Perceived Ease Of Use (PEOU)	Perceived usefulness, perceived ease of use, and user acceptance of information technology (Davis, F.D. Jr., 1989)
	Perceived Usefulness, Ease of Use & Usage of IT: A Replication (Adams, D. Nelson, R.& Todd, P., 1992)
	Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and emotion into TAM (Venkatesh V., 2000)
	A Model of the Antecedents of Perceived Ease of Use: Development & Test (Venkatesh V. & Davis F.D., 1996)
	The Technology Acceptance Model: Past, Present & Future (Lee, Y., et la., (2003)
	Why Do People Use Information? A Critical Review of TAM (Legris P., et la., 2003)
Intention To Use Tracking Systems (ITUTS)	Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research, Reading(Fishbein, M. and Ajzen, I. 1975).
	Understanding Consumer Intention, (Chien-Wen David Chena, 2009)
	A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions" : Reviewed Work(s), (Oliver R. L., 1980)
	Predicting User Intensions: Comparing the TAM with Theory of Planned Behaviour (Mathieson K., 1991)
Actual Tracking System Use (ATSU)	Cognitive Model of the Antecedents & User Consequences of Satisfaction Decisions (Richard L. Oliver, 1977)
	User Attitudes & Management Information System Use (Robey D., 197)
	From intentions to Actions: A theory of Planned Behaviour (Azjen, I., 1985). In: J. Kuhl & J Beckman (Eds).
Overall User Satisfaction (OUS)	User Information Satisfaction: IS Implementability and Effectiveness (Iivari, J. and Ervasti, I. (1994).
	User Satisfaction as a Measure of Success in End User Application Development: An Empirical Investigation (McGill, T. J., et la.,1998)
	A Theoretical Assessment of the User-Satisfaction Construct in Information Systems Research (Melone, N.P., 1990),
	"Toward a Process Model of Consumer Satisfaction," in Conceptualization and Measurement of Consumer Satisfaction and Dissatisfaction(Day, Ralph L. (1977).
	User Information Satisfaction Reconsidered: An Information System as the Antecedent of User satisfaction (Iivari, J., 1987)
Is User Satisfied?	Is User Satisfaction a Valid Measure of System Effectiveness (Gatian, A.W. (1994)
	Towards a Process Model of User/Consumer Satisfaction, in Conceptualization and Measurement of User/Consumer Satisfaction and Dissatisfaction (Day, Ralph L., 1977)
	The Measurement of User Information Satisfaction (Ives, B., Olson, M.H. and Baroudi, I. J., 1983)
	Disconfirmation Effects On Consumer Satisfaction and Decision Making Processes (Ellen

(IUS)	M. Moore & F. Kelly Shuptrine, 1984)
	Measuring information systems success: Models, Dimensions, Measures, And Interrelationships (Stacie Petter, et la., 2008)
User Report To Vendor (URTV)	Change, Attitude to Change, and Decision Support for System Success (Barki, et la., 1985).
Tracking System Impacts	An empirical study of the impact of user involvement on system usage and information satisfaction (Baroudi, J. J., Olson, M.H., and Ives, B., 1986)
	A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level (Petter, S., et la., 2009)
	A Short-Form Measure of User Information Satisfaction: A Psychometric Evaluation and Notes on Use (Baroudi, J. J. and Orlikowski, WJ., 1988)
Net Benefits	Expectations About Net Benefits of Future IS Use (Seddon et al., ...)
	Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis Information Systems Research (Arun Rai, et la., 2002)
	Critical Success Factors Of Process Performance Management Systems: Results Of An Empirical Research(Blasini, Josef, 2011)
Dependent Variables	User-developed applications: An empirical study of Dependent Variables (Edberg, D. T., et la., 1996)
	Information Systems Success: The Quest for the Dependent Variable (DeLone, W.H. and McLean, E.R. (1992)
	A Re-specification and Extension of the DeLone and McLean Model of IS Success Information Systems Research (Peter B. Seddon 1997)
	User-developed applications: An empirical study of dependent variable. Information Systems Research (Edberg, D. T., & Bowman, B. J. 1996)

From the table above, it can be seen that each concept that emerged from the empirical data is related to two or more existing literature and theories relevant to this research. The implication here is that, this research has added valuable theoretical knowledge to existing literature.

6.3.10 Findings in Relation to IS Success and User-Satisfaction Models

The results/findings propose that, more empirical research is required to investigate the relationships between the IS success constructs in Table 5.4 to ensure adequate research works on IS success model development, and this is one of the motivational factors for undertaking this current study.

However, there could be other more complex factors that could explain the relationship between these success-constructs at either the individual or organizational levels of analysis.

There are also a number of other boundary conditions that deserve attentions, e.g., “the voluntariness of the system, the timing of success measurement and the type of information system examined" as posit by Stacie Petter, et al., (2008). These researchers alert that, further studies are also required on the relationships among “information quality and IS use, among user-satisfaction and net benefits”. To contribute to these further studies, this current research collected empirical data and analyzed the effect of the concepts of System Use on User Satisfaction and Net Benefits, to buttress the efforts initiated by Burton-Jones & Straub (2006) to improve the “measurement of systems use’, by incorporating the structure and function of “Use” in the process of developing IS success models.

6.3.11 Findings with Reference to the Independent Variables

In the updated D&M (2003) IS success model, three concepts constituted the Independent Variables, these were the concepts of: System Quality, Information Quality and Service Quality. This study has extended the Independent Variables to five concepts; the two new concepts discovered empirically are: the concepts of Perceived Tracking System Performance (PTSP) and Expectancy Disconfirmation (EDisc), i.e., User Expectation.

The study found that, the inclusion of these two new concepts will address the situation in which the perceptions and expectations of users, regarding system & service performances, were relegated to the background (before and during system & service provisioning) in the D&M's success model. It was also established that, these two concepts have direct influences on users' Perceived Tracking System Usefulness (PTSU), Perceived Ease of Tracking System Use (PEOTSU) and Overall User Satisfaction (OUS).

6.3.12 Findings with Reference to the Intervening Variables

The nine core IS success concepts that emerged from the data for the intervening variables as compared to two - three concepts identified with previous research works (see section 3.2.4) is a novelty in the IS success model development series in the field of IS research.

Three Notable and innovative concepts among these nine were the concepts of: Is User Satisfied? (IUS), User Reports System Problems (URSP) and Vendors Address System Problems (VASP).

The discovery and introduction of these three new concepts into the development of IS success models invariably contribute to IS research literature in extending academic works in IS studies. With the discovery of these three new concepts, users of vehicle tracking systems in Ghana and for that matter in other developing countries (in the context of this study), now have a platform on which unsatisfactory system & service performances and usefulness could be addressed. Again, three other intervening concepts necessary to rapidly deploy ITS technologies in second world countries are: Intention to Develop ITS (IDI), ITS Development & Usage (IDU) and ITS User Satisfaction (IUS).

6.3.13 Findings with Reference to the Dependent Variables

The study revealed that, the existing IS concepts constituting the Dependent Variables of the D&M IS success model were well sufficient for the development of the conceptual IS success model; these were, the concepts of: Individual & Group Impact, External Impact and Organizational Impact. The findings further disclosed that, any attempts to increase or diminish these concepts made the new model rather complex compared with existing ones.

For instance, attempts were made to introduce the concepts of: Economic Impact, Social Impact and Environmental Impact. Any one of these concepts added to the newly developed IS success model rendered the determination of the concept of Overall User Satisfaction more complex; in the sense that, the focus of IS studies was being digressed. It was for this good reason that Individual and Group Impacts which are closely related characteristically were grouped to create a single virtual impact concept in the model developed in this current research. On the other hand, it was established that, any attempt made to suppress any one of the three impact concepts caused the new model to be incomplete. Interpretations made from the responses of participants and respondents implied that, it was impracticable to collapse any of these impact concepts when dealing with IS success model development and the use of it in vehicle tracking systems.

6.3.14 Findings in Respect of the Factors Impacting ITS Deployment in Developing Countries

The key findings from the literature reviewed in Section 2 pointed to the fact that, developing countries are failing to speedily develop and deploy ITS technologies to address their national transportation problems, compared to how similar problems are being addressed in the developed world. It was found further that, the common factors hampering the penetration of ITS solutions in developing countries include but not limited to: Lack of education and training on ITS applications; Lack of public awareness at national levels; Lack of standardization of ITS technologies, etc. Other barriers found to be peculiar to individual countries included: High rates of private motorization, rather than public transportation; Lack of initiatives to develop and deploy ITS projects; Lack of political willingness; Lack of prioritization of IT projects and funds; Political & ideological disparities; Very strange religious & spiritual believes; Traditional & cultural differences, etc.

Additionally, the findings suggest that, developing nations can take the following approaches to gradually develop and deploy ITS applications into their conventional transportation systems:

a) Institutionalization of the development of national ITS Architecture Plan;
b) Systematic implementation of ITS plans and projects;
c) Preparation of clear targets and budgets for deployment of ITS solutions and Development of ITS standards;
d) Focusing on the use of ITS demand management solutions (e.g., road user charging, information & customer management techniques, etc).

6.3.15 Findings on the Developed Conceptual IS Success Model for IVTS

In addition to the memos or thick phenomenological descriptions provided on each concept, the following analyses are done in furtherance to the analysis of the research findings as a whole. Under the Independent Variables, five Core Concepts emerged to form the Construct of Information System (IS) Use. These variables were: Tacking System Quality (i.e., the quality of the tracking system expected by users); Tracking Information Quality (i.e., the usefulness of captured vehicle information, e.g., information accuracy, currency, updates, interpretability, comprehensiveness, etc);

Tracking Service Quality (i.e., the quality of the vehicle tracking services as experienced by users, it has to do with expected quality of service, etc); Perceived System Performance (i.e., how users perceived or observed the performance of the tracking system s after using the systems and services, i.e., user-perceptions); Expectation Disconfirmation (i.e., how users established their own expected tacking system performance thresholds to either confirm or disconfirm their expectations after using their vehicle tracking systems).

On one hand, if users' perceived tracking system performance fell above their own predefined thresholds, then they formed negative expectancy disconfirmation, i.e., they negate their expectation of the tracking system performance; this means, a positive tracking system performance had been established. On the other hand, when their perceived tracking system performance fell below their predefined thresholds, then they obtained positive expectancy disconfirmation; this means, they held on to their disconfirmation of the tracking system performance. This translates to mean that; low, or, better still, poor tracking system performance had been experienced.

The next interesting analysis has to do with the construct of Intervening Variables ("the concept of effect"). These variables are logically playing the role of a network interface between the Independent Variables and the Dependent Variables (Note: the dependent variables are the effects that the intervening variables have on the independent variables).

6.4 IMPLICATIONS OF THE RESEARCH FINDINGS

6.4.1 Implications of the Theories Used in the Research

The findings of this study have not only added valuable contributions to existing knowledge about the problems researched into; but the findings additionally have implications on the broader body of knowledge in IS research and ITS studies, as well as the parent and relevant theories outlined in the theoretical framework (Section 3). To a large extent, the findings have significant implications on other associated theories, such as the Behavioural Change Theories (BCT), Theory of Planned Reasoning (TPR) and Theory of Reasoned Action (TRA) applied in studying the attitudes and behaviours of users of information systems (e.g., in TAM).

The implications of these theories on the current research are that, users of intelligent vehicle tracking systems create intentions to use these systems before they actually use them or otherwise, just as they do when utilizing information systems.

6.4.2 Implications on the Research Problems

The findings of this research imply that, the research problems formulated in Section 1.2 are addressed. In solving the research problems, three constructs of IS success variables were identified and analyzed. Furthermore, seventeen core IS success concepts were also generated from the empirical data and used to develop the conceptual IS success model that can help to solve the research problems. This model was generated from scratch, i.e., from empirical data. Twenty two other IS success concepts were identified and utilized to develop a second conceptual IS success model for deploying ITS applications in countries with low economic status.

6.4.3 Implications on the Research Methodology

This section reflects on the implications of the methodology employed in this research. The research process and the research design have been well articulated in Sections 4.2 and 4.3 respectively. Being a qualitative, single-case study and grounded theory research, the data collection phase (questionnaires and face-to-face interviews) wasn't that entirely easy work. In view of this, the implications of the research results in respect of the research methodology infer that, the grounded theory method of data collection and analysis can be employed to conduct IS research and as well as ITS studies.

6.4.4 Implications on Practices/Society

This study identified four implications for further research, details of which are given in Section 6.6 below. Two more implications identified have to do with reduction of the number of stages practically employed by both vehicle tracking system operators and users in measuring the performance of information systems, their usefulness, as well as user-satisfaction levels.

The other implication is about the practical use of the developed conceptual IS success models. It is suggested that, the new conceptual models developed in this study be used to identify the role of vehicle tracking service providers, and that of the users as well, to meet the needs and demands of users. When this is done, then the models could have commercial impacts on individual and group users regarding their external and organizational transactions, to achieve positive net system benefits as illustrated by the Dependent Variables in the models. It is therefore assumed that, these implications would improve the economic status and quality of life of individuals and societies in developing countries at large.

6.4.5 Implications of the Research for Developing Countries

Due to the complexity of integration of information systems in the field of ITS, it is desirable for developing countries to define and develop ITS architectures at the national levels, which will function as overarching frameworks within which individual components or groups of components of ITS can be deployed. Such approaches will ensure that systems developed and deployed at different places and times are interoperable and compatible with each other including existing ones, locally, regionally and globally. Thus, countries with transitional economies that are yet to define their National or Regional ITS Architectures should not embark on full scale ITS deployment at a go; rather, for such countries to benefit fully from the potentials of ITS technologies, they need to develop their ITS infrastructures gradually and systematically, but should not be planned over too long periods, since technologies and their related costs are very dynamic and “fly away with the hours of the day”.

However, other developing countries such as Ghana, Kenya, Tanzania and many more, who do not have economic capabilities, technical logistics and expertise to follow the paths of the world leaders in ITS technologies, can establish Government Agencies and Autonomous Bodies to develop and deploy ITS technologies in their countries gradually but systematically, devoid of any political divisions or unwillingness, traditional & cultural believes & differences, including chieftaincy disputes. Lastly, if developing countries cannot afford the approach of onetime ITS applications development and deployment, they can proceed steadily and in piece mill, until local, national and regional ITS architectures are built completely.

6.5 RESEARCH CONTRIBUTIONS

This section discusses in detail how innovative or insightful this research is, and why the results/findings from this study matters. The goal here is to make it easy for potential audiences of this dissertation to understand the rationale, magnitude and contributions of this research to existing Body of Knowledge (BoK). To start with, the contributions in this study are in three fold. First, the use of vehicle tracking systems in Ghana and in other developing countries is characterized by unsatisfactory system performance and usefulness, resulting in poor user satisfaction. Many studies conducted in the field of IS research (see Section 3.2) considered system quality, information quality and service quality as the IS success concepts that need to be incorporated into IS success model development, to establish reliable system performance and to create competitive user-satisfaction (DeLone and McLean 1992)), (Seddon an Kiew, 1994), (Oliver R. L. et al, 1999), (Mark I. Hwang, et al., 2000), (DeLone W.H., McLean E.R., 2003), (Wu and Wang 2006), (Stacie Petter, 2008), and many more.

However, these earlier studies did not consider or regard user "Expectations" and "Perceptions" as critical concepts in developing IS success models (Vann Raaij, 1991), (Olive James, 2007). (Setayesh Sattari, 2007), (Theodore H. Poister et al., 2011). Furthermore, neither have earlier IS success model developers proposed in their models any platforms for users to test and measure the performance and usefulness of their systems, and their satisfaction levels; nor have they suggested any avenues whereby users could communicate the performance status of their systems and services, and their dissatisfaction; in order to get these problems addressed by vendors/suppliers/providers. Adding to these five research shortcomings, IS studies have not yet been extended to measure the performance of information systems deployed in intelligent vehicle tracking systems and their attendant user-satisfaction and dissatisfaction issues. These shortcomings constitute considerable research gaps, which have been filled / addressed in this current research.

As part of the processes in filling these research gaps by way of contributing to existing body of knowledge, this current research has developed a new conceptual IS success model, by introducing six new IS concepts into the existing IS success models referred to in the first paragraph of this section, as looking glasses/lenses for this study.

The introduction of the six new IS concepts into the D&M (2003) IS success model has extended that model considerably, and that is an academic contribution to existing literature in IS studies. In the first place, it is among the few studies (assuming there is any) investigating the performance of vehicle tracking systems and user-satisfaction levels in developing nations. Thus, it represents a response to the need to address problems that lead to the phenomena of non-performance of vehicle tracking systems and services deployed in developing countries. Again, it corresponds to the few attempts (if any) to situate IS research into ITS studies. Given the role and importance of information systems and ICT in vehicle tracking systems, this study is mutually relevant and timely.

Another contribution of this current study to the on-going discussions on ITS development & deployment in developing nations is in the form of blueprint guidelines. Thus, some developing countries like India, Brazil, South Africa, etc., that have financial and technological capabilities can follow the paths taken by the leaders in ITS technologies to develop and deploy ITS solutions in their national road transport networks, embarking on full scale ITS implementation approaches. Those countries who cannot afford the full scale approach could do that gradually but systematically.

Secondly, this current research accentuates the value or significance of qualitative investigation for researching into the perceptions, expectations and experiences of individuals, groups and organizations that use vehicle tracking systems as part of their operational prerequisites. This study has also researched into relatively under-explored phenomena, i.e., investigation of the performance of information systems deployed in intelligent transportation systems. Interestingly, this inquiry has underlined the usefulness and effectiveness of the grounded theory method and as a meticulous qualitative research method in identifying IS success concepts that emerged from empirical data and showed how these new concepts are related to existing theoretical concepts. Thirdly, the identification of the twenty two IS success concepts from literature reviewed, together with the proposed second conceptual IS success model created from these twenty two concepts, provide guidelines for developing nations by which they can deploy the potentials of ITS technologies to address their transportation systems, and this is another considerable academic contribution.

Fourthly, the researcher has directly contributed to academic knowledge during the course of this research. Given that the researcher is a lecturer at Ghana Technology University College (GTUC) in Accra, the researcher have been lecturing and supervising students at both graduate and undergraduate levels. Additionally, the researcher has contributed to the body of knowledge by means of disseminating and sharing information gathered from the IS and ITS studies that related to the problems investigated, at five international conferences, congresses and workshops, to the broader academic and industrial communities. Table 6.2 below exhibits 8 published articles and research papers written & presented so far, by way of disseminating and sharing academic knowledge to larger audiences outside the traditional classrooms.

Table 6. 2: Research Publications - AS Contributions to the Body of Academic Knowledge

Item	Paper / Article	Presented At	Publication Status
1	Development Of A Techno-Economic Model Of Intelligent Transportation System (ITS) For Deployment In Ghana	The 26th Wireless World Research Forum (WWRF) Conference, In Doha, Qatar, In April 2011 (Co-Authored With Reza Tadayoni (Assoc. Prof))	Published In The IEEE Vehicular Technology Magazine, Sept 2011, Vol. 6, Issue 3, Pages 88 – 98
2	ITS As A Tool For Citizens In Developing Countries; The Case Of Ghana	8th ITS European Congress, In Lyon France, June 2011 (Co-Authored with Reza Tadayoni (Assoc Prof))	Published In The Congress Proceedings
3	Accessing The Role Of PPP As A Tool For Simulating Broadband Infrastructure Investment In Africa: Multiple Case Studies Of NEPAD And Kenya	Presentation Not Required; Co-Authored with Williams Idongesit.	Published In: Digiworld Economic Journal, no. 91, 3rd Q. 2013, p.81
4	Comparative Analysis Between WiMAX And Fiber Optics Backhaul Network Deployment In Developing Countries - The Case Of Ghana	29th WWRF Meeting In Berlin - Germany, Sept 2012 (Co-Authored with Williams Idongesit).Submitted To Elsevier For Publication	Published In: 29th WWRF Proceedings, October 2012
5	Optimising Signalised Intersection Using Wireless Vehicle Detectors	9th ITS European Congress, Dublin, Ireland, 4-7 June 2013 (Co-authored with Moses Torkudzor& Jack Asare)	Published In Congress Proceedings, June 2013
6	Investigating The Factors Impacting On The Development & Deployment Of ITS Solutions In Developing	9th ITS European Congress In Dublin, Ireland, June 2013 (Co-Authored with Reza Tadayoni	Published In Congress

	Countries	(Assoc Prof) & Kenneth K. Tsivor))	Proceedings, June 2013
7	The Assessment Of Solar Photovoltaic Electricity In ICT for Sustainability In Developing Countries	The International Scientific Conference on Electronic Communications: Theory & Practice (Co-Authored with Kenneth K. Tsivor)	Published in Europejska Przestrzen Kommunicacji Electronicznej TOM I, June 2013, Pg 42 – 47
8	The M-Technologies in M-Learning	The Int. Scientific Conference on Electronic Communications: Theory & Practice (Co-authored with Nana Kofi Annan & G. O. Ofori-Dwumfour)	Published in Europejska Przestrzen Kommunicacji Electronicznej TOM I, June 2013Vol. II, Pg 643 – 654

6.6 PhD COURSES ATTENDED AND ECTS OBTAINED

The researcher attended a number of general and project related PhD Courses during the programme and obtained a total of 30 ECTS (European Credit Transfer System). Details of the PhD courses attended are provided in Appendix J.

6.7 EVALUATION OF THE RESEARCH

The Charmaz's (2006) version of GT method was adopted and followed in this current research. It is therefore logical to evaluate this research by applying the four Charmaz Kathy's GT research evaluation criteria. These criteria are: "Research Credibility, Research Originality, Research Resonance, & Research Usefulness". It is helpful to reflect on this section about the research results/findings in accordance with these four GT method evaluating criteria. First, evaluating this study in terms of Research Credibility; the study procedure was methodical, rigorous, and detailed as much as possible. In the study findings, core IS success concepts and theoretical concepts were identified and analyzed through deep qualitative description and memoing. These facts are planted in the empirical data in a steady manner in the opening/initial coding process and throughout the data analysis processes. Links between categories (i.e., provisional, substantive, core and theoretical categories) were identified, analyzed and used to create the emerged core success concepts.

The detailed information provided in Appendices E to Appendix H appends additional transparency or preciseness to the investigation processes followed in this research.

Regarding Research Originality, the six new core concepts presented in Section 5.2 are innovative both to the series of IS success model development and to ITS research. In the case of 'Resonance', the multiplicity of categories and concepts that resulted from the empirical data signifies concretized general perceptions of the problem studied. Moreover, the format used to present and discuss the results in section 5 renders the findings accessible to all concerned individuals and stakeholders who are central to the very phenomena investigated.

Lastly, in evaluating the Usefulness of this research; it is imperative to underline that, the findings of this research have prospects to be applied in IVTS practically to address the problems of unsatisfactory system and service performances to forestall user-satisfaction for users of vehicle tracking systems. The results further provide important contributions to the body of knowledge in the fields of IS research and ITS studies.

CHAPTER SEVEN

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

7.1 OVERVIEW

This research was based on prior Information Systems (IS) research works (as lenses), and extended the utilization of IS success models into intelligent vehicle tracking practices to address unsatisfactory tracking system and service performances experienced by users of these systems in nations with transitional economies. Thus, this final section briefly presents the conclusions of the research as a whole. This philosophical constructive/interpretive research has qualitatively and inductively explored the phenomena in which users of vehicle tracking systems in developing countries are unsatisfied with the performance of the systems they are using, as well as the quality of the services provided by the vendors / operators of these systems. The study focused on collecting qualitative data from purposive research participants who had been using vehicle tracking systems (at the time of data collection) as requirements in all aspects of their operations and business transactions. In the past, little or no attention has been given to the satisfaction levels of users of vehicle tracking systems in developing countries, particularly in Ghana. Qualitative survey questionnaires (open-ended questions) and interviews were employed to collect data by following the single-case study research tradition. The overall research procedure, together with the final dissertation have been deeply informed or enlightened by applying the grounded theory method of data collection and analysis.

The ultimate aspiration of this research has been to develop a conceptual IS Success Model that can address the problems of vehicle tracking systems and service performances, and user-dissatisfaction problems. This concluding chapter therefore briefly presents the inevitable research limitations encountered during the process of the study, and the very last subsection documents some recommendations for possible future research, as a result of the inescapable methodological limitations that emerged from this current research, including other delimitations necessarily imposed on the research as a whole in the introductory section.

7.2 RESEARCH LIMITATIONS

As explained in Section 4.8.2, the apparent limitations experienced during the process of data analysis was the inability to use the NVIVO10 Computer Aided Qualitative Data Analysis (CAQDA) software to analyze the data in the methodology chapter, due to the excessive time it took the researcher to learn how to use the software to analyze the qualitative data; in the end, the data was necessarily and invariably analyzed manually. The only limitation here was that, in addition to the numerous appendices produced manually, other ancillary data classifications could have been generated electronically just to show more data patterns. However, the absence of the software analysis and possible extra patterns of the data did not detract anything from the research results and the findings, since the three constructs of IS variables and the seventeen core IS success concepts identified and analyzed manually were more than adequate & appropriate for the development of the conceptual IS success model for use in IVTS. Arguably, varieties of data pattern couldn't have contributed in any way to the development of the proposed model IS success model; they could only add up to the number of figures, tables and volume of pages.

Admittedly, the qualitative research results obtained at the end of a study like this kind may not be generalizable to a broader population (as compared to quantitative research results); due to the delimited number of participants & respondents and the purposive professional background requirements of the research population/universe, including the purposeful sampling method employed. Some general limitations associated with qualitative research such as the use of researcher perceptions and reflexivity in collecting and analyzing data instead of statistical figures cannot be exonerated from this current study, and it is well acknowledged.

Again, the results of this study are cross-sectional qualitative data and not a longitudinal research data; thus, the results may not be applicable to different cases, situations or environments. These limitations are peculiar characteristics of qualitative research, and are well noted. Finally, it is imperative to state here that, in spite of the limitations mentioned above; the significance of the researchand academic contributions made in this study still remains credible and reliable, since qualitative research processes and grounded theory method were duly and rigorously followed to the latter. These limitations merely provide opportunities or platforms for future IS research and ITS studies, this platform is created by this current study.

7.3 RESEARCH CONCLUSIONS

The purpose of this research was to develop a conceptual IS success model that can be utilized to measure the performance and usefulness of intelligent vehicle tracking systems & services deployed in countries with transitional economies, as well as the satisfaction or otherwise of the users of these tracking systems, selecting Ghana as a case study. In concluding these IS research and ITS studies, it is imperative to state that, the findings discovered have thrown more light on the multifaceted and problematical characteristics of the phenomena that led to the hitches investigated. The implications of the research findings in connection with the research problems, objectives and inquiry questions have been duly presented and discussed. Literature reviewed, theories employed and methodological approaches have also been highlighted. It is established that the developed conceptual IS success model has created a considerable extension work to the updated (2003) DeLone & McLean IS success model by introducing two new and innovative IS success concepts into existing IS success concepts of Independent Variables constituting the construct of IS use in extant models. These newly discovered concepts are: Perceived Tracking System Performance and User Expectancy Disconfirmation.

Furthermore, five new core IS concepts have been discovered as Intervening Variables that can assist in addressing the problems of unsatisfactory vehicle tracking system & service performances and usefulness; these are: the Concepts of Tracking System Use, Overall User Satisfaction, Is User Satisfied?, User Report System Performance, and Vendors Address System Performance. Principal to these newly emerged intervening variables is the concept of Overall User Satisfaction, which has never been considered by earlier IS success model developers. This concept is a determinant to ascertain whether or not users will continually re-use vehicle tracking systems deployed in developing nations.

The last new concept discovered is the concept of External Impact, to augment the individual impact and organizational impact identified by earlier IS success model creators; it is associated with the construct of Net Benefits gained from using intelligent vehicle tracking systems, and it is linked to the Dependent Variables of the developed IS success model.

This research has recognized that, the use of IVTS influences Individuals & Groups in a very similar manner (since the performances of individuals result in the performance of a group); thus, forming a composite and fundamental concept of Dependent Variables of the developed IS success model for IVTS.

From the findings on the issues pertaining to how developing nations can deploy ITS solutions to address their transportation dilemmas, this study concludes that, countries with transitional economies can systematically and steadily develop and deploy ITS applications to address their transportation problems by: institutionalizing the development of national ITS Architecture Planning and Standardization, preparing tailored targets and budgets for deploying ITS solutions, economically implementing ITS plans and projects, and focusing on the use of ITS demand management solutions. This research further concludes that, developing nations can develop & deploy ITS applications/solutions by following the identified guidepost, which consists of three innovative and critical IS concepts together with twenty two IS success variables.

The final conclusion is that, the identified core IS success concepts that emerged from the empirical data and employed in developing the conceptual IS success models for IVTS, together with the investigated factors (from literature review) impacting deployment of ITS solutions in developing nations imply that, the research questions for this study have been answered empirically; the predefined strategic research objectives have also been achieved inductively; and eventually, the strategic research problems selected for this current study have also been solved qualitatively.

Based on all the foregoing discussions and conclusions made in this dissertation, it is crucial to posit at this terminating section that: Intelligent Vehicle Tracking Systems (IVTS); under the auspices of Intelligent Transportation Systems (ITS) technologies, apparently interplay major roles in all aspects of the global society by saving lives, finance, time and by protecting valuable properties and other precious resources. This august research and its empirical results and findings present a great landmark to the IS research community, as well as to the ITS studies community.

7.4 RECOMMENDATIONS FOR FUTURE STUDIES

This section suggests how the outlined research limitations could be addressed in future studies. This current research focused on developing a conceptual IS Success Model for use in intelligent vehicle tracking systems; this model needs to be tested hypothetically and statistically. Hence, further quantitative studies could be conducted on this qualitative study by deducing a hypothesis from the model and then collecting quantitative data to test the model deductively and statistically. Given the variety of concerns (about poor tracking system performance and user-dissatisfaction) expressed by research participants/respondents and captured in the empirical data of this current study, there is a great potential to undertake further studies on this topic or on modified versions of it. Probable IS/IVTS studies emerging from this current study and recommended for further studies in the nearest future include, but not limited to:

a) Generate deductive-hypothesis to test the proposed conceptual IS success model for IVTS, using the mixed-methods approach (Pragmatic research).

   Note: This recommendation has two objectives, the first one is to address the second background sub-question posed in the methodology chapter (see section 4.1.2); which could not be investigated, though very necessary, due to none availability of resources, e.g., time, finance, etc. The second object is to be able to generate and generalize quantitative results to a wider population in the field of information systems, and in the vehicle tracking industries.

b) Hypothesize and collect empirical data to quantitatively test the proposed model created for developing nations (see fig A.11) to use as a replica to deploy ITS solutions to solve their transportation shortfalls.

c) Develop a Techno-Economic IS Success Model for IVTS Deployed in Developing Nations. This suggested research work is to address the first background sub-question posed in the methodology chapter (see section 4.1.2); which could not be investigated, although very essential, due to limited resources (time, finance, etc). The second object for this recommendation is to consider the econometrics that can be involved in the development and deployment of such a model in ITS.

d) Assessing the level of ICT applications in transportation systems in developing countries.

e) Evaluate the role of Public Private Partnership (PPP) in developing and deploying ITS in developing countries. This recommendation is really vital, since it is very resource intensive (finance, land, human-expertise, etc) to develop and deploy ITS technologies singly (i.e., by lone organizations, institutions, and even by government agencies solely).

Invariably, further studies and investigations into this current study are necessary in order to understand the behaviour and attitudes of users from the time they create intentions to use vehicle tracking systems to the time that they actually use these systems, and how they use these systems towards the achievement of positive system net benefits. In view of the foregoing, this study further makes the following two imperative recommendations:

a) Although IS success models are very contingent as well as multidimensional, developers of these models ought to minimize considerably the number of steps employed in measuring the success of information systems, to be able to compare and evaluate, credit or validate various research findings.

b) The IS success model developed in this current research should be used to identify the role or responsibilities of vendors/operators and users of vehicle tracking systems, to meet the perceptions and expectations of users in relation to system and service performances and usefulness.

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APPENDICES

APPENDIX A: ADDITIONAL MATERIALS FOR LITERATURE REVIEW PART I – ITS TECHNOLOGIES

A.1 ITS ARCHTECTURE

ITS architecture is defined around four basic components linked by communication infrastructure. To date, "the majority of development efforts in support of communication capabilities within the ITS architecture have been directed at fixed point-to-point communication and ITS solutions, taking advantage of wide area communication networks" (Padmadas M., 2010). More recently, the combined availability of the Global Positioning System (GPS) and deployment of cellular-based communication systems have further fuelled the development of vehicle tracking systems, "providing information to travellers in vehicles through wireless means. This is why Padmadas M. stresses that, "interest in Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) communication capabilities has recently gained momentum among the ITS studies community".

A.1.1 The Main Components of ITS Architecture

As outlined by Padmadas M (2010), the main modules of ITS architecture can be summarized as follows:

a) ITS Camera System – Built up of IP Based sophisticated Infrared Cameras;
b) ITS Camera Access Network – Built up with wired/wireless access technologies;
c) ITS Management Server, the rest are as presented in fig A.1 below.

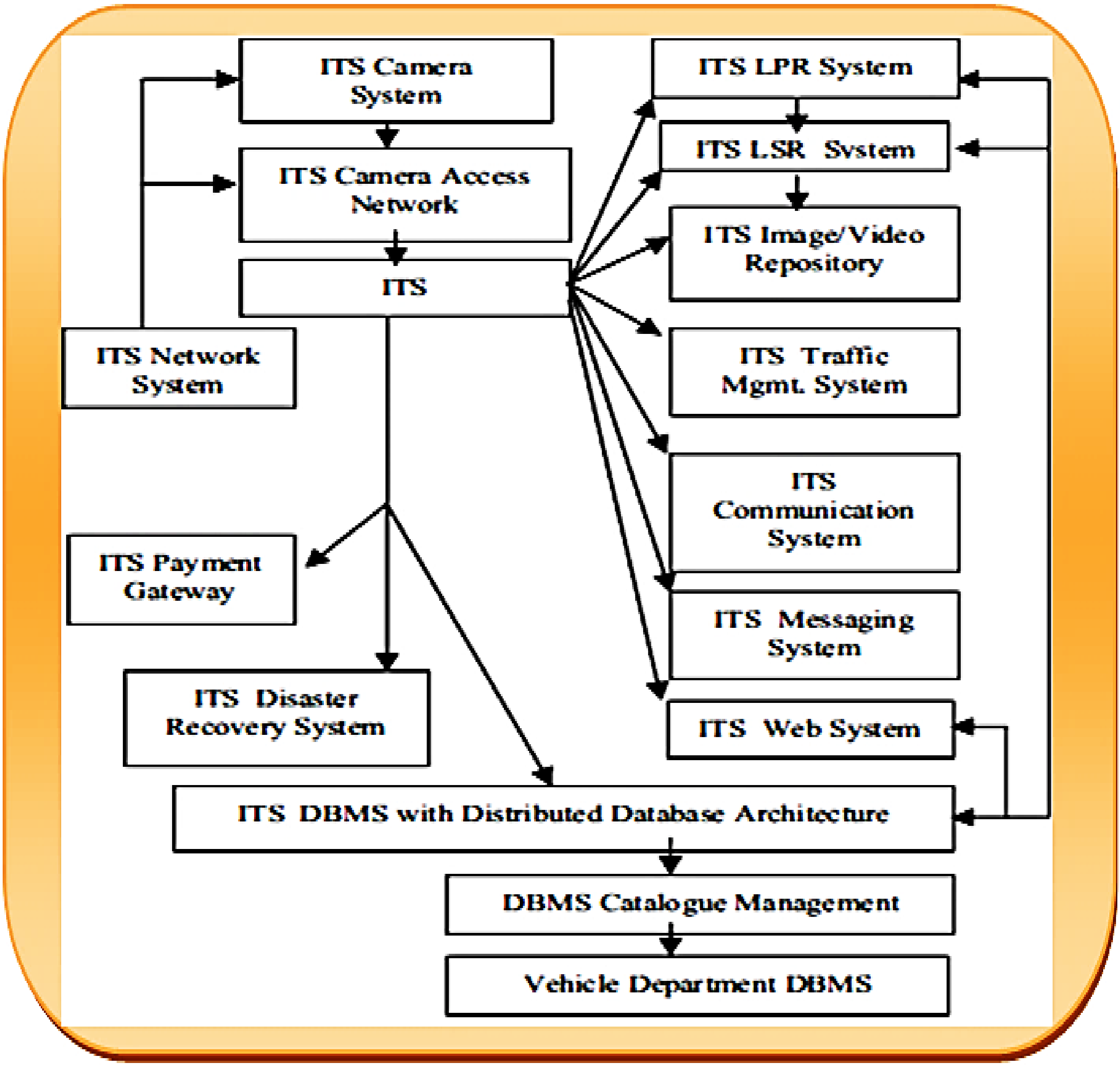

Figure A.1: Schematic Diagram of ITS Architecture

Source: (Padmadas M, 2010)

A.1.2 National ITS Architecture for Developing Countries

Primarily, a National ITS Architecture provides a common framework for planning, defining, and integrating ITS technologies. This can be viewed as a "matured product that reflects the contributions of a broad cross-section of the ITS community" (National ITS Architecture, 2013); this community includes: "Transportation Practitioners, Public Private Partnerships (P^3), Vehicular Technology Specialists (Technologists), Systems Engineers, System Developers, Consultants", etc.).

For developing countries, a national ITS architecture must have the capability to define the functions that are central to well-organized ITS operations; e.g., vehicular traffic and travel information, "Physical entities or subsystems where these functions reside, information flows and data flows that connect these functions and physical subsystems together into an integrated tracking system" (US DOT, 2012). Traditionally, three key structural concepts that form the building block of a national ITS architecture are: "Communication – Transportation – Institutional Structures" (e.g., PPPs) as illustrated in fig A.2 below. As posits the Actor Network Theory (ANT), "there are permanent relationships that establish enduring causalities between all three constructs" (Amany R. Elbanna; 2009), thus all must be planned for during national ITS architecture planning stages. Hence, the communications infrastructure is the main "actant" interplaying between transportation infrastructures and institutional structures, i.e., stakeholders in the transportation industry. An illustration of the three constructs of national ITS architecture is as shown in fig A.2 below.

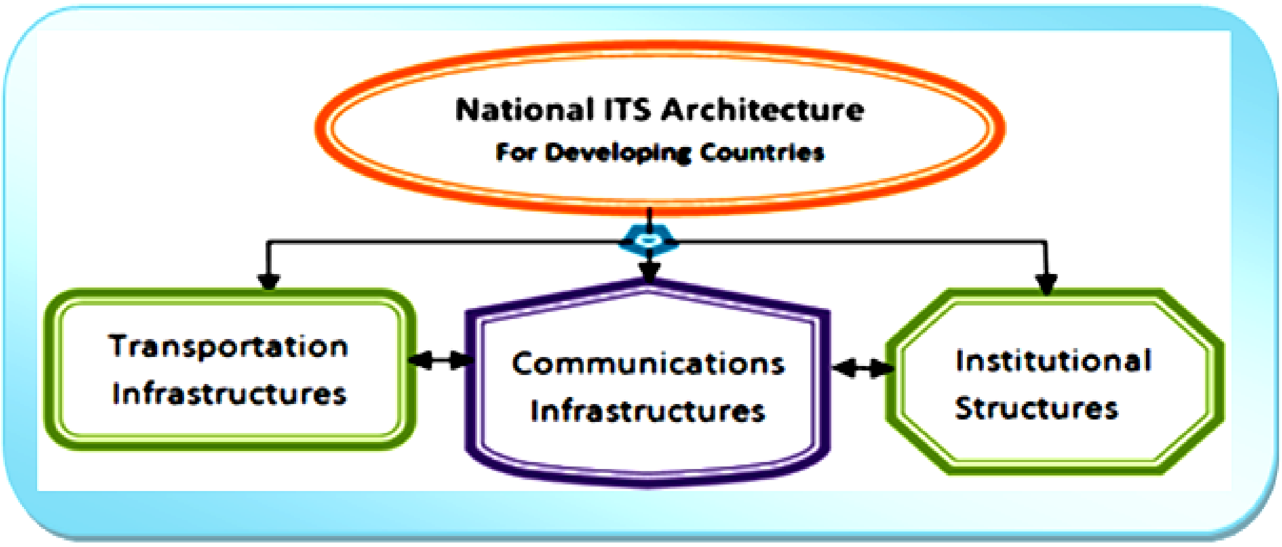

Figure A.2: Three Main Constructs of National ITS Architecture for Developing Nations

Source: Field Work

A.2 STATE-OF-THE ARTS IN ITS TECHNOLOGIES

This section discusses the level of contemporary knowledge and developments achieved in ITS studies. The section discloses new knowledge and expertise; it presents unique ideas and the most up-to-date knowledge and practices in the field of intelligent vehicle tracking, in order to make advancements in novel knowledge in ITS technologies, architecture and literature. The aim is to indicate the extent of knowledge within the field of IVTS of the ITS technologies and to demonstrate ability to identify, integrate and evaluate relevant research literature in the area of IVTS studies. In this information age, there is the need for “High Tech” IVTT and technological advancement to meet road users’ requirements and demands for vehicle tracking, operation and management. It is therefore imperative to review the State-of-the-Arts technologies developed and deployed in contemporary IVTS and ITS technologies.

A.2.1 ITS Digital Agenda for Europe 2020

At the European Union’s 12th Workshop on ITS, organized by the European Commission’s (EC) Digital Agenda Assembly held in Brussels in June 2011, the EC instituted an ITS Digital Agenda for Europe, code named, “Europe 2020” (Barroso José Manuel, 2011). According to EC’s ITS objectives, “Europe 2020” is a 10-year strategic plan in which the European Commission has agreed to reduce greenhouse gas emissions (GHG) by at least 20%, by the year 2020. The EC intends to do this by “increasing the speed of ITS take-ups for road and urban transport, and by applying the proposed ITS EU Directives in support of interoperability and rapid standardisation”. The aim is to address the problem of high energy consumption in the transport industry in Europe.

To achieve the above laudable go, the EC decides to undertake the following critical activities which commenced from January 2012: "Report on the progress in the implementation of ITS Action Plan and adoption of specifications for data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users”; “Harmonisation of ITS standardisation on international level, in particular with USA and Japan” (Barroso José Manuel, 2011),etc.

A.2.2 Current Research Works On Intelligent Vehicle Tracking Systems

A.2.2.1 A Research on Vehicle Tracking Sensor Networks; By: Lin Kai (2012)

Critical tasks facing many vehicle tracking system operators include the tracking of the movement of vehicles in a given monitoring area; since “Vehicle Sensor Networks (VSNs), consist of vehicle nodes and monitoring nodes" (Lin Kai, 2012), making the networks a bit complex to track. The monitoring nodes are responsible for tracking the mobile vehicles. Lin Kai argues that, “exact vehicle tracking cannot be realized when only one type of sensor is equipped on monitoring nodes”. Typically, VSNs must check vehicle trajectory in real-time by “processing the sensing data”.

Monitoring nodes are “hosted by general sensor nodes that are limited by energy and computational ability”. Knowing that, “monitoring nodes are resource-constrained”, coupled with behavioural uncertainty of vehicle movements, “the monitor nodes need to conquer the tradeoff between the tracking accuracy and energy utilizing”, since vehicles appear at any position randomly with occasional probabilities, then in a typical vehicle tracking system, only the monitoring nodes that are near the targeted vehicle “participate in the tracking tasks”.

In an effort to address this constraint, Lin studies “how to achieve precise vehicle tracking with minimized energy consumption”. Applying the experimental results obtained, Lin designs “an effective approach to predict vehicle movements and activate the nodes around the targeted vehicles ahead of time”. Lin concludes that, “vehicle movement prediction and monitoring nodes management can enable high-quality vehicle tracking”. Lin’s main aim is to “design a model that can minimize the number of monitoring nodes participating in vehicle tracking under high accuracy requirement”. In this current research, a conceptual IS success model is being developed analogous to the vehicle monitoring nodes proposed by Lin Kai. The proposed model in this current research will also measure satisfaction levels of users of vehicle tracking systems in developing nations.

A.2.2.2 Research Works on Vehicle Tracking, By: Maehlisch et al. (2006)

Agreeably, vehicles play outstanding roles in private, commercial and industrial environments. Hence, vehicle tracking practices have become inevitable and very imperative in our daily lives. Consequently, developing accurate vehicle tracking methods has caught the attention of many ITS researchers who are developing valuable contributions to the accuracy of vehicle tracking in the transport industry. In this regard, the following are, but few related research works undertaken in the field of vehicle tracking by some researchers in recent times. Thinking about improving upon future driver assistance systems “based on the probability hypothesis density filter”, Maehlisch et al., develop vehicle detection and tracking system (Maehlisch et al. 2006). Their system concurrently excludes data correlation and deals with “existence evidence of the targets”, i.e., vehicles under tracking. Contributing to the efforts of improving the accuracy of vehicle tracking, Duvallet et al. develop a “Wi-Fi localization algorithm that generates Wi-Fi maps to estimate the global position of an autonomous vehicle” (Duvallet and Tews, 2008). In their estimation, the algorithm can be utilized for “bootstrapping a higher resolution localizer, or for cross-checking and localization redundancy”. They integrate their algorithm with an existing laser-beacon localizer to facilitate system recovery when failure occurs during the process of system initialization (Duvallet and Tews, 2008).

A.3 STANDARDIZATION CONCERNS IN ITS / IVTS TECHNOLOGIES

According to Richard J. W., et al. (2004), “in many respects, the need for ITS standards is the same as the need for other standards” (Richard J. Weiland, et la., 2004) applied in other technologies under the auspices of ITS. Thus, the standards of IVTS are embedded in the standards of ITS. Therefore, ITS standards discussed in this section equally apply to the standards of IVTS. Acceptably, ITS standards have attracted the attention of many researchers from both academia and industry, precisely by the world leaders in the ITS technologies, e.g., Japan, USA, the European Union, South Korea, China, etc.

A.3.1 The Need for ITS/IVTS Standards

As discussed above, the need for ITS/IVTS standards is the same as the need for other technical and non-technical standards. To elaborate this further, superior ITS system standards include:

- "Help to make ITS applications function consistently and expectably";
- "Improve the interfaces between parts of ITS nodes, networks and complex systems";
- "Enable users to expect at least minimum ITS system performance";
- "Help private and public ITS agencies and other organizations to cooperate and interact successfully";
- "Offer prospect of faster and more reliable ITS development";
- "Offer economies of scale and lower liability risks for ITS technologies and services";
- "Offer governments better ability to achieve social goals uniformly and fairly".

A.3.2 Key ITS/IVTS Standards

Usually, every technology requires very high standards to ensure system compatibility and inter-operability. ITS/IVTS technologies are not exempted from system standardization requirements. For to that, many Standardization Bodies, Groups and Committees have developed and are still developing ITS hardware and software standards for ITS operators and users. Along with the general development of ITS systems, early ITS standards were more concerned with the generic behaviour of in-vehicle systems, or the management and transfer of data around land based networks. Currently, ITS Organizations in different parts of the globe have placed emphasis on the standardization of communication systems with and between vehicles, the use of electronic vehicle registration, number plate recognition, security and eSafety systems (e.g., eCall)", etc. (Williams Bob, 2009).

There are three levels of ITS standard bodies in the ITS industry. These are: The global International Standards Organization/Technical Committee (ISO/TC204) – ITS & ISO/TC22 for Road Vehicles; The European Commission for Standards (CEN); CEN/TC278 for ITS and ETSI (European Telecommunications Standards Institute): ETSI TC ITS and the EU member National Standards Bodies.

Presently, a Strategic Co-ordination at the European level is being led by the ITS Standards Steering Group (ITSSG) (Henk Stoelhorst, 2010). The ITU-T sector of the United Nations (UN) plays a leading role in standardizing ITS technologies. ITS Working Group 4 (WG4) works on PHY (Physical) & MAC (Medium Access Control) standardization issues, ITS-WG5A works on 5.875 GHz to 5.905 GHz frequency range, ITS-WG5B works on 5.855 GHz to 5.875 GHz, ITS-WG5C works on WLAN 5.4 GHz frequency range, ITS-WG2 works on the 2.4 GHz frequency range, ITS-IR Infrared, ITS-WG60, 60 GHz millimetre-wave, Etc., (ETSI, 2009). These standards are tabulated and presented in TableA.1 below.

Table A.1: List of Published Key ETSI ITS Standards
Source:(ETSI, 2009)

STANDARD	DESCRIPTION
EN 301 091 Parts 1	Short Range Devices; Road Transport and Traffic Telematics (RTTT); Radar equipment operating in the 76 GHz to 77 GHz range
EN 302 264	Short Range Devices, Road Transport and Traffic Telematics (RTTT); Ultra Wide Band Radar Equipment Operating above 60 GHz
TS 102 486 Series	Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment
EN300 674 Series	Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 Kbit/s / 250 Kbit/s) operating in the 5, 8 GHz Industrial, Scientific and Medical (ISM) band (ETSI Standards, 2009)

A.3.3 IEEE 802.11 Series for ITS Standards

Wireless LANs are specified by the Institute of Electrical and Electronics Engineers (IEEE) 802.11 series standard (Official IEEE 802.11 WG, 2009). The IEEE 802.11 series standard defines technologies and protocols for wireless LANs operating from 2 Mbps to 248 Mbps (J. Hui, 2005). Endeavouring to improve upon coverage and speed, another Standard – IEEE 802.11a was proposed. This standard specifies a maximum speed of 54 Mbps using the 5 GHz spectrum.

The IEEE 802.11g standard was ratified in 2003 and can support devices transmitting at 54 Mbps. 802.11n is another amended-standard which improves the previous standards by adding Multiple-Input, Multiple-Output (MIMO) Antennas and other newer next generation network (NGN) features.

A.3.4 International Standards for Vehicle Tracking Systems

For the purpose of easy presentation and review, selected and simplified international standards for ITS/IVTS operations are shown in Table A.2 below.

Table A.2: International Standards for IVTS
Source: Retrieved from" (Bob William, 2008)

STANDARD	DESCRIPTION
Radio Frequency Identification (RFID)	
ISO 15963	RFID for Item Management—Unique Identification for RF Tags
ISO 18046	RFID Tag and Interrogator Performance Test Methods
ISO 24730	Real-Time Locating Systems (RTLS)
ISO 15963	Radio Frequency Identification (RFID) for Item Management—Unique Identification of RF Tags
ISO 18046	RFID Tag and Interrogator Performance Test Methods
Geographic and Location Based Standards	
SAE J1698	Vehicle Location Referencing Message Specification (LRMS)
ISO 6709:2006	Standard Representation of Latitude, Longitude, & Altitude for Geographic Point Locations
ISO 19111	Geographic Information—Spatial Referencing by Coordinates
ISO 19116:2004	Geographic Information—Positioning Services
ISO 19132	Geographic Information—Location Based Services Possible Standards
ISO 19133	Geographic Information—Location Based Services Tracking and Navigation
Cargo Vehicle Shipment/Goods Item Identification, Tracking &Tracing	
ISO 24533	ITS—Data Dictionary and Message Set for Tracking of Freight and Its Intermodal Transfer
ISO 18185	Freight Containers—Electronic Seals— Part 3: Environmental Characteristics

ISO 24730	Real-Time Locating Systems (RTLS) 555 Timers
ISO 24753	Management—Application Protocol: Encoding & Processing Rules for Sensors &Batteries
SAE J1698	Vehicle Event Data Interface

A.3.5 Adopting ITS/IVTS Standards from Elsewhere by Developing Countries

Various aspects of ITS/IVTS standards are existing and are being refined from time to time (Richard J. W. et al., 2004). These researchers emphasize that "standards are readily available for use by developing countries", rather than developing their own ITS/IVT standards, in order to avoid system incompatibility and non-interoperability with existing ITS/IVTS technologies. They further hint that, leading ITS/IVTS Standards Development Organizations (SDOs) are constantly publishing several updated catalogues of ITS/IVTS standards; and interestingly, varieties of these standards are made available in hardcopies and in electronic forms (available both in print and online), thus developing nations can make good use of existing IVTS standards.

One vital mitigating factor, in this regard, is to discover precisely which ITS/IVTS standards meet critical requirements of a developing nation, her transport industry and the needs of the citizens who use IVTS in that country. Richard J. W. et al., (2004) advise that, national agencies and advisory institutions/bodies responsible for ITS/IVTS standardization in developing countries can tremendously assist vehicle tracking industries to:

a) "Clearly define the needs that particular developing nation has for ITS/IVTS standards";

b) "Explore the available existing ITS/IVTS standards and evaluate how well they meet these needs;

c) "Select ITS/IVTS standards for adoptions that are good fits to domestic needs and to existing standards";

d) "Publicize to interested parties that ITS/IVTS standards have been adopted for national use";

e) "Provide assistance in incorporating ITS/IVTS standards both in procurement requirements and in system specifications to meet these requirements".

A.3.6 Approaches for Developing Countries to Develop ITS Standards

A general perception in the public domain that developing countries need to address is that, "it is probably not feasible and economical for them to establish their own independent program for developing voluntary consensus ITS/IVTS standards", as suggest Richard J. Weiland, et al. (2004). These authors offer serious admonishments to developing nations "not to independently develop standards that have already, or are already being developed elsewhere, unless such standards are unsuitable for their domestic uses. Developing countries need to work with leaders in the ITS technologies (e.g., EU, USA, Japan, etc.) to develop specific ITS/IVTS standards if particular standards do not exist elsewhere yet.

For instance, many developed nations, particularly in Europe, are forgoing national programs of consensus standards development in favour of participation in regional ITS standards development activities (e.g., CEN, TC278, ETSI, etc.) or international ITS/IVTS activities (e.g., ISO, TC204, IEEE, OSI, etc.). There are a number of avenues through which private industries and public agencies in developing countries can help to ensure that appropriate ITS/IVTS standards are in place in their countries. According ETSI, these avenues include but not limited to:

a) "Adopting national and/or international standards developed by experts" in the field of ITS/IVTS;
b) "Participating in international standards development" agendum and activities;
c) "Participating in relevant industry-oriented standard development organizations and consortia", etc.

All these approaches will benefit from the existence of national organizations in developing nations that coordinate the adoption and deployment of ITS/IVTS standards persistently. Normally, the organization or agency that serves as a country's national representative at ISO, ITU-T, ITU-R, WTO, etc., is the best entity to undertake this sort of coordination responsibilities. Besides these, Richard J. Weiland, et al. suggest that, ITS-oriented industry association or ITS/IVTS promotion organization in a developing country can serve as consultants to their national standards organization. In Ghana for instance, the government agencies or bodies responsible for ITS/IVTS standards are the Ministry of Transport, Ministry of Roads & Highways and the Ministry of Communications.

A.3.7 Implications of ITS Standards for Stakeholders in Developing Countries

As discussed in the preceding sections, there are numerous ITS/IVTS standards already available and in use in the developed world. This implies that, for developing countries to develop and deploy ITS solutions that will be compatible and interoperable with existing systems, devices and applications, then these countries must comply with the already existing ITS/IVTS standards discussed so far and any other standards recommended by the ITS Standardization Bodies like ETSI, CEN, ANSI, ITU-T, ITU-R, etc. Such compliance will ensure vehicle tracking system compatibility and interoperability in developing countries striving to deploy ITS solutions in their conventional transportation systems.

A.4 FACTORS IMPACTING ITS DEVELOPMENT & DEPLOYMENT IN DEVELOPING COUNTRIES

A.4.1 Transportation Problems in Developing Countries

Globally, transportation predicaments have major impacts on the quality of life of all citizens in all nations, their environments and economies. Recent studies into ITS development and deployment activities around the globe point to the fact that, these impacts are more prevalent in countries with transitional economies. Thus, these countries are often at disadvantage compared with the developed nations, regarding the development and deployment of ITS infrastructure to combat these impacts on society (Adjin D.M.O., Raze Tadayoni; 2011). For these reasons, transportation authorities in developing countries are overwhelmingly encountering numerous challenges centred on worsening road traffic congestions as a result of: high increase in urbanization and vehicular-mobility, lack of sophisticated transport infrastructure, affordability constraints, increasing emissions (CO_2 & GHG) and growing customer needs, wants & demands.

However, developing countries are not able to catch up rapidly to develop and deploy State-of-the-Art ITS technologies to address these problems, by following the approaches by which these same problems are addressed in countries in the developed world (Seong J Namkoong, 2011). Accordingly, the second part of this current study sought to investigate the factors impacting the development and deployment of the ubiquitous ITS technologies in developing nations to solve their national transportation deficiencies. For lack of space, two examples of transportation problems in Ghana and Brazil are discussed below.

A.4.1.1 Transportation Problems in Ghana

Several organizations/institutions over the world are facing numerous fleet operation and management problems resulting in ceaseless exploration of solutions that can provide the most efficient & effective fleet management resolutions. Similarly, in Ghana scores of great corporate institutions face comparable fleet management complications; in many cases, resulting in the exclusion of transport departments within many organizations, by way of out-sourcing transportation services, but these methods have been providing very ad hoc solutions (E-Solutions, 2012). The transportation problems in Ghana can be addressed by developing and deploying high quality intelligent vehicle tracking systems which can provide efficient and effective vehicle operation and management approaches that will result in lasting solutions (if not permanent) to ensure firm management control over fleets of vehicles in Ghana. The most common transportation problems facing Ghana and perhaps other African countries include but not limited to:

a) Considerable increases in expenditures in acquiring vehicle/fleet assets, as a result of decreases in vehicle lifetime due to maltreatment and misuse of these assets;

b) Depreciatory operational efficiency coupled with recurrent expenditures due to ineffective & inefficient management control over the mobility and utilization of vehicles in institutions;

c) Substantial increases in recurrent maintenance expenses on vehicles due to the lack of effective monitoring and control systems;

d) Delays/holdups on trips/errands that hamper institutional effectiveness and efficiency;

e) Escalation of fuel or energy consumption resulting from the lack of on-board vehicle monitoring systems;

f) Inadequate and inaccurate logistics provisioning of effective vehicle assets, Etc.

A.4.1.2 Transportation Problems in Brazil

In Brazil, "there are high rates of car theft, an estimated 350, 000 vehicles are stolen each year" (Anti-Theft Vehicle Tracking, 2013).

For this reason, the government of Brazil has made it compulsory for everyone to fix anti-theft vehicle tracking systems in every new vehicle. These alarming rates of vehicle theft are not different in other countries with transitional economies. In addition to the high rate of vehicle theft, Brazil has insufficient urban transportation infrastructure; this poses a major barrier to Brazil's developmental progress in the transport sector. The inadequate municipal transport systems cause vehicular congestion in the cities, creating another economic barrier. According to Brazil's "National Logistics and Transport Plan", the infrastructural-investments required to curb these transportation predicaments are estimated at "US$180 billion between 2010 and 2025" (Marcos Cintra, 2013).

Brazil's public transport system development is trailing behind her economic growth. No traffic management systems are deployed in the subway-networks. A study conducted by the "Institute for Applied Economic Research" led by Joubert Fortes Filho, president of ANP Trilhos and director of Rio Metro, shows that, public/municipal transportation systems in Brazil are speedily giving way to private vehicle operations, as a result, restricting access for personal vehicles in "mega-cities" (Joubert F.F, 2011). Traffic congestion levels in urban cities are escalating, hence creating considerable barriers to the development of transportation systems in Brazil. For these reasons; Brazil, as a developing nation, needs to urgently apply the potentials of ITS solutions to her conventional surface road transportation systems to address her national transportation problems.

A.4.2 Barriers Hampering the Development & Deployment of ITS In Developing Countries

There exit a number of considerable barriers mitigating the development and deployment of ITS technologies in developing countries (Phil Sayeg & Phil Charles, 20011). From the above cases discussed, the common barriers that cut across many developing nations include: lack of education and training on ITS applications, insufficient understanding of the economic potentials and societal benefits of ITS applications due to the lack of public awareness at national levels; economic & financial in-capabilities; non-standardization of ITS technologies; lack of ITS applications & operations at the local and regional levels.

Additionally, there are other specific barriers that still hamper the development and deployment of ITS solutions in individual developing countries on case by case basis.

E.g., in India, the major barrier is high rates of urbanization and motorization in many cities which are not commensurate with the low rate of urban modernization coupled with the slow rate of transportation infrastructural modernization, particularly in built up areas (residential & commercial) in large cities. India faces urgent need to augment mass transport facilities which calls for the development and deployment of ITS solutions in many urban and highway transport networks.

In South Africa for instance, there are some institutional and traditional challenges surrounding the implementation of her first 5-Year ITS development plan. The key barriers facing South Africa therefore include: lack of ITS skills and retention of existing expertise; spending on ITS projects as a result of poor management of the contractual processes and agreements; lack of technical support for ITS projects, lack of prioritization of allocation of ITS funds, ineffective technical coordination; lack of efficient system integration with existing transport infrastructure, etc. In another example, Kenya, another developing country, has no technical expertise to kick start a full-grown ITS infrastructure for her national transportation networks, she also lacks technical coordination and initiatives to develop and deploy ITS solutions.

In addition to the common barriers hampering the development and deployment of ITS technologies, Ghana has specific bottlenecks. These include the lack of: political willingness and full government support for ITS projects; the lack of prioritization of allocation of transportation development funds, ineffective technical coordination as well as lack of ITS system integration plans at the district, regional and national levels, limited deployment of state-of the art ICT devices and networks (e.g., limited communication network bandwidth, capacity, speed, etc.) in both remote and urban areas. Other critical barriers facing Ghana in developing and deploying ITS applications into her national transportation networks include: political & ideological differences; religious & spiritual believes which cannot be proved, land litigations, chieftaincy disputes, traditional & cultural reservations and variances, etc.

A.4.3 How Developing Countries Can Develop & Deploy ITS Solutions

Planning first to develop, and then to deploy ITS solutions are very crucial decision making processes for all developing countries, since these processes must meet the following primary development objectives: -

Establishment of ITS blueprints to meet national needs (and not individual needs as prevailing now in many developing countries); Systematic implementation of ITS projects; Drawing clear targets and measures for deployment of ITS applications that will meet both local, regional and international technological requirements and market demands (Phil Sayeg & Phil Charles, 2005).

To respond to these requirements of national ITS plans, transport authorities in developing countries can no longer depend solely on their traditional approach of building new or more infrastructures, as this approach demands significant financial commitments as well as complex regulatory and environmental planning processes to manage (IBM, 2012).

As a solution, transport authorities across the world are increasingly focusing on the use of demand management with schemes such as road user charging and information & customer management techniques, including enhanced traveller information services. This broader application of Information Technology (IT) provides opportunities to create and drive innovative technologies into the provisioning of transportation systems and services. This approach is what developing countries must take to develop and deploy ITS technologies into their traditional transportation systems/networks.

The approach discussed so far can be conceptually modelled by employing the key constructs of IS success model and the factors identified from the above discussions. The framework of the model is based on the popular DeLone & McLane IS Success model (DeLone, W. and McLean, E., 2003) utilized in determining the Performance, Usefulness and Successfulness of Information Systems (IS), detailed in Chapter 3. Creation of the model is based on three main IS constructs, namely, the Construct of: Independent Variables, Intervening Variables and Dependent variables. The concepts and variables that need to be considered by countries with transitional economies to develop and deploy ITS solutions into their existing conventional transportation networks are as presented in Table A.3 below. These concepts were identified and analyzed through systematic literature review (Oliver R. L., 1980), (Seddon & Kiew (1996), (Au et la., 2002), (McGill et al., 2003), (Phil Sayeg & Phil Charles, 2005),(Seong J Namkoong, 2011), (E-Solutions, 2012), etc.

Table A.3: Identified Guideposts for Developing & Deploying ITS Solutions in Developing Countries

VARIABLE CONCEPTS	INTERVENING / INFLUENCING CONCEPTS	EFFECT / BENEFITS CONCEPTS
ITS Planning	Intention to Develop ITS	Enhanced Road Safety (Saving Human Lives) Reduced Traffic Congestion Reduced Carbon Emission Reduced Costs Modernizing Cities Meet User Needs & Wants Higher Standards of Living (Benefits to Society)
Autonomous Bodies		
Public Transport Policies		
Government Subventions		
External ITS Experts	ITS Deployment & Usage	
Coordination & Management		
Technical Support		
ITS Standardizations		
System Integration	ITS User Satisfaction	
System Quality		
Information Quality		
Service Quality		

To facilitate ease of understanding and quick analysis of these variables, the emerging concepts in the above table were developed into a conceptual IS success mode, shown in fig A.3 below. The model consists of a number of concepts or artefacts showing causalities and interrelationships between the constructs/variables.

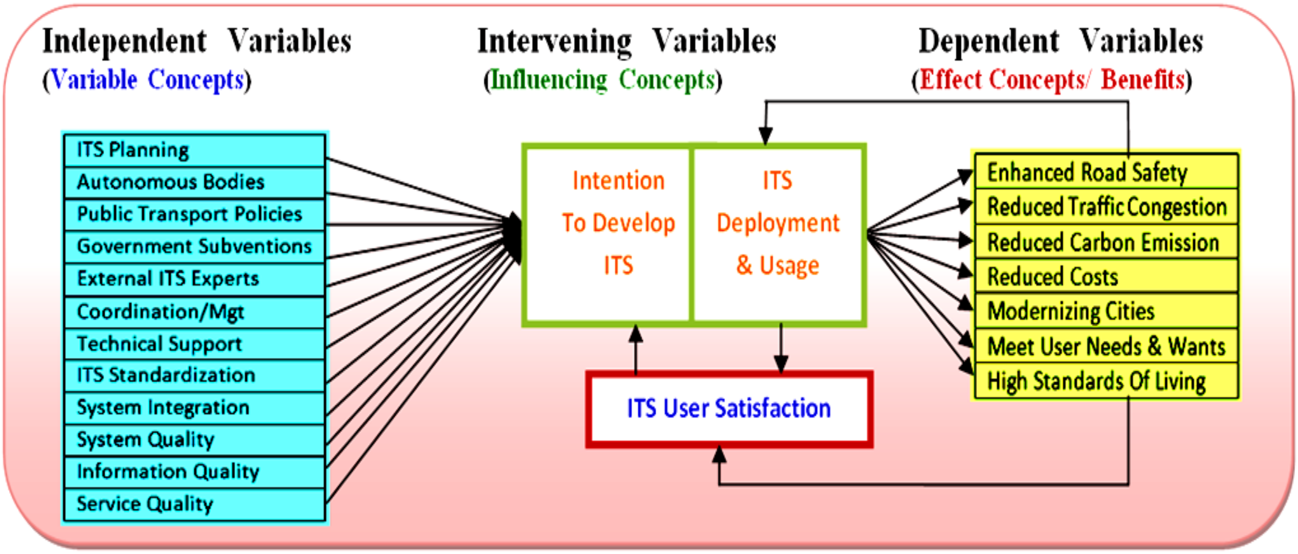

Figure A.3: Suggested conceptual IS Success Model for Developing and Deploying ITS Solutions in Developing Nations

Source: Field Work

From the above model, it is hypothesized that, two phenomena will have to take place whenever ITS applications are developed, deployed and used. Firstly, users will experience satisfaction from using the system; and secondly, users will then benefit from utilizing the system. The satisfaction that users acquire creates intentions for them to reuse the system.

This causality is illustrated in the feedback link from the Dependent Variable to User Satisfaction concept of the Intervening Variable. Again, in the model, it is posited that, the Benefits that users obtain will generate more interests and intentions to deploy, use and re-use ITS applications. These two feedback loops form continuous and circuitous processes that ensure successful development and deployments of ITS solutions for developing countries.

APPENDIX B.1: SAMPLED INTERVIEW QUESTIONS RELATING TO THE SUB-RESEARCH QUESTIONS

The table below shows a sample of the interview questions that were posed to the research participants and respondents to collect data during the interview process.

Appendix B.1: Sampled Interview Questions Relating to the Sub-Research Questions

THE MAIN RESEARCH QUESTION: What Are The Critical Concepts Required To Develop A Conceptual IVTS Success Model?	
SUB-RESEARCH QUESTIONS	**SAMPLE OF INTERVIEW QUESTIONS**
Qn 1. Why Are Users Of Intelligent Vehicle Tracking Systems Not Satisfied With The Performance, Usefulness And Successfulness Of These Systems Deployed In Developing Countries, Particularly, In Ghana? (I.e., Indentifying "Independent Variables" That Generate User-Satisfaction Or Otherwise);	* Please how Flexible or otherwise it is to use the systems of your vehicle tracking service provider? * Please to what extent is the system available for use and how reliable (durability) it is? * Please how good or otherwise is the communication flow between you and your drivers and other stakeholders in your business? * Please how detailed and accurate does the tracking system record vehicle Information? * And Many More
Qn 2. Why Would Users Want To Continue To "Use" Or Otherwise The Systems of A Particular Tracking Service Provider? (I.e., Identifying "Intervening Variables" Or Factors That Generate "Intention To User" & "User Satisfaction")	* Please what accounts for your intention to use the tracking systems you are utilizing now, as against other systems operated by other tracking companies? * Please what makes you satisfied with the performance of the system you are using now? Please why would you want to continue using the tracking system you are using now as your first choice and not as your second or third choice? * And Many More
Qn 3. How Will The Use Of IVTS Generate "Individual Impact And Organizational	* Please in what ways are the performance of the system assisting you to enhance your output as an individual? * Please in your perspective, what might be the impacts of the performance of the tracking system on Working Groups, Units, Divisions

Impact On Users Of These Systems? (i.e., Identifying Factors Of "Individual Impacts", Working Group Impacts", External & "Organizational Impacts" For Using IVTS);	or even Departments in your organization? * Please how does the performance of the system impact on transactions between you and your External Business Counterparts? * Please how does the performance of the tacking system help you to take Good Business Decisions and draw achievable Plans for your organization? * Please, aside Good Business Plans and Decisions, what other Key Performance Indicators (KPIs) do you think can impact on the overall performance of your Organization? * And Many More
Qn4. What Concepts / Factors Can Contribute To The Achievement Of Positive "Net Benefit" For Using IVTS In Developing Countries? (i.e., Identifying "Dependent Variables, As The Effects Of The Intervening Variables).	*Please by what means are the system impacting the overall Waiting Times, Travel Times and Travel Distances of your vehicles? * Please, how is the performance of the tracking systems benefiting your organization in respect of Internal and External Cost Reductions? * Please, alongside Cost Reductions and Profit Maximization, what other benefits do you expect to gain from using the tracking systems you have subscribed to? * And many more
Qn5: What is the Way Forward (Guidepost) for Developing Countries to Develop and Deploy ITS Solutions Effectively and Efficiently?	* What Factors can Hamper the Development and Deployment of ITS Applications in Developing Countries? * Which Concepts can Enhance the Development and Deployment of ITS Solutions in Countries with Least Economies?

APPENDIX B.2: INTERVIEW & SURVEY QUESTIONS - BATCH 1

The survey and interview questions for the first batch of the research survey and interview are presented below.

Theme 1: Information about Demographic Profile

Questions:

1.1 Please kindly share with us your Professional Background or Area of Speciality.

1.2 Please kindly highlight on your Functions or Responsibilities in your organization.

Theme 2: Information about "Independent Variables" - The Construct of Information System (Is) Use

Questions:

2.1 The Concept of Tracking System Quality

- Please, how Flexible or Easy is it to use the system of your Tracking Service Provider (TSP)?
- Please, to what extent is the system available for use and how reliable is it (durability)?
- How good or otherwise is the communication flow between you and your drivers, TSP and any other stakeholders?
- How detailed and accurate does the system record vehicle locations, speeds, fuel levels, driving habits and other characteristics of your vehicles and occupants on board?
- How long does the system allow you to view historic data (i.e., 3, 4, .., months)?
- Please kindly estimate the extent to which you are satisfied with the Performance of the system you are using (e.g., 100%, 50%, Etc., Satisfaction)?

Probes:

- Please could you kindly talk about Security Issues: Whether vehicle doors are open / closed, inherent anti-jam features to prevent breaks in communication, etc.
- Please kindly mention any other points relating to the quality of the system that you have not yet discussed.

2.2 The Concept of Tracking Information Quality

- Please what is your perception on the accuracy (correctness) of the information provided by the system about the locations and status of your vehicles?
- How current is the information you receive (i.e., how new is the information or how frequently is it updated)?

- Comment on the relevancy and reliability of the information you receive (i.e., does the information you receive serve your interests)?
- What about the Completeness or Conciseness of the information you receive (i.e., does the system offer all the essential "Information you require to your satisfaction)?

Probes:

- To what extent do you receive information on time (i.e., according to output timeliness)?
- Please kindly cite any other point relating to the Quality of the information that we have not mentioned.

2.3 The Concept of Tracking Service Quality

Questions:

- Please how reliable is the service you receive from your TSP (i.e., regular support services)?
- How often do you experience service outage and how long does it take your TSP, on the average, to restore service?
- How efficient (responsive) is the TSP staff in restoring service in times of outages.
- As a User, how Satisfied or otherwise are you with the services you receive from your TSP?

Probes:

- Please how regular do you receive "After Sales Services" from your TSP?
- Kindly throw light on other issues relating to quality of service not yet mentioned.

Core Probe: Please in addition to "System Quality", "Information Quality" and "Service Quality" what other "Quality Indicators" would you want your TSP to offer you to enhance your Business?

Theme 3: Information about "Intervening Variables"

Questions:

3.1 The Concept of "Performance-specific Expectation"

- Please what were your expectations regarding System-Performance at the time of contracting the tracking service from your TSP?

3.2 The Concept of "Expectancy Disconfirmation"

- Please what informed you to expect that the system you are using would perform to your satisfaction before you resolved to subscribe to it?

3.3 The Concept of "Intention to Use" a System

- Please what accounts for your intention to use the system you are utilizing now, as against other systems operated by other tracking companies?

- Please what makes you satisfied with the performance of the system you are using now?

3.4 The Concept of "Use"

- Please why would you want to continue using the tracking system you are using now as your first choice and not second or third choice? (e.g., the system provides you Quality & Complete Information, Alerts you via Mobile Phones / E-mails whenever Drivers Divert From Approved / Planned Routes, Excessive Delays, Etc).

    - Please what do you do whenever you are not satisfied with the Performance of the system you are using? (e.g., Report unsatisfactory performance to your TSP, Enforce Service Level Agreement Bylaws, etc., Terminate contract and sign on new contract with another Vehicle Tracking Company).

3.5 The Concept of "User Satisfaction"

Questions: Please how satisfied are you with the:

- Relevance of the tracking Information provided by the tracking system you are using?
- Comprehensiveness of the information received at all times?
- Credibility of the tracking information you receive?
- Ease of system accessibility?

Probes:

- Please how convenient or otherwise it is for you to use the information you receive?
- How easy or otherwise it is for you to interpret information once received (interpretability)?

Theme 4: Information about The Construct Of "Dependent Variables"

Questions:

4.1 The Concepts of "Individual" and "Working Group" "Impacts"

- Please in what ways is the performance of the system assisting you to enhance your output/performance as an individual to successfully achieve your daily, weekly, monthly, etc., objectives?
- Please in your perspective, what might be the impacts that the performance of the system you are using has on Working Groups, Units, Divisions or even Departments in your organization?

Probe: Please kindly comment on any other form in which the performance of the system impact on you as an individual in this establishment.

4.2 The Concept of "External Impact"

- Please how does the performance of the system impact on transactions between you and your External Business Counterparts?

Probe: Please beside what you have just explained, could you kindly touch on any other system performance issues that exhibit external Impact on your Business?

4.3 The Concept of "Organizational Impact"

- Please how does the performance of the system help you to take Good Business Decisions, make Good Plans or Otherwise for your organization?
- Please, aside Good Business Plans and Decisions by having your vehicles tracked, what other Key Performance Indicators (KPIs) do you think can impact on the overall performance of your Organization as a whole?

Theme 5: The Construct of "Net Benefits"

Questions:

- Please in what ways is the tracking system you are using impacting on the overall Waiting Times, Travel Times and Travel Distances of your Organization?

- Please, how is the performance of the system benefiting your organization in respect of Internal and External Cost Reductions (e.g., less expenditure on extra hours, fuel consumption, etc)?

- Please, alongside Cost Reductions and Profit Maximization, what other Benefits do you expect to gain from using the tracking system of your Vehicle Tracking Service Provider?

Thank You Very Much for Your Valuable Time and Warm Cooperation

My Best Regards

APPENDIX B.3: INTERVIEW & SURVEY QUESTIONS - BATCH 2

This Appendix shows the survey and interview questions and responses for the second batch of the research survey and interview conducted.

INFORMATION ABOUT INDEPENDENT CONSTRUCTS

Theme 1: The Concept of System Quality

Questions:

1.1 Please how Flexible or Easy is it to use the system of your **Tracking Service Provider (TSP)**? .... Response: It's makes managing the vehicles very easy and helps reduce the stress of making countless calls to find the location of the vehicles.

1.2 To what extent is the system available for use and how reliable is it (durability)? .... Response: Even though the system depends on the vehicle's power system, the system is such that it even works when the vehicle's power is off because it has it's own buck up battery which keeps the vehicle working till vehicle power is restored. This makes the solution very reliable.

1.3 How good or otherwise is the communication flow between you and your drivers, TSP and any other stakeholders? ....Response: Communication between myself and my drivers has improved so much since arguments about vehicle usage and location is always available for cross-checking misunderstandings.

1.4 How detailed and accurate does the system record vehicle locations, speeds, fuel levels, driving habits and other characteristics of your vehicles and occupants on board? .... Response: The Vehicle Displays real time vehicle locations and stores vehicle information on real time basis.

1.5 How many months does the system allow you to view historic data (i.e., 3, 4, .., months)? .... Response: It shows history data from the first day of installation till date.

1.6 Please kindly estimate the extent to which you are satisfied with the Performance of the system you are using (e.g., 100%, 50%, Etc., Satisfaction)? .... Ans: 99%

Probing Question: Please kindly mention any other points relating to the quality of the system. There has been no major problem with the devices since their installation. .... Response: I believe its very device is very quality.

Theme 2: The Concept of Information Quality

Questions & Responses:

2.1 Please what is your perception on the accuracy (correctness) of the information provided by the system about the location and status of your vehicles?...... Response: I have cross-checked vehicle location via phone call and it has proved accurate at all time.

2.2 How current is the information you receive (i.e., how new is the information or how frequently is it updated)? Response: I usually get information on real time basis, it's when my internet connection is slow that I don't get real time update which is not the fault of the device.

2.3 Comment on the relevancy and reliability of the information you receive (i.e., does the information you receive serve your interests)?..... Response: Yes the information serves my interest.

2.4 What about the Completeness or Conciseness of the information you receive (i.e., does the system offer all the essential "Information you require to your satisfaction)? .... Response: Not all, I wish I could get information about the activities going around the vehicle but what I get is about location.

Probing Question: Please kindly cite any other point relating to the Quality of the information that we have not mentioned. .... Response: I think the device's standby power doesn't work for long. It takes the vehicle round for about 2 days and that's all.

Theme 3: The Concept of "Service Quality"

Questions & Responses:

3.1 Please how reliable is the service you receive from your TSP (i.e., regular support services)? .... Response: Very Reliable

3.2 How often do you experience service outage and how long does it take your TSP, on the average, to restore service? .... Response: Once in the blue and it's resolved within 48 hours.

3.3 Please, on the average, how long does it take your tracking service provider to restore service after reporting faults or breakdown? ....Within 42 hrs

3.4 How efficient (responsive) is the TSP staff in restoring service in times of outages. .... Response: They are professionals and they deliver brilliantly

3.5 As a User, how Satisfied or otherwise are you with the services you receive from your TSP?........... Response: Very Satisfied.

Probing Questions:

- Kindly throw more light on other issues relating to quality of service not yet mentioned. ..... Response: Non I can think of.

INFORMATION ABOUT “INTERVENING CONSTRUCTS”

Theme 4: The Concept of Performance-specific Expectation

Question & Responses:

Please what were your specific expectations regarding System-Performance at the time of contracting the tracking service from your TSP? .... Response: I expected it will just tell me the location of vehicle in plain words via SMS or email anytime I request for it.

Theme 5: The Concept of Expectancy Disconfirmation

Question & Responses

Please what informed you to expect that the system you are using would perform to your satisfaction before you resolved to subscribe to it? .... Response: When I saw their demo and it working on satellite Google map.

Theme 6: The Concept of Intention to Use a System

Questions & Responses

6.1 Please what accounts for your intention to use the system you are utilizing now, as against other systems operated by other tracking companies? ..... Response: With this I get other benefits like immobilizer, geo-fence and many more which is not available with other tracking companies.

6.2 Please what makes you satisfied with the performance of the system you are using now? .....
Response: Because I can tell Vehicle location at all times.

Theme 7: The Concept of System Use

Questions & Responses

7.1 Please why would you want to continue using the tracking system you are using now as your first choice and not second or third choice? (e.g., the system provides you Quality & Complete Information, Alerts you via Mobile Phones / E-mails whenever Drivers Divert From Approved / Planned Routes, Excessive Delays, Etc) .... Response:
The systems gives me vehicle location information, ability to switch-off a vehicle’s engine when stolen, ability to keep drivers in a confined area and many more

7.2 Please what do you do whenever you are not satisfied with the Performance of the system you are using? (e.g., Report unsatisfactory performance to your TSP, Enforce Service Level Agreement Bylaws, etc., Terminate contract and sign on new contract with another Vehicle Tracking Company). .... Response: I quickly call to inform my provider.

Theme 8: The Concept of User Satisfaction

Questions & Responses:

8.1Please how satisfied are you with the relevance of the tracking Information provided by the tracking system you are using? .... Response: I am very satisfied.

8.2 Please how satisfied are you with the comprehensiveness of the information received at all times? .... Response: Since the device location is shown on a Google satellite map I can easily understand them.

8.3 Please how satisfied are you with the credibility of the tracking information you receive? ..... Response: Very Credible

8.4 Please how satisfied are you with the ease of system accessibility? .... Ans: It's web base and can be accessed from phone or computer once there is internet connection.

Probing Question:

Please how convenient or otherwise it is for you to interpret and use the information you receive?... Response: Very convenient and easy

INFORMATION ABOUT THE CONSTRUCT OF "DEPENDENT VARIABLES"

Theme 9: The Concept of Individual Impacts

Questions & Responses:

9.1 Please in what ways is the performance of the system assisting you to enhance your output as an individual to successfully achieve your daily, weekly, monthly, etc., objectives? ....Response: It's very smooth.

9.2 Please in your perspective, what might be the impacts that the performance of the system you are using has on Working Groups, Units, Divisions or even Departments in your organization? .... Response: I am sure it's making vehicle management easy for them.

Probing Question: Please kindly comment on any other form in which the performance of the system impact on you as an individual in this establishment. ......
Response: It makes it easy for me to handle my role.

Theme 10: The Concept of External Impact

Please how does the performance of the system impact on transactions between you and your External Business Counterparts? ...... Response: There is now timely delivery and fewer misunderstandings.

Probing Question: Please beside what you have just explained, could you kindly touch on any other system performance issues that exhibit external Impact on your Business? Response: Non I can think of

Theme 11: The Concept of Organizational Impact

11.1 Please how does the performance of the system help you to take Good Business Decisions, make Good Plans or Otherwise for your organization? ....Response: Since I can always locate vehicle's I easily check the platform and inform the driver nearer to the next location to move to the place and carry out the necessary job to be done there rather than calling all of them to find their location and then decide. Decision making is very easy now.

11.2 Please, aside Good Business Plans and Decisions by having your vehicles tracked, what other Key Performance Indicators (KPIs) do you think can impact on the overall performance of your Organization as a whole? .... Response: If I can get to know activities happening around the vehicle then it would be of much help.

Theme 12: The Construct of Net Benefits

Questions & Responses:

12.1 Please in what ways is the tracking system you are using impacting on the overall Waiting Times, Travel Times and Travel Distances of your Organization? .... Response: Time Management is very effective now.

12.2 Please, how is the performance of the system benefiting your organization in respect of Internal and External Cost Reductions (e.g., less expenditure on extra hours, fuel consumption, etc)? .... Response: Fuel Management is easy since the device has the fuel management feature which helps me to monitor fuel and save cost.

12.3 Please, alongside Cost Reductions and Profit Maximization, what other Benefits do you expect to gain from using the tracking system of your Vehicle Tracking Service Provider? .... Response: It which I could get to know activities happening around the vehicle.

INFORMATION ABOUT "INDEPENDENT VARIABLES"

Theme 1: The Concept System Quality
Questions:

1.1 Please how Flexible or Easy is it to use the system of your **Tracking Service Provider (TSP)**? .... Response: it is reasonably easy because i do not have a lot of problems and if I do the technicians help out immediately

1.2 To what extent is the system available for use and how reliable is it (durability)? ... Response: Almost a 70% available when I want to use it and it's also very reliable I will give it 79%

1.3 How good or otherwise is the communication flow between you and your drivers, TSP and any other stakeholders? .... Response: Ok my driver don't know because it is him I am tracking to know where the car has being.

1.4 How detailed and accurate does the system record vehicle locations, speeds, fuel levels, driving habits and other characteristics of your vehicles and occupants on board? .... Response: One and the half years

1.5 How many months does the system allow you to view historic data (i.e., 3, 4, .., months)? .... Response: One and a half yrs

1.6 Please kindly estimate the extent to which you are satisfied with the Performance of the system you are using (e.g., 100%, 50%, Etc., Satisfaction)? .... Response: 79%

Probing Question: Please kindly mention any other points relating to the quality of the system.
Response: The system I have used so far is durable

Theme 2: The Concept of Information Quality

Questions & Responses:

2.1 Please what is your perception on the accuracy (correctness) of the information provided by the system about the location and status of your vehicles? .... Response: I think it's reliable

2.2 How current is the information you receive (i.e., how new is the information or how frequently is it updated)?.. Response: the system updates every minute

2.3 Comment on the relevancy and reliability of the information you receive (i.e., does the information you receive serve your interests)? .... Response: yes very well

2.4 What about the Completeness or Conciseness of the information you receive (i.e., does the system offer all the essential "Information you require to your satisfaction)? .... Response: No, not really

Probing Question: Please kindly cite any other point relating to the Quality of the information that we have not mentioned. ..... Response: it does not affect the operation or performance of my car in any way.

Theme 3: The Concept of "Service Quality"

Questions & Responses:

3.1 Please how reliable is the service you receive from your TSP (i.e., regular support services)? .... Response: yes I get regular support and most at times I get minor problems a lot but my TSP are very reliable

3.2 Please how often do you experience service outage? ...... Response: On a scale from 1-10 will say 5 but my TSP are always available for me.

3.3 Please, on the average, how long does it take your tracking service provider to restore service after reporting faults or breakdown? ....Response: they always restore it in time so I say again they are reliable

3.4 How efficient (responsive) is the TSP staff in restoring service in times of outages. .... Response: they always restore it in time so I say again they are reliable

3.5 As a User, how Satisfied or otherwise are you with the services you receive from your TSP?.......................... Response: For now I will say above

Probing Questions:

- Kindly throw more light on other issues relating to quality of service not yet mentioned. .... Response: ok my TSP provide me with a platform were I track my car so I can track my car when I am anywhere in the world

INFORMATION ABOUT "INTERVENING CONSTRUCTS"

Theme 4: The Concept of Performance-specific Expectation

Question & Responses:

Please what were your specific expectations regarding System-Performance at the time of contracting the tracking service from your TSP?........... Response: very high and so far so good

Theme 5: The Concept of Expectancy Disconfirmation

Question & Response:

Please what informed you to expect that the system you are using would perform to your satisfaction before you resolved to subscribe to it? .... Response: my TSP showed me an example and I liked it

Theme 6: The Concept of Intention to Use a System

Questions & Responses

6.1 **P**lease what accounts for your intention to use the system you are utilizing now, as against other systems operated by other tracking companies?............ Response: this system is cheaper and has more functions than the others

6.2 Please what makes you satisfied with the performance of the system you are using now? .... Response: mostly get the information I'm looking for

Theme 7: The Concept of System Use

Questions & Responses

7.1 Please why would you want to continue using the tracking system you are using now as your first choice and not second or third choice? (e.g., the system provides you Quality & Complete Information, Alerts you via Mobile Phones / E-mails whenever Drivers Divert From Approved / Planned Routes, Excessive Delays, Etc) .... Response: I will continue because it is the only way to find out where my car has being

7.2 Please what do you do whenever you are not satisfied with the Performance of the system you are using? (e.g., Report unsatisfactory performance to your TSP, Enforce Service Level Agreement Bylaws, etc., Terminate contract and sign on new contract with another Vehicle Tracking Company). .... Response: I call my TSP immediately to complain and for them to resolve the problem or what ever

Theme 8: The Concept of User Satisfaction

Questions & Responses:

8.1 Please how satisfied are you with the relevance of the tracking Information provided by the tracking system you are using? .... Response: convincing so I will say above average

8.2 Please how satisfied are you with the comprehensiveness of the information received at all times? .... Response: I would say it's quite comprehensive because I only want to know where my vehicles are

8.3 Please how satisfied are you with the credibility of the tracking information you receive? .... Response: It is highly credible

8.4 Please how satisfied are you with the ease of system accessibility? ... Response: easy enough for me so it is good

Probing Question:

- Please how convenient or otherwise it is for you to interpret and use the information you receive? .... Response: it is convenient because I know were my car has been and that is all that matter to me.

INFORMATION ABOUT THE CONSTRUCT OF "DEPENDENT VARIABLES"

Theme 9: The Concept of Individual Impacts

Questions & Responses:

9.1 Please in what ways is the performance of the system assisting you to enhance your output as an individual to successfully achieve your daily, weekly, monthly, etc., objectives? ....
Response: know where it has being I can estimate how much fuel it has used and how places it has being to

9.2 Please in your perspective, what might be the impacts that the performance of the system you are using has on Working Groups, Units, Divisions or even Departments in your organization? .... Response: it has an impact because now almost all my friends are using it. For their water tankers etc

Probing Question: Please kindly comment on any other form in which the performance of the system impact on you as an individual in this establishment. ...

Response: **now I can monitor my car anywhere in the world**

Theme 10: The Concept of External Impact

Please how does the performance of the system impact on transactions between you and your External Business Counterparts? .... Response: It has impressed the general public

Probing Question: Please beside what you have just explained, could you kindly touch on any other system performance issues that exhibit external Impact on your Business? Response: The g**eneral performance of the system needs to be improved.**

Theme 11: The Concept of Organizational Impact

11.1 Please how does the performance of the system help you to take Good Business Decisions, make Good Plans or Otherwise for your organization? ....Response: now I know how long my car works and the amount I will expect from my driver

11.2 Please, aside Good Business Plans and Decisions by having your vehicles tracked, what other Key Performance Indicators (KPIs) do you think can impact on the overall performance of your Organization as a whole? .... Response: know you have control over your car when you are not even in it.

Theme 12: The Construct of Net Benefits

Questions & Responses:

12.1 Please in what ways is the tracking system you are using impacting on the overall Waiting Times, Travel Times and Travel Distances of your Organization? .... Response: Waiting Times are minimized because staffs do not have to wait for longer times before their vehicle requests are meet. e.g., if the company has to rent once. Travel Times are so relaxed as compared to rented vehicle in that …..

12.2 Please, how is the performance of the system benefiting your organization in respect of Internal and External Cost Reductions (e.g., less expenditure on extra hours, fuel consumption, etc)?.................. Response: The system Benefits the organization in monitoring the movements of all company assets (vehicles) and also helps in reducing extra hours expenditure that may be charged by some service providers e.g., vehicle rental companies since charges are determined by hour of usage.

12.3 Please, alongside Cost Reductions and Profit Maximization, what other Benefits do you expect to gain from using the tracking system of your Vehicle Tracking Service Provider? .... Response: Aside all the benefits already mentioned I will want to see a video monitor or camera installed to see what kind of goods or passengers that vehicle users carry in their assigned vehicles.

INFORMATION ABOUT "INDEPENDENT CONSTRUCTS"

Theme 1: The Concept System Quality

Questions:

1.1 Please how Flexible or Easy is it to use the system of your **Tracking Service Provider (TSP)**? .... Response: The system is quite flexible and easy to use.

1.2 To what extent is the system available for use and how reliable is it (durability)? .... Response: So far, the system has been available whenever I need it except for about some two instances that I could not assess it.

1.3 How good or otherwise is the communication flow between you and your drivers, TSP and any other stakeholders? .... Response: Communication flow is quite good. I have listen in functionality in some of our cars but no two way communication facility yet.

1.4 How detailed and accurate does the system record vehicle locations, speeds, fuel levels, driving habits and other characteristics of your vehicles and occupants on board? .... Response: Accurate enough for my liking.

1.5 How many months does the system allow you to view historic data (i.e., 3, 4, .., months)? .... Response: Approximately 24months

1.6 Please kindly estimate the extent to which you are satisfied with the Performance of the system you are using (e.g., 100%, 50%, Etc., Satisfaction)? .... Ans: 99%

Probing Question: Please kindly mention any other points relating to the quality of the system. There has been no major problem with the devices since their installation. .... Response: I am quite satisfied with the system's quality, especially with the warranty.

Theme 2: The Concept of Information Quality

Questions & Responses:

2.1 Please what is your perception on the accuracy (correctness) of the information provided by the system about the location and status of your vehicles? .... Response: I am quite convinced of the quality, because I cross-check with happenings on the field.

2.2 How current is the information you receive (i.e., how new is the information or how frequently is it updated)? Response: …….. Information is updated on a minute by minute basis. So it is current to my liking.

2.3 Comment on the relevancy and reliability of the information you receive (i.e., does the information you receive serve your interests)?........ Response: So far the information received meets my needs and requirements.

2.4 What about the Completeness or Conciseness of the information you receive (i.e., does the system offer all the essential "Information you require to your satisfaction)? .... Response: Yes, information received is straight to the point, meeting all needs.

Probing Question: Please kindly cite any other point relating to the Quality of the information that we have not mentioned............ Response: Information received is up to the point. I have access to my vehicles 24hours a day and I can get minute by minute updates.

Theme 3: The Concept of "Service Quality"

Questions & Responses:

3.1 Please how reliable is the service you receive from your TSP (i.e., regular support services)? .... Response: I am okay with the after sales support. There are some few delays in response for service, though.

3.2 How often do you experience service outage and how long does it take your TSP, on the average, to restore service? .... Response: About once in every two months and takes about 30mintues to restore service

3.3 Please, on the average, how long does it take your tracking service provider to restore service after reporting faults or breakdown? .... Response: More than 24 hrs

3.4 How efficient (responsive) is the TSP staff in restoring service in times of outages. .... Response: Quite efficient

3.5 As a User, how Satisfied or otherwise are you with the services you receive from your TSP?.......................... Response: Quite satisfied.

Probing Questions:
- Kindly throw more light on other issues relating to quality of service not yet mentioned. ..... Response: None

INFORMATION ABOUT "INTERVENING CONSTRUCTS"

Theme 4: The Concept of Performance-specific Expectation

Question & Responses:

Please what were your specific expectations regarding System-Performance at the time of contracting the tracking service from your TSP?.......... Response: I was expecting a system that is stable

Theme 5: The Concept of Expectancy Disconfirmation

Question & Response:

Please what informed you to expect that the system you are using would perform to your satisfaction before you resolved to subscribe to it? .... Response: Because of the credibility of the providing company.

Theme 6: The Concept of Intention to Use a System

Questions & Responses

6.1 Please what accounts for your intention to use the system you are utilizing now, as against other systems operated by other tracking companies? .... Response: Features, credibility of provider

6.2 Please what makes you satisfied with the performance of the system you are using now? .... Response: Support, appreciable service delivery level.

Theme 7: The Concept of System Use

Questions & Responses

7.1 Please why would you want to continue using the tracking system you are using now as your first choice and not second or third choice? (e.g., the system provides you Quality & Complete Information, Alerts you via Mobile Phones / E-mails whenever Drivers Divert From Approved / Planned Routes, Excessive Delays, Etc) .... Response: Quality of support, stability of performance.

7.2 Please what do you do whenever you are not satisfied with the Performance of the system you are using? (e.g., Report unsatisfactory performance to your TSP, Enforce Service Level Agreement Bylaws, etc., Terminate contract and sign on new contract with another Vehicle Tracking Company). ..... Response: I report all complaints to the support desk of the TSP.

Theme 8: The Concept of User Satisfaction

Questions & Responses:

8.1 Please how satisfied are you with the relevance of the tracking Information provided by the tracking system you are using? .... Response: Satisfied

8.2 Please how satisfied are you with the comprehensiveness of the information received at all times? .... Response: I think information is comprehensive enough

8.3 Please how satisfied are you with the credibility of the tracking information you receive? .... Response: Quite credible, as confirmed by our assessments.

8.4 Please how satisfied are you with the ease of system accessibility? ….. Response: Satisfied

Probing Question:
- Please how convenient or otherwise it is for you to interpret and use the information you receive? .... Response: Information is easy to use.

INFORMATION ABOUT THE CONSTRUCT OF "DEPENDENT VARIABLES"

Theme 9: The Concept of Individual Impacts

Questions & Responses:

9.1 Please in what ways is the performance of the system assisting you to enhance your output as an individual to successfully achieve your daily, weekly, monthly, etc., objectives? ....
Response: I use it in tracking system routes, in checking vehicle abuse and in planning and forecasting maintenance schedules based on mileage.

9.2 Please in your perspective, what might be the impacts that the performance of the system you are using has on Working Groups, Units, Divisions or even Departments in your organization?............. Response: Helps them to be responsive

Probing Question: Please kindly comment on any other form in which the performance of the system impact on you as an individual in this establishment. ... Response: Helps us in our fleet management efforts.

Theme 10: The Concept of External Impact

Please how does the performance of the system impact on transactions between you and your External Business Counterparts? ..... Response: Better fleet management helps in our service delivery to all business partners

Probing Question: Please beside what you have just explained, could you kindly touch on any other system performance issues that exhibit external Impact on your Business? Response: Non I can think of

Theme 11: The Concept of Organizational Impact

11.1 Please how does the performance of the system help you to take Good Business Decisions, make Good Plans or Otherwise for your organization?........ Response: Helps in budgeting, fleet requirements forecasting

11.2 Please, aside Good Business Plans and Decisions by having your vehicles tracked, what other Key Performance Indicators (KPIs) do you think can impact on the overall performance of your Organization as a whole? .... Response: None

Theme 12: The Construct Of Net Benefits

Questions & Responses:

12.1 Please in what ways is the tracking system you are using impacting on the overall Waiting Times, Travel Times and Travel Distances of your Organization?....... Response: Helps in better planning. Vehicles are tracked live and help in reducing travel times.

12.2 Please, how is the performance of the system benefiting your organization in respect of Internal and External Cost Reductions (e.g., less expenditure on extra hours, fuel consumption, etc)? .... Response: Reduces cost. Example in fuel wastage, maintenance costs, etc. due to proper care and monitoring

12.3 Please, alongside Cost Reductions and Profit Maximization, what other Benefits do you expect to gain from using the tracking system of your Vehicle Tracking Service Provider?........ Response: Better security, example from the immobilizer.

Thank You Very Much for Your Valuable Time and Warmest Cooperation

Thank You in Anticipation

My Best Regards

APPENDIX B.4: INTERVIEW & SURVEY QUESTIONS - BATCH 3

This Appendix shows the survey and interview questions and responses for the third batch of the research survey and interview conducted, discussed in Section 4.4.3.9. For lack of space, only a sample of the responses are shown.

Note: Legend for the Five Interviewees/Respondents:

- Transport Manager (TM)
- Freight Manager (FrM)
- Logistics Manager (LM)
- Fleet Manager (FlM)
- Head / ICT Mgr (HICT)

THEM 1: PERCEIVED SYSTEM USEFULNESS (PSU)

Qn. 1.1: Please what was your perception towards the usefulness of your Tracking System at the time of subscription?

Resp 1: My perception was that, the system would provide High Quality Vehicular Information (TM)

Resp 2: I expected the system to be very useful in our operations (FrM)

Resp 3: We have the perception that, our tracking system will deliver relevant, tracking information (LM)

Resp: 4 The perception is that, our tracking system will offer accurate vehicle tracking information (FlM)

Resp 5: We perceive that, the tracking system will exhibit reliable tracking information (HICT)

Qn. 1.2: Please what is your expected overall impact of tracking system usage (i.e., your perceived system usefulness)?

Resp 1: Our expected overall impact of the tracking system is centered on how satisfactorily does the system perform and how beneficial is the system to our business? (TM)

Resp 2: The overall impact of the tracking system we are using is associated with persistent Positive Net Benefit achieved from our business transactions over the last three years. (FlM)

Resp 3: In terms of overall system impact on our operations, we are perceiving very high user satisfaction (LM)

Resp 4: My overall expected impact of tracking system usage is tied to high positive net benefits (FlM)

Resp 5: We have an overall expected impact of the tracking to achieve high profit maximization (HICT)

THEME 2: PERCEIVED EASE OF USE (PEOU)

Qn. 2.1: What is your perception on the ease of using the tracking system?

Resp 1: My perception is that the tracking system should be very easy to use (TM)

Resp2: Our expectation is that, the usage of the tracking system should be much easier (FlM)

Resp 3: We expected that it should be very easy when using the tracking system (LM)

Resp 4: The perception is that, it will be easy and friendly to use the system (FlM)

Resp 5: It is the perception that, ease of use lead to our intention to use the tracking system (HICT)

Qn 2.2: Why is ease of system use a very critical issue to you?

Resp 1: The ease of system use informed our intention to use the tracking system (TM)

Resp 2: Our intention to use the tracking system was informed by the ease of use of the system (FrM)

Resp 3: The Ease of use of the tracking system was the deciding factor of our intention to use it (LM)

Resp 4: My intention to use the tracking system was formed by its ease of use (FrM)

Resp 5: We intend to use this tracking system due to its ease of use (ITM)

THEME 3: EXPECTATION DISCONFIRMATION

Qn 3.1: How does the performance of the tracking system impact on the process of its usage?

Resp 1: The process of using the tracking system is impacting positively on it performance (TM)

Resp2: We virtually do not see any impact of the usage process on the performance of the tracking system (FrM)

Resp 3: Invariably, the system performance is directly linked the usage process (LM)

Resp 4: I think the usage process is associated with the system performance (FlM)

Resp 5: It is clear that the performance of the tracking system depends on the usage process (HICT)

Qn 3.2: Why does system usage process impact on the performance of the tracking system you are using?

Resp 1: The process of using the tracking system is impacting positively on it performance (TM)

Resp2: We virtually do not see any impact of the usage process on the performance of the tracking system (FrM)

Resp 3: Invariably, the system performance is directly linked the usage process (LM)

Resp 4: I think the usage process is associated with the system performance (FlM)

Resp 5: It is clear that the performance of the tracking system depends on the usage process (HICT)

THEME 4: PERCEIVED SYSTEM PERFORMANCE

Qn.1: What influenced your decision to subscribe to the tracking system you are using?

Resp 1: We perceived the system to be available all the time (TM)

Resp 2: I perceived the system to perform very reliably (FrM)

Resp 3: The tracking system was perceived to perform accurately (LM)

Resp 4: Our tracking system was perceived to perform creditably (FrM)

Resp 5: My tracking system was perceived to perform simply and not complexly (HICT)

Qn.2: How did you expect the tracking system to perform?

Resp 1: We expected the system to be available all the time (TM)

Resp 2: I expected the system to perform very reliably (FrM)

Resp 3: The tracking system is expected to perform accurately (LM)

Resp 4: Our tracking system is expected to perform creditably (FrM)

Resp 5: My tracking system was expected to perform simply and not complexly (HICT)

Qn3: Why did you expect the system to perform the way you want it?

Resp 1: Because I had expected total user satisfaction (TM)

Resp 2: We expect maximum user satisfaction (FrM)

Resp 3: Our expectation was centered on user satisfaction (LM)

Resp 4: My expectation was focused was absolute user satisfaction (FlM)

Resp 5: The expectation was mainly on commendable user satisfaction (HICT)

THEME 5: OVERALL USER SATISFACTION

Qn. 1: How will you describe your overall satisfaction from using your tracking system?

Resp 1: Actually, my overall satisfaction is on the positive side (TM)

Resp 2: Our Overall satisfaction is achieved through the usefulness of the tracking system (FrM)

Resp 3: My Overall satisfaction is that the annual turnover is improved steadily as we use the system (LM)

Resp 4: We are anticipating a higher overall user satisfaction from our tracking system (FlM)

Resp 5: The overall satisfaction in using the tracking system is the positive net benefit achieved (HICT)

Qn 2: Why do you think that overall user satisfaction is an important issue in your operations?

Resp 1: The issue of overall user satisfaction is key in determining the usefulness of the tracking system (TM)

Resp 2: The overall user satisfaction that we experience tells how well the tracking system performs (FrM)

Resp 3: Overall user satisfaction is the benchmark to the usefulness of the tracking system (LM)

Resp 4: Overall user satisfaction shows the level of the performance of the tracking system (FrM)

Resp 5: Our overall satisfaction demonstrates the successfulness of the tracking system (HICT)

Qn 3: What is the level of your overall user satisfaction you obtain from your tracking system?

Resp 1: We are experiencing nearly 80% overall user satisfaction (TM)

Resp 2: I am achieving close to 90% overall user satisfaction (FrM)

Resp 3: The expectation is that the overall user satisfaction must be around 95% (LM)

Resp 4: The overall user satisfaction chopped is on the average (FrM)

Resp 5: My perception on the overall user satisfaction is about 100% (HICT)

Theme 6: Unsatisfactory System Performance

Qn 1: What do you do whenever the performance of your tracking system deteriorates?

Resp 1: I do report to the tracking system operator to address the problem (TM)

Resp 2: By our sales agreement, we report all tracking system problems to system operator (FrM)

Resp 3: My job is to report all tracking problems to the system vendor for restoration (LM)

Resp 4: The procedure is that we have to report system malfunctions to the service provider (FlM)

Resp 5: In case of any poor system performance, I report to the system supplier for redress (HICT)

Qn 2: How do you address problems leading to poor system performance?

Resp 1: We first log the problem into a faults' log book and then report to the system provider (TM)

Resp 2: Every morning, I send system status report to D/ Operations and to the service provider (FlM)

Resp 3: It is agreed that all systems performing abnormally be reported to the vendor to address it (LM)

Resp 4: I have been reporting system faults to the supplier every day (FrM)

Resp 5: On daily basis, the vendor takes reports on system performance and works on all faults (HICT)

Qn 3: Why do you report system malfunctions to the service provider or vendor?

Resp 1: We report system performance status to vendor to enable him to restore the system faster (TM)

Resp 2: I have to report system problems to service provider so that he can solve it for us (FrM)

Resp 3: One of my responsibilities is to report the status of the system to the vendor for solution (LM)

Resp 4: The service provide is required to restore system faults, hence we report all problems to him (FrM)

Resp 5: Our policy is to get the system supplier to address all system malfunctions, that is why we report all problems to him (HICT)

Theme 7: Net Benefits

Qn 1: How does the performance of the tracking system impact on you as an individual?

Resp 1: The system is impacting on me positively as an individual, in terms of performance (TM)

Resp 2: For me as an individual, the system is helping me to achieve my daily targets (FrM)

Resp 3: Individually I am able to clear my desk, thanks to the performance of the tracking system (LM)

Resp 4: The performance of the system is reducing my fuel consumption as an individual (FlM)

Resp 5: Being an individual, the system performance is augmenting my effort to curb travel times (HICT)

Qn 2: How are you benefiting (i.e., the net benefit) from the tracking system as a group or unit?

Resp 1: The usefulness of system is what is facilitating the positive net benefit we are experiencing (TM)

Resp 2: Undoubtedly, we are benefitting from the successfulness of the tracking system as a whole (FrM)

Resp 3: As a group, the overall reduction of our round-trips is a great benefit to us (LM)

Resp 4: We are benefitting from the tracing system by way of decreasing delays in delivering goods (FlM)

Resp 5: The benefit we derive from the system has to do with the good quality of the tracking information captured by the system (HICT)

Qn 3: Why do you think that the performance of your tracking system is impacting on you externally?

Resp 1: We think that, the system performance is impacting positively on us externally in terms of public image building (TM)

Resp 2: The "just in time" delivery of consignments we have been registering of late has actually won us some external recognition to a very large extent (FrM)

Resp 3: Externally, the system is impacting us, we have more suppliers wanting to do business with us (LM)

Resp 4: Our external clients have doubled over the last three years, due to the performance of our tracking system (FlM)

Resp 5: The truth is that, all of external customers are still loyal to us due to the external impact that the performance of our tracking system is having on our operations and transactions (HICT)

Qn 4: How will you rate the impact of the performance of your tracking system on you as an organisation?

Resp 1: We as an organisation, are witnessing positive impacts of the performance of our tracking system in profit maximization (TM)

Resp 2: Our annual financial reports for the two years show upwards trends of revenue generation (FrM)

Resp 3: Management is in full control of all aspects of this business, thanks to the performance of the tracking system we are using as an organisation (LM)

Resp 4: Summing it all, we are able to offer total customer satisfy to our clients as an organisation, due to the commendable performance of our tracking system (FlM)

Resp 5: The fact is that, the high performance of the tracking system is impacting affirmatively on the net benefit of this organisation (HICT)

APPENDIX C: A COPY OF LETTER OF INTRODUCTION

This Appendix contains a copy of the Letter of Introduction sent to research participants to seek for permission, audience and access to their premises.

Aalborg University - Copenhagen

Date: 28/11/12

Student**:** Daniel Michael Okwabi Adjin

Research Area: Intelligent Transportation Systems (ITS)

Research Title: D**eveloping A Conceptual Information Systems (Is) Success Model For Intelligent** Vehicle Tracking Systems Used In Developing Countries – The Case Of Ghana

Dear Esteemed Research Participant,

SUBJECT: INTERVIEW QUESTIONS FOR ACADEMIC DATA COLLECTION

Please I am Daniel M. O. Adjin, a PhD Student pursuing a Research Programme in Telecommunications Engineering at Aalborg University (AAU) – Denmark, in collaboration with Ghana Technology University College (GTUC) - Accra.

As part of my Research Studies, I am required to conduct academic interviews in the vehicle tracking industry in Developing Countries, using Ghana as a case study. I will be very grateful if you could please spare some valuable time of yours to complete the attached questionnaire. The interview will take about 45 to 60 minutes to complete.

Ethical Issues: Please, I will adhere to all academic research and data collection ethics, confidentiality, security, integrity, etc., required of me. Please this Survey is solely for Academic Research purposes, thus, any information provided will be used as such.

Thank you very much in advance for your precious time and for your warmest cooperation in this respect.

Yours Sincerely,

………………

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APPENDIX D.1: THE FIRST OPENING / INITIAL CODING PROCESS

Appendix D.1 covers the first part of the first step of the data analysis process that produced the opening/initial codes required to start the focused coding process or microanalysis process. These data are the first of the three batches of data collected for this research. The first column shows the themes around which the survey and interview questions were asked. Column two records the responses and the transcribed interview questions, the last column stores the coded responses and answers or the collated information. They are termed here as Opening/Initial Codes.

Legend to Interviewees' Backgrounds: Transport Managers (TM), Freight Managers (FrM), Logistics Managers (LM), Fleet Managers (FlM) and Heads of ICT Units (HICT).

Appendix D.1: The First Opening / Initial Coding Process

INTERVIEW		ORIGINAL TEXTS (RESPONSES) FROM TRANSCRIPTION	OPENING / INITIAL CODES
Theme	**Question**		
First Phase Of Data Collection	**1.** Please how Flexible or otherwise it is to use the systems of your vehicle tracking service provider?	It wouldn't be flexible for you if you don't understand how the tracking system works (TM)	System Not Being Flexible (1)
		The tracking system that we are using is very flexible (FrM)	System Being Flexible (1)
		It is easy to use the tracking system as long as you don't temper with it (LM)	Not Tempering With System (1)
		Flexible and easy because it brings all activities of company vehicles to the fingertips of the fleet manager (FlM)	Bringing All Activities To Monitoring Point (1)
		It's easy to use but sometimes, there are challenges with internet network connectivity, etc., (HICT)	Easy Using The Tracking System (1)
	1.2 Please to what extent is the system available for use and how reliable	The system could be available for use for longer time through regular and retune maintenance (TM)	Maintaining System For Availability (1)
		Our tracking system is available about 90% of the time, it is relatively durable. However, we do experience some outages due to power fluctuations and system instabilities (FrM)	Experiencing System Outages (1)
		The system is available most of the time for use by our drivers and we highly expect it to be durable, but my records show that once a while intermittent system breakdowns are experienced (LM)	Making System Available Most Of The Time (1)

1. Tracking System Quality	(durability) it is?	It's availability 24/7 The system has its expiring date for 3 years and after that the problem starts (FlM) The durability and reliability depend on the internet, GPS and the routing server. Although the system works 24/7 (HICT)	Getting System Available 24/7 (1) System Working 24/7 (1)
	1.3 Please how good or otherwise is the communication flow between you and your drivers and other stakeholders in your business?	Our communication systems are good but not the best, many a times we experience unexpected link failures and system breakdowns (TM) We are observing good communication flow (FrM) Communication is very good but not at all times (LM) Communication flow is excellent (FlM) Communication between our internal customers is considerably good, however, external communication network needs to be improved (HICT)	Experiencing Unexpected Link Failures (1) Observing Good Communication Flow (1) Having Good Communication Flow(1) Enjoying Excellent Communication Flow (1) Considering A Good Communication Flow (1)
	1.4 Please how detailed and accurate does the tracking system record vehicle Information?	When it comes to some of these system characteristics, details are not too accurate (TM) Vehicle locations are at times not accurate, e.g., speed limit recordings are not accurate. Fuel level recordings are not accurate, records on over speeding and hash braking are not very consistent (FrM) The system breaks down sometimes, thus limiting its accuracy and efficiency (LM) Records generated by the system on the above mentioned are not always accurate (FlM) The Accuracy of the Network is affected by Network delays, intermittent high bit error rates (BER) and limited bandwidth for the radio access network affect the speed of our internet setup and hence affect the accuracy of the tracking systems (HICT)	Detailing System Accuracy (1) In-accurately Recording Vehicle Information (1) System Breakdowns Limiting Accuracy & Efficiency (1) Generating In-accurate Records (1) Network Limitations Affecting System Accuracy (1)
		The system allows us to view historic data which are 3 months old and over (TM) We can see up to 4 months historic data of	Viewing 3 Months & Over Historic Data (1) Accessing up to 4 Months

	1.5 Please how often does the system allow you to view historic data of the tracking systems you are using?	the tracking system (FrM) The tracking system permits 3 months historic data (LM) It is possible to access 12 Months historic data (FlM) Every month per the system we cannot have fully 3 to 4 months historic data (HICT)	Historic Data (1) Permitting 3 Months Historic Data (1) Accessing 12 Months Historic Data (1) Possibility of Viewing Historic data On Monthly Basis (1)
	1.6 Please kindly estimate the extent to which you are satisfied with the Performance of the tracking system you are using?	We are 80% - 85% satisfied, but we need close to 100% satisfaction (TM) System satisfaction is estimated around 95%, but must be improved (FrM) Satisfaction of our tracking system is about 90%, it must be improved to 100% (LM) With 97% system satisfaction, all vehicular activities are brought to the finger tips of the fleet manager (FlM) As I have indicated before, due to limitations on bandwidth, speed and accuracy, system satisfaction can be estimated to about 85-90%, it needs improvement (HICT)	Needing Close to 100% System Satisfaction (1) Estimating System Satisfaction Around 95% (1) Improving System Satisfaction to About 100% (1) Bringing Vehicular Activities To A Central Point (1) Estimating System Satisfaction To About 87.5% (1)
	Probing: Please kindly mention any other points we have not yet discussed relating to the quality of the tracking systems you are using.	Vehicles are seen at every destination and also detailed at the rate they are moving, speed limits are also recorded (TM) The quality of the received GPS signals fluctuates thereby damping the quality of captured vehicle locations, the system freezes occasionally (FrM) Security wise, the system is good, but quality of GPS pictures showing vehicle locations needs to be improved (LM) There is more room for quality improvement (FlM) Makes the fleet manager know the current activities of his vehicles managed (HICT)	Detailing Vehicle Activities (1) Damping of Vehicle Location Information (1) Improving Quality Of GPS Images (1) Requiring System Quality Improvement (1) Activities of Vehicles Known (1)
	2.1. Please what is your perception on the accuracy (correctness) of	It is expected that, the tracking system gives as close as possible the area of vehicle location (TM) My expectation is that, Location updates (showing status of vehicle and occupants) are accurate to a 99% (FrM) Information accuracy is not persistent, it	Expecting Closed Up Vehicle Locations (1) Updating Accurate Location (1) Information Accuracy Not

2. Quality of Tracking Information	the information provided by the tracking system about the location and status of your vehicles?	varies, based on distance - how far is the vehicle from towers (LM) Information captured on vehicle location is around 90% and not 100% (FlM) My perception is that, information accuracy is not perfect due to propagation delays resulting from GPS round-trip transmission Delay (HICT)	Being Persistent (1) Capturing 90% Information Accuracy (1) Rating Information Accuracy (1)
	2.2. Please how current is the information you receive from the tracking systems?	Information received is always new (TM) Received information is updated every 5 minutes (FrM) Information is updated as and when it comes (LM) The system updates itself periodically (FlM) The system is supposed to update every 10sec, but at times it delays due to transmission problems (HICT)	Receiving New Information (1) Updating Information Every 5 Min (1) Updating Information When Available (1) Updating System Periodically (1) Updating System Every 10sec (1)
	2.3. Please kindly comment on the relevancy of the information you?	The tracking system outputs purposeful information (TM) Yes it does, it helps in making vehicle assignment decisions and to track maintenance time also (FrM) Very well, my interests are sometimes served (LM) Ever since the system was installed, we have been receiving relevant information on the performance of the tracking system (FlM) Yes it does, but information details at times are not adequate enough for the consumption of the data centre (HICT)	Outputting Purposeful Information (1) Making Vehicle Assignment & Maintenance Decisions (1) Sometimes Serving User Interests (1) Receiving Relevant Information (1) Not Detailing Information Adequately Enough (1)
		Sometimes not to the extent you want it (TM) For most part it does. When it doesn't, the vendor is able to fashion reports to meet our needs FrM) Received Information is not complete all the time, that is why I said sometimes (LM) It depends on the tracking system. Our	Wanting Information To Some Extent (1) Fashioning Reports to Meet Needs (1) Receiving Non-complete Information (1)

	2.4. Please what about the Completeness or Conciseness of the information you receive	systems give the most important information, i.e., working hours, summary, vehicle history technical, geo-fencing, over speeding, excess idling etc. (FlM) No, for instance excess idling lacks the duration the person violates the excess idling (HICT)	Giving Most Important Information (1) Idling Exceeds Threshold (1)
	Probe: Please kindly discuss any other point relating to the Quality of information that you have not mentioned.	Quality of the Info helps to turn off Engines (TM) We receive information in good time (FrM) Sometimes the exact locations of vehicles are not accurate, calculated coordinates aren't precise (LM) Information on real time location of vehicles are sometimes not very accurate, hence hampering the quality of the information (FlM) Because of round-trip delays, atmospheric and environmental interferences, the quality of received information is degraded sometimes (HICT)	Turning off Engines (1) Receiving Information Timely (1) In-accurately Calculating Location Coordinates (1) In-accurate Location Hampering Information Quality (1) Receiving Degraded Information (1)
3. **Quality of Service**	**3.1** Please how reliable is the service you receive from your Vehicle Tracking Service Provider?	Support service is reliable, except that the support team delays in responding to service calls (TM) Very reliable (regular and efficient) (FrM) Somehow reliable, but there is room from improvement (LM) 80% reliable, but they need to improve upon their services in general (FlM) Even though, support is about 85% reliable, the trackers need to have hot standby service team to attend to and restore network breakdowns immediately (HICT)	Supporting Service Reliability (1) Ensuring Reliable Service (1) Improving Service Reliability (1) Improving Reliability of Service (1) Having Reliable Support Service (1)
		Total outages do happen once a while, but unfortunately it takes considerable time (hours or even days) to restore the system (TM) System outages occur roughly about once in 3 months (FrM) Unplanned system outages are resulted un-	Outages happening once a While (1) Outages Occurring Every 3 Months (1) Outages Resulting UN-

	3.2 Please how often do you experience service outage?	anticipatorily due to unforeseen system failures (LM) Outages arise once a while, when the weather is bad, making network accessibility very difficult (FlM) Unexpected Internet outages result mostly from failures of servers and gateway routers (HICT)	anticipatorily (1) Outages Arising Once A While (1) Outages Occurring Unexpectedly (1)
	3.3 Please, on the average, how long does it take your tracking service provider to restore service after reporting faults or breakdown?	It takes a couple of hours, sometimes days (if not weeks) to restore service (TM) In most cases they delay in attending to faults (FrM) The tracking service provider takes about 24 hrs to fix service after breakdowns (LM) Our tracking service is restored within 48 hours whenever it breaks down or faulty Communication network operator restores internet services within 24 hours (HICT)	Taking Hours To Restore Service (1) Delaying Fault Restoration (1) Taking 24 Hrs to Fix Breakdowns (1) Restoring Service Within 48 Hours (1) Restoring Internet Service Within 24 Hrs (1)
	3.4 Please How responsive (efficient) is the vehicle tracking staff in restoring service in times of faults or outages?	The staff of the tracking system respond fairly on time to restore outages/faults (TM) Responsive within 3 hours with some considerable efficiency (FrM) Their responses are fairly good and encouraging (LM) Service provider's responses are quite efficient except that they delay in restoring faults/outages (FlM) The communication network operators need to respond efficiently to restore faults/outages (HICT)	Responding On Time To Faults (1) Responding Within 3 Hrs (1) Responding Fairly To Breakdowns (1) Responding Efficiently To Faults(1) Needing To Respond Efficiently (1)
	3.5 Please as a User, how Satisfied or otherwise are you with the	I wish to be better satisfied than this (TM) A lot more has to be done for us to enjoy system satisfaction than what we are receiving currently (FrM) Location updates and accuracies need to be improved to ensure total user satisfaction (LM)	Wishing To Be Satisfied Better(1) Doing More Towards Satisfaction (1) Improving Total Satisfaction (1)

	services you receive from your tracking service provider?	We are basically enjoy only a fair satisfaction (FlM) As a user, we need to see more satisfaction in terms of location accuracy and the quality of the information received (HICT)	Enjoying Fair Satisfaction (1) Requiring Better Satisfaction (1)
	Probe: Please kindly throw more light on other issues relating to quality of service (QoS) issues you have not yet mentioned	The QoS of the tracking systems needs to be improved (TM) Quarterly service is done on units and replacement for faulty units are usually made within 48 hours to ensure good quality of service (FrM) After-sales support services must be efficiently and effectively carried out by the tracking service provider. (LM) The quality of the tracking information & that of the communication networks must be improved (FlM) Information quality is a critical issue for us at the data centre, therefore it's improvement must be prioritized (HICT)	Improving System QoS (1) Ensuring Good QoS (1) Improving QoS (1) Improving QoS (1) Prioritizing Information Quality (1)
4. **System Performance Expectation**	**4.** Please what were your expectations regarding Tracking System-Performance at the time of contracting the tracking service?	I expected the tracking system to perform perfectly as much as possible (TM) We expected to be able to track our vehicles, schedule them better, based on location updates and get reports on variations (FrM) Honestly, I expected few system faults per year, but I did not expect to experience frequent breakdowns as I am doing now (LM) We expected the tracking system to track the behaviour of our drivers at all times. (FIM) I am expecting high speed internet connectivity and high bandwidth data communication network to successfully operate the data centre (HICT)	Expecting Perfect System Performance (1) Expecting Excellent System Performance (1) Expecting Few System Faults (1) Expecting Behaviour Tracking (1) Expecting High Speed Connectivity (1)
	5.Please what informed you to	I was impressed by the demonstration that took place and how I understood the demo (TM) Customer testimonies and the proof of	Understanding System Demonstration (1)

5. Performance Expectancy Dis-confirmation	expect that the tracking systems you are using would perform to your satisfaction before you resolved to subscribe to it?	concept by the vendor (FrM) Recommendation by management (LM) Due to its features & functions. It alerts you and keep track of all maintenance records (FIM) Recommendations from IT experts, business partners & personal friends who are using similar systems (ICT)	Vendor Proofing Concept (1) Mgt Recommending System Use (1) Tracking Maintenance Records (1) Friends Using Similar Systems (1)
6. **Intention to Use Tracking System**	**6.1** Please what accounts for your intention to use the tracking systems you are utilizing now, as against other systems operated by other tracking companies?	My intentions to use these tracking systems were based on its security features (TM) Intentions were originated from affordable pricing and favourable system features (FrM) It was Management's decision from above (LM) This is what the company agreed on to use (FIM) My unique intention was informed by ease of use and low subscription cost (HICT)	Basing Intention On Security Features (1) Originating Intention From Favourable Features (1) Mgt Deriving Intention To Use System (1) Company Initiating Intention To Use (1) Mgt Deriving Intention To Use User (1)
	6.2 Please what makes you satisfied with the performance of the system you are using now?	I cannot say that I am completely satisfied, system performance needs to be upgraded (TM) The speed, the quality of the reports, the efficiency of data and service support must be adhered to (FrM) The security aspect is very satisfying, however, the information quality needs to be upgraded (LM) I am not totally satisfied, I have to do with what is available (FIM) We are not completely satisfied with the performance of the system, particularly, the deficiency in location updates (HICT)	Upgrading System Performance (1) Advancing System Performance (1) Upgrading System Performance (1) Doing With Existing System Performance (1) System Performance Not Satisfying (1)
		It is because of the quick response by the system and the automatic alert features (TM)	Auto Alerting Features (1)

7. **Tracking System Use**	**7.1** Please why would you want to continue using the tracking system you are using now as your first choice and not as your second or third choice?	The system provides comprehensive reports, timely alerts and the vendor provides fair support (FrM) Perhaps, it is relatively one of the best tracking systems in the vehicle tracking industry in Ghana (LM) Detailed reports are outputted by the system making it easier to manage our fleet of haulage trucks (FIM) We want to continue using this system since it is flexible and compatible with our IT systems (HICT)	Timely Alerting & Reports (1) Relating To Best Tracking Systems (1) Detailing Manage Reports (1) Wanting To Use System (1)
	7.2 Please what do you do whenever you are not satisfied with the Performance of the tracking system you are using?	I make reports to management (TM) I Report it to the vendor for support or take the necessary actions as per our Service Level Agreement (SLA) (FrM) If I have problem with the performance of the system, I contact my immediate head of the section (LM) I report unsatisfactory performance to the vendor (FIM) I report to tracking system operator to solve the problem (HICT)	Reporting To Management (1) Reporting To Vendor (1) Contacting Head of Section (1) Reporting To Vendor (1) Reporting to Operator (1)
	8.1 Please how satisfied are you with the relevance of the tracking information you receive?	The system goes off-and-on making it not available for use at all times, thus not fully satisfied (TM) Information provided is relevant, it is the accuracy and quality of it that must be worked on (FrM) As for the information it is very relevant, but we need we need improvements to a large extent (LM) That's very good, achieving about 99% relevant (FIM) Apart from area locations and information updates, most of the information provided are not really relevant to all officers who use our vehicles (HICT)	Not Satisfying With Information Relevancy (1) Offering Relevant Information (1) Improving Information Relevancy (1) Achieving 99% Information Relevance (1) Providing Non-relevant Information (1)

8. **Tracking System User Satisfaction**	**8.2** Please how satisfied are you with the comprehensiveness of the information you receive?	Information is comprehensive but sometimes difficult to interpret (TM) The information is not too comprehensive as I have seen, it is so much loaded with unwanted pieces (FrM) Well are satisfied with the comprehensiveness (LM) Not in totality, but to some extent (FlM) The information received are so much that it is difficult to comprehend all (HICT)	Comprehending Information satisfactorily (1) Not Comprehending Information Fully (1) Information Comprehensiveness is Satisfying (1) Comprehensiveness Is Somehow Satisfying (1) Comprehensiveness Is fairly Satisfying (1)
	8.3 Please how satisfied are you with the credibility of the tracking information you receive?	Information is credible since it gives vehicle locations and updates data regularly, but it fails to display sometimes (TM) Credible but not the best, since adequacy of location updates are compromised sometimes (FrM) There is a fair credibility generally, because vehicle locations are monitored and recorded (LM) Yes, there is some credibility, but not very accurate in location updates (FrM) Relatively, the received information is credible since sometimes location update are not very accurate (HICT)	Information credibility Is Satisfying (1) Information credibility Is Quite Satisfying (1) Information credibility Is Fairly Satisfying (1) Information Credibility Requiring Improvement of (1) Satisfying Information Credibility Relatively (1)
	Probing: Please how convenient or otherwise it is for you to interpret and use the tracking information you receive?	Information received is well understood, interpreted and applied to fit into what the information is demanding for (TM) Interpretation of received information is not all that easy for me (FrM) Very convenient because information is tailored towards our needs and it can also be manipulated for easy interpretation (LM) The received Info is not understood all the time and interpretation at times is a little bit difficult (FlM)	Interpreting Information Conveniently (1) Interpreting Information Inconveniently (1) Information Usage Being Convenient (1) Interpreting Information Is Somewhat Convenient (1)

		Information received is fairly friendly to understand, making interpretation a little easy to do (HICT)	Information Interpretation Is Fairly Comprehensive (1)
9. **Internal Impacts of System Performance**	**9.1** Please in what ways are the perfor-mance of the system assisting you to enhance your output as an individual?	The system puts our drivers on alert and also cautions them to ply only approved roots (TM) It is now possible for me to regulate the movement and location of our vehicles and drivers, hence, goods are delivered on time to our clients (FrM) It helps me to monitor vehicles and make efficient use of the vehicles (LM) As a fleet officer it helps curb accidents, as violators are sanctioned (FlM) With the advent of the tracking systems I am able, as an IT expert, to process real time location information & updates (HICT)	Making Individual Impact By Meeting Annual Targets (1) Recording Individual Impact By Estimating Vehicle Locations (1) Establishing Individual Impact By Curbing Fuel Consumption (1) Creating Individual Impact BY Planning Routes (1) Generating Individual Impact BY Processing Data Faster Than Before (1)
	9.2 Please in your perspective, what might be the impacts of the performance of the tracking system on Working Groups, Units, Divisions or even Departments in your organisation?	The performance of the tracking system has enhanced the reporting and delivering times by the drivers (TM) The tracking system helps to reduce cost across group operations, since the activities of the drivers and officers who use company vehicles are monitored regularly, company properties are also protected (FrM) The system is helping to improve the performance of various groups regarding reduction in mileage per month and reduction in cost of fuel (LM) It helps in curtailing cost due to allocation of cost to each department and makes geo-fencing useful and easier to identify (FlM) The units/sections in our department are able to meet our quarterly targets and to satisfy our clients (HICT)	Showing g Group Impact regarding Enhanced Delivering Times (1) Establishing Group Impact regarding Revenue Increase (1) Realizing Group Impact regarding Cost Reduction (1) Achieving Group Impact Regarding Over-speed Reduction (1) Registering Group Impact Regarding Internet Bandwidth Mgt (1)
		The tracking systems have gained us trust and confidence from our business partners (TM) We have had a number of our old clients coming back because we are delivering	Enjoying External Impacts in View of Delivering Goods JIT (1)

10. External Impacts of System Performance	**10.** Please how does the performance of the system impact on transactions between you and your External Business Counterparts?	assignments and contracts to Burkina, Faso, Niger and Mali through inland ports in Ghana (FrM) Doing business with our external counterparts has become more effective and efficient, e.g., delivering of goods has become more reliable and devoid of diversion and armed robbery incidents (LM) The system has reduced the long delays in delivering services to our clients (FlM) Since we subscribed to this tracking devices, we have been able to add on more clients than before (HICT)	Accumulating External Impact By Attracting New Investors (1) Gaining External Impacts By Adding More Clients (1) Building External Impacts By Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1)
11. Organizational Impacts of System Perfor-mance	**11.1** Please how does the performance of the tacking system help you to take Good Business Decisions and draw achievable Plans for your organization?	Performance of the systems has enabled management to take informed disciplinary decisions against drivers who detour from their approved routes (TM) The system has helped to efficiently service both internal and external clients regarding requests for haulage vehicles and delivery of consignments from Tema Habour to Kumasi, Tamale and Bolgatanga in Northern Ghana (FrM) Through these systems, management is able to control the logistical operations effectively and efficiently (LM) The tracking system forces both drivers, company officers and staff using official vehicles to ply planned/approved routes, thus, arriving on time at almost all destinations (FlM) Mgt is able to plan the movement of all operational vehicles especially its scheduling vans that move various goods from Accra to the Regions (HICT)	Improving System Performance By Creating Positive Organizational Impact (1) Increasing Customer Trust Is Generating Organizational Impact (1) Increasing Revenue generation Is Improving Organizational Impact (1) Achieving Profit Maximization Is Enhancing Organizational Impact (1) Improving System Performance Is Attaining Organizational Impact By (1)
	11.2 Please, aside Good	One of the key performance indicators of the tracking system is reduction in the rate of vehicle accidents and diminution in maintenance expenditure (TM) We are able to reduce flue consumption and prolong the life spans of company vehicles	Reducing Costs & Accident Rates (1) Lessening Fuel Consumption (1)

	Business Plans and Decisions, what other Key Perfor-mance Indicators (KPIs) do you think can impact on the overall performance of your Organization?	(FrM) By using the tracking systems, the organization is able to curb potential diversion of goods & raising our cooperate image (LM) Since the insertion of the vehicle tracking systems, our performance as an organization has improved tremendously in terms of overall turnover or annual profit margin (FlM) Tracking of our vehicles has maximized the use of IT in our operations, boosted public image and enhanced public perception (HICT)	Curbing Diversion Of Goods (1) Increasing Annual Profit Margin (1) Enhancing Public Image & Perception (1)
12. Overall System Benefits	**12.1** Please by what means are the system impacting on the overall Waiting Times, Travel Times and Travel Distances of your vehicles?	Waiting and travel times of our drivers and other officers in vehicular traffic have diminished remarkably, reduced running costs, thus prolonging life spans of company vehicles (TM) Our annual overall round trips in kilo metres have reduced, thereby cutting down fuel consumption, thus curtailing gas emission and environmental pollutions (FrM) Short travel-distances are now being achieved since drivers and other official vehicle users are compared to adhere to the use of approved company routes (LM) We are observing diminutions in travel times and travel distances. These result in economic savings made on recurrent expenditure, culminating into Organizational benefits (FlM) Costs of transacting business with our external customers are shrinking steadily (HICT)	Prolonging Vehicle Life Spans (1) Curtailing Fuel Consumption & Pollution (1) Achieving Short Travel-distances (1) Culminating Into Organizational Benefits (1) Travel-time & Distance Cut Down (1)
	12.2 Please, how is the performance of the tracking	Thanks to the implementation of the tracking system, we are now experiencing less expenditure on extra hours/overtime payments (TM) Fuel conception is reduced, due to controls on travel times and travel distances (FrM) The use of the tracking system has cut down costs e.g., fuel consumption and	Less Expenditure on Overtime Payments (1) Reduced Fuel Conception (1) Costs Cut Down (1)

	systems benefiting your organisation in respect of Internal and External Cost Reductions?	unnecessary/ un-official errands with company vehicles (LM) It is cutting cost through fuel consumption, tear and wear, reducing accident rates, saving life and property and keeping the public image of the company upright (FlM) Internal and external waists and expenditures are monitored, restrained at the click of a computer mouse (HICT)	Cutting Costs, Saving Lives & Properties (1) Restrained Waists & Expenditure (1)
	2.3 Please, beside Cost Reductions and Profit Maximization, what other Benefits do you expect from using the tracking systems you have subscribed to?	Less expenditure on fuel & maintenance and less turnaround time for vehicle requests (TM) Our vehicles are now in good conditions, no theft or armed robbery cases reported for now (FrM) The system is helping us to carry out more logistical operations and analysis. We are able to meet our vehicle needs and projections (LM) Besides cost reductions we are happy to know the where about of our vehicles, the conducts of our drivers and what they do at any point in time (FlM) We expect to maintain our existing clients and to win more additional clients as the quality of service we render to our clients are improved by the application of our four tie data centre in mining vehicle information (HICT)	Lessing Expenditure on Fuel & Maintenance (1) Vehicles Being in Good Conditions (1) Carrying Out More Logistical Operations (1) Knowing Real Time Vehicle Status (1) Maintaining Existing Clients & Wining New Ones (1)

APPENDIX D.2: THE SECOND OPENING / INITIAL CODING PROCESS

Appendix D.2 contains the second initial/opening codes generated as part of the data analysis process. It is the second of the three batches of data collection, required to start the selective coding process. The first column shows the themes around which the survey and interview questions were asked. Column two records the responses and the transcribed interview questions, the last column stores the coded responses and answers or the collated information. They are termed here as Opening/Initial Codes.

Legend to Interviewees' Backgrounds: Transport Managers (TM), Freight Managers (FrM), Logistics Managers (LM), Fleet Managers (FlM) and Heads of ICT Units (HICT).

Appendix D.2: The Second Opening / Initial Coding Process

INTERVIEW		ORIGINAL TEXTS (RESPONSES) FROM TRANSCRIPTION	OPENING / INITIAL CODES
Theme	**Question**		
Second Phase of Data Collection	**1.1** Please how Flexible or otherwise it is to use the systems of your vehicle tracking service provider?	The system require more flexibility (TM) The system is reasonably flexible because I do not experience a lot of problems in my operation (FrM) The system though flexible has its own challenges (LM) The system is quite flexible and easy to use.(FlM) It is quite flexible to use the system. (HICT)	Requiring System Flexibility (1) System Being reasonably Flexible (1) Having Flexibility Challenges (1) System Being Quite Flexible (1) System being Quite Flexible (1)
	1.2 Please to what extent is the system available for use and how reliable it is (durability)?	The system works so long as its backup battery works, thus making it available most of the time (TM) It's very reliable, I will give it 79%(FrM) The system is always available for use but reliability and durability depends on the internet availability (LM) So far, the system has been available mostly, except for few instances that I could not assess it (FlM)	Making System Availability Thr' Backup Battery (1) System Being Available & Reliable (1) Keeping System Available all the Time (1) System Being Available Most of the Time (1)

1. **Tracking System Quality**		The system is network dependent, thus it is available whenever the network is up (HICT)	System Working Reliably, thus available (1)
	1.3 Please how good or otherwise is the communication flow between you and your internal & external customers?	Communication has improved so much, no more misunderstandings. (TM) Mgt is striving to improve communication flow (FrM) Communication flows is quite good but needs to be improved. (LM) The flow of communication is relatively good, but with intermittent breakdowns (FIM) Communication flow is quite okay, but there is the need to make it expand the existing network (HICT)	Improving Communication so much (1) Improving Communication Flow (1) Needing to Improve Communication Flow (1) Experiencing breaks in communication Flow (1) Expanding Communication Flow (1)
	1.4 Please how detailed and accurate does the tracking system record vehicle location information?	The system estimates vehicle location information, thus, we need to check on information accuracy (TM) Vehicle information is recorded in details (FrM) Accuracy of vehicle location needs to be improved (LM) Location information is accurate enough and well detailed (FIM) Information on vehicle location is well detailed, although accuracy requires to be worked on (HICT)	Estimating Tracking System Accuracy (1) Detailing Vehicle Information (1) Improving System Accuracy (1) Specifying Location Information (1) Working on Location Accuracy (1)
	1.5 Please how often does the system allow you to view historic data of the tracking systems you are using?	Historic data can be viewed in real time (TM) One month historic data can be retrieved (FrM) Our system displays up to 6 months historic data (LM) Basically 24months historic data can be retrieved (FIM) Historic data can be viewed over 12 months (HICT)	Viewing Historical Data (1) Retrieving Historic Data (1) Displaying Historic Data (1) Retrieving 24 months Historic Data (1) Accessing Historic data on Weekly Basis (1)
		We receive real time info, enjoying 99%	Enjoying 99% System

	1.6 Please kindly estimate the extent to which you are satisfied with the Performance of the tracking system	satisfied (TM) We can limit satisfaction to about 79% (FrM) We are observing about 80 % satisfaction LM) We recording 99% satisfaction and is very good (FlM) Satisfaction is limited to only 85% due to frequent breakdowns in internet connectivity (HICT)	Satisfaction (1) Limiting System Satisfaction to 79% (1) Observing 80% System Satisfaction 100% (1) Recording 99% Satisfaction (1) Limiting Satisfaction To 85%
	Probing: Please kindly mention any other points we have not yet discussed relating to the quality of the tracking systems.	The system requires high quality info delivery (TM) Particular attention must be paid to system quality at all times (FrM) The System Quality must be seriously adhered to (LM) System quality must be measured and improved upon regularly (FlM) It is important to benchmark system quality with that of other operators (HICT)	Requiring High Quality Information (1) Paying Attention to System Quality (1) Adhering to System Quality (1) Measuring System Quality Regularly(1) Benchmarking System Quality (1)
2. **Tracking Information** **Quality**	**2.1** Please how current is the information you receive from the tracking systems ?	I usually get information on real time basis, (TM) The system refreshes information every minute (FrM) Information are received very frequently (LM) Information is updated on a minute by minute basis, so it is current to my likening.(FlM) Information is updated regularly, when internet speed is slow then info is not updated in real time (HICT)	Getting Real Time Information (1) Refreshing Information Every 5 Min (1) Receiving Information Frequently (1) Retrieving Information regularly (1) Revising System Information hourly (1)
	2.2 Please kindly comment on the relevancy of the information you	Yes the outputted information serves my interest (TM) Information captured on vehicle locations are very relevant (FrM) So far, the information received meets my needs and requirements (FlM) Information retrieved from the system is	Outputting Information Purposeful (1) Capturing Relevant Information (1) Meeting Information

	receive (i.e., does the information you receive serve your interests)?	very relevant since it helps to know vehicle users, their location and movements and monitor fuel consumption, etc (LM) The info enables us to indentify vehicle and status, hence it is very relevant.	Relevancy (1) Retrieving Relevant Information (1) Information Being Relevant (1)
	2.3 Please what about the Completeness or Conciseness of the information you receive?	So much info is produced, but I would wish to having precise info leading to vehicle status than location (TM) Once a while, info is packaged to meet specific needs FrM) The system offers about 80% information needed whiles the controllers do the rest (LM) The Received information is well refined(FlM) Information received is tailored to suit everyone's requirements (HICT)	Wishing to Have Information on Vehicle Status (1) Packaging Information Needs (1) Offering 80% t Information (1) Refining Received Information (1) Tailoring info to Suit Everyone (1)
	Probe: Please kindly discuss any other point relating to the Quality of information that you have not mentioned.	The Quality of info received must be polished (TM) Information retrieved does not affect the operation or performance of vehicles in any way.(FrM) The information quality should be maintained at all times in order to win more clients (LM) Sometimes delays hamper information quality (FlM) Information quality must not be compromised in order to achieve high information adequacy (HICT)	Polishing Information Quality (1) Retrieving Information Efficiently (1) Maintaining Information Quality (1) Delays Hampering Information Quality (1) Not Compromising Info Quality Information (1)
		The tracking system is Very Reliable (TM) We are anticipating reliable services	Tracking System Being Reliability (1) Anticipating Reliable System

3. **Tracking Service Quality**	**3.1** Pleasehow reliable is the service you receive from your Vehicle Tracking Service Provider?	from the tracking system's service (FrM) The service provided by tracking system vendor is considerably reliable (LM) I am okay with the after sales support. There are some few delays in response for service, though.(FlM) The service rendered by the tracking system operator is quite reliable. (HICT)	Service (1) Proving Reliability Service (1) Offering Reliable Service (1) Rendering Reliable Service (1)
	3.2 Please how often do you experience service outage?	We experience service outage occasionally (TM) On a scale from 1-10 will say 5 but my service provider is always ready to restore service (FrM) Service outage does not occur very often (LM) Service outages are recorded every two months (FlM) Service outages happen at least thrice a year (HICT)	Experiencing Insignificant Service Outage (1) Restoring Service Outage (1) Outages Not Occurring Very Often (1) Recording Outages Almost Every Two Months (1) Outages Happening Thrice a Year (1)
	3.3 Please, on the average, how long does it take your tracking service provider to restore service after reporting faults or breakdown?	Sometimes reported service breakdowns are restored within 48 hrs or more(TM) Our vendor fixes service within 24 hours or less (FrM) On the average, faulty services are reinstated within an hour or more (LM) It takes the vendor more than 24 hours to return service breakdowns to normalcy (FlM) The service provider spends about 36 hours to repair service when broken down(HICT)	Restoring Service Within 48 Hrs (1) Fixing Service Within 24 Hrs (1) Reinstating Service Within 1 Hr or More (1) Returning Service after 24 Hours (1) Repairing Service Breakdowns About 36 Hrs (1)
	3.4 Please How responsive (efficient) is the vehicle tracking staff in restoring service in times of	They are professionals and they deliver brilliantly (TM) They always restore it in time so I say again they are reliable (FrM) Responses to restoring service in times of outages is about 60% efficient. LM) Responses to breakdowns are quite	Responding Brilliantly to Faults & Outages (1) Responding Efficiently In Restoring Faults (1) Responding To Breakdowns - 60%Efficiency (1) Responding Quite Efficiently

	faults or outages?	efficient (FlM) The responses of the vendor to faults are quite efficient. (HICT)	To Breakdowns (1) Efficiently Responding To Faults (1)
	Probe: Please kindly throw more light on other issues relating to quality of service (QoS) issues you have not yet mentioned	The QoS provided needs to be revamped (TM) The vendor ensures that all quality of service parameters are tested and realigned quarterly (FrM) I would wish to have some more qualities like vehicle location and its occupants, fuel gauge levels etc. (LM) The betterment of the QoS must be pursued at all times (FlM) Delays in setting up local administrator accounts affect system QoS (HICT)	Revamping System QoS (1) Aligning QoS Parameters Quarterly (1) Having more QoS Details(1) Bettering QoS at all times (1) Delays In Setting Up Administrative Accounts Affect QoS (1)
4. Perceived System. Usefulness	**4.** Please what was your perception about the performance of the tracking system at the time of subscription?	My perception at the time of subscribing to this system was that, the system will be very useful (TM) I had the perception that the system will be available 24/7 (FrM) The perception at the time was that the system was going to be very reliable (LM) It was our perception that the system shall provide high QoS delivery (FlM) We created the perception that system Usefulness will not fall below 99% of the time (HICT)	Perceiving A Very Useful System (1) Perceiving A Very Good System Usefulness (1) Perceiving A Very Reliable System (1) Perceiving a Very High Information Quality (1) Perceiving 99% System Performance (1)
5. **Expecta-tion**	**5. 1** Please, what are your expectations regarding quality	We are having high expectations as far as system quality, quality of received information and quality of service are concerned (TM). Our expectations are that, the tracking system will perform to our satisfaction by displaying accurate location information our haulage vehicles (FrM) My expectations as Logistics Manager are that, the systems will deter diversions and reduce fuel consumption	Expecting High System Quality (TM) Expecting Satisfactorily System Performance (FrM) Expecting Reduced Diversions & Fuel Consumptions (LM)

Disconfi-rmation	and performance of the system as you are using it?	(LM) The expectations are that, the QoS offered will be very high (FlM) We at the ICT Dept are expecting the tracking system to exhibit a very high information quality (HICT)	Expecting very High QoS Expecting very High Information Quality
	5.2 Please what were your expectations regarding Tracking System-Performance at the time of contracting the tracking service?	I expected it will just tell me the location of vehicle in plain words via SMS or email anytime I request for it.(TM) We expected the system to perform very good, to our satisfaction (FrM) Our expectations were that, the tracking system will perform very accurately (LM) I was expecting a system that is stable (FlM) We at the ICT Dept expected the system to perform speedily and accurately (HICT)	Expecting High System Performance (1) Expecting Very Good System Performance (1) Expecting Accurate System Performance (1) Expecting A Stable System (1) Expecting Speedy and Accurate Performance (1)
6. **Tracking System Use**	**6.1** Please, what informed your intention to use the tracking systems you are employing now, as against other systems operated by other tracking companies?	We have the intention to use it because, with this I get other benefits like immobilizer, geo-fencing and many more which are not available with other tracking companies. (TM) The system we selected is cheaper and has more functions than the others, hence, our intention to use it (FrM) We admit that, there are equally good systems on the market, but our intention to use this one was informed by the great successes that other companies are enjoying by using this type of system (LM) Features & credibility of provider are quite good, thus our intention to use this one (FlM) We were satisfied with our perceived system performance, hence our intention to use it.(HICT)	Having Intentions to Use System With More Features & Benefits (1) Having Intention To Use Cheaper System (1) Having Intention to Use Systems being Used Already By Other Successful organizations (1) Having Intention To Use Systems From Credible Vendors (1) Having Intention To Use System With High Perceived Performance (1)

	6. 2 Please What Informed your actual use of the system as against your initial intention to use it?	We perceived a high degree of satisfaction from the system, thus the actual use of it (TM) We had the perception that the system will be very useful, this resulted in our actual use of it (FrM) Our perceived usefulness of the tracking system informed our actual use (FrM) The perception we had on the user satisfaction of the system lead to our actual use of it (LM) We anticipated a very high degree of system performance, hence our actual use (FIM) Our actual use of the tracking system was informed by our perception of high system performance (HICT)	Perceiving High Degree of System Satisfaction (1) Perceiving System Usefulness (1) Perceiving System Performance (1) Perceiving User High Level Satisfaction (1) Perceiving High Degree of System Performance (1) Perceiving High System Performance (1)
7. **Perceived System Usefulness**	**7.1** Please how did you perceive the tracking system you are employing?	The tracking system is very useful to my operations in the sense that, all vehicles and their users (drivers of officials) are monitored and controlled remotely (TM) We expected just-in-time delivery of destination and transit goods to northern Ghana and beyond (FrM) We anticipate d that, the usefulness of the tracking system will cut down our cumulative round-trip mileage and fuel consumption (LM) We predicted high usefulness of the tracking system we have subscribed to (FIM) I foresaw that the usefulness of the tracking system was high in the area of control and mgt of vehicles in other companies (HICT)	Tracking System Being Very Useful (1) Expecting System Usefulness (1) Anticipating System Usefulness (1) Predicting High System Usefulness (1) Foreseeing High System Usefulness (1)
	7.2 Please what do you do whenever you are not	Our procedure is to call to inform and report to the tracking service provider (TM) I call my TSP immediately to complain and report for them to resolve the problem (FrM)	Reporting Non-performance To Vendor (1) Reporting Problem to System Operator (1) Falling on the Service Provider

	satisfied with the Performance of the tracking system you are using?	The controllers have no choice than to fall on the service provider to restore the system after reporting the problem (LM) I report all unsatisfactory services and performances to the support desk of the TSP for redress (FlM) I do report unsatisfactory performance to the tracking system operator (HICT)	to restore System Faults (1) Reporting Unsatisfactory Performance to Service Provider (1) Reporting Unsatisfactory Performance to System Operator (1)
	Probing: Please what next do you do if the problem still persists, or if you are still not satisfied with the performance of the system after fault restoration?	I immediately report the situation to management to enable it to take informed decisions (TM) Management is informed for further actions (FrM) Any unsatisfactory system performance is quickly reported to the service provider and to management for further decision (LM) I have been asked to escalate such reports to first to the vendor then to management and then follow up for management decision (FlM) I quickly reports to Mgtt to take decision (HICT)	Reporting the Situation to Mgt (1) Informing Mgt About the Situation (1) Reporting Persistent Unsatisfactory Performance to Vendor & Mgt (1) Escalating Reports to Operator & Mgt (1) Reporting Unsatisfactory Performance to Mgt (1)
	8.1 Please, what makes you satisfied with the performance of the system you are using now?	Because I can identify vehicle locations at all times, this satisfies me (TM) We mostly get the information we need and that is a source of satisfaction for as a freight company (FrM) The usefulness of the system caused us to be satisfied with its performance (LM) The tracking system supports quick service delivery and therefore meets our satisfaction as a company (FlM) The performance of the system meets our IT operational requirements (HICT)	Identifying Vehicle Locations Anytime (1) Getting Information that We Need (1) Being Satisfied With System Usefulness (1) System Supporting Quick Service Delivery (1) Meeting IT Operational Requirements (1)
		I am very satisfied with the relevancy of received information (TM) Convincingly, I will say above average	Being Satisfied With Information Relevancy (1) Experiencing Average

8. **Overall User Satis-faction**	**8.2**Please, how satisfied are you with the relevance of the tracking information you receive?	(FrM) Information provided by the system are about 80% accurate(LM) I am satisfied with the 99% information relevancy achieved persistently (FlM) Relevance of received information is gratifying (HICT)	Information Relevancy (1) Providing About 80% Information Relevancy (1) Achieving 99% Information Relevancy (1) Relevance of Received Information is Gratifying (1)
	8.3 Please how satisfied are you with the comprehensiveness of the information you receive?	Since the device location is shown on a Google satellite map I can easily understand them. (TM) I would say it's quite comprehensive because I only want to know the locations of my vehicles (FrM) Information are received in raw forms. Hence, tracking controllers interpret it to be comprehended by all (LM) I think information is comprehensive enough .(FlM) We are satisfied with the comprehensiveness of the information received (HICT)	Comprehending Information satisfactorily (1) Comprehending Information Fully (1) Interpreting Information for Comprehensiveness BY All (1) Satisfying Comprehensiveness Averagely (1) Fairly Satisfying Comprehensiveness (1)
	8.4 Please how satisfied are you with the credibility of the tracking information you receive?	Received information is Very Credible (TM) The tracking information is highly credible (FrM) There is a fair credibility generally, because vehicle locations are monitored and recorded (LM) Quite credible, as confirmed by our assessments(FlM) Tracking information received is quite credible (HICT)	Satisfying Information credibility (1) Satisfying Information credibility Is (1) Fairly Satisfying Information credibility (1) Requiring Information Credibility Improvement (1) Satisfying Information Credibility Relatively (1)
	8.5 Please how satisfied are you with the ease of	It's web base and can be accessed from phone or computer once there is internet connection, resulting to some level of satisfaction (TM) It is quite easy to access the tracking system, so I am satisfied (FrM) Accessibility is sometimes not friendly, thus not fully satisfied (LM) For now we are Satisfied with system	Being Satisfied With System Accessibility (1) Being Satisfied With System Accessibility (1) Facing Difficulties In Accessing the System (1)

	system accessibility?	accessibility(FlM) W e need improvement on the ease of system accessibility to meet our satisfaction (HICT)	Enjoying The Degree of System Accessibility (1) Improving Upon The Degree of Accessibility (1)
	Probing: Please as a User, how do you rate your overall Satisfaction for using the tracking system you are subscribing to?	I wish to be more satisfied than experiencing now (TM) I will say that my satisfaction is above average (FrM) Am 70% satisfied about the TSP's services LM) We are fairly satisfied (FlM) The service provider repairs faulty units & devices periodically (HICT)	Wishing To have Better Overall Satisfaction (1) Experiencing Average Overall Satisfaction (1) Recording 70% Overall Satisfaction (1) Enjoying A Fair Overall Satisfaction (1) Anticipating A Better Overall Satisfaction (1)
	9.1 Individual Impact Please in what ways are the performance of the system impacting on you as an individual?	The performance of the system has created some individual impact on me by meeting my monthly and quarterly targets (TM) The performance of the system has registered an individual impact on my ability to estimate vehicle locations accurately at any time (FrM) The system performance has curbed fuel consumption & vehicle abuses, thus impacting individually on my performance as Logistics Manager(LM) The laudable performance of the system has impacted positively on my ability to plan vehicle routes in advance(FlM) As Head/ICT Dept, the system performance has greatly impacted on my output as an individual in terms of sending processed data to required entities (HICT)	Creating Individual Impact By Meeting Targets (1) Establishing Individual Impact By Estimating Vehicle Locations (1) Recognizing Individual Impact By Curbing Fuel Consumption (1) Registering Individual Impact BY Planning Routes (1) Generating Individual Impact BY Processing Data Faster Than Before (1)
	9.2 Working	The performance of the system is impacting positively on all units, groups, departments, by enhancing their delivery times (TM) We have observed that the performance of the system has impacted positively on groups, units & Departments in our	Seeing Group Impact regarding Enhanced Delivering Times (1) Observing Group Impact regarding Revenue Increase

9. **NET BENEFITS**	**Group, Unit & Dept'al Impacts** Please in your opinion, what might be the impacts of the performance of the system on Working Groups, Units & Depts in your organisation?	company regarding revenue increase (FrM) Vehicle users from all units & depts are limited to particular confinement or region, thus impacting positively on their fuel consumption rates (LM) The performance of the system has impacted commendably on various groups, units & Depts concerning over-speeding and excessive idling (FlM) The system has impacted on groups & units by managing efficiently the available internet bandwidth (HICT)	(1) Achieving Group Impact regarding Cost Reduction (1) Realizing Group Impact Regarding Over-speed Reduction (1) Accomplishing Group Impact Regarding Internet Bandwidth Mgt (1)
	9.3 External Impact Please how does the performance of the tracking system impact on your External Business transactions?	The performance of the tracking system is impacting so well on our external business transactions in terms of delivering goods "Just-In-Time" (JIT), (TM) The performance of the system is impacting positively on our external business transactions by attracting new investors (FrM) The performance of the tracking system has impacted positively on our external transactions wining more external business counterparts (LM) The system performance is showing positive signs of external impact by enhancing our public image (FlM) The system performance has curtailed internet fraud in our operations, thus, registering optimistic external impact on our operations (HICT)	Gaining External Impacts in View of Delivering Goods JIT (1) Building External Impact By Attracting New Investors (1) Facilitating External Impacts By Adding More Clients (1) Constructing External Impacts By Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1)
		The performance of the system needs to be improved to achieve organizational impact (TM) The performance of the tracking system	Improving System Performance Will Create Positive Organizational Impact (1)

	9.4 Organizational Impact Please, how is the performance of the tracking system benefiting your organisation as a whole?	is building customer trust and loyalty in our clients and this is impacting on our organization positively (FrM) The performance of the tracking system is increasing our revenue generation capacity and this is impacting positive on our company as a whole (LM) We are enjoying persistent annual profit maximization as a result of the organizational impact the tracking system has on our business transactions (FlM) We can attain high organizational impact by improving the performance of the tracking system (HICT)	Increasing Customer Trust Is Generating Organizational Impact (1) Increasing Revenue generation Is Improving Organizational Impact (1) Achieving Profit Maximization Is Enhancing Organizational Impact (1) Improving System Performance Is Attaining Organizational Impact By (1)
	Probing: Please, as an institution, why would you want to continue using this system as your first choice and not as your second or third choice?	We are continuing using the system because it is impacting positively on our business (TM) I will continue using this system, since it is the best system in locating our haulage vehicles at all times (FrM) It is imperative for us to continue to use the tracking system since we are experiencing positive net benefits in our operations LM) We want to continue using it due to the Quality of support and stability of system performance(FlM) The system provides relevant information for effective fleet mgt, hence we will continue using it (HICT)	Impacting Positively on Business (1) Best System for Locating Vehicles (1) Experiencing Positive Net benefits (1) Benefiting From System Performance (1) Providing Relevant Information (1)

APPENDIX D.3: THE THIRD OPENING/CODING PROCESS – BATCH 3

This appendix contains research questionnaire themes &questions, original responses/texts transcribed from the research participants, and initial/opening codes during the third step in the data collection stage. These codes are pre-requisites to start the provisional Coding Process.

Appendix D.3: The Third Opening/Coding Process – Batch 3

INTERVIEW		ORIGINAL TEXTS (RESPONSES) FROM TRANSCRIPTION	INITIAL/OPENING CODING
Theme	**Question**		
Third Phase Of Data Collection	**1. 1 Please what was your perception towards the usefulness of your Tracking System at the time of subscription?**	My perception was that, the system would provide High Quality Vehicular Information (TM)	Providing High Quality Information (1)
		I expected the system to be very useful in our operations (FrM)	Expecting Useful System (1)
		We have the perception that, our tracking system will deliver relevant, tracking information (LM)	Delivering Relevant Information (1)
		The perception is that, our tracking system will offer accurate vehicle tracking information (FIM)	Offering Accurate Information (1)
THEME 1: PERCEIVED SYSTEM USEFULNESS (PSU)		We perceive that, the tracking system will exhibit reliable tracking information (HICT)	Easy Using The Tracking System (1)
	1.2 Please what is your expected overall impact of tracking system usage (i.e., your perceived system usefulness)?	The system could be available for use for longer time via regular and retune maintenance (TM)	System Being Available For Use (1)
		The overall impact of the tracking system we are using is associated with persistent Positive Net Benefit achieved from our business transactions over the last three years (FrM)	Impacting On Net Benefits Positively (1)
		In terms of overall system impact on our operations, we are perceiving very high user satisfaction (LM)	Perceiving High User Satisfaction (1)
		My overall expected impact of tracking system usage is tied to high positive net benefits (FIM)	Impacting On Net Benefits Positively (1)
		We have an overall expected impact of the tracking to achieve high profit maximization (HICT)	Impacting On Profit Maximization (1)
	2.1. Please	My perception is that, tracking system should be very easy to use (TM)	System Being Easy For Use (1)

	What is your perception on the ease of using the tracking system?	Our expectation is that, the usage of the tracking system should be much easier (FrM)	System Being Easier For Use (1)
		We expected that it should be very easy when using the tracking system (LM)	Using System Easily (1)
		The perception is that, it will be easy and friendly to use the system (FlM)	Being Easy To Use System (1)
		It is the perception that ease of use leads to our intention to use the tracking system (HICT)	Leading To Intention To Use System (1)
THEME 2: PERCEIVED EASE OF USE (PEOU)	**2.2 Why is ease of system use a very critical issue to you?**	The ease of system use informed our intention to use the tracking system (TM)	Informing Intention To Use System (1)
		Our intention to use the tracking system was informed by the ease of use of the system (FrM)	Forming Intention To Use System (1)
		The Ease of use of the tracking system was the deciding factor of our intention to use it (LM)	Deciding To Use System (1)
		My intention to use the system was formed by its ease of use (FrM)	Informing Intension To Use System(1)
		We intend to use this tracking system due to its ease of use (ITM)	Intending to Use System (1)
THEME 3: EXPECTA-TION DISCONFIR MATION	**3.1 How does the performance of the tracking system impact on the process of its usage?**	The process of using the tracking system is impacting positively on it performance (TM)	Impacting Positively on Performance (1)
		We virtually do not see any impact of the usage process on the performance of the tracking system (FrM)	Seeing No Impact Yet (1)
		Invariably, the system performance is directly linked to the usage process (LM)	Linking Performance To Usage Process (1)
		I think the usage process is associated system performance (FlM)	Associating Performance To Usage (1)
		It is clear that the performance of the tracking system depends on the usage process (HICT)	Performance Depending On Usage Process (1)
	3.2 Why does system usage process impact on the performance of the tracking system you are using?	The process of using the tracking system is impacting positively on it performance (TM)	System Impacting positively on Performance (1)
		We virtually do not see any impact of the usage process on the performance of the tracking system (FrM)	Not Seeing Impact On Usage (1)
		Invariably, the system performance is directly linked the usage process (LM)	Linking Performance To Usage Process (1)
		I think the usage process is associated with the system performance (FlM)	Associating Performance To Usage Process (1)
		It is clear that the performance of the tracking system depends on the usage process (HICT)	Performance Depending On Usage Process (1)
		We perceived the system to be available all	System Being Available Always

		the time (TM)	(1)
	4. 1 What influenced your decision to subscribe to the tracking system you are using?	We had perceived the system to perform accurately daily (FrM) The system was perceived to perform perfectly (LM) My tracking system was perceived to perform satisfactorily (FrM) Our system was perceived to perform simply (HICT)	System Performing Accurately (1) System Performing Perfectly (1) System Performing Satisfactorily (1) System Performing Simply (1)
	4.2 How did you expect the tracking system to perform?	We expected the system to be performed efficiently (TM) I perceived the system to perform very reliably (FrM) The tracking system is expected to perform accurately (LM) Our tracking system is expected to perform creditably (FrM) My tracking system was expected to perform simply and not complexly (HICT)	System Performing Efficiently (1) System Performing Reliably System Performing Accurately (1) System Performing Creditably (1) System Performing Simply (1)
	4.3 Why did you expect the system to perform the way you want it?	Because I had expected total user satisfaction (TM) We expect maximum user satisfaction (FrM) Our expectation was centered on user satisfaction (LM) My expectation was focused was absolute user satisfaction (FlM) Expectation was mainly on commendable user satisfaction/HICT	Expecting Total User Satisfaction (1) Expecting Max User Satisfaction(1) Expecting User Satisfaction (1) Expecting absolute User Satisfaction (1) Expecting Positive User Satisfaction (1)
	5.1 How will you describe your overall	Actually, my overall satisfaction is on the positive side (TM) Our Overall satisfaction is achieved through the usefulness of the tracking system (FrM)	Positing Positive Overall Satisfaction (1) Achieving Overall Satisfaction positively (1)

THEME 5: OVERALL USER SATIS-FACTION	satisfaction from using your tracking system?	My Overall satisfaction is that the annual turnover is improved steadily as we use the system (LM)	Improving Overall Satisfaction (1)
		We are anticipating a higher overall user satisfaction from our tracking system (FlM)	Anticipating Higher Overall Satisfaction (1)
		The overall satisfaction in using the tracking system is the positive net benefit achieved (HICT)	Achieving Overall Satisfaction Positively (1)
	5.2 Why do you think that overall user satisfaction is an important issue in your operations?	The issue of overall user satisfaction is key in determining the usefulness of the tracking system (TM)	Determining Overall Satisfaction (1)
		The overall user satisfaction that we experience tells how well the tracking system performs (FrM)	Experiencing Overall Satisfaction (1)
		Overall user satisfaction is the benchmark to the usefulness of the tracking system (LM)	Benchmarking Overall Satisfaction (1)
		Overall user satisfaction shows the level of the performance of the tracking system (FrM)	Showing Overall Satisfaction (1)
		Our overall satisfaction demonstrates the successfulness of the tracking system (HICT)	Demonstrating Overall Satisfaction (1)
	5. 3 What is the level of your overall user satisfaction you obtain from your tracking system?	We are experiencing nearly 80% overall user satisfaction (TM)	Experiencing 80% Overall satisfaction (1)
		I am achieving close to 90% overall user satisfaction (FrM)	Achieving 90& Overall Satisfaction (1)
		The expectation is that the overall user satisfaction must be around 95% (LM)	Expecting 95% Overall Satisfaction (1)
		The overall user satisfaction chopped is on the average (FrM)	Chopping average Overall Satisfaction (1)
		My perception on the overall user satisfaction is about 100% (HICT)	Perceiving 100% Overall Satisfaction
	6.1 What do you do	I do report to the tracking system operator to address the problem (TM)	Reporting To System Operator (1)
		By our sales agreement, we report all tracking system problems to system operator (FrM)	Reporting To System Operator (1)

THEME 6: UNSATIS-FACTORY SYSTEM PERFOR-MANCE	**whenever the performance of your tracking system deteriorates?**	My job is to report all tracking problems to the system vendor for restoration (LM) The procedure is that we have to report system malfunctions to the service provider (FlM) In case of any poor system performance, I report to the system supplier for redress (HICT	Reporting To System Vender (1) Reporting To Service Provider (1) Reporting To System Supplier (1)
	6.2 How do you address problems leading to poor system performance?	We first log the problem into a faults' log book and then report to the system provider (TM) Every morning, I send system status report to D/ Operations and to the service provider (FlM) It is agreed that all system performing abnormally be reported to the vendor to address it (LM) I have been reporting system faults to the supplier every day (FrM) On daily basis, the vendor takes reports on system performance and works on all faults (HICT	Report To System Provider (10 Reporting To Service Provider (1) Reporting To Vendor (1) Reporting To Supplier (1) Vendor Taking Reports (1)
	6.3 Why do you report system malfunctions to the service provider or vendor?	We report system performance status to vendor to enable him to restore the system faster (TM) I have to report system problems to service provider so that he can solve it for us (FrM) One of my responsibilities is to report the status of the system to the vendor for solution (LM) The service provide is required to restore system faults, hence we report all problems to him (FrM) Our policy is to get the system supplier to address all system malfunction s, that is why we report all problems to him (HICT)	Vendor Restoring System (1) Vendor Solving System Problem (1) Vendor Providing Solution (1) Vendor Restoring System (1) Supplier Addressing Problems (1)
		The system is impacting on me positively as an individual, in terms of performance (TM)	Performance Impacting On Individual Positively (1)

THEME 7: NET BENEFIT	**7.1 How does the performance of the tracking system impact on you as an individual?**	For me as an individual, the system is helping me to achieve my daily targets (FrM) Individually I am able to clear my desk, thanks to the performance of the tracking system (LM) The performance of the system is reducing my fuel consumption as an individual (FlM) Being an individual, the system performance is augmenting my effort to curb travel times (HICT)	Achieving Individual Daily Targets (1) Performance Aiding Individual Desk Clearing (1) Performance Aiding Individual Fuel Reductions (1) Performance Curbing Individual Travel times (1)
	7.2 How are you benefiting (i.e., the net benefit) from the tracking system as a group or unit?	The usefulness of system is what is facilitating the positive net benefit we are experiencing (TM) Undoubtedly, we are benefitting from the successfulness of the tracking system as a whole (FrM) As a group, the overall reduction of our round-trips is a great benefit to us (LM) As a group, we are benefitting from the tracing system by way of decreasing delays in delivering goods (FlM) The benefit we derive from the system has to do with the good quality of the tracking information captured by the system (HICT)	Group Benefiting Positively (1) Group Benefiting Successfully (1) Reducing Group Round Trips (1) Group Benefiting From Less Delays (1) Group Benefiting Quality Information (1)
	7.3 Why do you think that the performance of your tracking system is impacting on you externally?	We think that, the system performance is impacting positively on us externally in terms of public image building (TM) The "just in time" delivery registering of late has actually won us some external recognition to a very large extent (FrM) Externally, the system is impacting on us, we have more suppliers wanting to do business with us (LM) Our external clients have doubled over the last three years, due to the performance of our tracking system (FlM) External customers are loyal due to the	Performance Building External Image (1) Impacting On External Recognition (1) Impacting Positive On External Suppliers (1) Impacting On External Client Doubling (1) Impacting On External

		external impact of performance on our operations and transactions (HICT)	Customer Retention (1)
	7.4 How will you rate the impact of tracking system performance on you as an organisation?	We as an organisation are witnessing positive impacts of the performance of our tracking system in profit maximization (TM) Our annual financial reports for the last two years show upwards trends of revenue generation (FrM) Management is in full control of all aspects of this business, thanks to the performance of the tracking system we are using as an organisation(LM) Summing it all, we are able to offer total customer satisfy to our clients as an organisation, due to the commendable performance of our tracking system (FlM) System high performance is impacting affirmatively on our business as organisation (HICT)	Witnessing Positive Organizational Impacts (1) Showing Organizational Revenue Generation (1) Managing Organizational Performance (1) Offering Organizational Customer Satisfaction (1) Performance Impacting Positively on Organisation (1)
	7.5 Please Kindly Comment on The Impact of your Tracking System on the Net Benefit of your Organisation	We have been achieving positive Net Benefits as an organization for past five years (TM) For us as an organisation, Positive Net Benefits are recorded each year (FrM) The performance of our tracking system is aiding us to register positive net Benefits steadily, as an organisation (LM) As an Organisation, we have been chopping Positive Net Benefits annually (FlM) The Organisation has been realising positive net benefit per our planned budgets (HICT)	Achieving Organizational Positive Net Benefits (1) Recording Organisation Positive Net Benefit (1) Registering Organizational Positive Net Benefit (1) Chopping Organizational positive Net Benefits (1) Realizing Organizational Positive Net Benefits (1)

APPENDIX E: THE FOCUS CODING PROCESS

This Appendix contains the second initial/opening codes generated as part of the data analysis process. It is the second step of the data analysis process. The first column shows the opening/initial codes produces at the end of Opening/Initial Coding Process. Column two carriers Provisional Categories produced during the focused coding process. The last column contains memos or notes describing the emerged provisional codes, showing their properties, dimensions and relationships in the emerged categories.

Legend to Interviewees' Backgrounds: Transport Managers (TM), Freight Managers (FrM), Logistics Managers (LM), Fleet Managers (FlM) and Heads of ICT Units (HICT).

Appendix E: The Focus Coding Process

OPENING/INITIAL CODES (UNITS OF RELEVANT MEANING)	PROVISIONAL CATEGORIES (CLUSTERS OF RELEVANT MEANINGS)	MEMOS
System Being Flexible to Use (1)	Tracking System Quality Depends on System Flexibility, & Ease of Use (2)	Provisional Category, property & a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
System Being Simple to Use (1)		
Experiencing Real System Breakdown (1)		
Collating all Vehicle Info to Monitoring Point (1)		
Easy Use of the Tracking System (1)		
Maintaining System For Availability (1)	System Availability 24/7 Ensures Tracking System Quality (2)	A property & a Subset of the concept of Tracking System Quality
Experiencing No System Outages (1)		
Making System Available Most Of The Time (1)		
Getting System Available 24/7 (1)		
System Working 24/7 (1)		
Experiencing Unexpected Link Failures (1)	Tracking System Quality Requires Good Communication Flow (2)	A property & a Subset of the concept of Tracking System Quality
Observing Good Communication Flow (1)		
Having Good Communication Flow(1)		
Enjoying Excellent Communication Flow (1)		
Considering A Good Communication Flow (1)		

Detailing System Accuracy (1)	Accurate Vehicle Location Information Determines Tracking System Quality (2)	A property & a Subset of the concept of Tracking System Quality
In-accurately Recording Vehicle Information (1)		
System Breakdowns Limiting Accuracy & Efficiency (1)		
Generating In-accurate Records (1)		
Network Limitations Affecting System Accuracy (1)		
Needing Close to 100% System Satisfaction (1)	System Durability, Usability & Usage Satisfaction Establishes Tracking System Quality (2)	A property & a Subset of the concept of Tracking System Quality
Estimating System Satisfaction Around 95% (1)		
Improving System Satisfaction to About 100% (1)		
Bringing Vehicular Activities To A Central Point (1)		
Estimating System Satisfaction To About 87.5% (1)		
Detailing Vehicle Activities (1)	Quality of GPS images Directly Links to Tracking System Quality (2)	A property & a Subset of the concept of Tracking System Quality
Damping of Vehicle Location Information (1)		
Improving Quality Of GPS Images (1)		
Requiring System Quality Improvement (1)		
Knowing Activities of Vehicles (1)		
Expecting Closed Up Vehicle Locations (1)	Vehicle Location Info Conciseness & Contemporarine ss , determine Tracking Information Quality (2)	Provisional Category, Property & a Subset of the concept of Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Updating Accurate Location (1)		
Information Accuracy Not Being Persistent (1)		
Capturing 90% Information Conciseness (1)		
Rating Information Conciseness (1)		
Receiving New Information Persistently (1)	Frequent Information Availability & Updates Result in Good Quality of Tracking Information (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS. Has no I/P.
Updating Information Every 5 Min (1)		
Updating Information When Available (1)		
Updating System Periodically (1)		
Updating System Every 10sec (1)		
Updating Information Every 3 Min (1)	Regular & Persistent Information Updates Guarantees Tracking Information Quality (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Updating Information at 2 Min Intervals (1)		
Updating System Regularly (1)		
Updating System Every 1 Min (1)		
Updating System Every 10sec (1)		

Outputting Purposeful Information (1) Sometimes Serving User Interests (1) Outputting Purposeful Information (1) Taking Vehicle Maintenance Decisions (1)	Meeting User Interests Progresses Quality of Tracking Information (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Serving Users Interests (1) Receiving Relevant Information (1) Meeting Users Interests (1) Detailing Information Purpose Enough (1)	Detailing Information Purpose Augments Quality of Tracking Information (2).	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Making Assignment & Maint'nce Decisions (1) Serving User Information Needs (1) Meeting User Information Demands (1) Detailing Information Adequately Enough (1) Making Vehicle Assignment & Maint'nce Decisions (1) Receiving Required Information (1) Not Detailing Information Enough (1)	Meeting User Information Needs & Demands Reckons on Tracking Information Quality (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Wanting Information To Some Extent (1) Fashioning Reports to meet Information Needs (1) Receiving Non-complete Information (1) Giving Most Important Information (1)	Information Completeness generates Tracking Information Quality (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Turning off Engines (1) Receiving Information Timely (1) Mis-calculating Location Coordinates (1) Receiving Information Timely (1) Wrong Vehicle Location Hampering Information Quality (1) Receiving Degraded Information (1)	Accurate & Timely Vehicle Location Information delivery amounts to Tracking Information Quality (2)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Supporting Service Reliability (1) Ensuring Reliable Service (1) Improving Service Reliability (1) Improving Reliability of Service (1) Having Reliable Support Service (1)	Users Perceive Very Reliable & Supportive Tracking System Service (2).	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.

Outages happening once a While (1)	System Outages/ Breakdowns hamper Tracking Service Quality (2)	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
Outages Occurring Every 3 Months (1)		
Outages Resulting UN-anticipatorily (1)		
Outages Arising Once A While (1)		
Outages Occurring Unexpectedly (1)		
Taking Hours To Restore Service (1)	Short service restoration-duration Boosts Tracking Service Quality (2)	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Delaying Fault Restoration (1)		
Taking 24 Hrs to Fix Breakdowns (1)		
Restoring Service Within 48 Hours (1)		
Restoring Internet Service Within 24 Hrs (1)		
Responding On Time To Faults (1)	Effective & Efficient response to service failures & breakdowns result in high Tracking Service Quality (2)	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Responding Within 3 Hrs to Restore Service (1)		
Responding Effectively To Service Breakdowns (1)		
Responding Efficiently To Faults (1)		
Needing To Respond Efficiently (1)		
Wishing To Be Satisfied Better(1)	Recuperating Tracking Service Quality generates user satisfaction (2)	Property & a Subset of the concept of "Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Doing More Towards Satisfaction (1)		
Improving Total Satisfaction (1)		
Enjoying Fair Satisfaction (1)		
Requiring Better Satisfaction (1)		
Improving System QoS (1)	Ensuring &Improving QoS Influences Tracking Service Quality (2).	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Ensuring Good QoS (1)		
Improving QoS (1)		
Prioritizing Service Quality (1)		
Improving QoS (1)		
Perceiving Perfect System Performance (1)	Users Perceive Excellent System Performance & Proofing	Property & a Subset of the concept of Tracking Service Quality, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU& OUS.
Perceiving Excellent System Performance (1)		
Perceiving Few System Faults (1)		
Perceiving Behaviour Tracking (1)		
Perceiving High Speed Connectivity (1)		

Perceiving Proofing Concept (1)	Concept (2).	
Perceiving System Demonstration (1)		
Users Perceiving High System Performance(1)	Perceiving High System Performance & Usefulness (2)	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Perceiving High System Performance (1)		
Perceiving good Maintenance performance (1)		
Perceiving High Tracking Performance (1)		
Users Perceiving Ease Using Systems (1)		
Users Perceiving High Tracking System Performance (1)		
Perceiving System Demonstration (1)		
Expecting Behaviour Tracking (1)	Expecting High Speed Connectivity & High Tracking System Performance	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, have no input. Antecedents to the concepts of PSU, PEOU& OUS.
Expecting High Speed Connectivity (1)		
Expecting Perfect System Performance (1)		
Expecting Excellent System Performance (1)		
Expecting Few System Faults (1)		
Expecting Behaviour Tracking (1)		
Expecting High Speed Connectivity (1)		
Expecting Perfect System Performance (1)	Users Expecting Tracking Systems To Perform Excellently & Satisfactorily	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, have no input. Antecedents to the concepts of PSU, PEOU &OUS.
Expecting Excellent System Performance (1)		
Expecting Few System Faults (1)		
Expecting Behaviour Tracking (1)		
Expecting High Speed Connectivity (1)		
Understanding System Demonstration (1)	Expecting Proofing & System Performance	Property & a Subset of the concept of Expectation Disconfirmation, & a Subset of the Construct of the Independent Variables, has no input. Subset of antecedents to the concepts of PSU, PEOU&OUS.
Vendor Proofing Concept (1)		
Mgt Recommending System Use (1)		
Tracking Maintenance Records (1)		
Friends Using Similar Systems (1)		
Expectation to use System - Security Features (1)	Users Expect the Best Tracking System Performance	Property & a Subset of the concept of Perceived System Performance, in Independent Variables. Subset of antecedents
Mgt Expecting Best System Performance (1)		
Expecting Favourable System Performance (1)		
Expecting Good System Performance (1)		

Expecting Improved System Performance (1)		to the concepts of PSU, PEOU&OUS.
Upgrading System Performance is Expected(1)	Users Expect Tracking System Performance to be Upgraded.	Property & a Subset of the concept of Perceived System Performance, in Independent Variables. Subset of antecedents to the concepts of PSU, PEOU &OUS.
Advancing System Performance is Expected(1)		
Improving System Performance is an Expectation (1)		
Leveraging System Performance is Expected (1)		
Enhancing Existing System Performance Expectedly (1)		
System Performance Not Satisfying Unexpectedly (1)		
Users perceiving High Tracking System Usefulness (1)	Tracking System Users Perceive Competitive & Long-term System Usefulness	Property & a Subset of the concept of PSU& a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Users having High Perception of System Usefulness (1)		
Perceiving Long-term Tracking System Usefulness (1)		
Perceiving Non-compromising System Usefulness (1)		
Users Perceiving Good System Usefulness (1)		
Comparing System Usefulness, general Perceptions (1)		
Tracking System users Perceive Appropriate System Usefulness (1)	Tracking system Users Perceive High System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users perceive continuous System Usefulness (1)		
Perceiving Adequate System Usefulness (1)		
Perceiving Appreciable System Usefulness (1)		
Users perceiving Competing System Usefulness (1)		
Users perceiving Good Tracking System Usefulness (1)	Users have High Perceptions on Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users having Big Perception of System Usefulness (1)		
Perceiving Lasting Tracking System Usefulness (1)		
Perceiving Unbeatable System Usefulness (1)		
Users Perceiving Excellent System Usefulness (1)		
Perceiving Competitive System Usefulness (1)	Users Perceive Competitive & Perpetual Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Complete System Usefulness (1)		
Users perceive permanent System Usefulness (1)		
Perceiving satisfactory System Usefulness (1)		
Perceiving substantial System Usefulness (1)		
Users perceiving Competing System Usefulness (1)		Property & a Subset of the
Users Perceiving outstanding System Usefulness (1)		

Perceiving aggressive System Usefulness (1) Users Perceive absolute System Usefulness (1) Users perceive enduring System Usefulness (1) Perceiving agreeable System Usefulness (1) Perceiving extensive System Usefulness (1) Users perceiving High System Usefulness (1)	Users Perceive Outstanding & Agreeable Tracking System Usefulness	concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving System to be Easily Use (1) Perceiving that System is very Easy to Use (1) Using System Easily is a High Perception (1) Tracking System Perceived as Easy To Use (1) Perceiving Friendly System Usage (1)	High Perception of Easy to Use Tracking Systems	A Property & a subset of the concept of PEOU& a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of "Intention To Use System.
Perceiving Ease of System Use as Deciding Factor (1) Perceived Ease of Use informs Intention To Use (1) Deciding To Use System- Ease of Use Perception (1) Ease of Use informs Intension To Use System (1) Perceiving to Use System Easily (1)	Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perception of Easily Using The Tracking System (1) Easy Use of Tracking System is a Perception (1) System Being Used Easily is the Perception (1) Perception of Easy System Usage (1) Using System Easily is a Perception (1)	Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Being Easy To Use System is a Perception (1) Perceiving Friendly System Usage (1) Perceiving Ease of System Use is a Decision Factor (1) Perceived Ease of Use informs Intention To Use (1) Deciding To Use System- Ease of Use Perception (1)	User Perceive Easy System Usage as a Decision Factor	Property & a subset of the concept of PEOU in the "Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Ease of Use informs Intension To Use System (1) Perceiving to Use System Easily (1) Perception of Easily Using The Tracking System (1) Easy Use of Tracking System is a Perception (1) Perception of Easy Use of Tracking System (1)	Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.

Perceiving System to be Easily Use (1)	High Perception of Easy to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving that System is very Easy to Use (1)		
Using System Easily is a High Perception (1)		
Tracking System Perceived as Easy To Use (1)		
Perceiving Friendly System Usage (1)		
Perceiving Ease of System Use as Deciding Factor (1)	Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceived Ease of Use informs Intention To Use (1)		
Deciding To Use System- Ease of Use Perception (1)		
Ease of Use informs Intension To Use System (1)		
Perceiving to Use System Easily (1)		
Perception of Easily Using The Tracking System (1)	Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Easy Use of Tracking System is a Perception (1)		
System Being Used Easily is the Perception (1)		
Perception of Easy System Usage (1)		
Using System Easily is a Perception (1)		
Being Easy To Use System is a Perception (1)	User Perceive Easy System Usage as a Decision Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving Friendly System Usage (1)		
Perceiving Ease of System Use is a Decision Factor (1)		
Perceived Ease of Use informs Intention To Use (1)		
Deciding To Use System- Ease of Use Perception (1)		
Ease of Use informs Intension To Use System (1)	Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving to Use System Easily (1)		
Perception of Easily Using The Tracking System (1)		
Easy Use of Tracking System is a Perception (1)		
Perception of Easy Use of Tracking System (1)		
Using Tracking System - Auto Alerting Features (1)	Tracking System Use is Important &Beneficial	A Property & a subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of "Intention To Use
Using Vehicle tracking systems is very Safe (1)		
Tracking System Usage is very Beneficial (1)		
Using Tracking System for Business is Important (1)		
Tracking System Usage Ensures Business Security (1)		
Using Tracking System Reduces Fuel Consumption (1)		

Tracking System Usage Curbs down Travel Times (1)		System & Actual System Use.
Using Tracking System Mitigates gas Emission (1) Using Tracking System Increases Productivity (1) Tracking System Usage Protects Properties (1) Tracking System Usage Saves Lives (1) Using Tracking System Improves Revenue (1) Using Tracking Systems Impacts - Individual Performance (1) Tracking System Usage Warrants Business Security (1)	Tracking System Use Saves Lives, Protects Properties, Impacts on Individual Performance & Increases Productivity	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Using Tracking Systems Impacts on Group Performance (1) Using Tracking Systems Impacts on Organizational Performance (1) Using Tracking Systems Impacts on Internal Customer Relations (1) Using Tracking Systems Impacts on External Customers (1) Using Tracking Systems Impacts on Internal Business Transactions (1) Using Tracking Systems Impacts on External Business Transactions (1) Using Tracking Systems Impacts on Organizational Business Transactions (1)	Tracking System Use Impacts on Group & Organizational Performance, Internal & External Customers &Business Transactions	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Using Tracking Systems Impacts- Individual Productivity (1) Using Tracking Systems Impacts on Group Productivity (1) Using Tracking Systems Impacts Internal Productivity (1) Using Tracking Systems Impacts External Productivity (1) Using Tracking Systems Impacts Organizational Productivity (1) Using Tracking Systems Impacts Public Image (1) Using Tracking Systems Impacts on Public Perceptions (1)	Tracking system Use Impacts on Individual, Group, Organizational, Internal, External Productivities	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the "Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Using Tracking Systems Impacts on Group Profits (1) Using Tracking Systems Impacts on Internal Profits (1) Using Tracking Systems Impacts on External Profits (1) Using Tracking Systems Impacts on Organizational Profits (1) Using Tracking Systems Impacts on Internal Business Transactions (1) Using Tracking Systems Impacts on External Business	Tracking system Use Impacts on Group, Internal, External & Organizational	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use

Transactions (1)	Profits & Business Transactions	System & Actual System Use.
Using Tracking Systems Impacts on Organizational Business Transactions (1)		
Using Tracking Systems Impacts on Individual Benefits (1)	Tracking system Use Impacts on Individual, Group, Internal, External & Organizational Benefits	A Property & a Subset of the concept of Tracking System Use& a Subset of the Construct of the "Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Using Tracking Systems Impacts on Internal Benefits (1)		
Using Tracking Systems Impacts on External Benefits (1)		
Using Tracking Systems Impacts on Group Benefits (1)		
Using Tracking Systems Impacts on Organizational Benefits (1)		
Using Tracking Systems Impacts on Customer Benefits (1)		
Using Tracking Systems Impacts on Benefits (1)		
High User Satisfaction building Intention To Use System (1)	System Usefulness, Performance &User-satisfaction Trigger Intention To Use Tracking Systems	Aa Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
High System Performance calling for Intention to Use(1)		
System Usefulness - intention to Use Tracking System (1)		
System Performance triggering Intention to Use (1)		
High Level User Satisfaction Creating Intention To Use (1)		
High System Performance calling for Intention to Use(1)		
High Level User Satisfaction Creating Intention To Use (1)	Credible System Features & Competitive Pricing Initiate Intention to Use Tracking Systems	Property of the concept of "Intention To Use System" & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
High Level of System Performance calling for Intention to Use(1)		
High System Usefulness Initiating Intention to Use (1)		
Having Intentions to Use based on Features (1)		
Having Intention To Use Cheaper System (1)		
Having Intention to Use Successful Systems (1)		
Having Intention To Use Credible Systems (1)		
Having Intention To Use System With Highly Perceived Performance (1)	System Suppleness & User Interests Give Birth to Intention to Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU &Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
High System Suppleness causing Intention to Use System (1)		
System Usefulness Demanding intention to use (1)		
High System Performance Meeting Intention to Use (1) System		

High Level User Interest Yielding Intention to Use System (1) Showing Intention to Use Successful Systems (1) High System Performance Creating Intention to Use System (1) High System Performance generating Intention to Use System (1)	User Interest & System Performance Agitate for Intention To Use Tracking systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU &Tracking System Use, with two outputs: the concepts of Actual System Use &OUS.
Having Intentions to Use System for More Benefits (1) Low Cost System Resulting in Intention To Use System (1) Moderate System Cost Mounting Intention to Use System (1) Vendor Credibility wining Intention To Use Systems (1) Perceiving High Performance To Use System (1) High System Performance Meeting Causes to Use System (1) High Level User Interest Yielding Intention to Use System (1)	Lost-Medium System Costs, Vendor Credibility Agitate for Intention to Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU &Tracking System Use, with two outputs: the concepts of Actual System Use &OUS.
Good System Performance clicks Intention to Use System (1) High System Performance Yielding Intention to Use System (1) Having Intentions to Use System for More Benefits (1) Having Intentions to Use System for More Benefits (1) Low Cost System Resulting in Intention To Use System (1) High System Alertness causing Intention to Use System (1) System Usefulness Demanding intention to use (1) Intention	High System Performance & More Benefits Yield Intention to Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use &OUS.
System Quality Being Good (1) Actual Use Information Quality Being High (1) Level of QoS Being High (1) Perceiving High System Usefulness (1) Perceiving Ease of Use of System (1) Information Quality Being Good (1)	High System & Information Qualities, Usefulness & Ease of Use	A Property of the Concept of Actual System Use & a Subset of the Construct of the Intervening Variables). It is an antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System &OUS, with single output - i.e., System Benefit.
Quality of Information Being High (1)	High	Property of the Concept of

Tracking System Quality Being High (1) QoS being Commendable (1) Perceiving High System Usefulness (1) System Use Being Easy (1) System Quality Being Appreciable (1)	Information & System Qualities, Usefulness & Ease of Use Leads to Actual System Use.	Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Quality of Information Being Warranted (1) Perceiving High System Usefulness (1) Information Quality Being Good (1) Quality of Information Being High (1) Perceiving High System Performance (1) System use Being Easy (1)	High System & Information Qualities, Performance, Usefulness & Ease of Use Result in Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Information Quality Being Good (1) System Quality Being High (1) Information Quality Being Good (1) Quality of Information Being High (1) QoS Being Good (1) Perceiving High System Usefulness (1)	Good Information & System Qualities, High QoS & Usefulness, Create Actual System Use.	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Not Satisfying With Information Relevancy (1) Offering Relevant Information (1) Improving Information Relevancy (1) Achieving 99% Information Relevance (1) Providing Non-relevant Information (1) Comprehending Information satisfactorily (1) Info Comprehensiveness Improves Info Quality (1) Interpreting Information satisfactorily (1)	Information Relevancy & Comprehensiven ess, & Improved Tracking Information Quality Trigger Actual Use Of System	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality "System Benefit, Etc.
Interpreting Information satisfactorily (1) Interpreting Received Info with little difficulties (1) Interpreting Information Fully (1) Interpreting Received Information Easily (1) Information Interpretativeness is Satisfying (1) Info Interpretativeness Is Somehow Satisfying (1)	Information Interpretativene ss & Enhanced Tracking Information Quality Demands for Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.

Info Interpretativeness Is fairly Satisfying (1) Actual Use		
Providing High Quality Information to Achieve Commendable (1) OUS	Tracking System Users Perceive Improved Overall User-Satisfaction	A Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
Positing Positive Overall User Satisfaction (1)		
Achieving Overall User Satisfaction positively (1)		
Improving Overall User Satisfaction (1)		
Anticipating Higher Overall User Satisfaction (1)		
Achieving Overall Satisfaction Positively (1)		
Determining Overall User Satisfaction (1)		
Experiencing Overall User Satisfaction (1)	Tracking System Users Expect High Level of Overall User Satisfaction	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of "System Benefit", Etc.
Benchmarking Overall User Satisfaction (1)		
Showing Overall User Satisfaction (1)		
Demonstrating Overall User Satisfaction (1)		
Experiencing 95% Overall User satisfaction (1)		
Achieving 90 & Overall User Satisfaction (1)		
Expecting 95% Overall User Satisfaction (1)	High Level of Information Quality Enhances OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Chopping Average Overall User Satisfaction (1)		
Perceiving 100% Overall User Satisfaction (1)		
Providing High Quality Information to Ensure OUS (1)		
Positing Positive Overall User Satisfaction (1)		
Achieving Overall User Satisfaction positively (1)		
Improving Overall User Satisfaction (1)	High System Quality Increases OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Anticipating Higher Overall User Satisfaction (1)		
Achieving Overall User Satisfaction Positively (1)		
Determining Overall User Satisfaction (1)		
Experiencing Overall User Satisfaction (1)		
Benchmarking Overall Satisfaction (1)		
Showing Overall User Satisfaction (1)	High System Information Quality Creates OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of "System Benefit, Etc.
Demonstrating Overall Satisfaction (1)		
Experiencing 80% Overall User satisfaction (1)		
Achieving 98% Overall User Satisfaction (1)		
Expecting 100% Overall User Satisfaction (1)		

Chopping Average Overall User Satisfaction (1)		
Perceiving 99% Overall User Satisfaction (1) Showing Overall User Satisfaction (1) Demonstrating Overall User Satisfaction (1) Experiencing 99% Overall User Satisfaction (1) Achieving 100 & Overall User Satisfaction (1)	Good System Quality Generates OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Expecting 99% Overall User Satisfaction (1) Chopping Average Overall User Satisfaction (1) Perceiving 98% Overall User Satisfaction (1) Benchmarking Overall User Satisfaction (1) Showing Overall User Satisfaction (1) OUS	High Level System performance Results in OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Not Satisfying With Information Relevancy (1) Offering Relevant Information (1) Improving Information Relevancy (1) Information Credibility Requiring Improvement of (1) Satisfying Information Credibility Relatively (1) Achieving 99% Information Relevance (1)	Information Relevancy, Credibility, Comprehensiveness & Improvement Causes System User Satisfaction	A Property of the Concept of "Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent & causality of the concept of "Net Benefit & User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors & Net Benefits.
Providing Non-relevant Information (1) Comprehending Information satisfactorily (1) Information Credibility Requiring Improvement of (1) Satisfying Information Credibility Relatively (1) Not Comprehending Information Fully (1) Information Comprehensiveness is Satisfying (1)	System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Comprehensiveness Is Somehow Satisfying (1) Comprehensiveness Is fairly Satisfying (1) Information credibility Is Satisfying (1) Achieving 99% Information Relevance (1) Providing Non-relevant Information (1) Information credibility Is Quite Satisfying (1)	Information Improvement Causes System User Satisfaction	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors.
Information credibility Is Fairly Satisfying (1) Information Credibility Requiring Improvement of (1)	System User Satisfaction Generated by	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening

Satisfying Information Credibility Relatively (1) Providing Non-relevant Information (1) Comprehending Information satisfactorily (1)	Information Credibility, Comprehensiveness & Relevancy.	Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors.
Interpreting Information Conveniently (1) Interpreting Information Inconveniently (1) Information Usage Being Convenient (1) Interpreting Information Is Somewhat Convenient (1) Information Interpretation Is Fairly Comprehensive (1)	System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit User Reporting System & Service Performance to Vendors.
Information credibility Is Satisfying (1) Information credibility Is Quite Satisfying (1) Information credibility Is Fairly Satisfying (1) Information Credibility Requiring Improvement of (1) Satisfying Information Credibility Relatively (1)	Information Credibility Impacts Positively on System User Satisfaction	Property of the Concept of "Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors.
Interpreting Information Conveniently (1) Interpreting Information Inconveniently (1) Information Usage Being Convenient (1) Interpreting Information Is Somewhat Convenient (1) Interpreting Information Comprehensively (1) User Sat	Information Interpretiveness & Comprehensiveness originate System User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit" &User Reporting System & Service Performance to Vendors.
Timely Alerting & Reporting System Faults to Vendor (1) Reporting to Vendor Reporting System Performance Status To Vendor (1) Detailing Manage Reports (1) Using System without any Breakdowns (1) Reporting To Management & then to vendor (1)	Reporting System Faults, Breakdowns & Performance Status to Vendor Users Report System/Service Performance to Vendors	A Property of the Concept of Report To Vendors/Operators; the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).
Reporting System & Service Status To Vendor (1) Contacting Head of Section on Breakdowns(1) Reporting Faulty System & Service To Vendor (1) Reporting Poor System & Service Performance to Operator (1)	Users Report System & Service Status & Performance to	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an

Timely Reporting System Faults to Operator (1)	Operator	antecedent of the concept of Vendors Address System/Service Problems, Etc.
Timely Alerting System Operator On Malfunctions (1)		
Detailing System & Service Reports to Operator(1)	Alerting & Sending System & Service Failures to Operator	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Sending System Report Daily to Vendor (1)		
Reporting Service & System problems to Operator (1)		
Reporting Unsatisfactory System/ Service Status To Vendor (1)		
Sending Daily System & Service Reports to Operator (1)		
Reporting Poor System & Service Status to Vendor (1)	Reporting System & Service Faults & Breakdowns to Mgt & Vendor	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Reporting System & Service Faults to Operator (1)		
Alerting Vendor on Failures of Systems Services & (1)		
Reporting System & Service Faults to Operators (1)		
Detailing System & Service Reports to Vendor (1)		
Reporting System & Service Breakdowns to Operator (1)	Alerting & reporting System & Service Breakdowns, Faults & Failures to Vendors / Operators	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Using System without any Breakdowns (1)		
Reporting To Management & then to vendor (1)		
Reporting System & Service Status To Vendor (1)		
Contacting Head of Section on Breakdowns(1)		
Reporting Faulty System & Service To Vendor (1)	Detailing System/Service Performance to Vendors/Operators for Redress.	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Alerting Vendor on Failures of Systems & Services (1)		
Reporting System & Service Faults to Operators (1)		
Detailing System & Service Reports to Vendor (1)		
Reporting System & Service Breakdowns to Operator (1)Report Rep To Vendors		
Vendors Taking Reports To Address System & Service Problems (1)	Vendors/Operators Address System & Service Problems	A Property of the Concept of "Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the "IS Use which forms the Construct of the Independent Variables.
Vendors Restoring System & Service Problems (1)		
Operators Solving System & Service Problem (1)		
Vendors Providing Solutions to System & Service Problems (1)		
Vendors Fixing System & Service Problems (1)		
Suppliers Addressing System & Service Problems (1)		
Operators Maintaining Good System & Service (1)		Property of the Concept of

Vendors Restoring Good System & Service Performance (1)	Vendors Address Unsatisfactory System Performance	Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use). Its O/P will feed the Concept of IS Use, which forms the Construct of the Independent Variables.
Vendors Taking Reports To Address System & Service Problems (1)		
Vendors Restoring System & Service Problems (1)		
Operators Solving System & Service Problem (1)		
Vendors Providing Solutions to System & Service Problems (1)		
Vendors Fixing System & Service Problems (1)	Suppliers Address System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Suppliers Addressing System & Service Problems (1)		
Operators Maintaining Good System & Service (1)		
Vendors Restoring Good System & Service Performance (1)		
Suppliers Addressing System & Service Problems (1)		
Operators Maintaining Good System & Service (1)	Operators Maintain Tracking System & Service Performances	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Vendors Restoring Good System & Service Performance (1)		
Vendors Taking Reports To Address System & Service Problems (1)		
Vendors Restoring System & Service Problems (1)		
Operators Solving System & Service Problem (1)		
Vendors Providing Solutions to System & Service Problems (1)	Vendors & Operators Provide Solutions to System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Vendors Fixing System & Service Problems (1)		
Suppliers Addressing System & Service Problems (1)		
Operators Maintaining Good System & Service (1)		
Vendors Restoring Good System & Service Performance (1)		
Vendors Restoring System & Service Problems (1)	Operators & Vendors Restore Tracking System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Operators Solving System & Service Problem (1)		
Vendors g Fixing System & Service Problems (1)		
Vendors Providing Results System & Service Problems (1)		
Suppliers Addressing System & Service Problems (1)		

Operators Maintaining Good System & Service (1)	Vendors, Operators & Suppliers Maintain & Address Tracking System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the "Independent Variables.
Vendors Restoring Good System & Service Performance (1)		
Suppliers Addressing System & Service Problems (1)		
Operators Maintaining Good System & Service (1)		
Vendors Restoring Good System & Service Performance (1) Vendors Address Problems		
Individual Impact, Meeting Annual Targets (1) Individual &Group Impacts	System Performance Enhances individual Out Put.	A Property of the Concept of Individual & Group Impacts (the 1st& 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied Together with the concepts of External & Organizational Impacts, the Individual & Group Impacts concepts form part of the Causalities of the Concepts of OUS & Continuous Use of Tracking Systems. They will take 3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied? With 2 outputs - the Concepts of Tracking System Use & OUS.
Recording Individual Impact- Estimating Vehicle Locations (1)		
Establishing Individual Impact By Curbing Fuel Consumption (1)		
Creating Individual Impact BY Planning Routes (1)		
Generating Individual Impact BY Processing Data Faster Than Before (1)		
Recording Individual Impact By Estimating Vehicle Locations (1)	Accurate Vehicle Location Impacts on Individual's Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Making Individual Impact, Meeting Annual Targets (1)		
Creating Individual Impact BY Planning Routes (1)		
Generating Individual Impact BY Processing Data Faster Than Before (1)		
Establishing Individual Impact - Curbing Fuel Consumption (1)	Curbing Fuel Consumption	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS& Is User
Making Individual Impact, Meeting Annual Targets (1)		
Recording Individual Impact - Estimating Vehicle Locations (1)		

Establishing Individual Impact - Curbing Fuel Consumption (1)	Impacts on Individual's Expenditure	Satisfied; have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Individual Impacts Meeting Annual Targets (1) Creating Individual Impact BY Approving Routes (1) Generating Individual Impact BY Processing Data Faster Than Before (1) Recording Individual Impact - Estimating Vehicle Locations (1) Establishing Individual Impact - Curbing Fuel Consumption (1)	Plying Approved Routes Impacts on Individual's Travel & Delay Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS &Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Creating Group Impact BY Planning Routes (1) Generating Group Impact BY Processing Data Faster Than Before (1) Achieving Group Impact Regarding Over-speed Reduction (1) Realizing Group Impact regarding Cost Reduction (1) Registering Group Impact About Internet Bandwidth Mgt (1)	Plying Planned Routes Impacts on Group's Travel & Delivery Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have 3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Realizing Group Impact regarding Cost Reduction (1) Group Impact regarding Enhanced Delivering Times (1) Establishing Group Impact for Revenue Increase (1) Group Impact regarding Enhanced Delivering Times (1) Establishing Group Impact for Revenue Increase (1)	Revenue Increases Impact on Group's Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Realizing Group Impact regarding Cost Reduction (1) Achieving Group Impact Regarding Over-speed Reduction (1) Registering Group Impact Regarding Internet Bandwidth Mgt (1) Achieving Group Impact Regarding Over-speed Reduction (1)	Cost Reductions Impact On Group's Financial	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the "Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User

Registering Group Impact Regarding Internet Bandwidth Mgt (1)	Activities	Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Realizing Group Impact regarding Cost Reduction (1)	Revenue Increase & Cost Cutting Impact on Group's Delivery Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS& Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Group Impact regarding Enhanced Delivering Times (1)		
Establishing Group Impact for Revenue Increase (1)		
Showing g Group Impact on Enhanced Delivering Times (1)		
Establishing Group Impact for Revenue Increase (1)		
Realizing Group Impact regarding Cost Reduction (1)	High Internet Bandwidth & Speed impact on Group's Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Achieving Group Impact Regarding Over-speed Reduction (1)		
Registering Group Impact for Internet Bandwidth Mgt (1)		
Establishing Group Impact for Revenue Increase (1)		
Group Impact regarding Delivering Times (1)		
Realizing Group Impact regarding Cost Reduction (1)	Reduction Of Over-speed & Costs Impact on Group's Outputs	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS &Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Achieving Group Impact Regarding Over-speed Reduction (1)		
Registering Group Impact on Internet Bandwidth Mgt (1)		
Establishing Group Impact for Revenue Increase (1)		
Group Impact regarding Delivering Times (1)		
Enjoying External Impacts in View of Delivering Goods JIT (1) External Impacts	System Performance Impact Positively On External Customer Loyalty & Business	A property of the concept of External Impact (the 3rd Subset of the Construct of "Dependent Variables).It forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS,
Accumulating External Impact By Attracting New Investors (1)		
Gaining External Impacts By Adding More Clients (1)		
Building External Impacts, Improving Public Image (1)		

Registering External Impact By Curtailing Internet Fraud (1)	Transactions.	with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Enjoying External Impacts on Just In Time Delivering Goods (1) Accumulating External Impact By Attracting New Investors (1) Gaining External Impacts By Adding More Clients (1) Building External Impacts, Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1)	JIT Delivery Impacts on External Business Transactions.	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Gaining External Impacts in Delivering Goods JIT (1) Accumulating External Impact By Attracting New Investors (1) Gaining External Impacts By Adding More Clients (1) Building External Impacts, Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1)	Attraction of New Investors Impact Positively on External Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Causing External Impact By Attracting New Investors (1) Registering External Impact By Curtailing Internet Fraud (1) Building External Impacts, Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1) Gaining External Impacts in Delivering Goods JIT (1) Accumulating External Impact By Attracting New Investors (1)	Cubing Internet Frauds Impacts Positively on External Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Enjoying External Impacts in JIT Delivering Goods (1) External Impact By drawing New Investors (1) Gaining External Impacts - Recruiting New Clients (1) Building External Impacts, Improving Public Image (1) Registering External Impact By Curtailing Internet Fraud (1)	Attracting New Investors Impacts Positively on Organizational Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Gaining External Impacts in Delivering Goods JIT (1) External Impact By Attracting New Investors (1) Gaining External Impacts By Adding More Clients (1)	Adding New	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the

Building External Impacts, Improving Public Image (1)	Clients Impacts Positively on Organizational Business Transactions	causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use &OUS.
Registering External Impact By Curtailing Internet Fraud (1)		
cause External Impact by Winning New Investors (1)	JIT Delivery & New Investments Impact Positively on Organizational Business Transactions	Property of the Concept of External Impact" (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use &OUS, with 2 O/Ps - the Concepts of Tracking System Use &OUS.
Registering External Impact By Curtailing Internet Fraud (1)		
External Impacts, Improving Public Image (1)		
External Impact By Curtailing Internet Fraud (1)		
Gaining External Impacts in Delivering Goods JIT (1)		
External Impact - Contracting New Investors (1)		
Improving System Performance - Positive Organizational Impact (1)	System Performance Impact Positively on Public Image / Perception,	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Increasing Customer Trust Is Generating Organizational Impact (1)		
Establishing Group Impact on Revenue Increase (1)		
Group Impact regarding Delivering Times (1)		
Enjoying Group Impacts by Delivering Goods JIT (1)		
High OUS Impacts on Organizational Business Activities (1)	Business Plans, Decisions, Customer Trust, Profit Maximization & Organizational Impact.	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use& OUS, with 2 O/Ps - the Concepts of Tracking System Use& OUS.
High Level of Actual System Creates Organizational Impact (1)		
Improving System Performance By Creating Positive Organizational Impact (1)		
Increasing Customer Trust Is Generating Organizational Impact (1)		
Achieving Profit Maximization Is Enhancing Organizational Impact (1)		
Improving System Performance by Attaining Organizational Impact (1)	Restricting Diversions/Detours Impacts on Organizational Profit Margins	
Reducing Costs & Accident Rates (1)		
Lessening Fuel Consumption (1)		
Restricting Diversion Of Goods (1)		
Increasing Annual Profit Margin (1)		
Enhancing Public Image & Perception (1) Org Impacts		

Prolonging Vehicle Life Spans Imparts on Organizational Benefits(1) Org Benefits Curtailing Fuel Consumption & Pollution Imparts on Organizational Benefits (1) Achieving Short Travel-distances Imparts on Organizational Benefits (1) Culminating Into Organizational Benefits (1) Travel-time & Distance Cut Down (1)	Pollution Mitigation Imparts on Organizational Benefits	A property of the Concept of Organizational Impact in the Concept of the Net Benefits (the 4th Subset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, &Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS&Is User Satisfied? With 3 O/Ps: the Concepts of: OUS, Is User Satisfied?&Tracking System Use.
Less Expenditure on Overtime Payments Imparts on Organizational Benefits (1) Reducing Fuel Consumption Imparts on Organizational Benefits (1) Cutting Down general Costs Imparts on Organizational Benefits (1) Cutting Costs, Saving Lives & Properties Imparts on Organizational Benefits (1) Restrained Waists & Expenditure Imparts on Organizational Benefits (1)	Life saving Imparts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits. Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS& Is User Satisfied? It has 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? & OUS.
Lessing Expenditure on Fuel & Maintenance Imparts on Organizational Benefits (1) Vehicles Being in Good Conditions Imparts on Organizational Benefits (1) Carrying Out Efficient Logistical Operations Imparts on Organizational Benefits (1) Knowing Real Time Vehicle Status Imparts on Organizational Benefits (1) Maintaining Existing Clients & Wining New Ones Imparts on Organizational Benefits (1)	Knowing Real Time Vehicle Status Imparts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits. Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS&Is User Satisfied? It has 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?& OUS.
Prolonging Vehicle Life Spans Imparts on Organizational Benefits (1) Org Benefits Curtailing Fuel Consumption & Pollution Imparts on Organizational Benefits (1) Achieving Short Travel-distances Imparts on Organizational Benefits (1) Culminating Into Organizational Benefits Imparts on Organizational Benefits (1)	Minimized Travel Times & Distances Imparts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits. Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? Has 3 O/Ps: - the Concepts of: Tracking System Use, Is User

Travel-time & Distance Cut Down Imparts on Organizational Benefits (1)		Satisfied? & OUS.
Less Expenditure on Overtime Payments Imparts on Organizational Benefits (1)	Restraining Waist & Expenditure Imparts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits. Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? Has 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? Has 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?& OUS.
Reducing Fuel Conception Imparts on Organizational Benefits (1)		
Cutting Costs Down Imparts on Organizational Benefits (1)		
Cutting Costs, Saving Lives & Properties Imparts on Organizational Benefits (1)		
Restrained Waists & Expenditure Imparts on Organizational Benefits (1)		
Lessing Expenditure on Fuel & Maintenance Imparts on Organizational Benefits (1)	Less Fuel Expenditure Impacts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits. Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? Has I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? Has 3 O/Ps: - the Concepts of: Tracking System Use Is User Satisfied? & OUS.
Vehicles Being in Good Conditions Imparts on Organizational Benefits (1)		
Carrying Out More Logistical Operations Imparts on Organizational Benefits (1)		
Knowing Real Time Vehicle Status Imparts on Organizational Benefits (1)		
Maintaining Existing Clients & Wining New Ones Imparts on Organizational Benefits (1)		
Total Opening / Initial Codes: 595	**Total Provisional Categories: 113**	-

APPENDIX F: THE SELECTIVE CODING PROCESS

Appendix F houses the Substantive Coding Process; it is the third step in the data analysis process. The first column re-captures the Provisional Categories produced at the end of the focused coding process. The second column records the 2nd opening/initial codes generated during the 2nd batch data collection phase. The third column shows Substantive Categories produced during this selective coding process. The last column contains memos or notes describing the emerged substantive codes, showing their properties, dimensions, relationships and their causalities.

Appendix F: The Selective Coding Process

<table>
<tr><th>PROVISIONAL CATEGORIES (Imported From Appendix D)</th><th>2ND BATCH DATA COLLECTED
(Comparing With Existing Provisional Categories)</th><th>SUBSTANTIVE CATEGORIES</th><th>MEMOS</th></tr>
<tr><td rowspan="5">Tracking System Quality Depend s on System Flexibility, & Ease of Use (2)</td><td>Requiring System Flexibility (1)</td><td rowspan="10">Tracking System Quality Reckons on System Flexibility, Availability & Reliability (3)</td><td rowspan="10">Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.</td></tr>
<tr><td>System Being reasonably Flexible (1)</td></tr>
<tr><td>Having Flexibility Challenges (1)</td></tr>
<tr><td>System Being Quite Flexible (1)</td></tr>
<tr><td>System being Quite Flexible (1)</td></tr>
<tr><td rowspan="5">System Availability 24/7 Ensures Tracking System Quality (2)</td><td>Making System Availability Through Backup Battery (1)</td></tr>
<tr><td>System Being Available & Reliable (1)</td></tr>
<tr><td>Keeping System Available all the Time (1)</td></tr>
<tr><td>System Being Available Most of the Time (1)</td></tr>
<tr><td>System Working Reliably, thus available (1)</td></tr>
<tr><td rowspan="5">Tracking System Quality Requires Good & Communication Flow (2)</td><td>Improving Communication so much (1)</td><td rowspan="5">Improved Communication & Information Accuracy</td><td rowspan="5">A property & a</td></tr>
<tr><td>Improving Communication Flow (1)</td></tr>
<tr><td>Needing to Improve Communication Flow (1)</td></tr>
<tr><td>Experiencing breaks in communication Flow (1)</td></tr>
<tr><td>Expanding Communication Flow (1)</td></tr>
</table>

Accurate Vehicle Location Information Determines Tracking System Quality (2)	Estimating Tracking System Accuracy (1)	Determines Tracking System Quality (3)	Subset of the concept of Tracking System Quality
	Detailing Vehicle Information (1)		
	Improving System Accuracy (1)		
	Specifying Location Information (1)		
	Working on Location Accuracy (1)		
System Durability, Usability & Usage Satisfaction Establishes Tracking System Quality (2)	Viewing Historical Data (1)	System Durability, Usability, Usage Satisfaction & Historic Data Establishes Tracking System Quality (3)	A property & a Subset of the concept of Tracking System Quality
	Retrieving Historic Data (1)		
	Displaying Historic Data (1)		
	Retrieving 24 months Historic Data (1)		
	Accessing Historic data on Weekly Basis (1)		
High System Quality Requires High Quality Information (2)	Requiring High Quality Information (1)	High System Quality &High Usage Satisfaction Levels Result in High Tracking System Quality (3)	A property & a Subset of the concept of Tracking System Quality
	Paying Attention to System Quality (1)		
	Adhering to System Quality (1)		
	Measuring System Quality Regularly(1)		
	Benchmarking System Quality (1)		
Quality of GPS images Directly Links to Tracking System Quality (2)	Enjoying 99% System Satisfaction (1)		
	Limiting System Satisfaction to 79% (1)		
	Observing 80% System Satisfaction 100% (1)		
	Recording 99% Satisfaction (1)		
	Limiting Satisfaction To 85%		
Vehicle Location Info Conciseness & Contemporari-ness , determine Tracking Information Quality (2)	Getting Real Time Information (1)	Relevancy, Conciseness & Updated Vehicle Location & Status Information Enhance Tracking System Information (3)	Property & a Subset of the concept of Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
	Refreshing Information Every 5 Min (1)		
	Receiving Information Frequently (1)		
	Retrieving Information regularly (1)		
	Revising System Information hourly (1)		
Frequent Information Availability &Updates Result in Good Quality of Tracking	Outputting Information Purposeful (1)		
	Capturing Relevant Information (1)		
	Meeting Information Relevancy (1)		
	Retrieving Relevant Information (1)		

Information (2)	Information Being Relevant (1)		
Regular & Persistent Information Updates Guarantees Tracking Information Quality (2)	Having Information on Vehicle Status (1) Packaging Information Needs (1) Offering 80% t Information (1) Refining Received Information (1) Tailoring info to Suit Everyone (1)	Regular Vehicle Information Refinements, Updates, Retrievability Maintainability Guarantee Tracking Information Quality(3)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Interests Progresses Quality of Tracking Information (2)	Polishing Information Quality (1) Retrieving Information Efficiently (1) Maintaining Information Quality (1) Delays Hampering Information Quality (1) Not Compromising Info Quality Information (1)		
Detailing Information Purpose Augments Quality of Tracking Information (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking Information Quality is Augmented by Meeting User Interests & Purpose (3)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Information Needs & Demands Reckons on Tracking Information Quality (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Information Completeness generates Tracking Information Quality (2)	No New Revelations/Data Was Gathered On This Provisional Category	Real Time Information, its Completeness &Accuracy Warrant Tracking System Quality(3)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Accurate & Timely Vehicle Location Information delivery amounts to Tracking Information Quality (2)			
Users Perceive Very Reliable & Supportive Tracking System Service (2)	Tracking System Being Reliability (1) Anticipating Reliable System Service (1) Proving Reliability Service (1) Offering Reliable Service (1) Rendering Reliable Service (1)	Users Perceive High Level of Tracking system service Reliability & Supportiveness (3)	A property & a Subset of the concept of Tracking Service Quality; Subset of the Construct of the Independent Variables& Antecedent of PSU, PEOU, OUS.
	Experiencing Insignificant Service Outage (1)		

System Outages/ Breakdowns hampering Tracking Service Quality (2)	Restoring Service Outage (1)	Insignificant Service Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality (3)	Property & a Subset of the concept of "Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
	Outages Not Occurring Very Often (1)		
	Recording Outages Almost Every Two Months (1)		
	Outages Happening Thrice a Year (1)		
Short service restoration-duration Boosts Tracking Service Quality (2)	Restoring Service Within 48 Hrs (1)		
	Fixing Service Within 24 Hrs (1)		
	Reinstating Service Within 1 Hr or More (1)		
	Returning Service after 24 Hours (1)		
	Repairing Service Breakdowns About 36 Hrs (1)		
Effective & Efficient response to service failures & breakdowns result in high Tracking Service Quality (2)	Responding Brilliantly to Faults & Outages (1)	Effective Responses & Efficient Restoration of System service Generate High Tracking Service Quality (3)	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
	Responding Efficiently In Restoring Faults (1)		
	Responding To Breakdowns - 60% Efficiency (1)		
	Responding Quite Efficiently To Breakdowns (1)		
	Efficiently Responding To Faults (1)		
Recuperating Tracking Service Quality Efficiently Generates user satisfaction (2)	Revamping System QoS (1)		
	Aligning QoS Parameters Quarterly (1) Having more QoS Details(1)		
	Bettering QoS at all times (1)		
	Delays In Setting Up Administrative Accounts Affect QoS (1)		
	Delays In Setting Up Administrative Accounts Affect QoS (1)		
Ensuring & Improving QoS Influences Tracking Service Quality (2)	No New Revelations/Data Was Gathered On This Provisional Category	Ensuring & Improving QoS Influences Tracking Service Quality (3)	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.

Users Perceive Excellent System Performance & Proofing Concept (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Perceive Excellent System Performance & High System Usefulness (3)	A property & a Subset of the concept of "Perceived System Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU& OUS.
Perceiving High System Performance & Usefulness (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Users Perceive High Speed System Connectivity & High System Performance (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Perceive High Speed System Connectivity & Satisfactory Performance (3)	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, have no input. Antecedents to the concepts of PSU, PEOU & OUS.
Users Perceive Tracking Systems To Perform Excellently & Satisfactorily (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Users Expecting Proofing & System Performance (2)	Expecting High System Quality (TM)	Users Expect High System Quality & Performance; High Information Quality (3)	A property & a Subset of the concept of Expectation Disconfirmation, & a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
	Expecting Satisfactorily System Performance (FrM)		
	Expecting Reduced Diversions & Fuel Consumptions (LM)		
	Expecting very High QoS		
	Expecting very High Information Quality		
Users Expect the Best Tracking System Performance (2)	Expecting High System Performance (1)	Users Expect High Tracking System Stability, Speed, Accuracy & Performance Upgrades (3)	Property & a Subset of the concept of Perceived System Performance, in Independent Variables. Subset of antecedents to the concepts of PSU, PEOU &OUS.
	Expecting Very Good System Performance (1)		
	Expecting Accurate System Performance (1)		
	Expecting A Stable System (1)		
	Expecting Speedy and Accurate Performance (1)		
Users Expect Tracking System Performance to be Upgraded (2)	No New Revelations/Data Was Gathered On This Provisional Category		
	Perceiving A Very Useful System (1)		A Property of the concept of PSU& a Subset of the
	Perceiving A Very Good System Usefulness (1)		

Users Perceive Competitive & Long-term System Usefulness (2)	Perceiving A Very Reliable System (1)	Users Perceive High Reliability, Competitive System Usefulness& High Information Quality (3)	Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
	Perceiving a Very High Information Quality (1)		
	Perceiving 99% System Performance (1)		
Tracking system Users Perceive High System Usefulness (2)	Perceiving A Very Useful System (1)		
	Perceiving A Very Good System Usefulness (1)		
	Perceiving A Very Reliable System (1)		
	Perceiving a Very High Information Quality (1)		
	Perceiving 99% System Performance (1)		
Users have High Perceptions on Tracking System Usefulness (2)	Perceiving High Level System Usefulness (1)	Users Perceive High, Perpetual, Dependable, Persistent, Commendable, Achievable, Enterprising & Profit-driven System Usefulness (3)	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
	Perceiving Dependable System Usefulness (1)		
	Perceiving Competitive System Usefulness (1)		
	Perceiving Persistent System Usefulness (1)		
	Perceiving 100% System Usefulness (1)		
Users Perceive Competitive & Perpetual Tracking System Usefulness (2)	Perceiving Commendable System Useful (1)		
	Perceiving Achievable System Usefulness (1)		
	Perceiving Marketable System Usefulness (1)		
	Perceiving Enterprising System Usefulness (1)		
	Perceiving Profit-driven System Usefulness (1)		
Users Perceive Outstanding & Agreeable Tracking System Usefulness (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Perceive Outstanding & Agreeable Tracking System Usefulness (3)	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	High Perception of Ease of Use of Tracking Systems is a Deciding Factor (3)	A Property & a subset of the concept of PEOU & a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent
Perceiving Ease Of Tracking System Usage is a Deciding Factor (2)	No New Revelations/Data Was Gathered On This Provisional Category		

			Variables. It is an antecedent to the concept of Intention To Use System.
High Perceptions of Easy Tracking System Usage (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Highly Perceive Easy System Usage in Making Decisions (3)	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceive Easy System Usage as a Decision Factor (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Perception of Ease of System Use Informs Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	User Perceptions of Ease of System Use Inform Intentions& Decisions to Use Tracking Systems (3)	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Perceiving Ease Of Tracking System Usage is a Deciding Factor (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Aggressive Perceptions of Easy Tracking System Usage (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Aggressively Perceive Easy Tracking System Usage as a Resolution Factor(3)	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Easy System Usage as a Decision Factor (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Perception of Ease of System Use Informs Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems(3)	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
	Having Intentions to Use System With More Features & Benefits (1)		A Property & a subset of the concept of Tracking System
	Having Intention To Use Cheaper System (1)		
	Having Intention to Use Systems being Used		

Tracking System Use is Important &Beneficial (2)	Already By Other Successful organizations (1)	Tracking System Use is Beneficial in Saving Lives, Protects Properties, &Increases Performance/ Satisfaction &Productivity Levels (3)	Use& a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System &Actual System Use.
	Having Intention To Use Systems From Credible Vendors (1)		
	Having Intention To Use System With High Perceived Performance (1)		
Tracking System Use Saves Lives, Protects Properties, Impacts on Individual Performance & Increases Productivity (2)	Perceiving High Degree of System Satisfaction (1)		
	Perceiving System Usefulness (1)		
	Perceiving System Performance (1)		
	Perceiving User High Level Satisfaction (1)		
	Perceiving High Degree of System Performance (1)		
	Perceiving High System Performance (1)		
Tracking System Use Impacts on Group & Organizational Performance, Internal & External Customers & Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking System Use Impacts on Group, Internal, External & Organizational Performances, & I Customers & Business Transactions (3)	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Org'nal, Internal, External Productivities (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Tracking system Use Impacts on Group, Internal, External & Organizational Profits & Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking system Use Impacts on Organizational Profits Margins & Business Transactions (3)	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Internal, External & Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category		

System Usefulness, Performance &User-satisfaction Trigger Intention To Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	Credible System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems (3)	A Property of the concept of Intention To Use System& a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU& Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
Credible System Features & Competitive Pricing Initiate Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
System Suppleness & User Interests Give Birth to Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	System Suppleness, Performance & User Interests Stimulate Users' Intentions To Use Tracking systems (3)	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEO &Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
User Interest & System Performance Agitate for Intention To Use Tracking systems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Low-Medium System Costs, Vendor Credibility Agitate for Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category	Low -Medium System Costs, Vendor Credibility, High System Performance &Benefits Generate Intention to Use	Property of the concept of "Intention To Use System" & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use,

		Tracking Systems (3)	with two outputs: the concepts of Actual System Use &OUS.
High System Performance & More Benefits Yield Intention to Use Tracking Systems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
High System & Information Qualities, Usefulness & Ease of Use (2)	No New Revelations/Data Was Gathered On This Provisional Category	High System & Information Qualities, Usefulness & Ease of Use Leads to Actual System Use (3)	A Property of the Concept of Actual System Use & a Subset of the Construct of the Intervening Variables). It is an antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of "Tracking System Use, Intention To Use System& OUS, with single output - i.e., System Benefit.
High Information & System Qualities, Usefulness & Ease of Use Leads to Actual System Use (2)	No New Revelations/Data Was Gathered On This Provisional Category		
High System & Information Qualities, Performance, Usefulness & Ease of Use Result in Actual System Use (2)	No New Revelations/Data Was Gathered On This Provisional Category	High System & Information Qualities, High QoS Performance, Usefulness & Ease of Use Create Actual System Use (3)	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Good Information & System Qualities, High QoS & Usefulness, Create Actual System Use (2)	No New Revelations/Data Was Gathered On This Provisional Category		

Information Relevancy & Comprehensiveness, & Improved Tracking Information Quality Trigger Actual Use Of System (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking Information Quality, Relevancy, Comprehensive-ness & Interpretativeness Induce Actual System Use (3)	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Information Interpretative-ness & Enhanced Tracking Information Quality Demands for Actual System Use (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Tracking System Users Perceive Improved Overall User-Satisfaction(2)	Identifying Vehicle Locations Anytime (1)	Users Perceive & Expect High Tracking Information Relevancy & Competitive System Usefulness, Leading to High Overall User-Satisfaction (3)	A Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
	Wishing To have Better Overall Satisfaction (1)		
	Anticipating A Better Overall Satisfaction (1)		
	Getting Information that We Need (1)		
	Being Satisfied With System Usefulness (1)		
	System Supporting Quick Service Delivery (1)		
	Meeting IT Operational Requirements (1)		
Tracking System Users Expect High Level of Overall User Satisfaction(2)	Being Satisfied With Information Relevancy (1)		
	Experiencing Average Information Relevancy (1)		
	Providing About 80% Information Relevancy (1)		
	Achieving 99% Information Relevancy (1)		
	Relevance of Received Information is Gratifying (1)		
	Enjoying A Fair Overall Satisfaction (1)		
High Level of Information Quality Enhances OUS (2)	Comprehending Information Fully (1)	High Level of Tracking Information Credibility &	Property of the Concept of Overall User Satisfaction & a Subset of the
	Comprehending Information satisfactorily (1)		
	Interpreting Information for Comprehensiveness BY All (1)		
	Satisfying Comprehensiveness Averagely (1)		
	Fairly Satisfying Comprehensiveness (1)		
	Recording 70% Overall Satisfaction (1)		
	Satisfying Information credibility (1)		
	Satisfying Information credibility Is (1)		
	Fairly Satisfying Information credibility (1)		

<table>
<tr><td rowspan="3">High System Quality Increases OUS (2)</td><td>Requiring Information Credibility Improvement (1)</td><td rowspan="10">Comprehensive-ness Increases OUS(3)</td><td rowspan="10">Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.</td></tr>
<tr><td>Satisfying Information Credibility Relatively (1)</td></tr>
<tr><td>Experiencing Average Overall Satisfaction (1)</td></tr>
<tr><td rowspan="7">High System Information Quality Creates OUS (2)</td><td>Being Satisfied With System Accessibility (1)</td></tr>
<tr><td>Being Satisfied With System Accessibility (1)</td></tr>
<tr><td>Facing Difficulties In Accessing the System (1)</td></tr>
<tr><td>Enjoying The Degree of System Accessibility (1)</td></tr>
<tr><td>Improving Upon The Degree of Accessibility (1)</td></tr>
<tr><td>Wishing To have Better Overall Satisfaction (1)</td></tr>
<tr><td></td></tr>
<tr><td>Good System Quality Generates OUS (2)</td><td>No New Revelations/Data Was Gathered On This Provisional Category</td><td rowspan="2">Good System Quality &High Level System Performance Motivate OUS(3)</td><td rowspan="2">Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.</td></tr>
<tr><td>High Level System performance Results in OUS (2)</td><td>No New Revelations/Data Was Gathered On This Provisional Category</td></tr>
<tr><td>Information Relevancy, Credibility, Comprehensiveness & Improvement Causes System User Satisfaction (2)</td><td>No New Revelations/Data Was Gathered On This Provisional Category</td><td rowspan="2">Relevancy, Credibility &Comprehensive ness Information Cause System User Satisfaction(3)</td><td rowspan="2">A Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent& causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors &Net Benefits.</td></tr>
<tr><td>System User Satisfaction Created by Information Relevancy, Comprehensive-ness & Credibility (2)</td><td>No New Revelations/Data Was Gathered On This Provisional Category</td></tr>
<tr><td>Improvement in Information Quality Causes System User Satisfaction (2)</td><td>No New Revelations/Data Was Gathered On This Provisional Category</td><td>Improvement in</td><td>Property of the Concept of Is User Satisfied & a Subset of the Construct of</td></tr>
</table>

System User Satisfaction Generated by Information Credibility, Comprehensiveness & Relevancy (2)	No New Revelations/Data Was Gathered On This Provisional Category	Information Quality, Credibility, Comprehensiveness & Relevancy Causes System User Satisfaction(3)	the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of "Net Benefit & User Reporting System & Service Performance to Vendors.
System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility (2)	No New Revelations/Data Was Gathered On This Provisional Category	System User Satisfaction Created by Information Relevancy, Comprehensive-ness & Credibility(3)	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of "Net Benefit & User Reporting System & Service Performance to Vendors.
Information Credibility Impacts Positively on System User Satisfaction (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Information Interpretiveness & Comprehensiveness originate System User (2)	No New Revelations/Data Was Gathered On This Provisional Category	Information Interpretiveness & Comprehensiveness originate System Tracking User Satisfaction(3)	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of "Net Benefit &User Reporting System & Service Performance to Vendors.
Reporting System Faults, Breakdowns & Performance Status to Vendors (2) Users Report System/Service Performance to	Reporting Non-system-performance To Vendor (1)	Tracking System Users Report System & Service Faults, Breakdowns & Performance Status to Vendors	Property of the Concept of Report To Vendors / Operators; the last but one Subset of the Construct of the Intervening
	Users Reporting Unsatisfactory Service to Vendor (1)		
	Falling on the Service Provider to restore System Faults (1)		
	Reporting Unsatisfactory Performance to Service Provider (1)		
	Reporting Unsatisfactory Performance to		

Operators (2)	System Operator (1)	/ Operators (3)	Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).
Users Report System & Service Status & Performance to Vendors (2)	Reporting the Situation to Mgt (1)		
	Informing Mgt About the Situation (1)		
	Reporting Persistent Unsatisfactory Performance to Vendor & Mgt (1)		
	Escalating Reports to Operator & Mgt (1)		
	Reporting Unsatisfactory Perform to Mgt (1)		
Alerting & Sending System & Service Failures to Operators (2)	No New Revelations/Data Was Gathered On This Provisional Category	Alerting & Reporting System & Service Failures To Head/ Operations & Vendors (3)	Property of the Concept of Report To Vendors/Operators a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Reporting System & Service Faults & Breakdowns to Head/Operations & Vendors (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Alerting & reporting System & Service Breakdowns, Faults & Failures to Vendors / Operators (2)	No New Revelations/Data Was Gathered On This Provisional Category	Detailing &Alerting System &Service Performance to Vendors/Operato rs for Redress(3)	Property of the Concept of Report To Vendors / Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Detailing System &Service Performance to Vendors/Operators for Redress (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Vendors/Operators Address System & Service Problems(2)	No New Revelations/Data Was Gathered On This Provisional Category	Vendors/Operato rs / Suppliers Address System & Service Problems(3)	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use
Suppliers Address System & Service Problems Performance(2)	No New Revelations/Data Was Gathered On This Provisional Category		

			which forms the Construct of the Independent Variables.
Vendors Address Unsatisfactory System& Service Performance (2)	No New Revelations/Data Was Gathered On This Provisional Category	Vendors &Operators Maintain Tracking System & Service Quality By Addressing Unsatisfactory System& Service Performances(3)	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Operators Maintain Tracking System & Service Performances (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Vendors & Operators Provide Solutions to System & Service Problems (2)	No New Revelations/Data Was Gathered On This Provisional Category	Vendors & Operators Restore / Provide Solutions to System &Service Problems(3)	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Operators & Vendors Restore Tracking System & Service Problems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Vendors, Operators & Suppliers Maintain & Address Tracking System & Service Problems (2)	No New Revelations/Data Was Gathered On This Provisional Category		
System Performance Enhances individual Out Put (2)	Creating Individual Impact By Meeting Targets (1)	Tracking System	A Property of the Concept of Individual & Group Impacts (the
	Establishing Individual Impact By Estimating Vehicle Locations (1)		
	Recognizing Individual Impact By Curbing Fuel Consumption (1)		

	Registering Individual Impact BY Planning Routes (1)	Performance Enhances individuals' Out Put (3)	1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied
	Generating Individual Impact BY Processing Data Faster Than Before (1)		
Track System Performance Enhances ImprovesIndividuals' Out Put (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Accurate Vehicle Location Impacts on Individuals' Performance (2)	Seeing Group Impact regarding Enhanced Delivering Times (1)	Accurate Vehicle Location Impacts on Individuals'& Groups' Performance (Curbing Fuel Consumption & Reducing General Expenditure) (3)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied;, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use& OUS, Etc.
	Observing Group Impact regarding Revenue Increase (1)		
	Achieving Group Impact regarding Cost Reduction (1)		
	Realizing Group Impact Regarding Over-speed Reduction (1)		
	Accomplishing Group Impact Regarding Internet Bandwidth Mgt (1)		
Curbing Fuel Consumption Impacts on Individuals' Expenditure (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Plying Approved Routes Impacts on Individual's Travel & Delay Times (2)	No New Revelations/Data Was Gathered On This Provisional Category	Plying Planned &Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times (3)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied;, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Plying Planned Routes Impacts on Group's Travel & Delivery Times (2)	No New Revelations/Data Was Gathered On This Provisional Category		

Revenue Increases Impact on Group's Performance (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking System & Service Cost Reductions &Revenue Increases Impact Positively on Groups' Financial Performance(3)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Cost Reductions Impact On Group's Financial Activities (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Revenue Increase & Cost Cutting Impact on Group's Delivery Times (2)	No New Revelations/Data Was Gathered On This Provisional Category		
High Internet Bandwidth & Speed impact on Groups' Performance (2)	No New Revelations/Data Was Gathered On This Provisional Category	High Internet Bandwidth & Speed impact on Groups' Performance(3)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of "Actual System Use, OUS& Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Reduction In Over-speed & Costs Impact on Group's Outputs (2)	No New Revelations/Data Was Gathered On This Provisional Category	Reduction In Over-speed &Accident Recurrent-expenditures (By Tracking Systems) Impacts on Group's	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have3 inputs: i.e., the concepts of Actual

		Outputs(3)	System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
JIT Delivery Impacts on External Business Transactions (2)	Gaining External Impacts in View of Delivering Goods Just In Time (JIT) (1)	Tracking System& Service Performances & JIT Delivery Impact Positively On External Customer Loyalty & Business Transactions (3)	A property of the concept of External Impact (the 3rd Subset of the Construct of Dependent Variables). It forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use &OUS, with 2 O/Ps - the Concepts of Tracking System Use &OUS.
	Building External Impact By Attracting New Investors (1)		
	Facilitating External Impacts By Adding More Clients (1)		
	Constructing External Impacts By Improving Public Image (1)		
	Registering External Impact By Curtailing Internet Fraud (1)		
System Performance Impact Positively On External Customer Loyalty & Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Attraction of New Investors Impact Positively on External Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category	Attraction of New Investors Impact Positively on External & External Business Transactions(3)	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use
Attracting New Investors Impacts Positively External Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category		

			& OUS.
Adding New Clients Impacts Positively on External Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category	Acquiring &Adding New Clients & Investors Impact Positively on External Business Transactions(3)	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use &OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
JIT Delivery & New Investors Impact Positively on External Business Transactions (2)	No New Revelations/Data Was Gathered On This Provisional Category		
System Performance Impact Positively on Public Image / Perception (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking System Performance Impact Positively on Public Image, Business Plans, Decisions, Customer Loyalty, Profit Maximization & External Profit Margins (3)	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use &OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Business Plans, Decisions, Customer Trust, Profit Maximization &External Impact (2)			
Restricting	Improving System Performance Will Create Positive Organizational Impact (1)	Restricting Diversions/Detours By Tracking Systems Enhances Clients' Trust &Impacts	A Property of the Concept of Organizational Impact in the Concept of the Net Benefits (the
	Improving System Performance Is Attaining Organizational Impact By (1)		
	Achieving Profit Maximization Is Enhancing		

Diversions/Detours Impacts on Organizational Profit Margins (2)	Organizational Impact (1)	Positively on Organizational Profit Margins(3)	3rdSubset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, &Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS& Is User Satisfied? With 3 O/Ps: the Concepts of: OUS, Is User Satisfied? &Tracking System Use.
	Increasing Revenue generation Is Improving Organizational Impact (1)		
	Increasing Customer Trust Is Generating Organizational Impact (1)		
Pollution Mitigation Imparts on Organizational Benefits (2)	Impacting Positively on Business (1)		
	Providing Conducive Business Environment (1)		
	Benefiting From System Performance (1)		
	Experiencing Positive Net benefits (1)		
	Improving Business Transactions (1)	Environmental Pollution Mitigation Saves Life, Imparts Positively on Organizational Net Benefits(3)	
Life saving Imparts on Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Knowing Real Time Vehicle Status Imparts on Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category	Knowing Real Time Vehicle Status & Minimizing Travel Times & Distances Imparts Positively on Organizational Net Benefits (3)	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, & Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? Has 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? & OUS.
Minimized Travel Times & Distances Imparts on Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category		
Restraining Waist & Expenditure Imparts on Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category	Tracking Systems Restrain Waists in Fuel	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of:

Less Fuel Expenditure Impacts on Organizational Benefits (2)	No New Revelations/Data Was Gathered On This Provisional Category	Consumption & in Related Expenditures; Thus, Imparting Positively on Organizational Net Benefits(3)	Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? Has 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?& OUS.
-	**-**	**Total Substantive Categories: 59**	**-**

APPENDIX G: THE SATURATION CODING PROCESS

Appendix G contains the Saturation Coding Process; it is the fourth step in the data analysis process. The first column re-echoes the previous substantive categories produced at the end of the selective coding process. The second column depicts the 3rd initial/opening codes generated during the 3rd batch data collection phase. In the third column, the Core Categories produced during this process are captured. As before, the last column contains memos or notes describing the emerged core categories, their relationships and causalities.

Appendix G: The Saturation Coding Process

<table>
<tr><th>SAUBSTANTIVE CATEGORIES</th><th>3RD BATCH DATA COLLECTED
(3RD OPENING CODING) - COMPARING WITH EXISTING 2ND CATEGORIES</th><th>CORE CATEGORIES</th><th>MEMOS</th></tr>
<tr><td>Tracking System Quality Reckons on System Flexibility, Availability & Reliability (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">Tracking System Quality Reckons on System Flexibility, Availability, Reliability, Improved Communication & Information Accuracy (4)</td><td rowspan="2">Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.</td></tr>
<tr><td>Improved Communication & Information Accuracy Determines Tracking System Quality (3)</td><td>New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td>System Durability, Usability, Usage Satisfaction & Historic Data Establishes Tracking System Quality (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">Tracking System Quality System is Achieved by System Durability, Usability & Maintainability
(4)</td><td rowspan="2">A property & a Subset of the concept of "Tracking System Quality"</td></tr>
<tr><td>High System Quality &High Usage Satisfaction Levels Result in High Tracking System Quality (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
</table>

Relevancy, Conciseness & Updated Vehicle Location & Status Information Enhance Tracking System Information (3)	No New Revelations/Data Was Gathered On This Substantive Category	Information Quality in a Tracking System is Attained through System Performance &User Satisfaction (4)	Property & a Subset of the concept of Tracking System Information Quality; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular Vehicle Information Refinements, Updates, Retrievability Maintainability Guarantee Tracking Information Quality (3)	No New Revelations/Data Was Gathered On This Substantive Category	Regular Vehicle Information Refinements, Updates, Retrievability, Meeting User Interests & Purpose Guarantee the Quality of Tracking Information (4)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Tracking Information Quality is Augmented by Meeting User Interests & Purpose (3)	No New Revelations/Data Was Gathered On This Substantive Category		
	No New Revelations/Data Was Gathered On This Substantive Category		
Real Time Information, its Completeness & Accuracy Warrant Tracking System Quality (3)	No New Revelations/Data Was Gathered On This Substantive Category	Real Time Information, its Completeness & Accuracy Augment Tracking System Quality (4)	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
	No New Revelations/Data Was Gathered On This Substantive Category		
Users Perceive High Level of Tracking service Reliability & Supportiveness(3)	No New Revelations/Data Was Gathered On This Substantive Category	High Levels of Tracking service Reliability, Supportiveness, Insignificant Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality (4)	Property & a Subset of the concept of Tracking Service Quality; a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.
Insignificant Service Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Effective Responses & Efficient Restoration of System service Generate High Tracking Service	No New Revelations/Data Was Gathered On This Substantive Category	Effective Responses & Efficient Restoration of System service &	Property & a Subset of the concept of Tracking Service Quality (Independent

Quality (3)		Improving QoS Generate High Tracking Service Quality (4)	Variables); Antecedent of PSU, PEOU, OUS.
Ensuring & Improving QoS Influences Tracking Service Quality (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Users Perceive Excellent System Performance & High System Usefulness (3)	System Being Available For Use (1)	Tracking System Users Perceive Excellent System Performance, High System Usefulness &Simplest Usage Process (4)	Property & a Subset of the concept of "Perceived System Performance", Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS
	Seeing No Impact Yet (1)		
	Linking Performance To Usage Process (1)		
	Associating Performance To Usage (1)		
	Performance Depending On Usage Process (1)		
	System Impacting positively on Performance (1)		
	Not Seeing Impact On Usage (1)		
	Mapping System Performance Onto System Usage Process (1)		
	System Performing Satisfactorily (1)		
Users Perceive High Speed System Connectivity & Satisfactory Performance (3)	No New Revelations/Data Was Gathered On This Substantive Category	Tracking System Users Perceive High Speed System & Service Connectivity& Satisfactory Performance (4)	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
	No New Revelations/Data Was Gathered On This Substantive Category		
Users Expect High System Quality & Performance; High Information Quality (3)	Expecting Useful System (1)	Users Expect High Level System, Service & Information Quality; High Degree System & Service Performance; & High Level User Satisfaction (4)	A property & a Subset of the concept of Expectation Disconfirmation, & a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
	System Performing Satisfactorily (1)		
	System Performing Effective (1)		
	Expecting Useful Service (1)		
	Offering Accurate Information (1)		
Users Expect High Tracking System Stability, AccuracySpeed, & Performance	Expecting Total User Satisfaction (1)		
	Expecting Max User Satisfaction(1)		
	Expecting User Satisfaction (1)		
	Expecting Absolute User Satisfaction (1)		

<table>
<tr><td>Upgrades (3)</td><td>Expecting Positive User Satisfaction (1)</td><td></td><td></td></tr>
<tr><td>Users Perceive High Reliability, Competitive System Usefulness & High Information Quality (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td>Users Perceive High System Reliability&, High Service Quality & High Information Quality to Trigger Their Intentions to Use Systems /Services (4)</td><td>Property of the concept of PSU& a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.</td></tr>
<tr><td>Users Perceive High, Perpetual, Dependable, Persistent, Commendable, Achievable, Enterprising & Profit-driven System Usefulness (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">Tracking System Users Perceive Outstanding & Agreeable System Usefulness

(4)</td><td rowspan="2">Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.</td></tr>
<tr><td>Users Perceive Outstanding & Agreeable Tracking System Usefulness (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td rowspan="12">High Perception of Ease of Use of Tracking Systems is a Deciding Factor (3)</td><td>System Being Easy For Use (1)</td><td rowspan="12">Users Perceive Ease Of Tracking System Use to Create their Intentions To Use Tracking Systems (4)</td><td rowspan="12">A Property & a subset of the Concept of PEOU. It Links to the Concept of Perceived Ease Of Use, an antecedent if the Concept of Intention To Use Tracking Systems.

It Originates from the Concepts of Perceived System Performance &Expectation Disconfirmation- all fro m the Constructs of the Independent Variables</td></tr>
<tr><td>System Being Easy For Use (1)</td></tr>
<tr><td>Using System Easily (1)</td></tr>
<tr><td>Being Easy To Use System (1)</td></tr>
<tr><td>Leading To Intention To Use System (1)</td></tr>
<tr><td>Informing Intention To Use System (1)</td></tr>
<tr><td>Forming Intention To Use System (1)</td></tr>
<tr><td>Deciding To Use System (1)</td></tr>
<tr><td>Informing Intension To Use System(1)</td></tr>
<tr><td>Intending to Use System (1)</td></tr>
<tr><td>Easy Using The Tracking System (1)</td></tr>
<tr><td>Easy Using The Tracking System (1)</td></tr>
</table>

<table>
<tr><td>Users Highly Perceive Easy Tracking System Usage in Making Decisions (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="3">Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems (4)</td><td rowspan="3">A Subset of the Core Category which belongs to the Concept of PEOU in the Construct of the Intervening Variables.

It is the 2nd Antecedent of the Concept of Intention To Use Tracking Systems.

The 1st Antecedent is PSU.</td></tr>
<tr><td>Users Aggressively Perceive Easy Tracking System Usage as a Resolution Factor (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td>Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td>Tracking System Use is Beneficial in Saving Lives, Protects Properties, & Increases Performance/Satisfaction & Productivity Levels (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td>Tracking System Use is Beneficial in Saving Lives, Protecting Properties, &Increasing Productivity Levels (4)</td><td>A Property & a Subset of the Concept of Tracking System Use, connected to the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System & Actual System Use.</td></tr>
<tr><td>Tracking System Use Impacts Group, Internal, External & Org'nal Performances, & on Business Transactions (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">Tracking System Use Impacts on Group, Internal, External & Organizational Performances, Profits Margins & on all Aspects of Business Transactions (4)</td><td rowspan="2">A Subset of the Core Category which belongs to the Concept of Tacking System Use, in the Construct of the Intervening Variables.</td></tr>
<tr><td>Tracking system Use Impacts Org'nal Profits Margins & Business Transactions (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
</table>

<table>
<tr><td>Credible System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td>Reliable Tracking System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems (4)</td><td>Property of the concept of Intention To Use Tracking Systems & a Subset of the Construct of the Intervening Variables; an Antecedent of the Concept of Actual System Use & OUS. It will take three I/Ps: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.</td></tr>
<tr><td>System Suppleness, Performance & User Interests

Stimulate Users' Intentions To Use Tracking systems (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">Vendor Credibility, High System Performance, Affordability,

User Interests, Perceived & Expected Benefits

Stimulate Users' Intentions To Use Tracking systems (4)</td><td rowspan="2">A Subset of the Core Category which belongs to the Concept of Intention to Use Tacking System Use, in the Construct of the Intervening Variables.</td></tr>
<tr><td>Low - Medium System Costs, Vendor Credibility, High System Performance & Benefits Generate

Intention to Use Tracking Systems(3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td>High System & Information Qualities, Usefulness & Ease of Use Lead to Actual System Use (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="2">High System & Information Qualities, High QoS& Performance; System Usefulness & Ease of Use Lead to Actual Tracking System Use (4)</td><td rowspan="2">Property of the Concept of Actual System Use, & a Subset of the Construct of the Intervening Variables.

It is an Antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit.</td></tr>
<tr><td>High System & Information Qualities, High QoS , Performance, Usefulness & Ease of Use Create Actual System Use (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
</table>

Tracking Information Quality, Relevancy, Comprehensiveness & Interpretativeness Induce Actual System Use (3)	No New Revelations/Data Was Gathered On This Substantive Category	Tracking System Information Quality, Comprehensiveness, Relevancy & Interpretativeness Persuade Actual Tracking System Use (4)	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an Antecedent & Causality System Benefit, Etc.
Users Perceive & Expect High Tracking Information Relevancy & Competitive System Usefulness, Leading to High Overall User-Satisfaction (3)	Providing High Quality Information (1) Positing Positive Overall Satisfaction (1) Achieving Overall Satisfaction positively (1) Improving Overall Satisfaction (1) Anticipating Higher Overall Satisfaction (1) Achieving Overall User Satisfaction (1) Determining Overall User Satisfaction (1) Experiencing Overall User Satisfaction (1) Benchmarking Overall User Satisfaction (1) Showing Overall User Satisfaction (1) Demonstrating Overall User Satisfaction (1) Experiencing 80% Overall satisfaction (1) Achieving 90 & Overall User Satisfaction (1) Expecting 95% Overall User Satisfaction (1) Chopping Overall User Satisfaction (1) Perceiving 100% Overall Satisfaction (1)	Users Perceptions & Expectations of their Overall User-Satisfaction is Determined By High Tracking Information Quality, Relevancy, QoS& Competitive System Usefulness(4)	Property of the Concept of "Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility & Comprehensiveness Increases OUS (3)	No New Revelations/Data Was Gathered On This Substantive Category	High Level of Tracking Information Credibility & Quality, C comprehensiveness & High Level System Performance Motivate OUS (4)	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Good System Quality & High Level System Performance Motivate OUS (3)	No New Revelations/Data Was Gathered On This Substantive Category		

Relevancy, Credibility & Comprehensive Information Cause System User Satisfaction (3)	No New Revelations/Data Was Gathered On This Substantive Category	Tracking Information Relevancy, Credibility & Comprehensiveness Generate System User Satisfaction (4)	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors &Net Benefits.
Improvement in Information Quality, Credibility, Comprehensive-ness & Relevancy Causes System User Satisfaction (3)	No New Revelations/Data Was Gathered On This Substantive Category		
System User Satisfaction Created by Information Relevancy, Comprehensive-ness & Credibility (3)	No New Revelations/Data Was Gathered On This Substantive Category User Satisfaction	Tracking System Information Completeness, Integrity, Interpretiveness & Usefulness Derive User Satisfaction (4)	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Information Interpretiveness & Comprehensiveness originate System Tracking User Satisfaction (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Tracking System Users Report System & Service Faults, Breakdowns & Performance Status to Vendors / Operators (3)	Reporting To System Operator (1)	Tracking System Users Report System & Service Faults, Breakdowns &Unsatisfactory Performance Status to Vendors / Operators /Suppliers (4)	Property of the Concept of Report To Vendors / Operators; the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).
	Reporting To System Operator (1)		
	Reporting To System Vender (1)		
	Reporting To Service Provider (1)		
	Reporting To System Supplier (1)		
	Report To System Provider (1)		
	Reporting To Service Provider (1)		
	Reporting To Vendor (1)		

	Reporting To Supplier (1)		A Platform For Users To Report Their Un-satisfactory System & Service Performances To Vendor For Redress, the last but one interface unit Intervening & Independent Variables.
Alerting & Reporting System & Service Failures To Head/ Operations & Vendors (3)	No New Revelations/Data Was Gathered On This Substantive Category	Alerting & Reporting System & Service Failures To Head/ Operations & Vendors (4) Detailing & Alerting System & Service Performance to Vendors / Operators for Redress (4)	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Detailing & Alerting System & Service Performance to Vendors / Operators for Redress (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Vendors / Operators / Suppliers Address System & Service Problems ()	Vendor Addressing System & Service Performance Efficiently (1)	Unsatisfactory Tracking System & Service Performance Issues are Addressed By Vendors, Operators & Suppliers (4)	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
	Vendor Restoring System Performing Reliably (1)		
	System Performing Accurately (1)		
	System Performing Creditably (1)		
	System Performing Simply (1)		
	Vendor Taking Reports (1)		
	Vendor Restoring System (1)		
	Vendor Solving System Problem (1)		
	Vendor Providing Solution (1)		
	Vendor Restoring System (1)		
	Supplier Addressing Problems (1)		An intervening core category & a causality of the concept of non-user satisfaction & calls on vendor to address non- performances of tracking systems &

			services
Vendors &Operators Maintain Tracking System & Service Quality By Addressing Unsatisfactory Performances (3)	No New Revelations/Data Was Gathered On This Substantive Category	Vendors & Operators Restore, Maintain &Provide Solutions to Tracking System & Service Problems (4)	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables".
Vendors & Operators Restore / Provide Solutions to System & Service Problems (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Tracking System Performance Enhances individuals' Out Put (3)	Group Benefiting From High System & Service Performances (1)	High Tracking System & Service Performance Enhances individuals' & Groups' Out Puts & Benefits (4)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & "Is User Satisfied
	Group Benefiting Successfully (1)		
	Reducing Group Round Trips (1)		
	Group Benefiting From Less Delays (1)		
	Group Benefiting Quality Information (1)		
Accurate Vehicle Location Impacts on Individuals' & Groups' Performance (Curbing Fuel Consumption & Reducing General Expenditure) (3)	No New Revelations/Data Was Gathered On This Substantive Category	Plying Planned & Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times& Cuts Costs (4)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS" &Is User Satisfied;, have 3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use" &OUS, Etc.
Plying Planned & Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times (3)	No New Revelations/Data Was Gathered On This Substantive Category		

<table>
<tr><td>Tracking System & Service

Cost Reductions & Revenue Increases Impact Positively on Groups' Financial Performance (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td rowspan="3">Tracking System & Service Cost Reductions,& Revenue Increases, Impact Positively on Groups' Financial Performances (4)</td><td rowspan="3">Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have 3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.</td></tr>
<tr><td>High Internet Bandwidth & Speed impact on Groups' Performance (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td>Reduction In Over-speed & Accident Recurrent-expenditures (By Tracking Systems) Impacts on Group's Outputs (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td></tr>
<tr><td rowspan="5">Tracking System & Service Performances & JIT Delivery Impact Positively On External Customer Loyalty & Business Transactions (3)</td><td>Performance Building External Image (1)</td><td rowspan="5">Tracking System & Service Performances Impact Positively On Attracting New External Clients & Retaining Existing Ones Through Public Image Enhancement (4)</td><td rowspan="5">Property of the concept of External Impact (the 3rd Subset of the Construct of Dependent Variable).It forms part of the causalities of the concepts of OUS &Tracking System Use.

Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.

A Core Category relating to the construct of Net System Benefit forming the Stem of the Dependent Variables.</td></tr>
<tr><td>Impacting On External Recognition (1)</td></tr>
<tr><td>Impacting Positive - External Suppliers (1)</td></tr>
<tr><td>Impacting On External Client Doubling (1)</td></tr>
<tr><td>Impacting - External Customer Retention (1)</td></tr>
<tr><td>Attraction of New Investors Impact Positively on External & External Business Transactions (3)</td><td>No New Revelations/Data Was Gathered On This Substantive Category</td><td></td><td></td></tr>
</table>

Acquiring & Adding New Clients/ Investors Impact Positively on External Business Transactions (3)	No New Revelations/Data Was Gathered On This Substantive Category	Tracking System Performance Impact Positively on Attracting New Investors. External Business Plans &Profit Margins (4)	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use& OUS, with 2 O/Ps - the Concepts of "Tracking System Use" & "OUS".
Tracking System Performance Impact Positively on Public Image, Business Plans & External Profit Margins (3)	No New Revelations/Data Was Gathered On This Substantive Category		
Restricting Diversions / Detours By Tracking Systems Enhances Clients' Trust & Impacts Positively on Organizational Profit Margins(3)	Impacting On Net Benefits Positively (1)	Tracking System Performance Enhances Positively on Organizational Profit Margins& Net Benefits as a whole. (4)	Property of the Concept of Organizational Impact in the Concept of the Net Benefits (the 3rd Subset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, &Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS& Is User Satisfied?; with 3 O/Ps: the Concepts of: OUS, Is User Satisfied?& Tracking System Use.
	Perceiving High User Satisfaction (1)		
	Impacting On Net Benefits Positively (1)		
	0Impacting On Profit Maximization (1)		
	Performance Impacting Positively On Individual (1)		
	Achieving Individual Daily Targets (1)		
	Performance Aiding Individual Works (1)		
	System Performance Aiding Individual Fuel Reductions (1)		
	Performance Curbing Individual Travel Times (1)		
High Performance of Good Tracking Systems Imparts Positively on Organizational Net Benefits (3)	Witnessing Positive Organizational Impacts (1)	High Performance of Good Tracking Systems Imparts Positively on	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied?. 3 I/Ps: the Concepts of:
	Showing Organizational Revenue Generation (1)		
	Managing Organizational Performance (1)		
	Offering Organizational Customer Satisfaction (1)		
	Performance Impacting Positively on Organization (1)		

Tracking Systems Restrain Waists in Fuel Consumption & in Related Expenditures; Thus, Imparting Positively on Organizational Net Benefits (3)	No New Revelations/Data Was Gathered On This Substantive Category	Organizational Revenue Generation, Expenditures & Net Benefits as a Whole (4)	Actual System Use, OUS&Is User Satisfied?; has 3 O/Ps: - the Concepts of: "Tracking System Use, Is User Satisfied?& OUS.
TOTAL SUBSTANTIVE CATEGORIES: 59	-	**TOTAL CORE CATEGORIES: 34**	-

APPENDIX H: THE THEORETICAL CODING PROCESS

This Appendix H holds the Theoretical Coding Process which produced the required theoretical concepts to develop the targeted IVTS success model, per the main objective of this research. This stage is the fifth step in the data analysis process. The first column re-displays the previous core categories produced at the end of the saturation coding process. The second column portrays the Theoretical Categories produced during this current process. Placed in the third column are Theoretical Concepts produced as a result of refining and conceptualizing the initial theoretical categories. Expectedly, the last column contains memos or notes explaining the relationships and causalities among the emerged theoretical concepts.

These theoretical concepts are the ultimate outcome or results of the data analysis process, and are subjected to further analysis in the next chapter, i.e., Chapter Six: Presentation and Analysis of Research Results.

Appendix H: The Theoretical Coding Process

CORE CATEGORIES	THEORETICAL CATEGORIES	THEORETICAL CONCEPTS	MEMOS
Tracking System Quality Reckons on System Flexibility, Availability, Reliability, Improved Communication & Information Accuracy (4) Tracking System Quality System is Achieved by System Durability, Usability & Maintainability (4)	Tracking System Quality Can Be Achieved Through System Flexibility, Availability, Reliability, Durability, Usability, Maintainability, Improved Communication & Information Accuracy(5)	**Tracking System Quality is a Causality of Satisfactory Tracking System Usage** **(6)**	A Concept of Tracking System Quality, a Subset of the Construct of the Independent Variables & an Antecedent of PSU, PEOU & OUS
Information Quality in a Tracking System is Attained through Information Relevancy, Accuracy, Refinements & Usefulness(4)	Information Quality in a Tracking System is Attained through	**Information Relevancy,**	Property & a Subset of the concept of Tracking System Information Quality; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU &

Persistent Information Updates, Retrievability, Completeness/Comprehensiveness Guarantee the Quality of Tracking Information (4) Real Time Information, its Completeness & Accuracy Augment Tracking System Information Quality (4)	Information Relevancy, Accuracy, Refinements, Persistent Updates, Retrievability, Interpretiveness, Comprehensiveness & Usefulness Guarantee the Quality of Tracking Information(5)	**Accuracy, Refinements, Persistent Updates, Retrievability, Comprehensiveness, Interpretiveness & Usefulness Are Determinant s of the Quality of Tracking Information (6)**	OUS. Has no I/P. Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
High Levels of Tracking Service Reliability, Supportiveness, Insignificant Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality (4) Effective Responses & Efficient Restoration of System service & Improving QoS Generate High Tracking Service Quality (4)	High Levels of Tracking Service Reliability, Supportiveness, Insignificant Outages, Efficient &Effective Restoration Ensure High Tracking Service Quality (5)	**Service Availability, Reliability, Supportiveness, Insignificant Outages, Efficient & Effective Restoration, Usefulness & User Satisfaction Are Causal Factors of Tracking Service Quality (6)**	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS. Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Tracking System Users Perceive Excellent System Performance, High System Usefulness & Simplest Usage Process (4) Tracking System Users Perceive High Speed & Bandwidth System Connectivity & Satisfactory Performance (4)	Vehicle Tracking System Users Perceive Excellent System Performance, Simplest Usage Process, High Speed & Bandwidth System Connectivity & High System Usefulness (5)	**Tracking System Users Perceive Excellent System Performance, Simplest Usage Process & System Usefulness (6)**	Property &a Subset of the concept of Perceived Tracking System Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Users Expect High Level System, Service & Information Quality; High	Users Expect High Level System, Service & Information Quality; High Degree System & Service Performance; & High Level User Satisfaction in their User Decision Making	**Tracking System Users Expect High Level System &Service Performance; High Information Quality, Usefulness &**	Property & a Subset of the concept of Expectation Disconfirmation, & a Subset of the Construct of the Independent Variables, has

Degree System & Service Performance; & High Level User Satisfaction (4)	Processes& Influence their Intentions to Use Systems & Services ((5)	**Satisfaction;&Influence Their Decision Making Processes& Intentions to Use Systems & Services (6)**	no input. Antecedents to the Concepts of PSU, PEOU&OUS.
Users Perceive High System Availability, Reliability, Quality & Usefulness to Trigger their Intentions to Use Tracking Systems (4)	Users Perceive High System Availability, Reliability, Quality; Outstanding &Negotiable System Performance & Usefulness to Trigger their Intentions to Use Tracking Systems (5)	**System Users Perceive High System Availability, Reliability, Quality; Outstanding & Negotiable System Performance & Usefulness as Antecedents of their Intentions to Use Tracking Systems (6)**	Property of the concept of PSU & a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Tracking System Users Perceive Outstanding & Agreeable System Performance Usefulness (4)			Property &a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Ease Of Tracking System Use to Create their Intentions To Use Tracking Systems (4)	Users Perceive Ease Of System Use to Create &Inform their Intentions To Use Tracking Systems (5)	**Tracking System Users Perceive Ease Of System Use as Antecedents of their Intentions To Use Tracking Systems (6)**	Property & a subset of the Concept of PEOU. It Links to the Concept of Perceived Ease Of Use, an antecedent if the Concept of Intention Tracking To Use Systems. It Originates from the Concepts of "Perceived System Performance &Expectation Disconfirmation; all from the Constructs of the Independent Variables
Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems (4)			A Subset of the Core Category which belongs to the Concept of PEOU in the Construct of the Intervening Variables. It is the 2nd Antecedent of the Concept of Intention To Use Tracking Systems. The 1st Antecedent is PSU.
Tracking System Use is Beneficial in Saving Lives, Protecting Properties, &Increasing Productivity Levels (4)	Vehicle Tracking System Use is Beneficial in Saving	**The Use of Tracking Systems is Beneficial in**	Property & a Subset of the Concept of Tracking System Use, connected to the Construct of the Intervening Variables. It will take its

Tracking System Use Impacts on Group, Internal, External & Organizational Performances (4)	Lives, Protecting Properties, &in Increasing Productivity & Performances Levels (5)	**Saving Lives, Protecting Properties, Increasing Productivity & Performance Levels,**	input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System &Actual System Use. A Subset of the Core Category which belongs to the Concept of Tacking System Use, in the Construct of the Intervening Variables.
Reliable Tracking System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems (4) Vendor Credibility, High System Performance, Affordability, User Interests, Perceived & Expected Benefits Stimulate Users' Intentions To Use Tracking systems (4)	Reliable Tracking System Features, Usefulness, Performance, Competitive Pricing, User-satisfaction Vendor Credibility &User Interests Stimulate Users' Intentions To Use Tracking systems (5)	**Users' Intentions To Use Systems are Causality of Their Actual Use of Tracking Systems (5)**	Property of the concept of Intention To Use Tracking Systems & a Subset of the Construct of the Intervening Variables; an Antecedent of the Concept of Actual System Use & OUS. It will take three I/Ps: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use &OUS. A Subset of the Core Category which belongs to the Concept of Intention to Use Tacking System Use, in the Construct of the Intervening Variables.
High System Quality, Performance; Usefulness & Ease of Use Lead to Actual Tracking System Use (4) Tracking System Quality, Affordability, Reliability, Comprehensiveness, Relevancy & Interpretativeness Persuade Actual Tracking System Use (4)	High System Quality, Performance, Reliability, Ease of Use, Usefulness &Competitive Charges Lead to Actual Tracking System Use (5)	**High System Quality, Performance, Reliability, Ease of Use, Usefulness & Competitive Charges are Causalities of Actual Tracking System Use** **(6)**	Property of the Concept of Actual System Use, & a Subset of the Construct of the Intervening Variables. It is an Antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit. Property of the Concept of Actual System Use, Subset

			of the Construct of the Intervening Variables; an Antecedent & Causality System Benefit, Etc.
Users Perceptions & Expectations of their Overall Satisfaction is Determined By High Tracking Information Quality, Relevancy, QoS& Competitive System Usefulness(4)	Users' Perceptions & Expectations of their Overall Satisfaction are Determined By High Levels Tracking System & Service Performances & Quality, Information Quality, & Competitive System Usefulness(5)	**Users' Perceptions & Expectations of Tracking System & Service Performances & Qualities; Information Quality, Usefulness & Ease of Use are Determinant Factors of their Overall User-Satisfaction (6)**	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility &Quality, Comprehensiveness & High Level System Performance Motivate OUS (4)			Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables An antecedent& causality of the concept of System Benefit, Etc.
Tracking Information Relevancy, Credibility & Comprehensiveness Generate System User Satisfaction (4)	Tracking System, Service & Information Qualities, Performances, Ease of Use & Usefulness Derive System User Satisfaction (5)	**Tracking System, Service & Information Qualities, Performances, Ease of Use & Usefulness Resolve Whether Tracking System Users are Actually Satisfied (5)**	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent& causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS) , with 2 O/Ps (Report to Vendors & Net Benefits
Tracking System Information Completeness, Integrity, Interpretiveness & Usefulness (4)			
Tracking System Users Have to Report System & Service Faults, Breakdowns &Unsatisfactory Performance Status to Vendors / Operators /Suppliers (4)	Tracking System Users Need to Detail &Report System & Service Faults, Breakdowns &Unsatisfactory	**Tracking System Users Must Detail & Report System & Service Unsatisfactory Performance to Vendors /**	Property of the Concept of Report To Vendors / Operators; the last but one Subset of the Construct of the "Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It

Users Persistently Alert & Report System & Service Failures To Head/ Operations & Vendors (4) Users Always Detail & Alert System & Service Performance to Vendors / Operators for Redress (4)	Performance Status to Vendors / Operators / Suppliers for Redress (5)	**Operators / Suppliers for Redress (5)**	will take One I/P (from the Concept of Is User Satisfied?). A Platform For Users To Report Their Un-satisfactory System & Service Performances To Vendor For Redress, the last but one interface unit Intervening & Independent Variables.
Unsatisfactory Tracking System & Service Performance Issues are Addressed By Vendors, Operators & Suppliers (4) Vendors & Operators Restore, Maintain &Provide Solutions to Tracking System & Service Problems (4)	Unsatisfactory Tracking System & Service Performances Issues are Addressed By Vendors, Operators & Suppliers to Maintain System & Service Usefulness & User-satisfaction (5)	**Unsatisfactory Tracking System & Service Performances Issues are Addressed By Vendors, Operators & Suppliers (6)**	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables. An intervening core category / concept& a causality of the concept of non-user satisfaction & calls on vendors to address non-performances of tracking systems &services. Vendors address reported System & Service Performance issues. This Concept is the last interface between Intervening Variables & the Independent Variables.
High Tracking System & Service Performance Enhances individuals' & Groups' Out Puts & Benefits (4) Plying Planned & Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times& Cuts Costs (4)	Plying Planned & Approved Routes; High System & Service Performances, Cost Reductions & Revenue Increases, Associated with	**Plying Planned & Approved Routes; High System & Service Performance s & Financial Improvements Link to Vehicle Tracking Systems**	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the

Tracking System & Service Cost Reductions,& Revenue Increases, Impact Positively on Groups' Financial Performances (4)	Vehicle Tracking Systems Impact Positively on Individuals' & Groups' Out Puts & Productivities (5)	**& Impact Positively on Individuals' & Groups' Out Puts & Productivities (5)**	Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied;, have 3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use &OUS, Etc.
Tracking System & Service Performances Impact Positively On Attracting More External Clients & Retaining Existing Ones Through Public Image Enhancement (4)	Tracking System & Service Performances Attract More External Clients, New Investors &Retain Existing Ones Through Public Image Enhancement &Impact Positively onExternal Business Plans & Profit Margins (5)	**Tracking System & Service Performances Attract External Clients &Impact Positively on External Business Plans & Profit Margins (6)**	Property of the concept of External Impact (the 3rd Subset of the Construct of Dependent Variables). It forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS. A Core Category relating to the construct of Net System Benefit forming the Stem of the Dependent Variables.
Tracking System Performance Impact Positively on Attracting New Investors, External Business Plans & Profit Margins (4)			
Tracking System Performance Enhances Positively on Organizational Profit Margins& Net Benefits as a whole (4)	Tracking System& Service Performances Impact Positively on Organizational Profit Margins& Net Benefits as a whole. (5)	**Tracking System & Service Performances Impact Positively on Organizational Profit Margins & Net Benefits (5)**	Property of the Concept of Organizational Impact in the Concept of the Net Benefits (the 3rd Subset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, & Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS& Is User Satisfied?; with 3 O/Ps: the Concepts of: OUS, Is User Satisfied?&Tracking System Use.
High Performance of Good Tracking Systems Imparts Positively on Organizational Revenue Generation, Expenditures & Net Benefits as a Whole (4)			
TOTAL CORE CATEGORIES: 34	**TOTAL CORE CATEGORIES: 17**	**TOTAL CORE CONCEPTS: 17**	**-**

APPENDIX I.1: THE RESULTING PROVISSIONAL CATEGORIES

The table below shows the Provisional Categories that emerged from the analysis of the six hundred and thirty two opening codes.

Appendix I.1: The Resulting Provissional Categories

PROVISIONAL CATEGORIES (CLUSTERS OF RELEVANT MEANINGS)	**MEMOS**
Tracking System Quality Depends on System Flexibility, & Ease of Use	Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
System Availability 24/7 Ensures Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Tracking System Quality Requires Good Communication Flow	A property & a Subset of the concept of Tracking System Quality
Accurate Vehicle Location Information Determines Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
System Durability, Usability & Usage Satisfaction Establishes Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Quality of GPS images Directly Links to Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Vehicle Location Info Conciseness & Contemporariness , determine Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Frequent Information Availability &Updates Result in Good Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular & Persistent Information Updates Guarantees Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Interests Progresses Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Detailing Information Purpose Augments Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Meeting User Information Needs & Demands Reckons on Tracking	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.

Information Quality	
Information Completeness generates Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Accurate & Timely Vehicle Location Information delivery amounts to Tracking Information Quality.	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Users Perceive Very Reliable & Supportive Tracking System Service	Property & a Subset of the concept of Tracking Service Qualitya Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.
System Outages/Breakdowns hamper Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
Short service restoration-duration Boosts Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Effective & Efficient response to service failures & breakdowns result in high Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Recuperating Tracking Service Quality generates user satisfaction	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Ensuring & Improving QoS Influences Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Users Perceive Excellent System Performance & Proofing Concept	Property & a Subset of the concept of Tracking Service Quality, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU &OUS.
Tracking system Users Perceive High System Usefulness	Property &a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users have High Perceptions on Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Competitive & Perpetual Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Outstanding & Agreeable Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use Tracking Systems	Property & a subset of the concept of PEOU & a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU & a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5

	Provisional Categories of the Independent Variables.
Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceive Easy System Usage as a Decision Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Easy to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Perceiving Ease Of Tracking System Usage is a Deciding Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Accurate Perceptions of Easy Tracking System Usage	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceive Easy System Usage as a Decision Factor	Property & a subset of the concept of PEOU in the Intervening VariablesIndependent Variables, an antecedent to the concept of Intention To Use System.
Perception of Ease of System Use Informs Intention to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Tracking System Use is Important &Beneficial	Property & a subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System&Actual System Use.
Tracking System Use Saves Lives, Protects Properties, Impacts on Individual Performance & Increases Productivity	Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking System Use Impacts on Group & Org'nal Performance, Internal & External Customers & Business Transactions	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of "Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Org'nal, Internal, External Productivities	A Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System&Actual System Use.
Tracking system Use Impacts on Group,	A Property & a Subset of the concept of Tracking System Use in the

Internal, External & Org'nal Profits & Business Transactions	Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Tracking system Use Impacts on Individual, Group, Internal, External & Org'nal Benefits	A Property & a Subset of the concept of Tracking System Use & a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System& Actual System Use.
System Usefulness, Performance &User-satisfaction Trigger Intention To Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU&Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
System Suppleness & User Interests Give Birth to Intention to Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU&Tracking System Use, with two outputs: the concepts of Actual System Use&OUS.
User Interest & System Performance Agitate for Intention To Use Tracking systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use&OUS. It will take three inputs: the concepts of PSU, PEOU&Tracking System Use, with two outputs: the concepts of Actual System Use&OUS.
High System Performance & More Benefits Yield Intention to Use Tracking Systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use &OUS. It will take three inputs: the concepts of PSU, PEOU&Tracking System Use, with two outputs: the concepts of Actual System Use&OUS.
High System & Information Qualities, Usefulness & Ease of Use	Property of the Concept of Actual System Use & a Subset of the Construct of the Intervening Variables). It is an antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System &OUS, with single output - i.e., System Benefit.
High Information & System Qualities, Usefulness & Ease of Use Leads to Actual System Use.	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
High System & Information Qualities, Performance, Usefulness & Ease of Use Result in Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Good Information & System Qualities, High QoS & Usefulness, Create Actual System Use.	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Information Relevancy & Comprehensiveness, & Improved Tracking Information Quality Trigger Actual Use Of System	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.

Information Relevancy & Comprehensiveness, & Improved Tracking Information Quality Trigger Actual Use Of System	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Info Interpretativeness & Enhanced Tracking Information Quality Demands for Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Info Interpretativeness & Enhanced Tracking Information Quality Demands for Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Tracking System Users Perceive Improved Overall User-Satisfaction	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
Tracking System Users Expect High Level of Overall User Satisfaction	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
High Level of Information Quality Enhances OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
High System Quality Increases OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
High System Information Quality Creates OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of System Benefit, Etc.
Good System Quality Generates OUS	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System BenefitEtc.
High Level System performance Results in OUS	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Information Relevancy, Credibility, Comprehensiveness & Improvement Causes System User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors &Net Benefits.
System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	Property of the Concept of Is User Satisfied& a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit& User Reporting System & ServicePerformance to Vendors.
	Property of the Concept of Is User Satisfied& a Subset of the Construct of

System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit&User Reporting System & Service Performance to Vendors.
Information Improvement Causes System User Satisfaction	Property of the Concept of Is User Satisfied& a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit&User Reporting System & Service Performance to Vendors.
System User Satisfaction Generated by Information Credibility, Comprehensiveness & Relevancy.	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit&User Reporting System & Service Performance to Vendors.
System User Satisfaction Created by Information Relevancy, Comprehensiveness & Credibility	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Info Credibility Impacts Positively on System User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Information Interpretiveness & Comprehensiveness originate System User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Reporting System Faults, Breakdowns & Performance Status to Vendor	A Property of the Concept of Report To Vendors/Operators; the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).
Users Report System & Service Status & Performance to Operator	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Alerting & Sending System & Service Failures to Operator	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Reporting System & Service Faults & Breakdowns to Mgt & Vendor	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Alerting & reporting System & Service Breakdowns, Faults & Failures to Vendors / Operators	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.

Detailing System/Service Performance to Vendors/Operators for Redress.	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Vendors/Operators Address System & Service Problems	A Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Vendors Address Unsatisfactory System Performance	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use). Its O/P will feed the Concept of IS Use, which forms the Construct of the Independent Variables.
Suppliers Address System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Operators Maintain Tracking System & Service Performances	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Vendors & Operators Provide Solutions to System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Operators & Vendors Restore Tracking System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the S Use which forms the Construct of the Independent Variables.
Vendors, Operators & Suppliers Maintain & Address Tracking System & Service Problems	Property of the Concept of Vendors/Operators Address System/ Service Problems; the last Subset of the Construct of theIntervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
System Performance Enhances individual	A Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied.Together with the concepts of External & Org'nal Impacts, the Individual & Group Impacts concepts form part of the Causalities of the Concepts of OUS&Continuous Use of Tracking Systems.They will take 3

Out Put.	inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?2 outputs - the Concepts of Tracking System Use&OUS.
Accurate Vehicle Location Impacts on Individual's Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use&OUS, Etc.
Curbing Fuel Consumption Impacts on Individual's Expenditure	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use &OUS, Etc.
Plying Planned Routes Impacts on Group's Travel & Delivery Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS& Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use& US, Etc.
Revenue Increases Impact on Group's Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use& OUS, Etc.
Cost Reductions Impact On Group's Financial Activities	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS"& Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use&OUS, Etc.
Revenue Increase & Cost Cutting Impact on Group's Delivery Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use &OUS, Etc.
High Internet Bandwidth & Speed impact	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?,

on Group's Performance	with 2 outputs - the Concepts of Tracking System Use &OUS, Etc.
Reduction Of Over-speed & Costs Impact on Group's Outputs	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
System Performance Impact Positively On External Customer Loyalty & Business Transactions.	A property of the concept of External Impact (the 3rd Subset of the Construct of Dependent Variables).It forms part of the causalities of the concepts of OUS &Tracking System Use.Will take 2 inputs: the concepts of Actual System Use& OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
JIT Delivery Impacts on External Business Transactions.	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use.Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use& OUS.
Attraction of New Investors Impact Positively on External Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS&Tracking System Use.Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
Cubing Internet Frauds Impacts Positively on External Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use.Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
Attracting New Investors Impacts Positively on Org'nal Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS&Tracking System Use.Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.

Adding New Clients Impacts Positively on Org'nal Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS &Tracking System Use. Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
JIT Delivery & New Investments Impact Positively on Org'nal Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS&Tracking System Use.Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
System Performance Impact Positively on Public Image / Perception,	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS&Tracking System Use.Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
Business Plans, Decisions, Customer Trust, Profit Maximisation & Organizational Impact.	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS&Tracking System Use. Will take 2 inputs: the concepts of Actual System Use&OUS, with 2 O/Ps - the Concepts of Tracking System Use&OUS.
Pollution Mitigation Imparts on Organizational Benefits	A property of the Concept of Organizational Impact in the Concept of the Net Benefits (the 4th Subset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, & Is User Satisfied?It will take 3 inputs: the Concepts of Actual System Use, OUS & Is User Satisfied? 3 O/Ps: the Concepts of: OUS, "Is User Satisfied? & Tracking System Use.
Lifesaving Imparts on Organizational Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied?3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?& OUS.
	Property of the Concept of Organizational Impact in the Concept of the

Knowing Real Time Vehicle Status Imparts on Org'nal Benefits	Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS&Is User Satisfied?3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? & OUS.
Minimized Travel Times & Distances Imparts on Org'nal Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS &Is User Satisfied? 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?&OUS.
Restraining Waist & Expenditure Imparts on Org'nal Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, & Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS&Is User Satisfied? 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? & OUS.
Less Fuel Expenditure Impacts on Or'nal Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied?&OUS.
Total Provisional Categories: 113	-

APPENDIX I.2: THE RESULTING SUBSTANTIVE CATEGORIES

The table below indications the Substantive Categories that resulted from the analysis of the one hundred and thirteen Provisional Categories.

Appendix I.2: The Resulting Substantive Categories

SUBSTANTIVE CATEGORIES	MEMOS
Tracking System Quality Reckons on System Flexibility, Availability & Reliability	Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
Improved Communication & Information Accuracy Determines Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
System Durability, Usability, Usage Satisfaction & Historic Data Establishes Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
High System Quality &High Usage Satisfaction Levels Result in High Tracking System Quality	A property & a Subset of the concept of Tracking System Quality
Relevancy, Conciseness & Updated Vehicle Location & Status Information Enhance Tracking System Information	Property & a Subset of the concept of "Tracking System Information; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular Vehicle Information Refinements, Updates, Retrievability Maintainability Guarantee Tracking Information Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Tracking Information Quality is Augmented by Meeting User Interests & Purpose	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Real Time Information, its Completeness & Accuracy Warrant Tracking System Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Users Perceive High Level of Tracking system service Reliability & Supportiveness	Property & a Subset of the concept of Tracking Service Quality a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.
Insignificant Service Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality	Property & a Subset of the concept of "Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS
Effective Responses & Efficient Restoration of System service Generate High Tracking Service Quality	Property & a Subset of the concept of "Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Ensuring & Improving QoS Influences Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Users Perceive Excellent System Performance &	Property & a Subset of the concept of Perceived System

High System Usefulness	Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Users Perceive High Speed System Connectivity & Satisfactory Performance	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU&OUS.
Users Expect High System Quality & Performance; High Information Quality	**Property & a Subset of the concept of Expectation Disconfirmation,**& a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
Users Expect High Tracking System Stability, Speed, Accuracy & Performance Upgrades	Property & a Subset of the concept of Perceived System Performance, in Independent Variables. Subset of antecedents to the concepts of PSU, PEOU&OUS.
Users Perceive High Reliability, Competitive System Usefulness& High Information Quality	**Property of the concept of PSU** & a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Users Perceive High, Perpetual, Dependable, Persistent, Commendable, Achievable, Enterprising & Profit-driven System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Outstanding & Agreeable Tracking System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
High Perception of Ease of Use of Tracking Systems is a Deciding Factor	**A Property & a subset of the concept of PEOU**& a Subset of the Construct of the Intervening Variables. It will also take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Users Highly Perceive Easy System Usage in Making Decisions	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
User Perceptions of Ease of System Use Inform Intentions& Decisions to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Aggressively Perceive Easy Tracking System Usage as a Resolution Factor	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems	Property & a subset of the concept of PEOU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Tracking System Use is Beneficial in Saving Lives, Protects Properties, &Increases Performance/Satisfaction &Productivity Levels	Property & a subset of the concept of Tracking System Use& a Subset of the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept

	of Intention To Use System & Actual System Use.
Tracking System Use Impacts on Group, Internal, External & Organizational Performances, & l Customers & Business Transactions	Property & a Subset of the concept of Tracking System Use in the Intervening Variables. It will take its input from the O/P of the Independent Variables; an antecedent to the concept of Intention To Use System & Actual System Use.
Credible System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems	Property of the concept of Intention To Use System &a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use &OUS. It will take three inputs: the concepts of PSU, PEOU& Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
System Suppleness, Performance & User Interests Stimulate Users' Intentions To Use Tracking systems	Property of the concept of Intention To Use System & a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
Low -Medium System Costs, Vendor Credibility, High System Performance &Benefits Generate Intention to Use Tracking Systems	Property of the concept of Intention To Use System& a Subset of the Construct of the Intervening Variables; an antecedent to the concept of Actual System Use & OUS. It will take three inputs: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
High System & Information Qualities, Usefulness & Ease of Use Leads to Actual System Use	Property of the Concept of Actual System Use & a Subset of the Construct of the Intervening Variables). It is an antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit.
High System & Information Qualities, High QoS Performance, Usefulness & Ease of Use Create Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Tracking Information Quality, Relevancy, Comprehensive-ness &Interpretativeness Induce Actual System Use	Property of the Concept of Actual System Use, Subset of the Construct of the Intervening Variables; an antecedent, causality System Benefit, Etc.
Users Perceive & Expect High Tracking Information Relevancy & Competitive System Usefulness, Leading to High Overall User-Satisfaction	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility & Comprehensive-ness Increases OUS	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
	Property of the Concept of Overall User Satisfaction & a Subset of the Construct of the Intervening Variables. An antecedent&

Good System Quality &High Level System Performance Motivate OUS	causality of the concept of System Benefit, Etc.
Relevancy, Credibility &Comprehensiveness Information Cause System User Satisfaction	**Property of the Concept of Is User Satisfied?**& a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS), with 2 O/Ps (Report to Vendors& Net Benefits.
Improvement in Information Quality, Credibility, Comprehensiveness & Relevancy Causes System User Satisfaction	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors.
System User Satisfaction Created by Information Relevancy, Comprehensive-ness & Credibility	Property of the Concept of Is User Satisfied & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Information Interpretiveness & Comprehensiveness originate System Tracking User Satisfaction	Property of the Concept of Is User Satisfied? & a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent& causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Tracking System Users Report System& Service Faults, Breakdowns & Performance Status to Vendors / Operators	Property of the Concept of Report To Vendors / Operators; the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of "Is User Satisfied"?).
Alerting & Reporting System & Service Failures To Head/ Operations & Vendors	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Detailing &Alerting System &Service Performance to Vendors/Operators for Redress	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Vendors/Operators / Suppliers Address System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Vendors &Operators Maintain Tracking System & Service Quality By Addressing Unsatisfactory System& Service Performances	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.

Vendors & Operators Restore / Provide Solutions to System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables.
Tracking System Performance Enhances individuals' Out Put	Property of the Concept of Individual & Group Impacts(the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied
Accurate Vehicle Location Impacts on Individuals'& Groups' Performance (Curbing Fuel Consumption & Reducing General Expenditure)	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use& OUS, Etc.
Plying Planned &Approved Routes Impacts on Individuals'& Groups' Travel & Delivery Times	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use& OUS, Etc.
Tracking System & Service Cost Reductions &Revenue Increases Impact Positively on Groups' Financial Performance	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS&Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Reduction In Over-speed &Accident Recurrent-expenditures (By Tracking Systems) Impacts on Group's Outputs	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS &Is User Satisfied, have3 inputs: i.e., the concepts of Actual System Use, OUS&Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Tracking System& Service Performances & JIT Delivery Impact Positively On External Customer Loyalty & Business Transactions (3)	Property of the concept of External Impact(the 3rd Subset of the Construct of Dependent Variables).It forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Attraction of New Investors Impact Positively on External & External Business Transactions	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use& OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the

cquiring &Adding New Clients & Investors Impact Positively on External Business Transactions	causalities of the concepts of OUS& Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Tracking System Performance Impact Positively on Public Image, Business Plans, Decisions, Customer Loyalty, Profit Maximization & External Profit Margins	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use& OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Restricting Diversions/Detours By Tracking Systems Enhances Clients' Trust &Impacts Positively on Org'nal Profit Margins	Property of the Concept of Organizational Impact in the Concept of the Net Benefits (the 3rdSubset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, &Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS&Is User Satisfied? 3 O/Ps: the Concepts of: OUS, Is User Satisfied? &Tracking System Use.
Knowing Real Time Vehicle Status & Minimizing Travel Times & Distances Imparts Positively on Organizational Net Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS &Is User Satisfied? 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? & OUS.
Tracking Systems Restrain Waists in Fuel Consumption & in Related Expenditures; Thus, Imparting Positively on Organizational Net Benefits	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, &Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS &Is User Satisfied?3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? &OUS.
Total Substantive Categories: 59	**-**

APPENDIX I.3: THE RESULTING CORE CATEGORIES

The table below illustrates the Core Categories that resulted from the analysis of the fifty nine Substantive Categories.

Appendix I.3: The Resulting Core Categories

CORE CATEGORIES	MEMOS
Tracking System Quality Reckons on System Flexibility, Availability, Reliability, Improved Communication & Information Accuracy	Property& a Subset of the concept of Tracking System Quality (the 1st Subset of the Construct of the Independent Variables; antecedents to: PSU & PEOU (1st 2 Concepts of Intervening Variables) & OUS.
Tracking System Quality System is Achieved by System Durability, Usability & Maintainability	A property & a Subset of the concept of Tracking System Quality
Information Quality in a Tracking System is Attained through System Performance &User Satisfaction	Property & a Subset of the concept of Tracking System Information Quality; Subset of the Construct of the Independent Variables, Antecedent of PSU, PEOU & OUS. Has no I/P.
Regular Vehicle Information Refinements, Updates, Retrievability, Meeting User Interests & Purpose Guarantee the Quality of Tracking Information	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
Real Time Information, its Completeness & Accuracy Augment Tracking System Quality	Property & a Subset of the concept of Tracking System Information; Antecedent of PSU, PEOU & OUS, has no I/P.
High Levels of Tracking service Reliability, Supportiveness, Insignificant Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality	**Property & a Subset of the concept of Tracking Service Quality;** a Subset of the Construct of the Independent Variables& Antecedent of PSU, PEOU, OUS.
High Levels of Tracking service Reliability, Supportiveness, Insignificant Outages & Reduced Service Restoration Periods Ensure High Tracking Service Quality	**Property & a Subset of the concept of Tracking Service Quality;** a Subset of the Construct of the Independent Variables & Antecedent of PSU, PEOU, OUS.
Effective Responses & Efficient Restoration of System service & Improving QoS Generate High Tracking Service Quality	Property & a Subset of the concept of Tracking Service Quality (Independent Variables); Antecedent of PSU, PEOU, OUS.
Tracking System Users Perceive Excellent System Performance, High System Usefulness & Simplest Usage Process	Property & a Subset of the concept of Perceived System Performance, Subset of the Construct of the Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU &OUS.
Tracking System Users Perceive High Speed System & Service Connectivity & Satisfactory Performance	Property & a Subset of the concept of Tracking Service Quality, in Independent Variables, has no input. Antecedents to the concepts of PSU, PEOU & OUS.

Users Expect High Level System, Service & Information Quality; High Degree System & Service Performance; &High Level User Satisfaction	**Property & a Subset of the concept of Expectation Disconfirmation,** a Subset of the Construct of the Independent Variables, has no input. Antecedents to the Concepts of PSU, PEOU&OUS.
Users Perceive High System Reliability&, High Service Quality & High Information Quality to Trigger Their Intentions to Use Systems /Services	**Property of the concept of PSU**; a Subset of the Construct of the Intervening Variables. It will take 5 inputs from the 5 Provisional Categories of the Independent Variables. It is an antecedent to the concept of Intention To Use System.
Tracking System Users Perceive Outstanding& Agreeable System Usefulness	Property & a Subset of the concept of PSU in the Intervening Variables Independent Variables, an antecedent to the concept of Intention To Use System.
Users Perceive Ease Of Tracking System Use to Create their Intentions To Use Tracking Systems	Property & a subset of the Concept of PEOU. It Links to the Concept of Perceived Ease Of Use, an antecedent if the Concept of Intention Tracking To Use Systems. It Originates from the Concepts of Perceived System Performance & Expectation Disconfirmation- all fro m the Constructs of the Independent Variables
Users Perceptions of Ease of System Use Inform their Intentions to Use Tracking Systems	A Subset of the Core Category which belongs to the Concept of PEOU in the Construct of the Intervening Variables. It is the 2nd Antecedent of the Concept of Intention To Use Tracking Systems. The 1st Antecedent is PSU.
Tracking System Use is Beneficial in Saving Lives, Protecting Properties, &Increasing Productivity Levels	Property & a Subset of the Concept of Tracking System Use, connected to the Construct of the Intervening Variables. It will take its input from the O/P of the Construct of Net Benefits (O/P of the Independent Variables). It is an antecedent to the concept of Intention To Use System& Actual System Use.
Tracking System Use Impacts on Group, Internal, External & Organizational Performances, Profits Margins & on all Aspects of Business Transactions	A Subset of the Core Category which belongs to the Concept of Tacking System Use, in the Construct of the Intervening Variables.
Reliable Tracking System Features, Usefulness, Performance, Competitive Pricing & Competing User-satisfaction Trigger Intention To Use Tracking Systems	**Property of the concept of Intention To Use Tracking Systems**& a Subset of the Construct of the Intervening Variables; an Antecedent of the Concept of Actual System Use & OUS. It will take three I/Ps: the concepts of PSU, PEOU & Tracking System Use, with two outputs: the concepts of Actual System Use & OUS.
Vendor Credibility, High System Performance, Affordability, User Interests, Perceived & Expected Benefits Stimulate Users' Intentions To Use Tracking systems	A Subset of the Core Category which belongs to the Concept of Intention to Use Tacking System Use, in the Construct of the Intervening Variables.
High System & Information Qualities, High QoS& Performance; System Usefulness & Ease of Use Lead to Actual Tracking System Use	**A Property of the Concept of Actual System Use,**& a Subset of the Construct of the Intervening Variables. It is an Antecedent& causality of the concept of System Benefit. It will feature three inputs: the concepts of Tracking System Use, Intention To Use System & OUS, with single output - i.e., System Benefit.
Tracking System Information Quality, Comprehensiveness, Relevancy &	Property of the Concept of Actual System Use, Subset of the Construct of

Interpretativeness Persuade Actual Tracking System Use	the Intervening Variables; an Antecedent & Causality System Benefit, Etc.
Users Perceptions & Expectations of their Overall User-Satisfaction is Determined By High Tracking Information Quality, Relevancy, QoS& Competitive System Usefulness	**A Property of the Concept of Overall User Satisfaction**& a Subset of the Construct of the Intervening Variables. An antecedent & causality of the concept of System Benefit. It will take 7 I/Ps (5 from Independent Variable, Intention to Use System & Net Benefits) with 3 O/Ps (Actual System use, Is User Satisfied? & Net Benefits).
High Level of Tracking Information Credibility &Quality, Comprehensiveness & High Level System Performance Motivate OUS	Property of the Concept of Overall User Satisfaction& a Subset of the Construct of the Intervening Variables. An antecedent& causality of the concept of System Benefit, Etc.
Tracking Information Relevancy, Credibility & Comprehensiveness Generate System User Satisfaction	**A Property of the Concept of "Is User Satisfied?** & a Subset of the Construct of the Intervening Variables. User Decision on OUS, antecedent & causality of the concept of Net Benefit &User Reporting System & Service Performance to Vendors. It will take One I/P (from OUS) , with 2 O/Ps (Report to Vendors & Net Benefits.
Tracking System Information Completeness, Integrity, Interpretiveness & Usefulness. Derive User Satisfaction	Property of the Concept of Is User Satisfied& a Subset of the Construct of the Intervening Variables. User Decision on OUS & antecedent & causality of the concept of Net Benefit & User Reporting System & Service Performance to Vendors.
Tracking System Users Report System & Service Faults, Breakdowns &Unsatisfactory Performance Status to Vendors / Operators /Suppliers	**A Property of the Concept of Report To Vendors / Operators;** the last but one Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems. It will take One I/P (from the Concept of Is User Satisfied?).A Platform For Users To Report Their Un-satisfactory System & Service Performances To Vendor For Redress, the last but one interface unit Intervening & Independent Variables.
Detailing & Alerting System & Service Performance to Vendors / Operators for Redress	Property of the Concept of Report To Vendors/Operators; a Subset of the Construct of the Intervening Variables, an antecedent of the concept of Vendors Address System/Service Problems, Etc.
Unsatisfactory Tracking System & Service Performance Issues are Addressed By Vendors, Operators & Suppliers	**A Property of the Concept of Vendors/Operators Address System/Service Problems;** the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of IS Use. Its O/P will feed the Concept of the IS Use which forms the Construct of the Independent Variables. An intervening core category & a causality of the concept of non-user satisfaction & calls on vendor to address non-performances of tracking systems & services
Vendors & Operators Restore, Maintain &Provide Solutions to Tracking System & Service Problems	Property of the Concept of Vendors/Operators Address System/Service Problems; the last Subset of the Construct of the Intervening Variables. It will take One I/P (from the Concept of Is User Satisfied?). Its O/P will feed the Concept of the "IS Use" which forms the Construct of the Independent Variables.
High Tracking System & Service Performance Enhances individuals' & Groups' Out Puts & Benefits	**A Property of the Concept of Individual & Group Impacts** (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS& Is User Satisfied

Plying Planned & Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times& Cuts Costs	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied;, have 3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Plying Planned & Approved Routes Impacts on Individuals' & Groups' Travel & Delivery Times& Cuts Costs	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied;, have 3 inputs: i.e., the concepts of Actual System Use, OUS & Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Tracking System & Service Cost Reductions,& Revenue Increases, Impact Positively on Groups' Financial Performances	Property of the Concept of Individual & Group Impacts (the 1st & 2nd Subsets of the Dependent Variables). They have 3 Antecedents as their I/Ps: the Concepts of Actual System Use, OUS & Is User Satisfied;, have 3 inputs: i.e., the concepts of Actual System Use, OUS &Is User Satisfied?, with 2 outputs - the Concepts of Tracking System Use & OUS, Etc.
Tracking System & Service Performances Impact Positively On Attracting New External Clients & Retaining Existing Ones Through Public Image Enhancement	**Property of the concept of External Impact** (the 3rd Subset of the Construct of Dependent Variables).It forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.A Core Category relating to the construct of Net System Benefit forming the Stem of the Dependent Variables.
Tracking System Performance Impact Positively on Attracting New Investors. External Business Plans &Profit Margins	Property of the Concept of External Impact (the 3rd subset of the Construct of Dependent Variables), forms part of the causalities of the concepts of OUS & Tracking System Use. Will take 2 inputs: the concepts of Actual System Use & OUS, with 2 O/Ps - the Concepts of Tracking System Use & OUS.
Tracking System Performance Enhances Positively on Organizational Profit Margins& Net Benefits as a whole.	**A Property of the Concept of Organizational Impact** in the Concept of the Net Benefits (the 3rd Subset of the Construct of the Dependent Variables). It forms part of the causalities of the concepts of Tracking System Use, OUS, & Is User Satisfied? It will take 3 inputs: the Concepts of Actual System Use, OUS & Is User Satisfied?; with 3 O/Ps: the Concepts of: OUS, Is User Satisfied? & Tracking System Use.
High Performance of Good Tracking Systems Imparts Positively on Organizational Revenue Generation, Expenditures & Net Benefits as a Whole	Property of the Concept of Organizational Impact in the Concept of the Net Benefits Causalities: the concepts of: Tracking System Use, OUS, & Is User Satisfied? 3 I/Ps: the Concepts of: Actual System Use, OUS & Is User Satisfied? 3 O/Ps: - the Concepts of: Tracking System Use, Is User Satisfied? &OUS.
TOTAL CORE CATEGORIES: 34	-

APPENDIX J: PHD COURSES ATTENDED AND TOTAL ECTS OBTAINED

The record below shows the PhD Courses attended, including the European Credit Transfer Stystem (ECTS) units obtained.

Appendix J: PhD Courses Attended & Total ECTS Obtained

COURSE TITLE	DATE	VENUE	No. of ECTS
General PhD Courses			
Scientific Qualitative Methods in Technology & Science	April 2010	AAU Cph Ballerup	3
Engineering Education Research – Mixed Methods Research Design	April 2011	AAU - Aalborg	3.5
The Research Process	Nov 2012	AAU Aalborg	3
Case Study Research	SEPT 2013	AAU Aalborg	3
Ethics in Research & Engineering	Nov 2013	AAU Cph Ballerup	2.5
		Sub Total -1	**15**
Project Related Courses			
The Political Economy of Information & Communications Technologies (ICTs)	Feb. 22 – 17th Mar., 2010	AAU Ballerup	5
Information-Theoretic Methods &Tools For Multiuser Wireless Networks	March 2011	AAU Aalborg	3
Intelligent Transportation Systems (ITS): Modeling & Analysis	June 2011	Danish Technical University (DTU)	5
Location Based Services & the Technologies Behind	June 2013	AAU Cph CMI	2
		Sub Total - 2	**15**
		Grand Total	**30**

In addition to the required 30 ECTS, the researcher attended a number of PhD courses for the purpose of acquiring more academic knowledge: These included: Theories of Science and Research; Scientific Writing; The Research Process; An Introduction to Qualitative Research Approaches in Technology, Science & Education; MIMO Wireless Communications, IT Media Policy and Regulation; and Criteria of Quality in PhD Work.

I also attended the WWRF #29 Workshop in Benin – Germany; in September 2013 (a paper was presented but not published). Lastly, I attended the 2013 Nordic Info Transportation Workshop in Oslo – Norway, in October 2013 (only participation, no paper was presented).