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Bridging the Digital Divide

Sustainable Supply and Demand of Internet Access in Developing Countries

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Bjørn Furuholt

**Bridging the Digital Divide:
Sustainable Supply and Demand of
Internet Access in Developing Countries**

PhD Thesis

**Department of Computer Science
Faculty of Engineering and Science
Aalborg University**

**In partial fulfilment of the requirements for the
Ph.D. degree in Computer Science**

Abstract

The topic area of this thesis is information technology (IT) and development. While the role of IT in the development of poor countries is widely accepted, the majority of the population in these countries do not have access to IT in general and to the Internet in particular. This phenomenon, termed the digital divide, is one of the main barriers to the developmental impact of IT. One of the main ways through which Information technology can contribute to development in underdeveloped countries is to bridge the digital divide by giving people sustainable access to information technology and to the Internet. The thesis therefore raises the following research question:

What affects the sustainability of public Internet access in developing countries, from the supply and the demand sides respectively?

To address this question, I adopted an inductive mode of research and have used a strategy called analytic research, which has not been used widely in the Information Systems literature. I have applied this strategy in an innovative way, by using ten of my own published research articles as domain (data source) for developing the theory. The thesis as a whole thus consists of two steps. The first step is the ten articles which are based on primary data and with individual contributions, mainly on the spread and use of information technology and the Internet in developing countries. The second step, which is called the Summary, is built on these results. The outcome of this summary is the new theory uncovering the underlying factors of sustainability of public Internet access in developing countries, i.e. elements that contribute to sustainability from both the supply side and the demand side, with a specific focus on the demand side, which have not been very well addressed in the existing literature. I have called these two sets of elements supply sustainability and demand sustainability.

The supply sustainability is grouped into two main sets of elements, each of them consisting of two subgroups:

- Management issues
- Context and policy issues

while the demand sustainability has four main groups:

- Economic capacity
- Benefits
- Knowledge and awareness
- Context

and a number of subgroups. The four groups of demand sustainability are, to some degree, related to the two groups of supply sustainability.

The contribution to knowledge is thus twofold: development of new theory on sustainability of public Internet access in developing countries, and the innovative use of the analytic research methodology.

Based on research reported in this thesis, I suggest some initiatives that aim to increase public Internet access sustainability. An obvious issue for further research will be to test and verify the new theory through deductive approaches. A particularly interesting direction will be to test the theory in different contexts, for example by looking at the role of new and emerging technologies in the context of IT for development.

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1. Introduction

The 2005 World Summit on the Information Society (WSIS) emphasized the importance of information technology (IT) in achieving internationally agreed upon development goals, including the millennium development goals (MDG) (UNDESA, 2009). The digital divide was one of the central issues addressed during the WSIS and was considered an important concept within the research area of IT and development. The 'digital divide' refers to "the global disparities in access to the Internet and other information and communication technologies that propelled globalization" (United Nations, 2009:11). IT has the potential to support development by providing access to information and by building communication lines between people and communities around the world. This thesis discusses the use of information technology and how IT can impact growth in developing countries. An important way of bridging the digital divide in developing countries is to provide access to IT and Internet services to people within these communities. Most people in these countries cannot afford to buy their own computer equipment and they don't have access to private internet connections. Therefore, they usually have to use public access points such as Internet cafés, telecentres, libraries, etc.

Bridging the digital divide is, therefore, not easy, and developing these needed changes takes time. The first step in this endeavour involves creating access in all areas of the country, and then implementing a system which would provide sustainable access over a long period of time. In this thesis, sustainability is a key issue which has to do with both the supply and demand side of Internet access. Research to date has focused mainly on the issue of supply, but has not dealt with the demand side as extensively.

This thesis will outline the findings from my ten research articles, which are listed and described in chapter 4. The thesis consists of two parts: The first part is a discussion of the ten articles. The primary data and individual results (or findings) in each article show the spread and use of IT and the Internet in developing countries. The second part summarizes these results and explains how integrating the concepts in the articles would contribute to bridging the digital divide. The summary also adds to the understanding of sustainability in general and demand sustainability in particular.

For the supply side, I will build on the findings from existing literature dealing with sustainability of public Internet access in developing countries. For the demand side, I will introduce and elaborate on the concept of 'demand sustainability', which will form the major part of the summary. This leads to the following research question, which will be further explained in sections 3.4 and 5.3:

*What affects the sustainability
of public Internet access in developing countries,
from the supply and the demand sides respectively?*

The structure of this thesis is illustrated in figure 1. The two main parts are the summary and the appendix. The appendix outlines the ten major research articles - I am one of the authors in each of these articles. The summary consists of seven chapters; chapters 4 – 7 are based on the articles in the appendix.

This introduction is the first chapter of the summary. Chapter two gives an introduction to the concept of digital divide and an explanation of the role of IT as a tool for bridging the digital divide in developing countries. In chapter three, I use general supply and demand theory as a starting point for discussing the sustainability of supply and demand in accessing the Internet. I conclude the chapter with a brief explanation of the research question.

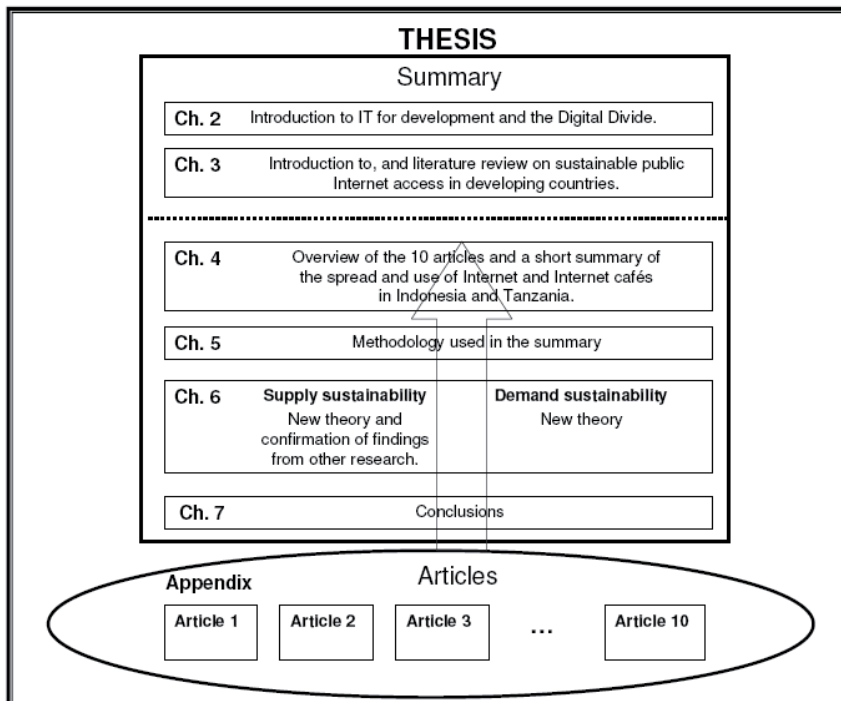


Figure 1. Main structure of the thesis.

The rest of the summary is based on the ten published articles. Chapter four gives a brief overview of my research, with descriptions of research designs and findings. I also discuss how Internet cafés are used as providers of public Internet access and I elaborate on Internet usage and users. This chapter contains two tables which summarize key contributions from all the articles. In this text, I will refer to the articles by their numbers from the lists (e.g. article 1).

In chapter five, I give a presentation of my use of a framework for building new theory on sustainability and I give an explanation of why I have chosen this specific approach. In chapter six, I present and discuss the results from the theory building work on supply and demand side sustainability issues. I also discuss my findings in relation to current literature.

In chapter seven, I emphasise the most important contributions from my research and give some proposals on how to further spread and strengthen the sustainability of public Internet access in developing countries.

2. Bridging the digital divide in developing countries

In this chapter, I will present some background in order to describe the context of my thesis. As stated in the introduction, the thesis is dealing with IT and development. I will therefore give an explanation of the role IT can play in creating development in developing countries by bridging the digital divide. I will also describe the concepts of ‘developing country’ and ‘digital divide’.

2.1 IT for development

Developing countries are those nations (primarily in Africa, Asia, and Latin America) that have little or no industrial base. Characteristically, they have high rates of population growth, high infant mortality, short life expectancy, low levels of literacy, and poor distribution of wealth (World Encyclopaedia, 2005).

The concept of ‘developing countries’ is, however, a disputed point, and there is no true agreed-upon definition. Various international organisations use different indicators and the criteria for these indicators have changed over time. For a long time, the classification was purely economic, based on gross domestic product (GDP) per capita. Other indicators have gradually become more important in recent years. Organisations like the World Bank and the International Monetary Fund still base their classification on economic measures, whereas the United Nations (UN) and the World Trade Organization (WTO), for example, use a broader selection of indicators. The UN Department of Economic and Social Affairs (UNDESA) developed a set of 96 “UN Indicators of Sustainable Development”. These indicators, including the Millennium Development Goals, are useful tools for measuring progress in achieving sustainable development at national and international levels (UNDESA, 2007). Developing countries comprise a majority of the UN members, and among these, the 50 lowest ranked countries are designated as least developed countries (LDCs): 34 of these are in Africa and 10 are in Asia.

Through Human Development Reports, the United Nations Development Programme (UNDP) has linked the development concept to their indicators (eg. human well-being). The Human Development Index (HDI) is a simpler and more operational measure used to assess progress in human development across countries. The UNDP states that “The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives”. As well, the programme contends that “Human development is about much more than the rise or fall of national incomes. It is about creating an environment in which people can develop their full potential and lead productive, creative lives in accordance with their needs and interests. People are the real wealth of nations. Development is thus about expanding the choices people have to lead lives that they value. And it is thus about much more than economic growth, which is only a means —if a very important one —of enlarging people’s choices” (UNDP, 2008).

The HDI is a summary composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge, and a decent standard of living. Health is measured by life expectancy at birth; knowledge is viewed as a combination of adult literacy rates and combined primary, secondary, and tertiary gross enrolment ratios; standard of living is measured by GDP per capita in respect to purchasing power parity (PPP US\$). Today, the HDI is the most common measure used to determine and indicate whether a country is a developed or a developing country. The HDI is calculated for 177 countries including areas where such data is available. Countries are classified into three groups: high, medium or low human development. The last group (i.e. low human development) overlaps

to a high degree with the least developed countries (LDCs). Indonesia and Tanzania, the two countries focused on in this research, are both classified as developing countries according to both measures. They are ranked as number 107 and 159, respectively, in the HDI rankings. Tanzania, for example, is considered to be one of the least developed countries in the world using these criteria.

To create and support development in developing countries, knowledge development and education are important issues. Information technology has the potential to support this development, mainly through providing access to information and through building communication lines between people. According to Sein and Harindranath (2004), the importance of information technology, related to national development, may lie simply in its knowledge enabling potential. In countries where the Internet and other technologies are not accessible, sources of information for personal development, business start-up and growth, or political participation are lacking. In addition, education is suffering, and people are not able to compete in the global economy.

Therefore, creating IT and Internet capabilities for people in LDCs could foster development in these countries by giving people access to global information and communication. Information has become one of the primary inputs in economic processes, and information technology has gradually become crucial for enterprises, communities and individuals to participate successfully in the global economy (Hollifield and Donnermeyer, 2003).

One area where information technology and public internet access can be particularly useful for the development of LDCs is as a tool for promoting good governance through e-government systems. Kristiansen (2004:11) states: "there seems to be a clear relationship between information asymmetry, corruption and bad governance". During the last 10 to 15 years, governments from all over the world have tried to take advantage of information technology in general and the Internet in particular to improve governmental administration and communication with their citizens and businesses. Generally, however, developing countries such as Indonesia and Tanzania are lagging behind in e-government adoption as compared to developed countries. The main advantages for e-government include: cost reductions in usage, improved efficiency for government systems and improved quality of services. These opportunities could be important motivational factors for transitional democracies and developing economies and could lead to reforms such as transparency disclosures, increased citizen participation and economic development (Seifert and Bonham, 2003).

The issue of access has two different perspectives. The technical perspective consists of building the physical infrastructure for access. The social, mental or cultural perspective facilitates the process and allows people to take advantage of the infrastructure in order to develop their competence and skills and to participate in the global information society. Building the infrastructure (the physical access) has generally been much slower to engage in developing countries than in their economically richer counterparts of the world. This is because there is a lower demand for these services which then translates into lower profitability for IT businesses. The disparity in the intensity of IT adoption in countries (e.g. LDC) is larger than the disparity in GDP per capita between countries. Wong (2002) contends that this trend is likely to become even more severe in the future. Both the technical aspect and the social aspect of access are part of the digital divide discussion and will be further elaborated on in section 2.2.

2.2 The digital divide

The digital divide is the gap between those with regular, effective access to digital technologies, in particular the Internet, and those without (cf. chapter 1). The global digital divide is a term often used to describe the gap between more and less developed countries. At the national level, there is often an urban-rural divide. In developing countries in particular, we see clear tendencies of increased concentration of information flow into urban and central areas (Wong, 2002; Mwesige, 2004). Economically disadvantaged countries and rural and peripheral districts within these countries tend to fall further behind in human resource development as well as in economic progress and political participation.

Even if the above mentioned access oriented definition is commonly used in the literature and discussions, the digital divide is not viewed purely as a technological phenomenon (cf. 2.1). A broader interpretation of the digital divide is necessary. The intersection of socioeconomic status, gender, age, language and geographic location tends to increase the digital divide in mutually reinforcing ways within and between countries. The largest gap is between better-educated, affluent, younger, English-speaking men in developed cities and less-educated, poor, older, non-English speaking women in underdeveloped rural areas (Chen and Wellman, 2004).

Also Warschauer (2003) warns against looking at the digital divide from a purely technological deterministic perspective. He points out that governments, the private sector, foundations and charities have spent too much money to bridge the digital divide by providing computers and Internet lines to those in need but have often done this without giving sufficient attention to the social contexts in which these technologies might be used.

This broader interpretation of the digital divide also contains a cultural dimension. Mosse and Sahay (2003) maintain that attempts to deploy IT in Mozambique faced critical problems due to a variety of constraints ranging from inadequate infrastructure to manpower shortages, to a culture that did not yet value the “efficient use of information”. Van Dijk (2006) claims that the digital divide cannot be understood without addressing issues such as attitudes toward technology and daily usage patterns, as well as doing a cultural analysis of lifestyles of the intended users. He states that the deeper social, cultural, and psychological causes behind the inequality of access have to be addressed in the digital divide research.

There is a wide agreement in academic literature about the broad definition of the digital divide concept. An important first step, however, in the direction of bridging the digital divide in a country, is to provide access to the Internet in poor and rural areas. Expansion of Internet access in poor areas is facilitated by arrangements for public use, such as Internet kiosks, cybercafés, or multipurpose community telecentres (Rogers and Shukla, 2001). In developing countries, most Internet users gain access through public access points and the Internet café (or cybercafé) concept has been successfully spread to poor countries mainly because it combines a reasonably priced access to the Internet with the chance to socialise with fellow users and to pick up new knowledge and ideas in computer usage. Ideally, Internet cafés in developing countries represent access points to sources of information for personal development, business start-up and growth, and political participation and the progress of civil society.

3. Supply and demand of Internet access and information

As stated above, bridging the digital divide is not an easy task and it will take a long time. One of the first steps toward bridging the digital divide is to create access to IT and the Internet in all areas of a developing country; rural and urban, rich and poor. After having created public access, the next challenge is to make it sustainable, i.e. the access has to survive and to work for a long period of time (see section 3.4 for more on sustainability). In creating and sustaining such access, both the supply side and the demand side will play a role. In order to better understand the balance between the two sides, I have consulted existing literature to see if supply and demand in this context is different from supply and demand of other commodities or services (cf. 3.1 and 3.2). In section 3.4, I will report on how sustainability of public Internet access in developing countries is covered in existing literature. At the end of this chapter, I will formulate the research question to be investigated and dealt with in the rest of this thesis.

3.1. Supply and demand of information.

In classical economic theory, the relationship between supply and demand determines the price of a commodity. This relationship is thought to be the driving force in a free market. Demand depends on the price of the commodity, the prices of related commodities and the incomes and tastes of the consumers. Supply depends not only on the price obtainable for the commodity but also on the prices of similar products, the techniques of production, and the availability and costs of labour as well as other factors of production. In analyzing supply and demand in the short term, one usually assumes that all factors but the price are constant in order to observe the relationship between various prices and the quantity potentially offered by suppliers and purchased by customers at each price. It is the function of a market to balance demand and supply through the price mechanism (Encyclopædia Britannica, 2008).

Computer equipment and infrastructure are needed to create access to the Internet. However, even though the price of information technology is continuously being reduced, computers are still too expensive to buy for most individuals in developing countries. In this sense, people who cannot afford to buy personal computers will not have access to the global information highway. Therefore, the supply and demand model applied to computer equipment as a commodity is of little relevance when studying the trade in access to information on the Internet in developing countries.

According to Coiera (2000), “information economics” offers insights into the dynamics of information across networked systems like the Internet. Is information economics or supply/demand of information a useful basis for understanding this trade then? An information marketplace is different from other marketplaces because an information commodity is not actually consumed and information can be reproduced and distributed at almost no cost. Thus, the characteristics of information goods differ from those of traditional traded goods in a number of ways:

- You must experience information before you know what it is.
- Production costs are typically high for information products, but they can be copied cheaply and indefinitely if they are in digital form.
- Since digital information can be copied exactly, it is never consumed.
- A possessor of information can transfer it to others without losing the information.
- Digital information can be transported at low cost (Coiera, 2000: 216).

These differences produce interesting consequences for producers and consumers. Consequently, the laws of supply and demand that depend on the scarcity of products cannot easily be applied to information goods. When free distribution of information is the goal, then the ability to reproduce and distribute information at a minimal cost is to be welcomed. When the owner of information seeks to generate revenue from the information, difficulties may arise.

Information is therefore fundamentally different from other commodities. It possesses many of the characteristics of a 'public good' (Soete and Weehuizen, 2003). In economics, a 'public good' is a good that is non-rival and non-excludable. This means that consumption of the good by one individual does not reduce the amount of the good available for consumption by others and no one can be effectively excluded from using that good. The information on the Internet may therefore be considered as a public good. Even if a small share of the information has a price (e.g. some scientific articles, some music, etc.), a great deal of this information is free of charge for most users, either because others pay for it (e.g. governments, NGOs) or because suppliers of other products pay to advertise on the information sites. Some information is even made free of charge for certain customer groups. For example, some research literature is made available at no cost for academic use in developing countries (Chan et al., 2005).

Even if information on the Internet is virtually free to obtain, and even if information technology and communication infrastructure have reduced transactions costs, there will still be costs associated with getting access to the information even if it is simply paying for Internet café fees. This cost is a real issue for users who do not have these resources.

3.2. Supply and demand of services

Providing public access to the Internet in poor regions (i.e. bridging the digital divide) is an example of supply and demand for a certain *service*, namely access, rather than supply and demand of a *commodity*, be it computer equipment or information. This service approach to information systems is aligned with recent thinking by Mathiassen and Sørensen (2003) who have introduced service thinking to theorize IT artefacts.

Supply and demand analysis may be applied to markets for services very much in the same way as analysis is applied to markets for goods. There are some clear differences which service managers need to address, however. According to Sasser (1976), managing demand and supply is a key task for the service manager. Whereas the consumption of goods can be delayed, as a general rule, services are produced and consumed almost simultaneously. Given this distinction, it seems clear that there are characteristics of a service delivery system that do not apply to a manufacturing one. Therefore, the service manager has to consider a different set of factors from those that would be considered by his or her counterpart in manufacturing (Sasser, 1976:133). Some of these factors are:

- Services are direct, they cannot be inventoried.
- There is a high degree of producer-consumer interaction in the production of service.
- Because a service cannot be transported, the consumer must be brought to the service delivery system or the system to the consumer.
- Because of the intangible nature of a service's output, establishing and measuring capacity levels for a service operation are often highly subjective and qualitative tasks.

The nature of service, in general, lacks homogeneity because, typically, services are modified for each consumer or for each new situation. Thus, providers of public Internet access have to focus on the relationship with their customers, and service managers need to develop and execute their service in response to supply and demand. Roman and Colle (2002) further advise these providers to offer a broader selection of information services. For example, public Internet access managers could act as gateways to governmental online services or could offer educational and training resources. Branching out in these ways could generate more income for local public access points, and could integrate these concepts into the community.

3.3 Supply and demand of Internet access - public Internet access points

So far I have argued that information can contribute significantly to development, and that IT is an important tool needed to disseminate information. Over the last ten years, many initiatives have been undertaken around the world aimed at bringing IT, the Internet, and the benefits of the Information Age to developing countries. The diffusion of these services depends on both the supply and demand sides. Industrial countries are well supported with facilitators in this area, but most developing countries struggle to set up and run useful and viable Internet access services.

Access to this new technology is usually facilitated by arrangements for public use (cf. 3.1). These public Internet access points, variously referred to as information kiosks, telecentres, cybercafés, community technology learning centres, and the like, have experimented to varying degrees of success with a variety of approaches (e.g., business models, service offerings, target populations, technologies employed) in service to their customers (Bell, 2006).

In her study of public Internet access points in Africa, Parkinson (2005) classifies these access points into seven distinct types. Two types of these access points are telecentres and Internet cafés. Some researchers consider 'telecentres' and 'cybercafés' as synonymous entities, while others (e.g. Molnár and Karvalics, 2002) regard cybercafés as parts of a number of types of telecentres. Roman and Colle (2002) contend that a simple evolutionary process is taking shape. They look at cybercafés and telecentres as two species at different levels of evolution: "the more narrowly focused cybercafés or Internet kiosks are also important because of their potential to become telecentres as they mature" (Roman and Colle, 2002: 3). In literature and dictionaries, the words 'cybercafé' and 'Internet café' are used interchangeably. I have chosen to standardise the terminology in this thesis and use the term 'Internet café' because it seems to be in most common use today.

I have not found an authorised dictionary definition for the terms 'Internet café' and 'telecentre'. However, I have found that, in the current literature, the most common meanings seem to be that these are two distinct types of public access points with some important differences regarding ownership, funding and purpose. Telecentres operate mostly as 'not-for-profit' organisations, relying on external sources for funding. These sources include government institutions, multilateral agencies, and non governmental organisations (NGOs). Telecentres have an explicit objective to support the community which often means supporting development among underprivileged and marginalised populations. According to Oestmann and Dymond (2001), telecentres in developing countries are almost exclusively funded by international aid agencies and are owned and/or managed by national or local NGOs. Internet cafés, on the other hand, are normally owned by local entrepreneurs and represent business opportunities for the owners. As private enterprises, their primary purpose is to generate profit for their owners. Because these entities serve different purposes, there are

marked differences in their market approach and service capabilities. While Internet cafés cater mainly to students, tourists and professionals, telecentres target their attention toward local communities and special interest groups, often offering training as an additional service. Table 1 describes the main differences between the two types of public Internet access points.

Table 1. Telecentre and Internet café characteristics.

	Business model	Main objective	Ownership	Incomes	Main market
Telecentres	Not-for-profit organisation	Development	Governmental or non-governmental organisations	External sponsors and user fees	Marginalised populations
Internet cafés	Commercial company	Generate profit	Local entrepreneurs	User fees	Students Professionals Tourists Youngsters

Both telecentres and Internet cafés vary considerably in size and variety of services. ‘Multipurpose Community Telecentres’ (MCTs), are advanced facilities promoted by the International Telecommunications Union (ITU). These facilities include libraries, training workshops, seminar rooms and office space, and they provide services such as videoconferencing, distance education, training and e-commerce (Oestmann and Dymond, 2001). In contrast, Falch (2004) describes the standard equipment for telecentres in Accra, Ghana as consisting of: two phones, a fax machine, a photocopier and a computer. This is an example of the disparity in resources in given areas. During my field studies in Africa and Asia, I found the same variation among Internet cafés; some of them contain more than 50 online computers, while others struggle to keep one or two operating.

In the development context, there has been a tendency to disparage Internet cafés. In his article on telecentre myths, Proenza (2001) claims that it is a common mistake to disregard them, and he further states that “by ignoring cybercafés we also miss an opportunity to learn important lessons about policy and managerial approaches that contribute to sustainability” (Proenza, 2001: 5). Bell (2006) points out that Internet cafés are found in communities throughout the developing world and he further states that they are an example of the most successful shared-access computing initiatives in these areas.

Internet cafés and telecentres are the two main sources of public Internet access in developing countries. Although telecentres are common in some developing countries (e.g. Africa and South America), I will focus this research on Internet cafes because these are the more prevalent means of accessing the Internet in the places we examined (e.g. Indonesia and Tanzania). Studies from other developing countries, like Peru, (Boase et al., 2002) and India (Haseloff, 2005) showed this trend as well.

3.4. Sustainable supply and demand

In order to support permanent development in poor communities, information systems (IS) have to be sustainable. While some research has been carried out on the success and failure of information systems in developing countries, there is little attention paid to sustainability.

Sustainability focuses on how IS projects can be successfully maintained over long periods of time with appropriate resources, including money and people (Walsham and Sahay, 2006). In his article which details failure and success rates of information systems in developing countries, Heeks (2002) uses his model of design-reality gaps and explains that sustainability failures frequently occur when design and actuality are disparate. Typical examples of these failures occur when, for example, donor funds are withdrawn, key IS staff quit or senior-level champions move on to another cause.

The majority of academic literature discussing public Internet access deals with telecentres. Telecentre sustainability has to some degree been an issue in the debate surrounding the use of IT for development (Harris et al., 2003). A wide variety of articles describe telecentre projects in more than 20 developing countries. It is evident that the many telecentres provide substantial benefits for the local, often poor, communities where they are introduced. The approach has, however, generally been one of pilot projects and the main problems have been with sustainability and replication of these projects (James, 2003:470).

Two main IS sustainability issues pointed out by Heeks (2002) are financial viability and staff capability. These shortcomings apply to telecentres and to public Internet access in general. In most cases, the sustainability discussion refers to financial or commercial self-sustainability, which is often regarded as a necessary condition for the continued existence of the centres. In this regard, there is an important distinction between the two terms 'financial sustainability' and 'commercial sustainability'. A financially sustainable public access point is not necessarily commercially viable. 'Commercial sustainability' denotes an initiative that relies on revenue generated solely from its operations to sustain itself, while 'financial sustainability' simply indicates that operations are sustained through funding derived from a variety of sources potentially including donors (Bell, 2006:14). Much of the literature equates sustainability and financial viability in respect to telecentres, and also contends that economy is the real measure for sustainability. I will adopt this understanding and will use financial sustainability when talking about telecentres and public Internet access points in general, and I will use commercial sustainability to describe the sustainability of Internet cafés.

Of the existing shared-access computing initiatives, the Internet café seems to be the only model to have achieved commercial viability. On the other hand, most telecentres have embraced a variety of strategies in their efforts to become financially sustainable, including both local support and external support from government and international donors (Bell, 2006). Simpson et al. (2004:326) report that even in developed countries like Australia and the UK, few telecentres have been able to be sustainable in the absence of government funding.

While Internet cafés rely on user fees to sustain their operations and thus have a narrow, commercial perspective on sustainability, most telecentres rely, totally or partially on donor funding, and the question of sustainability consequently has a broader scope. Some of the challenges of making telecentres sustainable are described in articles by Proenza (2001), Roman and Colle (2002), Stoll (2003), Harris et al. (2003), Madon (2005), Parkinson (2005), Ali and Bailur, (2007), and Sein et al. (2008). These articles all have a supply side focus. I will come back to these sustainability issues in section 6.1.

Since the telecentre concept has an explicit development objective, the focus on financial sustainability as a success criterion has been subject for discussion. Some research contends that because these entities make an important contribution to the community, they should be regarded as a "public good" (cf. 3.1), and as such, these services should be offered for free or for a nominal price (Bell, 2006:14). In this regard, Simpson et al. (2004: 335) and Bailey (2009: 9) suggest that the provision of public access points in rural communities needs to be

reconceptualised as an essential community infrastructure, like schools and libraries, rather than as an economic development strategy. A radical change in viewing Internet access in regard to this policy issue would obviously have a great impact on the sustainability of public Internet access points.

As I have pointed out in this section, most of the literature covering information systems sustainability in general, and sustainability of public Internet access in particular, have a supply side focus. In some articles, however, we can find traces of a demand side perspective. For example, Roman and Colle (2002: 8) list ten themes for telecentre sustainability, where one of the themes has a demand perspective: “The importance of raising awareness about information and ICTs as a valuable resource for individuals, families, organisations and communities”.

The presentation in this chapter has narrowed the focus to the sustainability of public Internet access in developing countries. My conjecture is that in creating and sustaining such access, both the supply side and the demand side, and their balance are important. I have therefore framed my research question in this way:

*What affects the sustainability
of public Internet access in developing countries,
from the supply and the demand sides respectively?*

Figure 2 illustrates the research question:

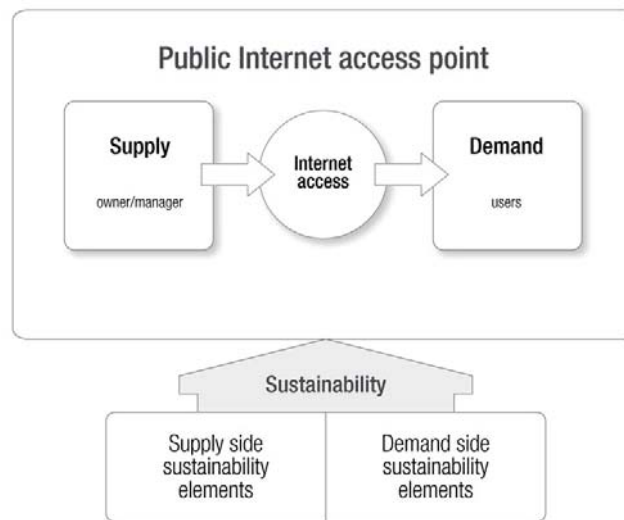


Figure 2. Sustainability of public Internet access

The rest of this thesis will deal with the underlying factors (i.e. elements) of sustainability that contribute to sustainability from both the supply and the demand side issue. In chapter 5, I will give an explanation of the theoretical foundation I used for the development of the research question (cf. 5.3), and I will outline my blueprint for building new theory on the sustainability issue based on this concept. In chapter 6, I will use my ten articles as input for the actual theory building model.

4. The ten articles – a brief overview

Ten research articles form the basis for this work on sustainability of public Internet access in developing countries, as described in chapter 1 and illustrated in figure 3, below. The articles are published in various journals and one conference proceeding, dating from 2003 to 2008. Seven of the articles (articles 1 – 7) discuss Internet cafés as providers of public Internet access and outline their use and users. The last three articles deal with other aspects of information access, including IS implementation and use in developing countries.

The ten articles are based on data collected in Indonesia and Tanzania. I give a brief outline of the research sites in the next section. Section 4.2 contains short summaries of the research designs, (i.e. the methodology applied in the ten articles). In section 4.3, I give a brief overview of the findings from the articles, as related to the research question presented in this thesis (i.e. the sustainability of supply and demand). Section 4.4 is a compressed list of the main content and the publication details of the articles.

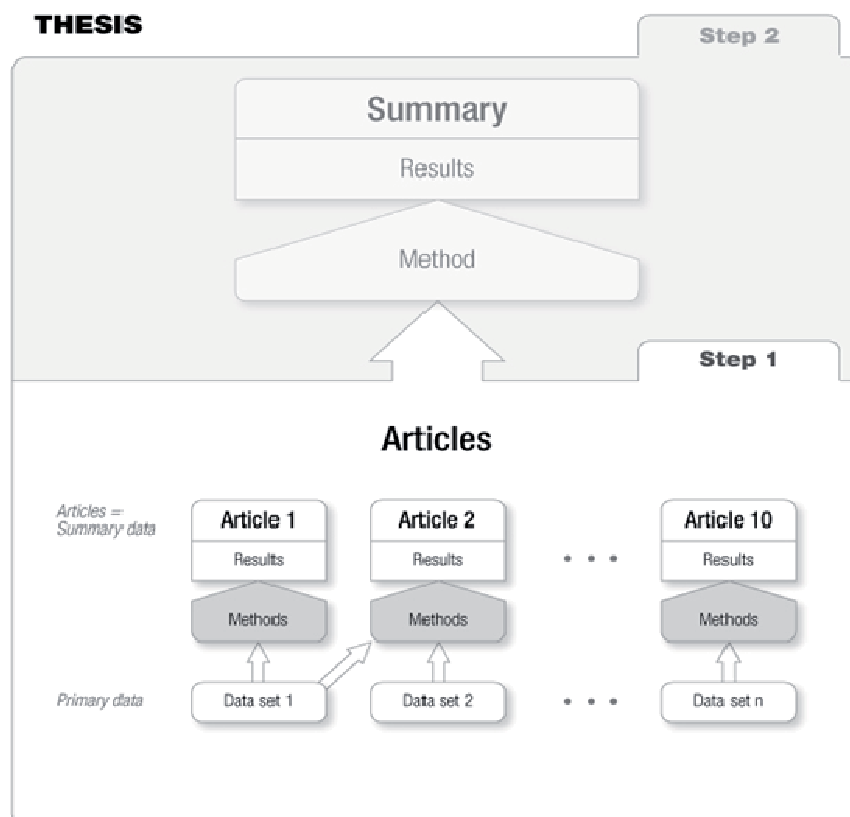


Figure 3. Thesis structure step 1: The ten articles: data, methods, and results.

4.1 The research sites – Internet use in Indonesia and Tanzania

The two countries which were selected as research sites are Indonesia and Tanzania. These were selected because the University of Agder has promoted extensive research collaboration with the universities in these countries for quite some time. The research has been partly funded by The Norwegian Agency for Development Cooperation (Norad) and The Norwegian Ministry of Foreign Affairs. The collaboration with Mzumbe University in Tanzania, for example, dates back to 1988.

Indonesia and Tanzania were also selected because the researcher felt these countries were representative of two typical developing areas. Both countries are located on different continents, but each country, in its own right, reflects the wide range of problems and concerns shared by developing nations in respect to economic limitations, human development, and cultural issues. Although Indonesia and Tanzania share some similarities, for example, colonial history, forms of government and language, the differences regarding social, financial and technological status are significant. Indonesia appears to be far more developed than Tanzania with regard to indicators such as Gross Domestic Product (GDP) per capita, Human Development Index (HDI), age structure, life expectancy, literacy rate, poverty and health problems (e.g. HIV/AIDS)(see table 2, below). Within the two countries, we selected research sites for data collection that gave a compound background regarding issues like urbanisation, trade and industry, economy and cultural context.

Today, both Indonesia and Tanzania are multi-party democratic republics. Indonesia achieved independence from the Netherlands in 1949 while Tanzania, a union of Tanganyika and Zanzibar, became independent from the UK in 1964.



Figure 4. Indonesia

Indonesia (see map, figure 4), with close to 240 million people, is the fourth most populous and the largest Muslim country in the world. It still suffers from the after-effects of the severe Asian economic crisis of 1997 and from the biggest natural disaster in recorded human history in 2004. The country is at a critical stage in the process of democracy building. More than 30 million people are unemployed and disparities between the rich and poor and between 'inner' and 'outer' parts of the country are enormous. The concentration of economic activity and political power is on the island of Java.

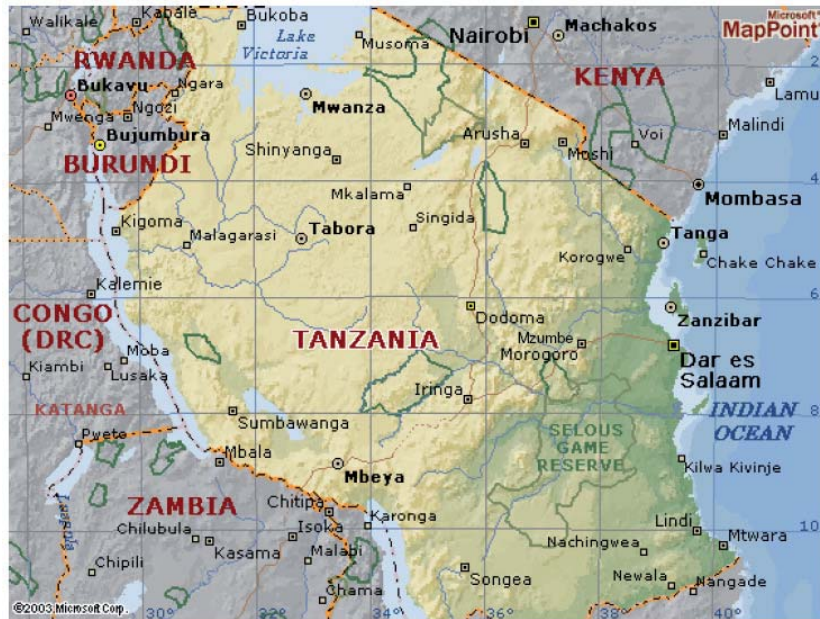


Figure 5. Tanzania.

With almost 40 million people and an area of 945,000 square km, Tanzania has 17% of Indonesia's population on 50% of the land mass. Tanzania (see map, figure 5) remains one of the least urbanised African countries; the majority of the population (i.e. 77 % of all Tanzanians) still live in rural areas. The per capita GDP is estimated to be less than one-fifth of Indonesia's, but this figure is probably understated because of the size of the informal sector. According to the Tanzanian Ministry of Planning, Economy and Empowerment (2006), 2.3 million people are unemployed, but the majority of people are self-employed and most work is seasonal in the agricultural and informal sector. Table 2 shows some key figures describing the two countries.

The population of Tanzania is far younger than that of Indonesia, with almost half of the Tanzanians being younger than 15 years - an average age of more than nine years less than in Indonesia. While people in Tanzania can expect to live to be 50 years, statistically, Indonesians have a life expectancy of more than 70 years. Both countries have a large proportion of poor people, 18% in Indonesia and double that in Tanzania. The literacy rate is also higher in Indonesia, and it is worth noting, that there is a significant difference in literacy levels between men and women in Tanzania. According to the statistics, the literacy rate has been decreasing in Tanzania during the last decade. Compared to its neighbouring countries, however, Tanzania still has a relatively high literacy rate.

In Indonesia, 86% of the population are Muslims, less than 10% are Christians and there are small minorities of Buddhists and Hindus. The Tanzanian population is divided into three large religious segments: Muslims, Christians and indigenous or animistic believers. Some sources claim the share to be roughly one-third of each of these, while others suggest about 40-45% of each of Muslims and Christians and 10-20% of traditional believers.

Table 2. Country Statistics

	Indonesia	Tanzania
Area (sq. km.)	1,919,440	945,087
Population (mill.)	234.7	39.4
Labour force (mill.)	106.4	19.4
Age structure (%)		
<i>0-14 years:</i>	28.7	43.9
<i>15--64 years:</i>	65.6	53.3
<i>65 -> years</i>	5.7	2.8
Median age	26.9	17.7
Life expectancy at birth (years)	70.2	50.7
HIV/AIDS - adult prevalence rate (%)	0.1	8.8
Religion (%)		
<i>Muslim</i>	86	38
<i>Christian</i>	9	30
<i>Other</i>	5	32
Literacy rate (% of people aged 15 and over that can read and write)		
<i>Total</i>	90.4	69.4
<i>Male</i>	94.0	77.5
<i>Female</i>	86.8	62.2
GDP; purchasing power parity (PPP, billion \$)	948.3	29.6
GDP (PPP) per capita (\$)	3,900	800
Population below poverty line (%)	17.8	36.0
Unemployment rate (%)	12.5	12.9*

Sources: CIA (2008) and *Tanzania national website (2007)

Both Indonesia and Tanzania have their lingua franca. Bahasa Indonesia is the dominant and official language and is spoken all over Indonesia. In Tanzania most people have their own, local languages, often quite distinct from each other. However, Kiswahili has become the lingua franca of eastern Africa and is the official language spoken by all Tanzanians. From secondary school level, all teaching is done in English, the second official language of Tanzania.

The use of the Internet is increasing rapidly in Indonesia (see table 3). The number of users rose by almost 400% during six years from 2001 to 2007, and reached 20 million. The density of Internet users, however, is still as low as 9%, which is well below the average user density in the rest of Asia and the world. Table 3 reveals that the situation in Tanzania is even lower. Although the growth of Internet users has increased by more than 500% during the same period, the density of Internet users is still only one fifth of the average African density.

Widespread public use of the Internet explains the much faster growth of Internet users as opposed to the actual number of PCs. In Indonesia, as well as in Tanzania, Internet cafés are mainly located in the larger cities in the central parts of the country, for example in Java in Indonesia and in Dar es Salaam and Arusha in Tanzania. Rapidly increasing numbers of Internet users, however, represent a potential step in the direction of more equitable access to information in both countries.

Table 3. Selected Indicators of IT Development in Indonesia and Tanzania.

Country	Year	Internet		PCs	
		Users (000s)	Users per 100 inhab.	Total (1000)	Per 100 inhab.
Indonesia	2001	4,200	2.01	2,300	1.10
	2004	14,508	6.52	3,022	1.36
	2007	20,000	8.9	not available	n.a.
Asia (excl. Middle East)	2007	559,359	24.92	n.a.	n.a.
Tanzania	2001	60	0.18	120	0.36
	2004	333	0.88	278	0.74
	2007	384	1.00	n.a.	n.a.
Africa	2007	43,996	4.7	n.a.	n.a.
World	2007	1,244,449	18.9	n.a.	n.a.

Sources: Internet World Stats (2009) and ITU (2006)

In Indonesia, we collected the Internet café data in three geographically different areas, Yogyakarta, Surabaya and Lombok (see figure 4). Yogyakarta was selected as a typical university city with a large proportion of the population being active students. Surabaya was selected because of its dominant role as a leading industrial city in Indonesia and the island of Lombok was selected because of the thriving tourist industry in the area. To study the information asymmetry problem (article 8), six districts at different levels of centrality on the islands of Java and Lombok were selected.

In Tanzania, we carried out the data collection in urban, semi-urban and rural regions across the country. The regions included the capital, Dar es Salaam, Morogoro, a semi-urban area classified as such from the geographical location, the infrastructure and the public services, and the rural and geographically distant regions of Iringa, Mbeya and Songea (see figure 5).

4.2 Methods and data collection

The first step in this research process, which related directly to the ten aforementioned articles (see figure 3 and chapter 1), involved using both an inductive and deductive schema. The deductive research is based on prior development, information systems and entrepreneurship theory. The research designs cover a wide selection of methodology, both qualitative and quantitative. In this section, I give a short summary of methods used for each of the thematic areas. An overview of theoretical foundation, data collection and analysis methods is presented in table 4 at the end of the section. The research methodology used in the second step of the research process will be presented in chapter 5.

Eight of the articles (articles 1-8) are based on surveys in combination with in-depth interviews. Articles 9 and 10 are solely qualitative and inductive, and use an explorative case study approach. The surveys were carried out among Internet café entrepreneurs (articles 1 and 2), Internet café users (articles 3-7), and senior high school students (article 8). The data collection process mainly followed the same pattern:

- Preliminary interviews with potential informants formed the basis for developing a questionnaire as the main research instrument for the survey.
- The questionnaire was developed in parallel in both the local language (Indonesian) and English. In Tanzania, we translated the questionnaire from English into Kiswahili.

- The questionnaire was then tested by a pilot study and revised according to feedback.
- The research sites were selected systematically, based on local knowledge, with an objective to being as representative as possible to geography, context, and time.
- Distribution and collection of questionnaires were carried out physically by the authors, with assistance from local research assistants.
- To complement the data from the questionnaires and to help interpret the quantitative data, we conducted additional in-depth interviews.

The tools used for analysing the survey data covered a selection of statistical methods, including correlation analysis, regression analysis, multidimensional scaling procedure, etc. (see table 4, below).

Internet café entrepreneurs in Indonesia.

Articles 1 and 2 were aimed at identifying the characteristics of private Internet café entrepreneurs. The main objectives were to gain an understanding of the reasons for the success of Internet businesses and to study the mechanisms behind the spread of Internet access in economically poor areas. Article 1 gives a broad description of all Internet café entrepreneurs. Article 2 deals specifically with those who have started an Internet café at an early stage of Internet café diffusion within a region. These individuals were deemed as principal drivers in this diffusion process.

Data were collected in January 2003. We received a total of 93 valid answers; the average response rate was 73%; the respondents were all owners of the sampled Internet cafés.

In article 1, we set up a model of three groups of variables as a basis for the statistical analyses: background variables, entrepreneurial adaptations, and success variables (see table 6) and we analysed statistical associations between them. We used correlation analyses in most cases, either Pearson's when both variables were at interval measurement levels, or cross-tabulation when both variables were categorical.

In article 2, we postulated that the speed and pattern of diffusion of the Internet café innovation was dependent on four factors:

- the technology
- the entrepreneurs who could implement the innovation at a new location
- the local markets for Internet cafés
- the economic, social, and cultural contexts of the technology, entrepreneurs, and markets.

We formulated hypotheses using the four factors. We used a combination of in-depth interviews and survey methods in order to interpret and analyze the collected data, and to test each of the hypotheses.

Internet café users and use.

Five articles addressed the factor of demand side of public Internet access in Internet cafés. Articles 3 and 4 dealt with Internet café users and Internet use in Indonesia. Article 5 discussed users in Tanzania, and articles 6 and 7 combined concepts from the other articles.

Articles 3 and 4 drew from a survey of users of Internet cafés in Yogyakarta during the period of November – December 2003. The total number of respondents was 270. In article 3, we identified the user groups. In order to understand the market for Internet café services, we then established what the main motives were for users, and what the perceived gains were from using their time and money in Internet cafés. A research model was developed, where

four hypotheses were formulated to analyse the determining factors behind the frequency of Internet café use. In addition to the four hypotheses, we did an explorative study to identify modifying effects. We applied bivariate analyses to examine the survey data. The effects of conditional variables on expected correlations between main variables were analysed by separate correlation analyses for each conditional variable. Regression analysis was subsequently used to test the effect of the four independent variables, individual capacity, financial capacity, occupation, and media exposure, on the main dependent variable, the frequency of Internet café use.

In article 4, we mapped the 13 dominating patterns of activities in the Internet cafés and the factors that decide use patterns. We did this in order to establish whether the growing number of Internet cafés served a useful purpose in spreading information, thus providing a valuable benefit to the users. In the analyses of the collected data, a multidimensional scaling procedure was used for grouping data by examining resemblance in patterns of Internet use among the Internet café customers. In our case, distance measures between types of use were displayed in a two-dimensional diagram. The groups were subsequently compared by applying means comparison analyses. In our efforts to explain use patterns, we analysed seven individual independent variables (e.g. age, personal capability, Internet experience).

Article 5 describes the digital divide within Tanzania. In this article, we showed the differences in quantity and quality of public Internet access points. We also looked at the differences in usage and users between rural, semi-urban and central regions of the country (cf. section 4.1). The survey was administered over two periods in 2004. In the first period (in January), we surveyed users in rural areas. In September, we carried out the second phase of the survey in Morogoro and Dar es Salaam. The total number of respondents was 265. Simple statistical analysis was used to examine the survey data and the same ten variables as were used in Indonesia were investigated across the three levels of rurality. These variables included: age, gender, education, employment, financial capacity, Internet café expenses, personal capability, Internet café use frequency, Internet experience, and access flexibility.

Articles 6 and 7 are based on the data from both Indonesia and Tanzania. They both deal with use of the Internet in Internet cafés. We looked at Internet use in order to try to find out if Internet cafes can, or have the potential to, promote individual or societal development in developing countries.

In article 6, we explored whether Internet cafés in Asia and Africa were used as arenas for education and learning and we looked for contextual explanations for the similarities and differences in Internet café use patterns and frequency in Indonesia and Tanzania. Our aim was to present useful guidelines for the arrangement and start-up of Internet cafés in information-poor areas of developing countries and to provide motivation for including Internet cafés as an element in national human resource development through individual competence building.

This exploratory work is based on surveys from 500 respondents which spanned a three year period and was administered in the two countries specified above. For the analysis of the survey data, we used simple statistical methods, and the article is a result of a combination of this and of an extensive use of in-depth interviews.

The main objectives of article 7 were to map and compare patterns of Internet use in poor areas of these countries and to enhance the understanding of social gains from using Internet access. The term 'utility gap' was introduced. We aimed to trace reasons behind the extent of utility gaps in Internet use from public access points in two cities: Yogyakarta in Indonesia and Dar es Salaam in Tanzania.

In our model, usage frequency and type of use were the dependent variables. The independent variables were grouped into four categories: geographical context, demographical information, individual competencies, and personal capacities. In the analysis, we investigated statistical associations between the sets of variables. First, we applied bivariate correlation analyses using Pearson's coefficient. Cross-tabulation (Chi-square test) was used to analyze the association between variables measured in nominal values. Then a T-test was used to compare means between two groups. A one-way ANOVA was used to compare means among more than two groups. When any significant difference was found, a least significant difference test was applied to determine significant differences between specific groups. In the following analyses, a multidimensional scaling procedure was applied (the Euclidian distance model) for grouping data by examining resemblance in patterns of Internet use among the Internet café customers at each of the two sites (cf. article 4, above). The procedure yielded sets of data which reflected the similarities and dissimilarities between the groups. The groups were also compared using means comparison analyses.

Information asymmetry in Indonesia.

The main objective in article 8 was to trace the mechanisms responsible for the information asymmetry problem in Indonesia and in developing countries in general. The research focused on the channels of information flow. In the article, we described how differences in levels of knowledge were affected by various influences. Some of these influences include: family background, location and school type, personal capabilities, and media exposure.

Data for our study were collected from students in public and private senior high schools in three districts in two provinces on Java and Lombok (see section 4.1). Data were collected from April to September, 2005. The total number of respondents was 592, equally divided among the three districts in each of the two provinces. We applied bivariate statistical methods, (e.g. correlation analyses and means comparison), and in some cases, we used stepwise regression analyses.

IS implementation and use. Contextual issues.

In article 9, we traced the attempts that were made to introduce information technology into a management college over a 10-year period (i.e. from 1991 to 2001). The study shows the validity of establishing an implementation strategy and provides an understanding of the complexities of the implementation process as it is played out over a number of years in a particular setting, in this case Tanzania. Our main objective was to use this implementation project as a study to get a better understanding of IT usage in Africa in general.

The study approach used here was an in-depth, longitudinal, interpretative case study. The subsequent analysis and interpretations were informed and structured by traditional IT implementation literature, and was supplemented by relevant literature which addressed the mediating contextual and cultural factors.

Data gathering was based partially on formal interviews and partially on observations and informal interviews with a number of stakeholders. All 44 interviews were written and transcribed without using any tools or coding. Some late interviews were discussed with the interviewees after transcription.

E-government in Indonesia.

Article 10 is also an exploratory study dealing with information systems implementation. In this article, we identified the challenges of e-government implementation in a developing country (i.e. Indonesia), and we endeavoured to find out how political leaders in this country were meeting these challenges.

Data collection was conducted in October 2006. We conducted semi-structured face-to-face interviews and we held informal focus group discussions with people involved in implementing e-government strategies. We interviewed e-government officials who worked at different levels within the political structure. The aim of these meetings was to ensure the validity of the information obtained. Each interview and discussion session lasted between 60 and 90 minutes. In addition to the interviews and the focus group discussions with government participants, we carried out field observations in rural areas ranging from district to sub-district to village levels. The purpose of these studies was to learn about the daily activities and the available infrastructure in these areas. We also looked at various documents such as the grand design of e-government document, and customer satisfaction reports. We were also given demonstrations of the services offered through the agencies.

All the interviews and the focus group discussions were recorded and transcribed. The transcripts were then analysed using the content analysis method. We developed a pre-defined set of categories (deductive category application) based on a theoretical background and on three groups of e-government challenges.

Table 4. Research design in the ten articles.

#	Title	Theoretical foundation	Data collection	Analysis methods
1	Internet café entrepreneurs: Pioneers in information dissemination in Indonesia	Conventional entrepreneurship theory and empirical studies of supply of and demand for entrepreneurial services in economically poor contexts.	Survey of 93 IC entrepreneurs in Surabaya, Yogyakarta and Lombok in January, 2003. Questionnaire in Indonesian. Additional in-depth interviews.	Mainly correlation analysis.
2	Information diffusion agents and the spread of Internet cafés in Indonesia	Innovation diffusion and entrepreneurship research.	Same survey and interviews as article 1.	Combination of statistical analysis and in-depth interviews with owners and users.
3	Information dissemination in a developing society: Internet café users in Indonesia	IT user acceptance theory.	Survey of 270 users in 15 Internet cafés in the city of Yogyakarta in December 2003. Questionnaire in Indonesian. Additional in-depth interviews.	Survey data: bivariate analyses, correlation analysis and regression analysis.
4	Internet for development? Patterns of use among Internet café customers in Indonesia	Exploratory analysis of Internet use in Internet cafés in a developing country based on general Internet use literature and statistics.	Same survey and interviews as article 3.	A multidimensional scaling procedure applied to 7 groups of variables and means comparison analysis.
5	A rural-urban Digital Divide? Regional aspects of Internet use in Tanzania.	Theoretical literature and empirical studies on the Digital Divide concept.	Survey of 265 users of Internet cafés in five towns in Tanzania: Dar es Salaam, Morogoro, Iringa, Mbeya and Songea (2004). Same questionnaire as articles 3 and 4, translated into Kiswahili. Additional in-depth interviews.	Descriptive statistical analysis.
6	Internet Cafés in Asia and Africa – Venues for Education and Learning?	Literature on adoption of Internet technology, in global and in development contexts.	Survey of users of Internet cafés in the city of Yogyakarta in Indonesia and in five towns in Tanzania (see articles 3-5), also in-depth interviews	Descriptive statistical analysis.

#	Title	Theoretical foundation	Data collection	Analysis methods
7	Gaming or gaining? Comparing the use of Internet cafés in Indonesia and Tanzania	Studies of Internet use and contextual explanations to variance in use patterns.	Same survey and interviews as article 6.	Statistical analyses: bivariate correlation analyses using Pearson's coefficient, Cross-tabulation (Chi-square test), and T-test one-way ANOVA. Multidimensional scaling procedure (the Euclidian distance model) for grouping data.
8	Investing in knowledge? Information asymmetry and Indonesian schooling	Theory of the digital divide and information asymmetry as a problem for economic development in poor countries.	Survey of 592 high school students in 6 different districts in two provinces in Java and Lombok (2005). Questionnaire in Indonesian. Additional in-depth interviews.	Statistical analysis: bivariate methods, such as correlation analyses and means comparison. Stepwise regression analyses applied.
9	Implementation of IT in Africa: Understanding and explaining the results of ten years of implementation effort in a Tanzanian organisation	IS implementation theory.	Formal and informal interviews with 60 persons, and observations from various Tanzanian institutions and organisations.	Study approach: in-depth, longitudinal, 10-year interpretative case study from 1991 to 2001.
10	E-government Challenges and The Role of Political Leadership in Indonesia: the Case of Sragen	E-government literature with emphasis on developing countries.	Exploratory study based on semi-structured interviews and focus group discussions together with field observations, document analysis, and demonstrations of services (October 2006).	Transcripts were analysed using the content analysis method.

4.3 Findings

In this section, I will give a brief overview of the findings from the ten articles, and I will discuss the results which are related to the research problem presented in this thesis (i.e. the sustainability issue). Articles 1 and 2 deal mainly with Internet café entrepreneurs and show the supply side perspective to public Internet access. Articles 3 – 7 pertain to the demand side perspective. In these articles, we interviewed customers in order to ascertain their usage of IT resources, including Internet usage, specifically in Internet cafés. In article 8, we look at the potential Internet café market by studying media exposure and access to information (specifically among young people) in Indonesia. In articles 9 and 10, we deal with information access and information systems implementation and use in developing countries.

4.3.1 Internet café entrepreneurs and the spread of Internet cafés

In order to study the supply side of Internet café businesses, it is imperative to get acquainted with the suppliers themselves (i.e. the Internet café owners and managers). Their personal capabilities and competence are an important condition for the success and sustainability of their businesses. From articles 1 and 2, we obtained the following information from Internet café entrepreneurs:

- age
- gender

- education
- work experience
- entrepreneurial readiness
- Internet café start-up time.

Not surprisingly, we found that Internet café entrepreneurs were typically young, well-educated men. Almost 90% of them were males and the average age was 30 years old. The average start-up and operating time for Internet cafés was 3.4 years, varying between one and eight years. According to length of operation, we classified the café endeavours into three groups: early, medium and late starters. The early starters had been in operation for more than four years, the medium group for three to four years and the late starters for not more than two years.

The level of education was high among all the café entrepreneurs in our study. All early starters and most of the later starters were university educated and the differences in levels of education among the three groups were small and statistically insignificant. Therefore, we concluded that higher education was a distinctive characteristic of all the Internet café entrepreneurs. However, the data showed that the educational background was not necessarily related to engineering or technical training. The lack of formal IT education was probably compensated for by other capabilities. The entrepreneurs reported that they obtained the technical skills necessary for starting and running their Internet café businesses through self-learning and practical experience, not from formal education.

Approximately two-thirds of the business starters had previous work experience. The differences in work experience between early and late starters are significant. Two-thirds of the early starters had IT-related work experience, compared with around one-third of the medium and late starters. Also, early adopters had more advanced technical skills than later adopters. A high percentage of the early starters also had work experience from varying geographical areas.

The background variable ‘entrepreneurial readiness’ is a combination of five individual and social factors which contribute to entrepreneurial drive and the capacity to start and succeed in a business innovation (e.g. an Internet café). In our survey, the respondents assessed their capabilities in each of these areas:

- leadership skills and self-confidence
- mental maturity and social skills
- social networks
- access to information
- access to financial capital.

We found that the entrepreneurial readiness scores for early starters were substantially higher than for medium and late starters, and the difference was statistically significant. Together with the significant differences in IT-related work experience, we concluded that these two factors were characteristics of an early starter.

Internet cafés spread first in urban areas, where there was an advanced infrastructure and a population with reasonable incomes and “modern” values (article 2). At well-established sites in Indonesia and Tanzania, business competition and capital requirements were high. We discuss how many of the entrepreneurs were obliged to find alternative and more profitable locations for their Internet cafés outside of these pressure areas. Capital entry barriers are generally low for these types of businesses due to the availability of second-hand computers, the plethora of premises for rent, and the possibility of starting with only a couple of PC units. Some café owners succeeded with little more than a 2,000 USD investment (article 2). In

developing countries like Indonesia, there is often a tradition of swift copying of successful business ideas (Kristiansen, 2003). For example, Internet cafés would multiply rapidly as soon as profitability was proven in a certain location. Our survey and interviews showed that Internet cafes popped up quickly in our three study areas as soon as the first ones were found to be successful. This phenomenon showed that potential business starters with IT competence and entrepreneurial readiness could easily be attracted to alternative locations, even in the periphery, if business preconditions are met.

4.3.2 Who are the users and what do they do?

In section 4.3.1 above, research showed that the Internet café owners were market oriented and responded to supply side mechanisms. They were conscious of their potential user groups and they were aware of where to locate the cafés at start-up. Students are often the main target group. Therefore, the entrepreneurs established cafés close to educational institutions and student accommodations. By the same token, when entrepreneurs wanted to target tourist clientele, they situated cafés in hotel areas or around hubs of transport (e.g. railway stations). Figures for the real current market segments show that their accuracy when estimating market shares was high. High-school and university students constituted a particularly important market segment for the early Internet café market, especially in rural areas (articles 2 and 5). To describe this market, I looked closely at the existing Internet café customers.

Who are they?

Previous empirical research on Internet users in developing countries (e.g. Joshi (2001) and Mwesige (2004)) supports our findings in regard to Internet café users. For instance, males are the dominant customers and they use the Internet more frequently than females. Usage frequency tends to increase with higher individual competency and the type of use is influenced by age and gender, as well as by education and financial capacity (article 3, 5, 6, and 7).

Gender.

One-third of the Internet café customers in Indonesia are women. Although women make up a significantly less proportion of users than the male share, they do constitute a substantial percentage in a poor, predominantly Muslim society. In Tanzania, the female share is slightly higher, 37%. These numbers illustrate the difference in general public participation between the genders in developing countries, but they also reveal that a considerable number of women have found their way to the Internet cafés, despite possible cultural obstacles (articles 6 and 7).

Age.

In developed countries, we note that Internet cafés are primarily populated by young people. According to existing literature on Internet cafés in developing countries (e.g. Joshi (2001) and Mwesige (2004)), this appears to be the case in these countries as well. Our research (articles 6 and 7) shows, however, that the age composition is broader than one would expect. In both arenas, about twenty per cent of the users were younger than 20 years old. In Yogyakarta, for example, the age of the users was closely linked to the population composition. Another factor for this age composition was that the city is a national centre for higher education. The average user was 24.2 years old, a little lower than the median age of the Indonesian population (i.e. 26.9 years old). Two-thirds of the users were between 21 and 30 years of age. In Dar es Salaam, where the users' backgrounds were more diverse, we found that the age dispersion was more complex. Here, the average user was older than in Yogyakarta (27.7 years), and was ten years older than the median age of the Tanzanian population, in general. The standard deviation was 9.7. One-third of the users were over 30

years old and ten per cent were over 40 years old. In other words, we observed that the Tanzanian Internet café users were older than what we would have expected.

Education and competence.

At both research sites, we found that the users had an average of 12 years of schooling. The numbers were surprisingly similar in both Indonesia and in Tanzania. However, the share of actual students was much higher in Yogyakarta. In addition, around one-third of the users, in both cities, had some university education. In Tanzania, ten per cent of the users had only completed their primary education. We propose here that less (formally) educated people can derive benefits from using the Internet as well (articles 4, 6, and 7).

Also, the users' perception of their own IT and Internet competence was very similar across the two research sites, although perceived English language proficiency differed. Due to the wide use of the English language in the Tanzanian school system and in Tanzanian society in general, the Tanzanian users scored higher (3.73) than the Indonesian users (2.73) on a scale from 1 to 5. Apart from the language skill scale in Tanzania, the scores in other competence dimensions were at a moderate level. This information does portend, however, that people can start their Internet use without a lot of previous competence (article 6 and 7).

Profession.

The prevalence of student users is much higher in Yogyakarta than in Dar es Salaam. More than 70% of the café customers are students, compared to only around 30% in Dar es Salaam. Meanwhile, there is a predominance of private and governmental employees, and entrepreneurs among the Internet café users in Dar es Salaam. This indicates a high share of professional use. In this regard, the cafés, to some extent, are regarded as professional computer centres for businesses and organisations that cannot afford to run their own IT service units. We know, for instance, that the level of automation in the governmental sector in Tanzania is low due to shortages of resources. Because of this, governmental officers constitute a significant share of the users in Internet cafés in Dar es Salaam (articles 5, 6, and 7).

Students are apparently an important customer category for all public Internet access points. On the other hand, concentrating too heavily on one market segment may make an Internet café more vulnerable. Therefore, broadening the customer base is important to sustainability. In Indonesia, for example, we found that the user frequency was lower than expected among students, due to alternative (and cheaper) access to on-campus data-labs with Internet connections (article 3). Also, in Zanzibar, Tanzania, one Internet café had to close down when the nearby university opened a new PC-lab for the students (article 6).

What do they do?

The average café customer in Indonesia and Tanzania spends around two hours per visit connected to the Internet, and frequents these establishments more than ten times per month. The average usage, therefore, is about 30 hours per month. Customers generally spend an additional five minutes waiting or socializing per visit. This trend suggests that the venues today are more cyber than café oriented. For example, when we visited Internet cafés in Asia and Africa, we found that areas designated for socializing were minimal, and other café services were limited as well (articles 4, 5, and 7).

There is a remarkable equality in patterns of use of Internet cafés in the two research sites. We developed a "popularity index" of 13 different Internet use categories. We based the index on the respondents' assessments of the importance of the various forms of usage during their visits to the Internet café. E-mail, information seeking, and chatting were the most popular activities for the Internet café customers at both research sites, while using the Internet for visiting pornographic sites, gambling, and e-business were the three least common activities.

Our objectives behind studying the various usage categories were to see if the Internet cafés are used for entertainment and individual amusement, or as a means for enhanced individual competence and social gains; what we call ‘serious use’. We assembled the usage patterns into four groups:

- recreational
- communication
- instrumental
- business

The groupings were based on the literature studied, and on our own findings through our statistical analyses.

The majority of customers use the Internet predominantly for communication. This category comprises e-mailing and chatting. The second largest group of users visit the Internet cafés for instrumental use of the Web: seeking information, reading online news, and doing research. It is interesting that very few users visit the Internet cafés primarily for recreational purposes, for example, to do computer gaming or to visit pornographic sites. Most customers, however, do more than one activity when they visit the café. More than one third of all customers play computer games, even if only twelve per cent report gaming as a primary activity, and even though very few users in Yogyakarta come to the cafés primarily for business purposes, more than one quarter report that they also use their online connection for doing business and e-shopping (articles 4 and 7).

Accordingly, people in developing countries go to Internet cafés mainly for what we would call serious use. In section 2.1, I pointed out that knowledge and education were the most important issues needed to create development. In article 6, we show that one main finding from our research is that Internet cafés, to a large extent, are used for competence development activities, like searching for information and research. Therefore, Internet cafes have the potential for being important instruments in supporting development. The issue of serious or non-serious use will be further elaborated on in section 6.2.2, when I discuss the customers’ benefits from Internet use.

4.3.3 Information asymmetry and Indonesian schooling

Article 8 focuses on channels of information flow for use by young people for their political participation and in accessing employment or business opportunities. The main objective of this article was to trace mechanisms behind the information asymmetry problem in Indonesia particularly, and the relevance for developing countries in general. Information is a resource of knowledge and competence that can be used by individuals for enhancing their economic welfare, political power, or social status.

The main dependent variable was students’ level of knowledge in political and economic fields. We compared the statistical associations between knowledge and the three groups of background variables: family background, local context and personal capabilities. One group of variables, named media exposure, covered the respondents’ use of various media (including the Internet). We analysed how different background variables influenced media exposure, and we looked at the statistical association between media exposure and knowledge.

We found that family background variables influenced students’ media exposure and their level of knowledge in several ways. Parents’ education, occupation, and economy had a significant impact on media exposure as well as on knowledge level. Parents who were employed in government or private sectors generally seemed to encourage media exposure

and higher knowledge levels for their offspring as compared to parents who were farmers, for example. Also, a families' level of economic status had a significant correlation to media exposure and knowledge level.

Students' local contexts were also found to be significant. Students in government schools and in centrally located areas generally had higher media exposure and levels of knowledge compared to students in private schools and in rural areas. In the city of Yogyakarta, for instance, knowledge level is almost 50% higher (measured by our scale) than in the more remote Lombok Barat. However, our analyses reveal relatively low explanatory values of media variables on students' knowledge. A threshold level of electronic media use is probably reached for most of the students so watching additional television or listening to the radio does not further influence their level of knowledge.

Since family background variables can affect a student's level of knowledge and can increase or decrease the likelihood that the student would obtain a higher level of education, we felt it was important to look for policy measures to counterweight family determinism. We observed a huge difference in levels of knowledge among the senior high school students in this study. After witnessing these incongruities, we believe that people's access to knowledge and information should become a politically charged arena and that information should be more highly valued as a resource for development.

4.3.4 Implementation of IT in Africa

Article 9 traces the attempts made to introduce information technology into a management college in Africa over a ten-year period (from 1991 to 2001). The study partially provides an indication of the validity of the established IS implementation theory in an African context and partially provides a deeper, contextually situated understanding of the complexities of the implementation process as it is played out over a number of years in this particular setting. Our main objective was to use the implementation project as a tool to achieve a better understanding of use of IT in Africa in general.

This case study showed little progress over the ten-year period studied. The article identifies several explanations for this outcome, some of which were of a political, organisational, personal, cultural and power-related essence. The findings related to the implementation, or the lack thereof, of introducing information technology into this site. The shortcomings of this implementation project tie in well with the general IT implementation literature, suggesting that some of the key elements in the literature, like lack of top management engagement, poor infrastructure, bad organisation, lack of job-related benefits and knowledge barriers are of a fairly general and universal nature.

The general nature of the literature does not, however, provide the background for a deeper understanding of the issues and underlying levels of explanation. For this, more contextual factors need to be taken into account. We discussed the following socio-cultural factors:

- reasons behind weak management support
- power related factors
- staff resistance
- the attitude to IT
- the symbolic value of IT
- the different agendas that might be at play
- the concept of time and planning for future.

4.3.5 E-government implementation and political leadership in Indonesia.

E-government systems are a special type of information system, aimed at supplying ordinary citizens with useful information thus enabling them to participate in the political process. In general, developing countries are lagging behind in e-government adoption compared to developed countries. In Indonesia, there is a huge disparity in e-government implementation between districts. Article 10 outlines e-government challenges and the role of political leadership in the rural district of Sragen, one of the leading districts in implementing e-government in the country. The study focuses on the supply-side of e-government, and categorises the challenges into three main areas: management, infrastructure, and human factors.

We contend that strong political leadership is one of the most important success criteria for e-government projects in general and in developing countries in particular. In Sragen, for example, we received statements from both politicians and administrative staff which supported this claim. Thus, we further assert that strong leadership is even more crucial to being able to generate progress over time and to help manage e-government implementation when there are limited resources available.

Other important considerations were gleaned from the Sragen case study. The main points included: understanding the importance of involvement for all stakeholders from the beginning of a project, placing a high value on exhaustive training and motivational encouragement for all those involved, and establishing partnerships with external parties. We also found that to ensure that the e-government implementation meets all expectations, regular evaluations should be performed to provide necessary feedback for improvement.

Despite the positive picture we saw in Sragen, we did identify some areas that needed attention. We noted that service provisions were not available online and were not accessible through the Internet. Electronic communication ends at the sub-district level and the offices work as service points. We propose that the services be made accessible through the Internet, anytime and anywhere. To make this possible, the IT infrastructure has to be improved. For example, financial constraints could be overcome by involving external investors in the process. Another challenge was: developing and implementing routines for improving direct communication with citizens in order to encourage people to use the information systems and thereby increasing the degree of participation in policy making and development.

Historically, focus has been placed on the supply-side of e-government, both from the government itself and from the research community. The demand side has been neglected, particularly in developing countries. An important next step will therefore be to study existing and potential users, and to exert external pressure as a drive to increase efforts from the government. Since two-thirds of the users in Indonesia and in other developing countries access the Internet through Internet cafés, these venues could be used to support the demand side of e-government. Along with other initiatives, like setting up public community telecentres or connecting schools to the Internet, these measures could help maintain demand-side sustainability for e-government.

4.4 Overview of the thesis articles – Table 5

#	Authors	Title	Research question	Main findings	Year	Publication
1	Kristiansen Furuholt Wahid	Internet café entrepreneurs: Pioneers in information dissemination in Indonesia	What are the characteristics of small-scale private Internet café entrepreneurs? What were reasons for success in their businesses?	Clear statistical associations between entrepreneurial adaptations: start-up time, connection types, financial flexibility, service variety, and success variables.	2003	International Journal of Entrepreneurship and Innovation (IJEI). Journal website: http://www.ipublishing.com/iei.htm
2	Wahid Furuholt Kristiansen	Information diffusion agents and the spread of Internet cafés in Indonesia,	What lessons can be learned from <i>pioneering</i> Internet café entrepreneurs in a developing economy?	The data show that most early adopters are highly educated, have previous IT-related work experience, and score high on the 'entrepreneurial readiness' variable. Students and youngsters are the main target market segments. Both early and late adopters are innovative.	2004	Communications of the Association for Information Systems (CAIS). Journal website: http://aisel.laisnet.org/cais/
3	Furuholt Kristiansen Wahid	Information dissemination in a developing society: Internet café users in Indonesia	To identify the <i>user groups</i> of Internet cafés in Indonesia and to trace their main motives and gains from using these venues.	Customers are typically young and educated. Males represent the majority of users but unmarried females are also regulars. User frequency is statistically associated with individual capability, electronic media exposure and financial capacity. Ten percent of customers' total monthly expenditures are on Internet cafés.	2005	The Electronic Journal of Information Systems in Developing Countries (EJISDC) Journal website: http://www.ejisdsc.org/ojs2/index.php/ejisdsc
4	Wahid Furuholt Kristiansen	Internet for development? Patterns of use among Internet café customers in Indonesia	What are the dominating patterns of activities among Indonesian Internet café users, and which factors decide use patterns among them?	Seeking information, e-mailing, and chatting are the most popular single activities for the Internet café users. Internet usage for business purposes and computer games is less common but still prevalent. The majority of customers use the Internet predominantly for communication and very few go to the Internet cafés primarily for recreational purposes. Users with better education, greater personal capability and more previous Internet experience tend to use Internet for more serious purposes than other users.	2006	Information Development (ID). Journal website: http://idv.sagepub.com/

#	Authors	Title	Research question	Main findings	Year	Publication
5	Furuholt Kristiansen	A rural-urban Digital Divide? Regional aspects of Internet use in Tanzania.	To study the digital divide within Tanzania.	The Digital Divide is mainly a question of finding venues with technology to access the Internet. The Internet users and usage in Internet cafés are surprisingly uniform in rural, semi-urban and central regions of the country. We see some small traces of difference in the way that the users are becoming more "elite" in the rural regions, where access is scarce. Another difference is the "gender divide" – the share of female users is considerably lower in rural regions.	2007	The Electronic Journal of Information Systems in Developing Countries (EJISDC) Journal website: http://www.ejisdc.org/ojs2/index.php/ejisdc
6	Furuholt Kristiansen	Internet Cafés in Asia and Africa – Venues for Education and Learning?	To find out to what degree Internet cafés are used for human resource development today and if they have the potential for being important arenas for learning in developing countries in general.	Internet cafés are used for competence development today, and they have the potential to be suitable arenas for human resource development for a wide range of users. The Internet café use pattern seems to change over time. New and young users start their 'career' with entertainment and socialising and after a while, more serious use takes over. For the users in general, access speed and price are important obstacles to increased use.	2007	Journal of Community Informatics (JCI) Journal website: http://www.ci-journal.net/index.php/ciej
7	Furuholt Kristiansen Wahid	Gaming or gaining? Comparing the use of Internet cafés in Indonesia and Tanzania	To trace reasons behind various extents of utility gaps in Internet use in poor countries.	A high percentage of users utilise their Web access in Internet cafés for socially gainful activities, and limited time is spent on games and gambling. At both locations, <i>usage frequency</i> tends to increase with higher individual competence and capacities. <i>Type of use</i> is influenced by age and gender, as well as by competence, capacities, and usage frequency. The utility gap appears to be bigger in the Tanzanian context than in the Indonesian context.	2008	International Information and Library Review (IILR) Journal website: http://www.elsevier.com/locate/ijlilr http://www.elsevier.com/locate/ijlilr http://www.elsevier.com/locate/ijlilr
8	Kristiansen Wahid Furuholt	Investing in knowledge? Information asymmetry and Indonesian schooling	To trace mechanisms behind the information asymmetry problem in Indonesia.	Information asymmetry exists as a problem in these societies. Type of school and location matter more than media exposure for students' knowledge level. Students in public schools generally score significantly higher than those in private institutions. Also, students' level of knowledge tends to fall with decreasing level of geographical centrality.	2006	International Information & Library Review (IILR) Journal website: http://www.elsevier.com/locate/ijlilr http://www.elsevier.com/locate/ijlilr http://www.elsevier.com/locate/ijlilr

#	Authors	Title	Research question	Main findings	Year	Publication
9	Furuhoit Ørvik	Implementation of IT in Africa: Understanding and explaining the results of ten years of implementation effort in a Tanzanian organisation	To use an implementation project as a lens to achieve a better understanding of use of IT in Africa in general.	The general nature of the implementation literature does not provide sufficient background for a deeper understanding of the issues and underlying levels of explanations for unsuccessful IS implementation in this setting. For this, more contextual factors need to be taken into account. We have outlined some of the political, organizational, personal, cultural, and power-related factors that play roles in the planning and implementation process. One of the most interesting findings is the different understanding of the time concept and its impact on IS development, implementation, and use.	2006	Information Technology for Development (ITD) Journal website: http://www3.interscience.wiley.com/journal/109863476/home
10	Furuhoit Wahid	E-government Challenges and The Role of Political Leadership in Indonesia: the Case of Sragen.	To study the challenges of <i>e-government</i> implementation in a developing country, and to examine how the political leaders are meeting these challenges.	The e-government challenges in developing countries are categorised in three main areas: management infrastructure, and human factors. Initiatives taken to deal with these challenges are presented and strong political leadership is found to play a major role. Other important lessons are: involvement of all stakeholders from the beginning, exhaustive training and motivating of human resources and partnership with external parties.	2008	The 41 st Hawaii International Conference on System Sciences (HICSS), Conference homepage: http://www.hicss.hawaii.edu/hicss_41/apa/home41.html

5. Methodology for theory building

In chapter 1 and in section 3.4, I introduced the research question:

*What affects the sustainability
of public Internet access in developing countries,
from the supply and the demand sides respectively?*

I formulated this question because I deemed that the use of a sustainable supply of public Internet access is important to bridge the digital divide in developing countries. In this context, sustainability has to do with both the supply and demand side of Internet services. As demonstrated in section 3.4, the limited amount of existing literature covering information systems sustainability in general and public Internet access sustainability in particular, focuses on the supply side aspect. I felt there was an obvious lack of theory describing the full picture of the sustainability problem and demand sustainability in particular.

Step one was mainly conducted in a deductive manner (cf. 4.2). My approach to step two of the research process needed to use inductive reasoning. Because there is very little relevant theory discussed in this context, I will develop a new theory, based mainly on my ten research articles, described in chapter 4, and as illustrated in figure 6:

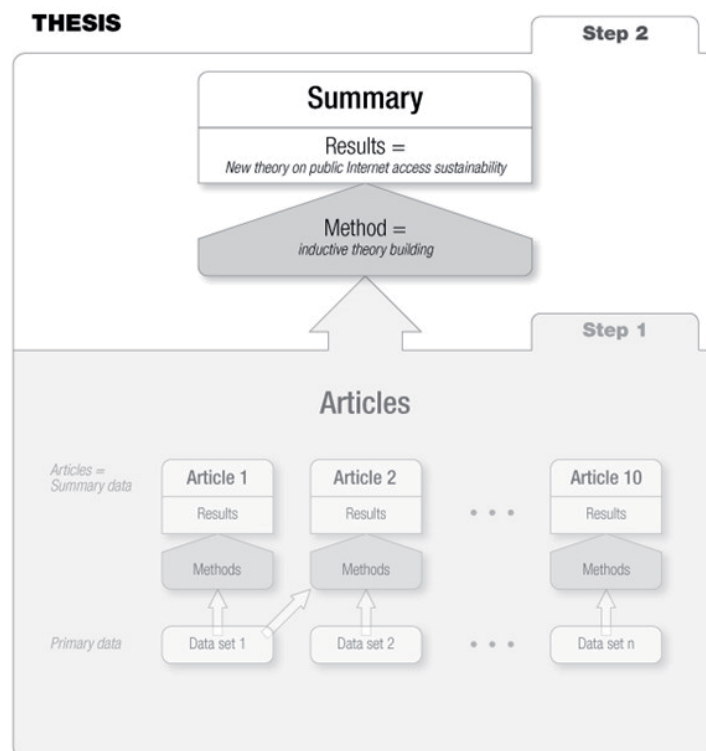


Figure 6. Thesis structure step 2: The summary; theory building.

5.1 In search of appropriate methodology.

Several authors have developed and described methods and frameworks for theory generation, and my first attempt was to see if the grounded theory method (GTM) would be suitable for my purposes.

After studying basic GTM literature (Glaser and Strauss (1967), Strauss and Corbin (1990), Haig (1995), Bryman (2004)), literature on use of GTM in information systems research (Baskerville and Pries-Heje (1999), Sarker et al. (2001) and Urquhart (2007)), and some practical oriented papers (Warburton (2005) and Borgatti (2006)), I was left with one central question regarding applying GTM to my case: "Is it possible to start the GTM process (coding etc.) from my existing articles, and not from the primary data?" (see figure 6).

A few of the studied articles paved the way for a discussion of this question. Warburton (2005) states that it is unclear what kinds of data are acceptable in GTM, apart from traditional and explicitly recognised forms of contemporaneous observation and interview. For GTM application in IS, Urquhart (2007: 348) states that the theory building aspect of GTM remains largely untapped, and she suggests that we need to be far more flexible as to what a unit of analysis might be.

On the other hand, after contacting two recognised researchers within the field (C. Urquhart and R. Baskerville), my reservations about the data basis for GTM (see above) were confirmed. The GTM is too closely linked to primary data and to certain coding techniques. I therefore decided to set GTM aside as the method for my theory building and to look closer at a research strategy known as analytic research (Buckley et al., 1976) or philosophical research (Jenkins, 1985) for my theory building process.

I will, however, still use some of the principles and working methods from GTM in my work. For example, I looked at Urquhart's (2007) practical oriented guidelines, and the iterative process described by Borgatti (2006: 2): "The basic idea of the grounded theory approach is to read (and re-read) a textual database (such as a corpus of field notes) and 'discover' or label variables (called categories, concepts and properties) and their interrelationships".

In addition to using this main source of methodology for theory building (Buckley et al., 1976), I planned my research design work using ideas from Eisenhardt (1989: getting started and defining the research problem), Whetten (1989: the building blocks of theory development), Wacker (1998: the virtues of "good" theory), and Bryman (2004: the process of analytic induction).

Buckley et al. (1976) identify four different strategies for generating or testing theory; one of these strategies is analytic research. Philosophical research, as described by Jenkins (1985), is just another name for analytic research, and Jenkins points out that Buckley et al. provide a good general description of this methodology.

5.2 What is Analytic Research?

According to Buckley et al. (1976:23), the term 'research strategy' refers to the essential nature of the data and the process by which it is found and analysed. Research strategy is concerned with the 'way' in which we go about generating or testing theory. Buckley et al. suggest four possible research venues for doing this: opinion, empirical, archival and analytic.

When describing analytic research, they point out that some problems are solved analytically, by breaking the problem down into its component parts so as to discover its true nature and the causal relationships among its variables. With analytic research, the solution lies within

the interface between the researcher and the problem. Analytic research relies on the use of internal logic on the part of the researcher. The researcher has the resources required for solving the problem *within* himself. No explicit reference to external data sources is necessary. From this ground rule, the problem may be solved *logically* or *philosophically*. The emphasis in this type of research is on cerebration which distinguishes this strategy from the others.

Jenkins (1985:112) gives a similar description: “This methodology defines a purely mental pursuit. The researcher thinks and logically reasons causal relationships. The process is intellectual and the aim is for the flow of logic to be explicit, replicable and testable by others”.

5.3 My application of Buckley, Buckley and Chiang’s framework.

The framework and guidelines offered by Buckley et al. (1976) appeared to be suitable for my selection of methodology. According to the authors, the framework is meant to serve as a conceptual outline for research design, and by following logically through it, the researcher should have a better appreciation for the options available, and should be able to develop a research program which is best suited to the problem at hand.

The research methodology framework consists of six steps. I will go through the steps below and explain my approach to each of them. Before the research effort begins, the researcher must identify the problem, define the terms and determine the research ‘mode’ (i.e. whether a theory is being generated or tested). Then the researcher follows the selection with an appropriate research ‘methodology’, consisting of strategy, domain and techniques. ‘Strategy’ refers to the process by which data is found and analysed; ‘domain’ refers to the data source and environment; and ‘technique’ is the instrument which is used to find and analyse data. Each of the four strategies mentioned above (opinion, empirical, archival and analytic research) is linked to various domain alternatives and techniques.

When the research plan is formulated within a framework, the research inquiry is conducted in accordance with the plan and the outcome of the inquiry is stated in explicit terms as a proposed hypothesis, theory or model (in my opinion, these three terms can be perceived as synonyms).

The research problem.

Buckley et al. (1976:14) suggest that problems may be generated formally or informally. One of the formal approaches is prior research. They claim that this is probably the most productive source of new problems. They further note that the literature search is an important part of problem definition. The intent of the literature search is to see whether the problem has surfaced previously. In my case, the literature review revealed that a broad area of the sustainability issue was not covered in published literature.

This formal approach was combined with an informal approach, where my intuitive feeling and experience aroused my interest and curiosity in studying the demand side of sustainability for Internet access supply in poor countries and regions. According to Buckley et al. (1976: 18), conjecture is frequently used as a useful, informal tool in problem-finding, where the researcher has an intuitive feel regarding a potential problem-area, and has a sense that the existing fund of knowledge is insufficient to solve the problem.

Within grounded theory research, the theory-building process is begun as close as possible to the ideal of no theory under consideration and no hypotheses to test. In analytic research and general theory building research, however, proper problem definition up front paves the way for the selection of an appropriate research strategy. Eisenhardt (1989:536) claims that an

initial definition of the research question, in at least broad terms, is important in building theory from case studies. Bryman (2004: 400) states that analytic induction begins with a rough definition of a research question and proceeds to a hypothetical explanation of the problem. Urquhart (2007:351) is even more explicit. She suggests that “a preliminary literature review is conducted ‘on the understanding that it is the generated theory that will determine the relevance of the literature.’ The literature review is revisited, and extended, once the theory has been generated from data”.

In line with this, I used a combination of my own experiences and literature reviews (see section 3.4), to develop my research problem as described. In chapter 6, I will follow Urquhart’s suggestion (above) and return to the literature for discussion of my new theory.

The mode: Inductive.

An essential consideration regarding methodology is to decide whether the project is primarily inductive or deductive. ‘Primarily’ is used because both modes are present to some degree in all research. As long as just a little relevant theory is present, my mode had to be inductive. This differentiation is important because it effects the selection of methodology and the very nature of the research activity itself.

The strategy: Analytic research.

As described above, I found that analytic research is the strategy that best fit with my research problem. According to Buckley et al. (1976:26), I then will search for meaningful relationships among the available data through an orderly and disciplined investigation based on logical reasoning. This process should result in an increased knowledge base, concretised through a new theory or a model. Buckley et al. (1976:42) state that good analytic research must meet two main conditions: The flow of logic must permit others to follow and examine it, and the conclusions must be stated in a form which is capable of being tested by others.

The domain: Internal logic.

According to Buckley et al., the domain, or data source, of analytic research is the researcher’s own knowledge and experience. In my case, the research (developing a new theory by logical reasoning) is not literally performed solely by cerebration, but is done with support from my ‘extended memory’, namely articles which were gleaned from my own research activities (see figure 6). Since this is my own work, it is not in conflict with the intention of analytic research stated by Buckley et al (1979:26), claiming that “The researcher has the resources required for solving the problem *within* himself”.

The technique: Informal argument.

Technique refers to the instrument which is used for data analysis. A variety of both formal and informal techniques can be used for analysing the data in conjunction with analytic research. Buckley et al (1976: 27) claim that among the informal techniques, philosophical argument is most widely used, and I found this technique suitable in my case because it relies on inductive reasoning. This technique is also in accordance with Eisenhardt (1989:532) who states: “Traditionally, authors have developed theory by combining observations from previous literature, common sense, and experience”. For creating theory through inductive research, Buckley et al. (1976:22) offer a set of specific questions to be used in an iterative data analysis process. The same questions are presented by Whetten (1989:490) as “the building blocks of theory development”, and he claims that a complete theory must contain these four elements:

- *What* are the essential variables and parameters of the problem situation?
- *How* are these factors related?
- *Why* does a given condition exist?

- *Who, where, when.* These temporal and contextual factors set the boundaries of generalisability, and as such constitute the range of the theory.

I applied these questions to my theory building process. I used logical reasoning and an analysis of the findings from the ten articles, to find factors (What) influencing the public Internet access' financial sustainability in both a positive and a negative direction, and relations between the factors (How). After that I explained and reasoned the relations and the connection to the sustainability issue (Why) and I filled in the contextual factors (Who, Where, and When).

To illustrate the use of Whetten's building blocks, let us, as an example, suppose that in Lombok (Where) users (Who) with some IT competence (What) visit Internet cafés more frequently than users without such competence (How) because they get more benefits from the Internet use (Why). If this is true, the users' IT competence is one of the demand side elements playing a role in Internet café sustainability.

In my theory building process in chapter 6, I will follow a three-step procedure, derived from the analytic research framework (as explained above):

- First, I will outline the main building blocks based on my knowledge, experience and logical reasoning (step 1),
- Then, in the iterative analysis process, I will scan through the ten articles (my 'extended memory') and confirm, extend, or reject parts of this construction (step 2),
- Finally, I will discuss these findings in the context of the existing literature in order to confirm or further develop the theory (step 3).

6. Sustainable supply and demand of public Internet access – theory building

In this chapter, I will present and discuss the results from the theory building work on supply and demand sustainability for public Internet access in developing countries. My three steps of theory building (cf. 5.3) start with logical reasoning about information systems and public Internet access points in general. Then I will review my own works mainly dealing with Internet cafés, and finally, I will compare the results with research from other authors. The context of this work will deal mainly with telecentres. The result of this process will provide an answer to the research question (cf. 1.0, 3.4, and 5.3) and will complement the model from figure 2 which outlines supply and demand side sustainability details.

In regard to public Internet access points, sustainability refers to the ability of the owners to obtain sufficient funds to continue their operations for a long term after the implementation stage is over and the initial start-up funding has dried up. This is what I call *financial sustainability* (cf. 3.4).

The principal difference between telecentres and Internet cafés is the business model (cf. table 1 and section 3.3). While telecentres have a two-sided objective of being development-oriented and financially sustainable, Internet cafés, as private enterprises, have a stronger focus on generating revenue from the operations, and an objective of making profit and being commercially sustainable. A commercially sustainable business is necessarily also financially sustainable (cf. 3.4). This means that all the building blocks of commercial sustainability I develop from my ten articles also apply to financial sustainability.

From a supply and demand perspective, commercial sustainability describes the market balance between the two sides. For the more general concept of financial sustainability, income is needed to cover operational costs like salaries, communication and maintenance fees, and possible financial costs. Income may come from various sources other than the Internet access users, for example, it could come from organisational sponsors.

In a traditional economic view, the relationship between supply and demand determines prices (cf. 3.1.); the price of Internet access has to be low enough to be affordable for low-income users, yet high enough to yield profits for potential suppliers. I have, however, pointed out the complexity of Internet access service, and I have argued that the traditional price based model is too simple to explain the supply and demand interactions in this context (cf. 3.4). Although price is important, it is only one of several factors that are at play when maintaining a sustainable presence for public Internet access in poor countries. In accordance with the research question presented in sections 3.4 and 5.3, my objective is to discuss these underlying factors for the sustainability issue (i.e. study the elements that contribute to sustainability from both the supply side and the demand side). In this chapter, I will call these two sets of elements or factors *supply sustainability* and *demand sustainability*, and I will elaborate on these two concepts in sections 6.1 and 6.2. In section 6.3, I will summarise the proposed theory on sustainability of public Internet access.

6.1 Supply sustainability and Internet café entrepreneurs

In this section, I will discuss the supply side factors that contribute to financial sustainability in regard to public Internet access (cf. 3.4 and 6.0). As a starting point for the theory building, I looked at the literature on information systems sustainability in general (Heeks 2002), Walsham and Sahay (2006), Kumar and Best (2006)). In their study of e-government projects in developing countries, Kumar and Best, for example, grouped sustainability challenges into

five principal categories: financial, cultural, technological, political, and environmental. They viewed all of these challenges from a supply side perspective, citing them as factors which could contribute to sustainability failures. They believe that this model captures the principal problem sources.

From this initial literature review I conclude the first step of the theory building by stating that, in general terms, supply sustainability depends on the entrepreneur's or manager's intention (desire and will), on his/her capability to run the business, on the possibilities decided by the available financial resources, and on the technological and legislative infrastructure.

I next looked at the supply sustainability elements in my articles, mainly in articles 1 and 2 which deal with Internet café entrepreneurs. In section 4.3.1, I give a brief overview of the supply and suppliers of Internet café services. In this section, I will describe characteristics of the owners/managers of Internet cafés. I will then discuss the conditions which make the cafés successful after the initial phase, and keep them in business (in other words, make them sustainable).

In article 1, we used the following organisation of variables as a basis for the analyses (see Table 6).

Table 6.

Organisation of variables for analyses of Internet café entrepreneurs, adapted from article 1.

Management characteristics	Managerial intentions	Success variables
Age (of the entrepreneur)	Start-up time (of the Internet café)	The entrepreneur's perception of success
Gender	Market stability	
Education	Connection type	
Work experience	Financial flexibility	Measured profitability
Entrepreneurial readiness	Variety of services	

Success variables are related to commercial sustainability. Profitability is quantified on the basis of calculated annual income and stated total investment, excluding operational expenses. This is a direct measure for the financial sustainability. The other variable is a multi-item subjective measure. We asked for the entrepreneurs' perceptions of success as indicated by five qualities:

- computers' utilisation rate
- growth of net income
- payback period
- general consideration of success
- assessment of business growth.

The understanding and feeling of being successful is an important incentive for the owner in order to keep up the operations of the Internet café, and hence this variable is another suitable measure for supply sustainability.

In section 5.3 I presented Whetten's building blocks of theory development as my theory building tool. I therefore start the second step of the theory building by specifying these building blocks:

What: My two first supply sustainability variables are the profitability and the perception of success.

How: The commercial sustainability of the Internet cafés is dependent on these two variables,

Why: because sustainability refers to the ability to obtain sufficient funds to continue operation (cf. 3.4 and 6).

How: They are also interdependent,

Why: because the profitability depends on utilisation rates and payback periods, and the perception of success and business growth depends on the measured profitability.

The rest of the theory building will follow the same pattern, pointing out the building blocks with their relations and their rationale. The fourth building block is the Who, Where, and When. A study of Indonesian Internet café entrepreneurs (Who, Where), conducted from 2002 to 2004 (When), was used to illustrate the supply side theory in general. I will not, however, specify these four questions in detail during the continued process.

We know from entrepreneurship research that the management characteristics listed in table 6 may contribute to entrepreneurial drive and to the capacity to start and succeed in the Internet café business (article 1) and thus potentially support supply sustainability. Based on our in-depth interviews with Internet café entrepreneurs in Indonesia, we expected to see statistical associations between the individual management characteristics and the managerial intentions variables, and significant statistical associations between these intermediate variables and our success variables.

The first four of the management characteristics are self-explanatory. Entrepreneurial readiness is a combination of five individual and social factors, including mental maturity, social networks, and access to information and financial capital (cf. 4.3.1).

Managerial intentions show decisions and initiatives made by the entrepreneurs. From their start-up times, we classified the cafés into three groups: early, medium and late starters. Market stability is dependent on the number of regular customers. The financial flexibility of the enterprise includes the number of sources the entrepreneur can use to raise financial capital. Connection type was the technology in use for Internet access at the time of the survey. We distinguished between four main connections: dial-up, ISDN/ADSL, leased line and WLAN. For the variable we call 'variety of services', we looked at non-IT related services in the cafés, such as bars or restaurants and the non-IT shops and tourist oriented services. We also considered IT-related services like computer games, website development and IT training and consulting.

I denote the management characteristics and the managerial intentions together by the collective term 'management issues'.

In article 1, we expected that age, gender, education, former work experience, and entrepreneurial readiness all would have an impact on start-up time and managerial intentions. We expected to find statistical relationships both with the management characteristics, and with the managerial intentions in regard to success variables. The Internet café entrepreneurs are, for example, characterised as having extraordinarily high levels of education. This factor should have had a positive impact on the business success measure.

However, we found from our data that only the age and entrepreneurial readiness management characteristics were significantly correlated with each one of the success variables. We found that measured profitability was higher for entrepreneurs who were older than 25 years of age. We also noted that entrepreneurial readiness was significantly correlated with perception of success.

There are, however, indirect relations as well. For example, all the management characteristics are significantly associated with one or more of the managerial intentions, and managerial intentions show significant associations with one or both of the success variables. We noticed, for instance, that increasing service variety, (i.e. providing IT training or offering computer games), contributed positively to the success of the enterprise. We found that having both a high number of regular customers and having financial flexibility lead to success as well. There is a significant difference between those who use family sources or third-part capital compared to those who do not. Financial flexibility is important in order to re-invest and to keep up with the competition as well as with new technological developments. When we looked at the start-up time for Internet cafés, we found that the number of years in operation significantly correlated with both the success variables. In other words, we ascertained that early start-up resulted in a more successful and sustainable business.

There is also a significant difference in perception of success and measured profitability between Internet cafés using different types of connections. More specifically, Internet cafés using leased line connections have a significantly higher profitability margin than those using ADSL/ISDN and WLAN connections. Internet cafés using dial-up connections experience significantly less success than those using other types of connections; this may be explained by the higher price of dial-up connections.

We concluded from our Internet café entrepreneur data that there is a clear relation between management issues and supply sustainability (article 1).

In articles 1 and 2, we studied the supply side of the issue. To explore this subject further, I began by focusing on managers and management issues. Our findings show that there are sustainability issues outside the managers' domain as well. I have noted that financial flexibility is an important issue. In article 1, we showed the importance of access to capital from local communities, or from remote sources like NGOs or government organisations. We noted that infrastructure quality (connection speed and reliability) and price were important variables for the establishment of Internet cafés and also for maintaining a competitive edge. Our in-depth interviews revealed that price and quality of Internet service providers (ISPs) were the main obstacles in the diffusion process and represented a key policy sustainability issue for Internet café businesses (article 2). I call these elements 'context and policy issues'. Supply sustainability is illustrated in figure 7.

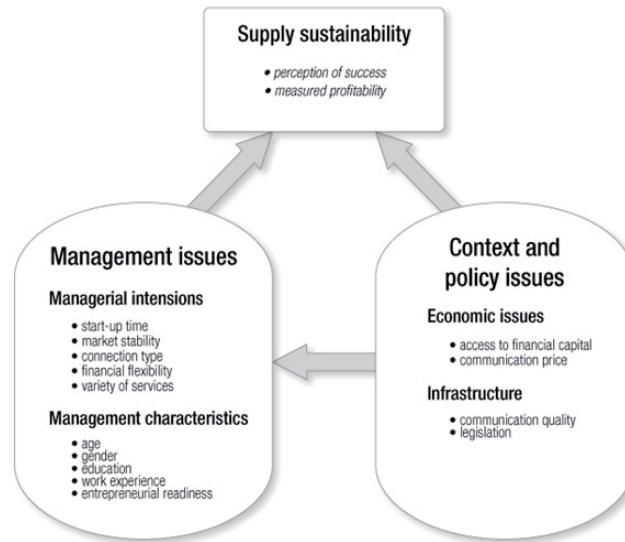


Figure 7. Supply sustainability.

In figure 7, the circles represent the supply sustainability dimensions and the arrows show their relations to (affect on) supply sustainability. Management issues and context and policy issues both affect supply sustainability directly, while context and policy issues in addition affects the sustainability indirectly via management issues. The managers' financial flexibility depends, for example, on the access to financial capital in the local community. I have not shown the relationship between the single variables in this figure, for example between communication prices, communication quality and connection type. They are described above and some of them are presented in detail in article 1.

For the next step of my theory development, I studied the existing literature, I framed my theory in relation to the literature, and I postulated on a further development of the theory. At the time we published articles 1 and 2, we did not find any systematic empiric studies of managers of public Internet access points in existing literature. Therefore, as a theoretical foundation for our research, we based our studies on innovation diffusion and entrepreneurship theory.

There are, however, a number of recent articles dealing with telecentres. Some of these articles address pertinent issues (e.g. the important role of telecentre managers, the qualities managers should possess in order to run the telecentres successfully). Bell (2006:17) outlines the importance of these factors. He states that management capacity is critical to overcoming micro-level operational challenges particularly for computing projects situated in villages. In his discussion on this theme, he emphasises competence within a mix of areas: project management, business, marketing, customer services and technology. Madon (2005), Harris et al. (2003), and Roman and Colle (2002) highlight training of staff within these knowledge areas as a main telecentre sustainability issue (cf. 3.4). While Parkinson (2005) points to some of the same key capacities, she further adds that the ability to build external networks is also an additional skill. Madon (2005: 404) also recognizes the managers' external responsibilities and looks at "the ability of telecentre operators to act as community development officers". Firstly, they must show a talent for managing interaction between the various stakeholders.

Secondly, they should be familiar with locally relevant information networks. Sein et al. (2008) and Bailey (2009) contend that the managers' connection to and interaction with the surrounding context is one of the main success criteria for telecentres to survive. These qualities, (i.e. staff skills and social networks) coincide with my entrepreneurial readiness variable within management characteristics.

Bell (2006:17) discusses the operational challenges of village computing projects, and he maintains that "grassroots entrepreneurs" have the ability to rise to the challenges of managing these village computing projects. He claims that there are lessons to be learned from commercially oriented entrepreneurs (e.g. Internet café managers) because these entrepreneurs can be exceptionally innovative and highly motivated when it comes to growth in their businesses. Motivation and innovative talent are important managerial properties and thus contribute to both telecenter and Internet café sustainability. These points are in keeping with my description of managerial intentions and perception of success.

Another lesson to learn from commercial oriented businesses (e.g. Internet cafés) is pointed out by Oestmann and Dymond (2001:11). They suggest seeking advice from "astute local business people" for maximising both the scale and viability of a telecentre. This is another example of the context's impact on the management issues and indirectly on the supply sustainability.

Sein et al. (2008: 7) state that positioning for steady financing flow is vital for telecentre sustainability. This statement alludes to the relation between the management and context issues noted in the model in figure 7. In line with Sein et al., we found that Internet café entrepreneurs are clever in raising money for expansion and re-investments. In this way, they are able to maintain a competitive position. However, the initial investments for late starters often have to be high compared with the pioneers. Since Internet technologies are continuously changing, the entrepreneurs also have to show innovative skills in their relation to use of technology to remain in business Bell (2006). Our analysis confirms this assertion (article 2).

Roman and Colle (2002:11) state the importance of providing a variety of services. They recommend that telecentre initiators focus on information services rather than just on computers and the Internet. They feel this strategy builds a larger base for generating income, thus producing successful telecentres. Variety of services, with an emphasis on non-IT services, is a key issue for Salvador et al. (2005), as well. When discussing the café aspect of Internet cafés, they state that Internet cafés have become remarkably similar in design. They argue that this "one-size-fits-all" requirement seems to artificially limit the potential with which cybercafés can help reduce the digital divide. While traditional cafés are recognised as social spaces for conversation and conviviality within communities, Internet cafés seem to embody a 'cyber' quality. Salvador et al. suggest that changing the culture by shifting the emphasis from 'cyber' to 'café' would make Internet cafés more attractive to a broader range of the population.

We shared some of the same experiences as Salvador et al. We have propounded that increasing service variety contributes positively to the success of Internet cafés, and helps make them sustainable. However, our observations revealed that the opposite was the case in most of the hundreds of Internet cafés we visited in Africa and Asia. Internet cafés are typically found in simple premises, where costs apparently are kept at a minimum and the services are mostly limited to Internet access and other computer use. The cafés normally have one or two staff serving their customers, mostly by assigning a computer for use and collecting the money after connection is completed (article 3). A few larger Internet cafés offer additional services; most of these are very closely linked to their computer activities,

though, so the amenities include copying CDs, selling computer equipment and providing some secretarial services (illustrated in figure 8). The European concept of a café is a coffee house or an informal restaurant with a selection of food and drinks where local people meet for socialising. This concept obviously does not apply to Internet cafés in developing countries.



Figure 8. Selection of services at Queen Internet café in Yogyakarta.

Madon (2005: 403) has pointed out that, in developing countries, there has often been sudden changes in the cost of communication as a result of changes in government policy. This has caused serious problems for telecentres in South Africa, in particular. This type of obstacle illustrates the policy issue problems (communication price) telecentres have to address..

Regardless of gender, educational background, work experience, or other variables, café entrepreneurs in our survey seem to be handling their business relatively successfully. Entrepreneurial shortcomings in one field seem to be compensated by competence in other areas. For instance, female entrepreneurs offer less of the profitable additional IT related services, (e.g. website development) but seem to be better than men in maintaining good relations with regular customers. We registered a high percentage of well educated entrepreneurs among the managers, but education did not necessarily need to come from technically oriented studies. The composition of the entrepreneurial readiness measure shows that business, social and management skills are equally important, and that lack of competence in one field can easily be compensated for by relevant work experience (article 2).

In the statistical analyses, we also observed that entrepreneurs from the younger age groups were fully able to start and succeed in the Internet café business. Even based only on personal savings and without the profitable financial flexibility that is more common for older entrepreneurs, younger entrepreneurs succeed because there are low entry barriers going into these types of businesses (cf. 4.3.1).

Our research shows that, unlike telecentres, Internet cafés are usually owned by local small-scale entrepreneurs (article 1). Local ownership will normally take care of many of the challenges that we have pointed out in our research: the need for local champions, appropriate content and services, and local community acceptance. Telecentres, however, are generally

organised by outsiders and may lack this local connection. For this reason Internet cafés have the potential to be more sustainable than telecentres.

Our empirical research reveals that entrepreneurial readiness and IT-related work experience are important factors which support sustainability (article 2). As well, these factors can facilitate the spread of Internet cafés into new areas.

In this section, I describe the supply side elements that contribute to commercial sustainability for Internet cafés (figure 7). I examined existing telecentre literature and found that much of it confirmed my findings. Since commercial sustainability is a subset of financial sustainability, I therefore conclude that it is a valid indicator for financial sustainability of public internet access in general. Figure 9 is an updated version of the model from figure 2 (cf. 3.4) and illustrates the results of supply side theory building.

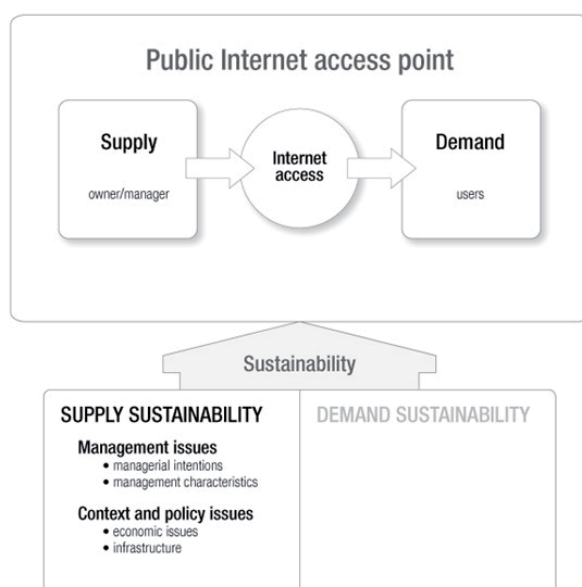


Figure 9. Main supply sustainability issues.

6.2 Demand sustainability – Internet café customers and their use of the Internet

In order to create and sustain public Internet access, both the supply side and the demand side, and their balance are important considerations. Current research focuses mainly on the supply side of this issue (cf. 3.4) and the demand side is almost entirely neglected in the literature. To address this void, I assert that the concept of demand sustainability is as important a consideration as supply sustainability. Although I discuss sustainability from both perspectives, I have put most of my emphasis on the underlying factors that contribute to the demand side of sustainability. As well, most of my underlying works (e.g. seven out of the ten articles I wrote) have a user perspective.

In building a theory on demand sustainability, I will principally follow the same procedure as for studying supply sustainability (cf. 6.1). There is definitely a lack of supporting literature in this area. Therefore, I had to develop the main building blocks of my theory using primarily my own knowledge (i.e. mainly documented through the ten articles), my experience and my logical reasoning. I will now outline some of the key elements pertaining to demand and demand sustainability.

According to Encyclopædia Britannica Online (2009), 'demand' means "willingness and ability to purchase a commodity or service", and in the context of this study, by 'demand' I mean "existing and potential customers' capacity (knowledge and resources) and desire to access information technologies and the Internet at public access points in developing countries". I further determine that 'demand sustainability' relies on "the long term presence of a threshold level of customers, paying for IT and Internet access services to keep the public Internet access point in operation". One implication here is that the customers have sufficient competence to utilise the access points to gain some kind of personal benefits. The measure of demand sustainability can then be calculated by looking at how much money the users actually spend on Internet café fees. This measure also shows a direct link to the general concept of financial sustainability.

In order to understand demand sustainability, it is important to acquire information about the customers. Here are some central questions that need to be addressed in regard to economic capacity: How much money are customers willing to and able to spend in the café? What are the driving forces behind this spending? What are the main elements affecting their use, either in a positive or a negative direction? From these questions, I found it reasonable to group the elements affecting demand sustainability into four main dimensions:

- *economic capacity*
- *benefits*
- *knowledge and awareness*
- *context*

The first three of these dimensions have both an individual and a social or contextual aspect. What is regarded as useful for an individual, for instance, does not necessarily make benefits for the local community.

The four dimensions are the first demand sustainability variables, or building blocks (What) in the theory building (cf. 5.3) of the demand side of this thesis. They will be further explained and developed together with How and Why in sections 6.2.1 to 6.2.4. Who, Where and When: We studied Internet café users in Indonesia and Tanzania from 2003 to 2006 (articles 3 – 7), with three exceptions (articles 8 – 10). A summary of this is found in section 4.2 and section 4.4.

In each of the next four sections (6.2.1 – 6.2.4), I will go through step two (develop the theory) and step three (discuss it in relation to the few instances of demand sustainability I have found in other literature) of the theory building procedure (cf. 5.3).

6.2.1 Economic capacity

In section 6.2, I stated that the measure of demand sustainability is the amount of money the users actually spend on Internet café fees. In this section; I will present some of our findings on how the users' ability and willingness to pay for the Internet café services affects sustainability. I call the combination of ability and willingness to pay, 'economic capacity'.

In a simple supply and demand model, (i.e. as described in section 3.1), the price of the commodity or service is important. Even if I have argued (cf. 6) that the traditional price

based model is too simple to explain financial balance and sustainability, I still claim that price is a deciding issue and is determining for the customers' ability and willingness to pay for the services. As such, price is an important consideration for entrepreneurs to maintain a sufficient base of customers for their Internet café businesses.

The ability to pay for a service depends, in general, on financial levels, both at a national and at a local level, and on the potential customers' individual purchasing power. In most developing countries, the ability to pay is usually very low. Table 2 (in section 4.1) shows that both Tanzania and Indonesia are among the poorest developing countries in the world. Both are well below the World average per capita (i.e. \$10,000 GDP (PPP)). The list (issued by CIA, 2008), ranks Indonesia as 125 and Tanzania as 169 out of 194 countries. Financial levels are figured to be around one-third and one-tenth of the World average, respectively. The statistics also show that a large share of the population in both countries (18% and 36%) fall below the poverty line.

At the local and individual level, the ability to pay depends on several factors. Firstly, there has to be a minimum amount of money in circulation. In the rural, agricultural based areas of Tanzania, for instance, people neither have, nor need cash to the same degree as in the urban regions. This phenomenon is due largely to an extensive informal barter economy. This, of course, limits the development and sustainability of commercial Internet café businesses in these areas (article 5).

Market composition is another factor which influences the local customer's ability to pay. Students constitute one of the main user groups even though they normally have less money to spend than people with permanent employment. However, regions with many educational institutions thrive commercially because of a stable and normally sustainable demand. On the other hand, urban business districts and tourist areas in particular consist of individuals with strong purchasing power and in these places one will always find a selection of sustainable Internet cafés with a relatively high quality of services (article 2).

At the individual level, the difference between the ability to pay at the two research sites is significant, but interestingly, the level moves in the opposite direction. Indonesian users' financial capacity is significantly lower than the Tanzanians, in spite of Tanzania's much lower per capita GDP. In article 6, we show that Tanzanian users have three times more money to spend than users in Yogyakarta (e.g. USD 200 compared to USD 62). There are various potential explanations for this discrepancy. The most obvious explanation deals with users' employment. Seventy two per cent of users in Yogyakarta are students as opposed to 38% in Tanzania. As well, a larger proportion of professionals are Internet users in Tanzania. Another possible explanation is the density of Internet users, which at the national level, is nine times higher in Indonesia (see table 3, section 4.1). The relatively few users in Tanzania represent a young market, and we know from the literature (article 3) that the early Internet café market in developing countries is dominated by an educational and financial 'elite'. This trend shows the importance of having a core of relatively well off customers during the start-up period of an Internet café business in a new region in order to making the business sustainable.

The price level is a crucial factor which affects the customers' ability and willingness to pay for Internet access services. Compared to price levels in industrialised countries, the nominal prices are low in Indonesia and Tanzania. The price level is considerably lower in Indonesia than in Tanzania, even though the general financial level is higher (i.e. the GDP (PPP) per capita is more than four times higher in Indonesia) (see table 2). In Indonesia, the users normally pay around one-third of a USD per hour for Internet use. At some tourist sites, for instance in places like Bali and Lombok where the cafés are mainly used by foreigners, the

price is substantially higher. In Tanzania, the price is normally the equivalent of half a dollar (US) in most of the country and one dollar in central business areas and at tourist sites (article 6).

The Internet café fee may look cheap to us, but it is expensive for the average Indonesian or Tanzanian. Our research shows that the market to a great extent is price-sensitive, and that price is an important factor for a sustainable enterprise. In Indonesia, we found that user frequency is lower among students compared with employees in private companies and business entrepreneurs. One reason is that many students have access to subsidised on-campus data labs with Internet connections (article 3). In Tanzania, we found that the typical Internet café customer is far above the Tanzanian average with regard to financial capacity. This suggests that the relatively high Internet café fees exclude a lot of potential users (article 7). When looking at barriers to Internet use in Internet cafés, Tanzanians rank cost as the most important factor. More than 50% of the respondents there said they would have used the Internet more if the price was reduced. Looking at the differences between national general economic level (table 2) and Internet café fees, we understand why this is a major issue for users. In Indonesia, as well, cost is stated as one of the highest ranked obstacles (article 6 and 7).

Even though the ability to pay for Internet access is generally low and the price is relatively high in these countries, *the willingness to pay* seems to be strong. This is an important concept in relation to demand sustainability. One of the most remarkable findings from our studies of Internet café users was the surprisingly high amount of money they tend to spend on Internet access. In Yogyakarta, the Internet café users in our survey spent an average of 6.51 USD per month for their Internet access, while the amount was as high as 11.60 USD in Tanzania, one of the poorest countries in the world (i.e. GDP (PPP) per capita was calculated at less than 600 USD during the year of our survey). This means that Tanzanian users spend approximately 5% of their monthly income on access fees, while Indonesian Internet café customers spend as much as 10% of their total available money in Internet cafés (article 6).

It appears that the willingness to pay is even stronger in rural areas, where the supply of Internet access is new and limited (article 6). In Tanzania, the rural users spend almost the same amount of money on Internet café fees as the urban users, even though rural people generally have only one third of the purchasing power (article 5). This shows that, even in underdeveloped areas of developing countries, the willingness to pay for Internet access is high. This is a promising trend for Internet café business in such regions.

There is obviously a connection between financial capacity and the amount of time and money people spend in Internet cafés. A statistical analysis showed that, in Indonesia for example, user frequency was significantly correlated with monthly expenditure (article 3). The correlation, however, was not significant for the higher expenditure groups in Indonesia, and in Tanzania, where the typical Internet café customer has a financial capacity which is far above the average, we found that usage frequency did not increase with higher monthly expenditure (article 7). In article 3, we postulated that Internet café use would decrease with higher incomes above a certain level because people would be able to afford to have connections in their homes. However, this subset represents a small portion of the population and most people in developing countries are not able to invest in computer equipment and communication. Thus, the demand for public services will probably remain sustainable.

Much of the current literature deals mainly with telecentres. For telecentres, external funding is normally more important for long-term sustainability. User economic capacity is not as important an issue. Various examples of external funding for telecentres are described in articles by Sein et al. (2008) and Oestmann and Dymond (2001). Oestmann and Dymond

(2001: 10) conclude that: “Telecentres in developing countries are almost exclusively funded by international aid agencies and are owned and/or managed by national or local NGOs” . However, they see that there is the possibility of additional income coming from general Internet users. They state that “contrary to common perception, rural people in developing countries are usually able and willing to pay between 1% and 3% (or even higher) of their community income on telecommunications” (Oestmann and Dymond, 2001: 8).

The strong willingness to pay for Internet access services is one of the main points from our study of Internet café customers as well -we found the share to be as high as even 5-10%. This trend has gained momentum in Indonesia, where cost was not considered a major hindrance, as long as the customers felt they achieved sufficient benefits from the Internet access (article 6). This is a promising development for commercial sustainability for Internet cafés in rural and poor regions in developing countries.

In this section, I have shown that the amount of money users actually spend on Internet café fees is a viable measure of demand sustainability. Two economic aspects influence this: the potential users’ ability to pay and their willingness to pay for the service. The ability to pay depends on both the general financial level, nationally and locally, and the potential customers individual purchasing power. In most developing countries, the ability to pay is, in general, very low. The other aspect, willingness to pay, is strongly related to the expected individual benefit which will be covered in the next section. The relationship between the pricing of Internet café services and the demand side economic capacity will be further discussed in section 6.3.

6.2.2 Benefits

In sections 6.2 and 6.2.1, I indicated that the demand for public Internet access services will stay sustainable as long as the customer gets sufficient benefits from these services. In this section, I will elaborate on the concept of benefits in this context and describe how and why benefits contribute to sustainability of Internet cafés. More specifically, I will show how expected benefits affect the customers’ willingness to pay for these services.

From my research, I have seen that access to the Internet represents a turning point for many people’s attitude toward information technology and their understanding of IT as a valuable tool (article 9). It is not, however, the access itself that is of interest to the users, but it is the information and service they get access to, and the use they can make of this information. For example, for the largest user group, students, relevant information for their studies gives them this benefit (article 7), and for citizens in need of a specific public service, an efficient e-government system is useful for them (article 10). Efficient Internet services provide a number of benefits: they save time, effort and in many cases, money. For many users, pleasure or entertainment is also an important benefit that they achieve from using the Internet.

In article 9, we discuss a study where IT was introduced into an African college. Here, we noted a lack of progress in embracing IT use over a ten-year period (up to 2001). A considerable amount of time and resources had been spent to train academic staff. Still, at this time (i.e. up to 2001), text processing was still the only facility that was utilized to any extent. The level of integration of IT in the professional work of the academic staff was low and only a small number of staff members were regular users of IT tools. The main reason for this was that there was relatively little job-performance utility to be gained from IT use for individual staff members (before 2000). From our interviews in 2001, however, we found that this was changing. The first Internet connection was established early in 2001, and several staff members expressed strong expectations about the potential benefits of a proper Internet

connection. Some of the obvious benefits were: communication with the outside world, information retrieval through the Internet, and e-mail. A neighbouring institution, which had been connected to the Internet since 1998, had the same experience. Suddenly the attitude changed and all academic staff wanted to have computers in their offices.

Before they were introduced to the Internet, academics were not exposed to situations where they had to use IT; they could get along without it. From 2001, the Internet represented an important driving force which provided valuable information for teaching and research purposes and gave them mail services for communication with the outside world. Increased access to academic material is especially important in this context, considering the poor library facilities and the prohibitive cost of books and periodicals. Combined with new teaching technology for improved presentations, IT showed an important increase in possible benefits for academic staff. An additional benefit was the increased opportunity to compete for, and to carry out consultancy work, which is a very important source of extra income for some of the more ambitious staff. This example shows that the perception of clear and substantial benefits is crucial for getting people to use IT in general, and that access to the Internet is an important instrument to achieve these benefits.

Many demands can be met in an Internet café, and there are probably substantial differences in the perception of benefits among groups of customers searching for information. Some use the Internet for professional and educational use, others for business development, political purposes, or simply for amusement (e.g. chatting, downloading music, or visiting pornographic sites). The content of services provided by the Internet café needs to be serviceable for the customers and needs to give them benefits from the use of the Internet. Content has to do with the type and relevance of information, as well as with the language in which the information is presented. The language issue will be further discussed below, and in section 6.2.3. Relevance of information is dependent on a regular updating of existing information and on an even flow of new, useful information. This concept pertains mainly to the supply side issue, and I will return to this in section 6.3.

We noted that high-school, college and university students constitute one of the major groups of Internet café customers (articles 3, 5, 6 and 7). For them, information relevant to their academic work will provide the most benefits and thus, will make them willing to use scarce financial resources for Internet access fees. Students need access to IT and are particularly dependant on public services for 'distant learning'. 'Distant learning' is a relevant and growing trend which is becoming very popular in developing countries.

During our visits to Internet cafés, we met with a wide variety of professional users. In Valentine's Internet café in Morogoro, Tanzania (figure 10), we interviewed school-teachers who were preparing their lessons and a freelance journalist who was writing articles and sending them to news agencies in Dar es Salaam and Nairobi.



Figure 10. Valentine's Internet café in Morogoro, Tanzania.

In Sea Boys Café in Dar es Salaam, one local entrepreneur was marketing spare parts for Japanese cars from his own web site, developed in and operated from the Internet café. Another group of customers in this café were women who were communicating with their husbands who worked abroad. In ClariNet Internet café in Yogyakarta, we met an author who had written his books and articles on Islamic studies in Internet cafés (figure 11). In the neighbouring Queens Internet café (figure 8), a 30-year old escort girl was using the 24-hour open café as her communication and “sales” office for her services.



Figure 11. Interview with an author outside ClariNet Internet café in Yogyakarta, Indonesia.

These examples show that, even if it is important to address large user groups, it is also important not to forget that there are many faces to the market for Internet café services. Different users elicit varying benefits from Internet café use. Even amusement activities, such as playing online computer games and downloading music, can be used as instruments for learning to operate computers. Thus, people can perceive these amenities as personal investments which can help build confidence and skills for higher private and social gains from Internet access at a later stage (article 7).

Some types of use are considered “bad” by some users or by authorities or by ordinary local people. However, others might regard these as useful. Either way, this type of usage also contributes to the sustainability of public Internet access points. Commercial gambling on the Internet, for example, has been banned for both legal and ethical reasons but, on the other

hand, this is an activity that makes individuals visit cafés and stay there for long periods of time because online gambling provides entertainment and can sometimes reap financial benefits for them. In Indonesia, we met people involved in ‘carding’ from Internet cafés (i.e. credit card fraud in connection with web shopping). In spite of the fact that this is an illegal activity, this pursuit did give great financial benefits to these users, and as such, generated an important customer base for many Internet cafés in Yogyakarta. However, these establishments were closed down (in 2002) when police descended on the carders and thereby reduced their customer base.

The term ‘bad use’ is subjective and contains normative judgements that are difficult to generalise. In section 4.3.2, I described two alternative ways to classify the various types of use of Internet services. Even though these classifications may be relative or even subjective, they are still applicable in the context of developing countries as we relate them to societal usefulness and potential to mobilise development. ‘Serious’ and ‘non-serious’ usage can be compared if we look at the terms in relation to the degree of expected learning effects and thus the expectation of gaining a higher social status. Individual learning and competence building may contribute to communal development and a general well-being in the society but playing online games or viewing pornography, for instance, is used for individual pleasure (article 7).

In article 4, we introduced four categories of Internet use: recreational, communication, instrumental, and business. We looked at these categories to study the potential benefits of their use (cf. 4.3.2). Business and instrumental use were regarded as yielding higher learning effects and were thus considered to be more serious pursuits than communication which is regarded as more serious than recreational use. Table 7 shows the grouping of the 13 different types of use into the four categories.

Table 7. Categorising types of Internet use, adapted from article 4.

Recreational	Communication	Instrumental	Business
Gambling Playing computer games Downloading music Downloading software for amusement Visiting pornographic sites	E-mail Chatting	Research Seeking information Reading online news	E-shopping Doing business Downloading software for professional use

When we grouped the users into the four categories in accordance with their prioritised use of the Internet, we found remarkably clear patterns. Users who employed the Internet for instrumental and business purposes were: significantly older, more educated, had more Internet experience, and had higher access flexibility and financial capability. The same pattern was found when we compared characteristics of those who used the Internet mainly for communication as opposed to those who visited sites for predominantly recreational use (articles 4 and 7).

In Yogyakarta, in particular, we found that serious use of the Web was clearly and significantly associated with higher usage frequency. The average monthly access time was 23.5 hours for recreational users, 30.5 hours for instrumental users, and as much as 91 hours for the few business users. The same tendency was found in Dar es Salaam. Instrumental users were connected 14 hours more than recreational users per month. Business users were,

by far, the most frequent customers. In conclusion, we found that the more serious usage by customers (and by implication more benefits) lead to increased sales and better sustainability for the cafés (article 7).

I have categorised the various types of use (table 7), and I have described different users (above). I now will introduce five groups of individual benefits for Internet café users:

- professional benefits (business)
- financial benefits
- educational benefits (instrumental)
- social benefits (communication)
- entertainment benefits (recreational).

Following the same logic as above, we note that some benefits have a stronger influence on the willingness to pay. Consequently, these benefits have stronger impact on demand sustainability for the businesses. I hypothesize that the range between these benefits follows the same pattern as the types of use (shown by the sequence above). In other words, professional benefits contribute more to sustainability than do entertainment benefits. Financial benefits (profit) do not have a direct link to one single category in table 7. They are, however, closely linked to the business category, and I postulate that they are on level with, or even above, professional benefits.

Many users will achieve a combination of two or more of these benefits. For example, a student visiting a café in order to seek information and chat, may get both educational and social benefits from her use, while a lucky gambler will achieve some financial benefits in addition to the entertainment benefit.

The results from article 7 show that, over time and with prolonged usage, users gain an enhanced, societal usefulness from the Internet. Through in-depth interviews, we traced the development of Internet café use for various user groups. We found that the use pattern changed over time. New and young users start their ‘careers’ with entertainment and socialising (e.g. chatting and playing games). After a while, though, they engaged in more serious usage. They use the Internet for information retrieval or for research. Their focus moved toward the instrumental category (see table 7). This trend could possibly continue into the business column but this outcome is uncertain. Studies of Internet use from developed countries point in that direction (article 4). We also noted that many of the respondents had moved into online business activities in Internet cafés, even though this category did not represent their major use of the Web on these sites (articles 4 and 7).

We know that a high percentage of users utilise their Web access for serious and non-recreational activities, and we see that, over a period of time, the use and the type of benefits change. We note that this change leads to more use which in turn results in a growth in the share of regular customers. From article 1, we recognize that the percentage of regular customers (market stability) is significantly correlated with the Internet café owner’s perception of success. Therefore, we acknowledge that this factor is important for business sustainability.

From general IS literature, we have found that users’ perception of benefits from the use of IT and information systems leads to increased usage. Davis’ (1989) concepts of ‘perceived usefulness’ and ‘perceived ease of use’ still have a dominant position in the stream of theories and models on IT user acceptance. ‘Perceived usefulness’ is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989: 320). Even if the concept of perceived usefulness is basically related to job performance, it is, to a great extent, similar to the benefit dimensions I have outlined. Davis’

Technology Acceptance Model (TAM) has been further developed in a number of articles (e.g. Venkatesh et al., 2003). Venkatesh et al presented an updated model of user acceptance for IT, unifying a lot of the previous work in this area. This model is called the Unified Theory of Acceptance and Use of Technology (UTAUT). Another example is The Technology Transition Model (TTM) by Briggs et al. (1998). TTM extends TAM by adding details to help explain the existence of self-sustaining and growing communities of users of IT technologies. In my work, I have presupposed the correlation between perceived benefits and usage according to TAM, etc. I then delved more deeply into the concept of benefits in this particular context, and I described how various categories of user benefits, not only professional benefits, affect the users' willingness to pay for the services. I further contend that all these issues thereby contribute to improved sustainability of public Internet access points.

That users' or customers' individual benefits impact on the sustainability of public Internet access points is mentioned in very general terms in recent literature. For example, Sein et al. (2008:17) state: "It is almost axiomatic that unless the service provided by a CIC (Community Information Centre) is useful, no one will use it". Sein et al. and Roman and Colle (2002), however, have pointed to a lack of relevant information as one prevalent obstacle to demand-driven telecentre access. While Sein et al. (2008:17) claim that "useful content is context specific and therefore highly localized", Roman and Colle (2002:14) mention two aspects of relevance that influence sustainability: localised information and the language that the information is presented in. In his paper on understanding e-governance for development, Heeks (2001: 16) gives a concrete example of the relationship between relevant content and sustainability of public Internet access. He describes the case of a set of touch-screen kiosks that were set up in remote rural communities in South Africa: "These were initially well received. However, the kiosks' lack of updated or local content and lack of interactivity led to disuse, and the kiosks were removed less than one year later".

Our findings regarding useful content support the research of Sein et al. and Roman and Colle. Language is a major issue and English is the dominant language on the Web. We asked users for their perception of obstacles which stood in the way of increased use of Internet services. Indonesians ranked lack of useful information higher than the Tanzanians, even though there is more information in the Indonesian language on the Web than in the Kiswahili (article 6). Tanzanians scored higher on the English proficiency variable so they would not be as reliant on the other language (i.e. Kiswahili) as the Indonesian population. In this regard, less than 10% of the Tanzanian respondents cited lack of useful information as an obstacle to increased use.

We have also pointed out the importance of context-specific information. This does not necessarily mean that there is mainly a local application. For some of the larger customer groups, like students and business people, the information generally has to have a wider scope to give the required benefits.

We have given a broad and thorough description of customers' benefits from their Internet access in Internet cafés in developing countries. We have shown that their experience of benefits is probably the strongest encouragement for continuing as customers. Two points that are worth mentioning are that the cafés are, to a large degree, used for serious and professional purposes which give benefits both for individuals and for the community, and that use experience over time results in more serious use and therefore increased benefits and improved sustainability for the Internet café.

6.2.3 Knowledge and awareness

When I presented my definition of demand sustainability in section 6.2, I claimed that implicit in the definition is an understanding that the customers have sufficient competence to utilise the access for some kind of personal benefits. In order to be willing to pay for the Internet access services, people need awareness of what they can acquire from the access, and they need to know how to use it (i.e. have knowledge). In this context, knowledge includes general literacy and educational level, as well as individual IT and Internet user competence. Consequently, knowledge and awareness have both a general and an individual impact, and together they form success criteria for creating a sustainable demand for an Internet café business.

In order to attract potential Internet café entrepreneurs to establish their business at new locations, there needs to be a certain level of awareness among potential customers in the area (articles 1 and 2). In Dar es Salaam, a young Internet café assistant told us he would be interested in starting an Internet café in his remote home village but in order to establish a sufficient customer base, he would have to do a lot of training of potential customers. An Internet café owner in Yogyakarta was less optimistic and he felt that the low educational levels and a lack of awareness among local people in his hometown, Palembang, in a rural area of Indonesia was a major hindrance for him to open a café there (article 2).

Together with awareness, general literacy is a main prerequisite for establishing a sufficient market for Internet access services. People have to be capable of reading information from the screen. From table 2 in section 4.1, we see that the literacy rate is high in Indonesia, where more than 90% of the adult population can read and write (i.e. compared to a world average of 82%). In Tanzania, the total rate is lower, around 70%, but compared to its neighbouring countries, the rate is still relatively high. According to CIA (2008), Sub-Saharan Africa is a region with extremely low literacy rates, and around one-third of the men and half of all women are illiterate.

In section 4.3.2 and 6.2.1, I described the Internet users in developing countries as a financial 'elite', and in our research we have pointed out that they are well educated as well. This trend is well documented in the literature (e.g. Joshi, 2001, Quibria et al., 2003, Mwesige, 2004). Less than one out of twenty Indonesian users have merely primary education, while in Tanzania close to 10% of the users have only elementary (6-7 years) education. In spite of the high proportion of students among Indonesian users, we find a surprisingly small difference when it comes to educational level between the Internet café users in the two countries. Around one-third of the Internet café customers in both countries have some university education. This is a high proportion. This fact shows that general educational level obviously influences the market for these services (article 6).

When we asked the users where they acquired their skills to use the Internet, we found that only a few of them had learned it at school or through formal courses. Most of the training had taken place in the cafés, where the users were self-taught, or were supported by friends and staff. Almost half of the Tanzanian users learned from the Internet café staff, while most of the Indonesian users learned to use the Internet by themselves or from their friends in the cafés. This trend shows that the Internet cafés function as classrooms as well. It also shows that knowledge among all participants at the public access points is important to get new users started and to strengthen the demand (articles 4 and 6).

In article 7, we presented the statistical associations between usage frequency among the Internet café users and three competence variables: educational level, personal capability, and Internet experience. Personal capability was measured by the respondents' perception of their own skills and knowledge in computer and Internet usage and English language proficiency.

We found that usage frequency increased significantly with all three competence variables. The correlations between the users' individual knowledge and their use frequency clearly showed the relation between knowledge and demand sustainability.

The impact of education on usage frequency is higher in Dar es Salaam, where the general level of education is lower, while the impact of the personal capability variable on usage frequency is stronger in Yogyakarta (article 7). English language proficiency is a part of the personal capability variable, which may explain this difference because English is the language of instruction in Tanzanian schools. English language skills are evidently an important knowledge in order to gain strong benefits from Internet access, and findings from article 6 confirm that this has a higher relevance in Indonesia than in Tanzania (cf. 6.2.2).

In section 6.2.2, we also showed that more serious use of the Web is associated with user frequency. In article 4, we found that in Indonesia, people with higher educational levels used the Web access in Internet cafés for more serious purposes, which, indirectly, supported the link between higher education and usage frequency.

We know that today users, in general, are well educated (article 6). For Internet cafés to become more attractive to ordinary, less educated people in developing countries, it is therefore important to raise competence levels and to better educate the Internet café staff. This is a supply side issue and a management responsibility. Training courses, combined with practical use, could become a valuable source of direct additional income for the Internet café business (article 1). This practice would be a useful way of extending the customer base and the market, and thus strengthen the demand sustainability.

Barreto (2000) reported that the biggest constraint they faced when they were implementing a strategy for giving people public access to the Internet in Peru was the lack of Internet knowledge. Their main challenge was to build up a 'critical mass' of people who understood the importance of information, were interested in it, and were capable of accessing the information on the Internet. First, they had to create awareness. Next, they were required to develop relevant content. Then, they needed to disseminate this information to the population at large. The result of their strategy was that people became used to working with information, and more people were able to enjoy accessing the Internet, what had previously been perceived as a status symbol.

Mahmoud (2003) states that investment in education is the key factor in increasing demand for internet access. Roman and Colle (2002) have noted that low general literacy levels are an obstacle to demand-driven telecentre access in developing countries.

Heeks (2000) claims that citizen access to electronic government data can be seen as an important component of both economic and social development. He has studied the barriers to be understood and addressed if this type of access is to become a more widespread reality, and he points to the same knowledge and awareness issues that I have discussed. He further states that: "citizens can only access available data if they know the data exists, that it is available and how it can be accessed", and that: "vast swathes of government data remain untapped by huge numbers of citizens simply because they have no idea that it is there or how to get hold of it" (Heeks, 2000: 5).

From our research, we see that creating awareness regarding the benefits of Internet access is a key strategy for attracting new customers to Internet cafés, as well as to telecentres (articles 1, 2 and 3). In an Internet café context, this depends largely upon the café staff. Telecentres usually have a broader set of stakeholders to take care of this spread of information. However, Internet cafés often function as classrooms, and staff and experienced users take on the role of

teachers and trainers (article 6). I will further discuss this classroom function in section 6.2.4 and in chapter 7.

The classroom function may also help customers overcome the language obstacle. As identified above and in section 6.2.2, the question of relevant information is also a question of understanding the language of the information. In an ideal world, all information should exist in all languages, but as long as some languages are dominating the Web, there will always be a need for foreign language knowledge, and a sufficient number of Internet café customers with such knowledge will have a positive impact on the sustainability of Internet cafes.

Using Whetten's (1989) building blocks, I will sum up this section in this way:

What: The main variable is knowledge and awareness, which is subdivided into:

- general literacy and educational level and
- individual awareness and competence, which is further subdivided as follows:
 - education
 - personal capability
 - computer knowledge
 - Internet knowledge
 - English language proficiency
 - Internet experience
 - awareness of possible benefits from Internet access.

How: The variables knowledge and awareness are directly related to benefits,

Why: because, in order to obtain benefits from Internet access, one has to know what is to be found there (awareness) and one must also have the competence to utilise the access (knowledge).

There is a long sequence of relations between demand sustainability and these variables (knowledge and awareness): In order to spend money in an Internet café, a user has to have some money to spend. He will only be willing to use the money if he can expect some kind of benefit from this use. This again depends on his general knowledge of what to find on the Internet and on his user skills.

6.2.4 Context

In section 6.1, I described how context is one of the categories of supply sustainability. I will now talk about context, in terms of Internet café location, and the role it plays in demand sustainability. A supportive local community and influential individuals are crucial elements for the sustainability of an Internet café in regard to the demand side. Other factors which are important are politics, religion, traditions and culture in general.

In the previous sections, I pointed to one aspect of this environment when I described certain groups of customers, like students and tourists, as main targets for the Internet café business. We have seen that the entrepreneurs are conscious of this market when they establish their businesses close to high-schools or in tourist areas. When we studied Internet cafés in Asia and Africa, we found other examples of geographical environments that have special target groups. In Dar es Salaam, one café was opened close to a hospital where there were small hostels housing patients' relatives. These people constituted the main group of customers for that establishment. In Yogyakarta, a military area was the marketing target for a café named B@yonet (figure 12).



Figure 12. B@yonet Internet café in Yogyakarta, Indonesia.

There is, however, a risk of making the cafés too vulnerable when the entrepreneurs stake too much in one market segment. In section 6.2.2, I mentioned the ‘carding’ activities which were occurring in Internet cafes in Indonesia. International organisations put pressure on the Indonesian government to put a stop to these practices, and then a lot of the Internet cafés had to close down. This example shows that powerful changes to the state of the local market may come about because of policy decisions made at national or even international levels.

The Bali bombing in 2002 was another dramatic example of this. After the bombing attack, tourism declined substantially on the Indonesian islands of Bali and Lombok. Internet cafés that had directed their services primarily toward foreigners had to close down (article 3). These are just a few examples that show how sudden changes and external forces can alter the local demographical context and directly affect the demand for Internet access services.

Another demographic factor worth noting is the gender balance. Women are under-represented as Internet café customers, in general, and, in Tanzania, we found what we call a ‘gender digital divide’ between urban and rural areas (article 5). The reason behind this is to be found in local culture. In many local communities, it is not considered proper for a woman to visit a public place like an Internet café. While the female share of Internet café customers is close to 40% in the urban areas, it is only 25% in Iringa, Mbeya and Songea (i.e. rural areas). These numbers show the difference in public participation between the two genders in developing countries in general, and in rural areas in particular.

This trend also illustrates that the Internet café itself - the image it represents and how it is organised - plays an important role in the local context dimension. As described in section 6.1, there is a clear difference in the understanding of the Internet café concept between industrialised and developing countries. In Internet cafés in developing countries, we found very few traces of a European ‘café culture’ (i.e. where the café is a place for socialising). In developing countries, the activities in the Internet café are almost entirely cyber-oriented. Areas for socialising are minimal, and other café services are extremely limited (e.g., they may have a refrigerator where customers can get a soft drink) (articles 4 and 7). In many cafés, the computers are placed in small, closed cells where the users sit in isolation and have

no contact with other customers (see figure 13). The average café customer in Yogyakarta, for instance, spends 2.5 hours connected per visit and only an additional five minutes waiting or socializing (article 4). An interesting study would be to see if more socially-oriented Internet cafés could attract new groups of users.



Figure 13. Internet café interior in Dar es Salaam, Tanzania.

In Tanzania, we studied some cafés that were regularly visited by local classes of students (from secondary school, high school and college) (figure 14). In Dar es Salaam, we found one of the largest Internet cafés on the premises of the main post office building. Other interesting issues to investigate would be to see if these ‘officially’ sanctioned sites for Internet cafés, or the heightened calibre of clientele might raise the status of these establishments and remove culturally based prejudices and obstacles against Internet café use. These revised opinions could thereby improve sustainability and could also increase the spread of information and competence in rural and information poor areas of developing countries (article 6).



Figure 14. A local secondary school class visiting Lugoba village Internet café in Tanzania.

In developing countries like Indonesia and Tanzania, there is an inequality in power distribution, which is accepted and in some cases, expected by less powerful people. Leaders play a very important role in deciding “to go” or “not to go” (article 10). Strong leadership can ensure a long-term commitment from the population and can unify different factions so that they collaborate and support IT initiatives. In Lugoba, Tanzania, we visited an Internet café, centrally located in the village, which had achieved sustainable operations due to strong support from the local political authorities.

Another contextual factor that plays an important role for most people’s attitudes and actions is family dynamics. In article 8, we studied the statistical associations between young people’s media exposure and their family background (c.f. 4.3.3). ‘Media exposure’ means the respondents’ use of various media, including the Internet, measured by the average number of hours spent per day. We found that the family background (their parents) influenced their media exposure in several ways. Parents’ education, occupation, and economy have a significant impact on media exposure. For example, a father’s and mother’s average number of years in school strongly correlates with their children’s media exposure; sons and daughters of government employees have a much stronger media exposure than do farmers’ children. Family income levels strongly and significantly correlate with high school students’ media exposure. Accordingly, the amount of time (young) people use the Internet is influenced by their family background as well. In Indonesia and other developing countries, this time is usually spent in public Internet access points and thus contributes to their sustainability.

In article 9, we described the symbolic value of IT. In the studied college context, where academic work was considered superior to service oriented positions, the prestige value linked to IT was realised more by having the technology than by actually utilising it. Some top management executives had computers in their offices but did not use them because they considered this type of work to be secretarial work and below their status. In another context, the attitude toward using new technology might be the opposite.

Attitudes to information technology and the Internet may also be influenced by religious opinions. In article 6, we describe experiences from a female Internet café manager in Zanzibar, Tanzania, where more than 90% of the people are Muslims. She said that many people would not visit her Internet café because of religious reasons and because they knew that people “can watch dirty sites there”. We collected data for article 8 at a high-school run by a Muslim organisation in Gunung Kidul on Java, in Indonesia (figure 15).



Figure 15. Muslim high-school students in Gunul Kidul on Java, Indonesia

We were told by the students that their religious leaders encouraged them to use the Internet because they could find valuable information there about religion and other topics. Hence, we see that these different areas see the Internet in different contexts, even though they share the same religious belief. They may have different attitudes to the Internet and therefore they may influence Internet use in exactly opposite directions.

Political, religious, cultural, and power-related factors can influence the market for Internet services, and thus affect demand sustainability. In article 9, we described contextual and cultural-based obstacles which were faced when developing an information systems implementation project in Tanzania. We recognised and described these obstacles. Even so, we concluded that we did not have a true grasp of all these obstacles. Some of the obstacles were still poorly understood by us, and some of them were probably not even clear to the key players involved. Some of the issues we were not able to pursue in great depth were transparency and corruption. These problems are internal and are usually more or less closed to outsiders.

In Tanzania, we found that people had a different understanding about the sense of time (article 9). This different outlook had an impact on IS development, implementation, and use. In this culture, where the future is regarded as of little importance compared to the past and the present, people are less interested in investing for the future. For example, they may not be interested in learning new skills because this represents an investment with an insecure payoff some time in the future. This concept of time is one example of how traditions and culture can influence attitudes toward new technologies like IT and the Internet, and may constitute a serious obstacle to achieving a sustainable demand for Internet café business.

Many articles (e.g. IDRC (2005), Harris et al. (2003), and Ali and Bailur (2007)) claim, in a general way, that the local community has an influence on people's attitudes toward using modern technology like computers and the Internet. This is not only the case in developing countries, but it does appear to be a serious obstacle for increasing use of the Internet in the third world. Many of these articles use a supply side perspective, and except for a few cases, there has been very little research systematically describing the relationship between context, culture and traditions and the demand for Internet access.

The factors that create and sustain a market for ICT projects in general, in addition to economy, derive from an area's or a country's socio-economic, demographic and cultural make-up (IDRC, 2005). Madon's (2005) list of players influencing telecentre sustainability includes both local companies and civil society organisations. Harris et al. (2003) point to community acceptance as one (out of four) key issues for the continued existence of Telecentres. Ali and Bailur (2007: 4) claim that social sustainability of telecentres requires: "user buy-in and participation, taking into account local traditions, considering differences within communities, empowering marginalized groups, sharing and aligning goals with local people and adapting to evolving community needs". They further state that the social sustainability dimension is about looking beyond equitable access and asking whether the access is actually something useful and provides relevant content. They admit, however, that the ability to measure this social impact is problematic due to its inherent complexity and lack of appropriate indicators and that existing literature does not point out how to determine what is 'locally relevant'.

Others, like Proenza (2001), Roman and Colle (2002), and Sein et al. (2008) have pointed to local champions, political support and community acceptance as important contextual sustainability issues. Sein et al. place a particularly strong emphasis on the importance of support from local individuals (catalysts and activists) for providing context dependent local content and for developing awareness in the local community. In article 10, we elaborate on

the role of political leadership in information systems implementation (e-government) and confirm the importance of strong political leadership in this context.

The organisation and image of Internet cafés is discussed by Salvador et al. (2005) (cf. 6.1) in an article titled “Less Cyber, More Café”. They question the prevailing emphasis on the ‘cyber’ approach to Internet cafes. They recommend a move toward a social ‘café’ function, in order to make Internet access more of a part of public life. We also contend that making the cafes more social would attract a broader selection of Internet users to the Internet cafés. Our suggestions include: making the cafes’ images more socially acceptable, and reorganising them to be more socially encouraging and inviting. To increase the number of female users, in particular; one challenge will be to make the Internet cafés more suitable for women. For example, in some areas, (e.g. Muslim countries) special arrangements could be set up at particular cafés where women could sit by themselves to feel more comfortable.

Many articles point to the importance of taking the local culture and traditions and local needs into consideration in making public access points sustainable. Few authors, however, have pointed out how to concretely do this. We have shown how difficult this can be for outsiders, because local culture can pull in opposite directions (e.g. religious beliefs). Two other factors we discuss here are status and prestige. We mentioned that, in some places (e.g., we used an example from Tanzania) using computers was regarded as low-status work. On the other hand, Barreto’s (2000) experience in Peru (cf. 6.2.3) was quite the opposite. There, an ability to use computers was considered a high status symbol. Another similar experience is described by Mercer (2006:260). She studied a telecentre that had been operating for some years in Sengerema, a village in northern Tanzania. At this location, people who used computers were looked upon as more developed than those who did not - [they] “were able to know more about the world”. It is likely to assume that the perception of higher status results in more use of technology in that context.

In summary, in this section I identified six elements which are included in the context variable:

- national and international policy
- local authorities and local community
- local champions
- family
- demography
- culture and religion
- Internet café premises and organisation.

Some of these elements affect demand sustainability directly by influencing the market and the number of Internet café customers (e.g. policy decisions and culture) and they all affect demand sustainability indirectly through one of the three other dimensions (i.e. economic capacity, benefits, and knowledge and awareness):

- Family background, demography and policy affect an individuals’ ability to pay for services in a local community (economic capacity).
- Family background, traditions and religion may influence people’s attitude to the Internet and consequently their willingness to pay (the economic capacity).
- Design and organisation of the café influence people’s attitude and their willingness to pay.
- Central and local authorities and international organisations upload useful information on the Web (benefits).

- Local champions may open the way for using and marketing the Internet (awareness).
- National and regional educational policies influence the literacy rate and education (knowledge and awareness).

6.3 Summing up the theory building

In figure 7, section 6.1, I made an outline of the dimensions and elements of supply sustainability in relation to management and context and policy issues. In figure 16, below, I make a corresponding figure based on the conclusions from section 6.2.1 through 6.2.4. I show the demand sustainability dimensions (circles) and how they relate to one another (arrows). Figure 16 further illustrates how each of these dimensions affects demand sustainability either directly or indirectly via another dimension.

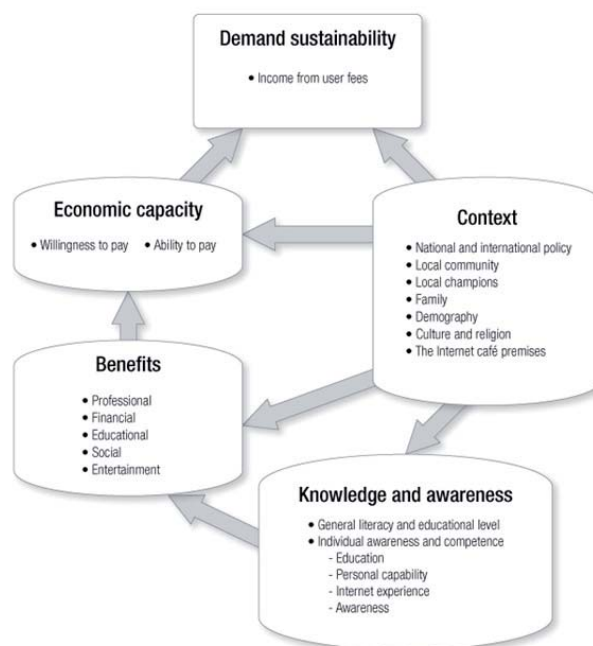


Figure 16. Demand sustainability.

Various players contribute to demand sustainability through these four dimensions. The users themselves are, of course, important in respect to all four dimensions. They raise money to pay for access, they build up their own competence, and they participate in networks by communicating through the Internet. By being users and telling others about it, they activate other users and they promote the use of the Internet locally. As experienced users, they help and train beginners and less experienced users. Consequently, they influence the local attitude towards use of IT and the Internet, either in a positive or negative direction. They also contribute new information by developing their own homepages and participating in activities on the Internet (e.g. Facebook, Wikipedia, etc.).

These four dimensions of demand sustainability are, to some degree, related to the two dimensions of supply sustainability. The context is the same for the supply and demand side issues of Internet café business, but the context and policy issues influence these issues in different ways. I described these differences in the previous sections.

From the supply side, the pricing of access is an important factor in regard to the customers' ability and willingness to pay for the services. This factor, therefore, affects the economic capacity dimension of the demand side issue, as well. The knowledge dimension is influenced by the suppliers, when they guide and help other users in their computer use. The amount of relevant and useful content and services is vital for the users' benefits.

While cost is the most prohibitive factor for most of the Tanzanian customers, poor infrastructure quality (access speed) is the most pertinent obstacle among Indonesian users. Access speed and price are the highest ranked factors limiting Internet use in Internet cafés in Indonesia and Tanzania. Both of these factors influence economy from the supply side perspective, and are, thus, important for the overall sustainability of Internet café businesses.

We have ascertained that a high percentage of users utilise Web access for serious and non-recreational activities. Over time, this usage, and the type of benefits from this usage, tends to develop and change. This change leads to more use and thus to a build up in the share of regular customers. From article 1, we know that the percentage of regular customers (market stability) is significantly correlated with the Internet café owner's perception of success. Consequently, user benefits are important for the supply sustainability of the business.

Figure 17 is an updated version of the model from figure 9 (cf. 6.1), and concludes my theory building on public Internet access sustainability.

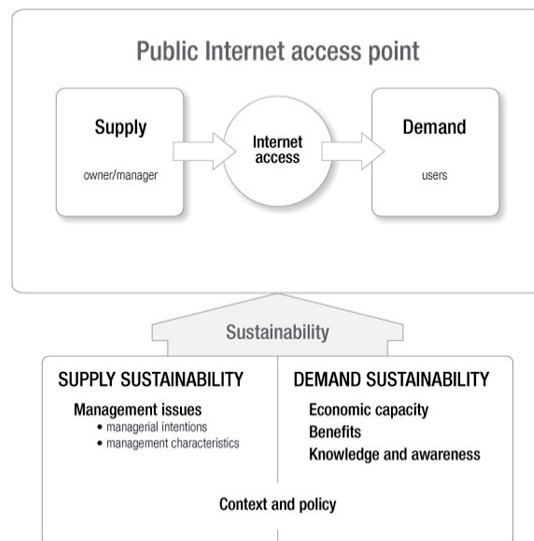


Figure 17. Supply and demand sustainability.

The figure outlines the elements that influence the sustainability of a public Internet access point from the supply side and the demand side (i.e. the supply sustainability and the demand sustainability). In section 6.1 and 6.2 I introduced three measures for these two sustainability issues:

- measured profitability (supply sustainability)
- perception of success (supply sustainability)
- income from user fees (demand sustainability)

Together, these three measures form a compound measure for the financial sustainability.

The figure shows that context and policy dimension is common for the supply and demand sides, and that this dimension affects the financial sustainability indirectly via the two sides (cf. figure 7 and figure 8). In some cases, however, when a telecentre receives external financial support which is not linked to individual users, the context will contribute to the financial sustainability directly and not via one of the two sides. This does not appear from the figure, and it is a consequence of the difference between commercial and financial sustainability (cf. sections 3.4 and 6).

7. Conclusions.

One of the ways to create development in poor countries is to give people sustainable access to IT and the Internet, and in this way, to bridge the digital divide (cf. chapter 2). In reviewing a broad selection of research papers on IT and development, I realised that sustainability issues, to a large extent, have been missing in the literature. Much of the existing research deals with the digital divide in a short-term pilot context. Some recent articles have, however, raised the question of sustainability but have not come up with any satisfactory answers. The demand side, (i.e. the users of Internet access) in particular, has been absent in the discussions so far. This thesis has therefore addressed the sustainability of public Internet access in developing countries, with a specific focus on the demand side.

My approach was to go through the ten research articles I published in order to detect information that was not covered in these articles, but has lain latent in the material. Due to lack of relevant theory, the mode of this research process has been inductive. I have used a strategy called analytic research when building this new theory.

The contribution from this thesis as a whole has two levels. The contributions from the individual articles are described in the articles and summarised in chapter 4. In brief the contributions are increased knowledge of the spread and use of information systems in general, and public Internet access in particular, in developing countries, based on studies of Internet cafés in Indonesia and Tanzania.

The other contribution is the development of a new theory (summarised in section 6.3), using an innovative research methodology.

I worked out definitions and detailed descriptions of the concepts of supply and demand sustainability for public Internet access in general (cf. the research question). I established that public Internet access points have to be sustainable if they are to play a role in development.

Urquhart (2007: 348) states: "IS is a new discipline which thus far has generated few theories of its own". She further claims that there is too much emphasis on theory testing as opposed to theory building within the IS field.

In this thesis, I have used analytic research for developing new theory, a strategy that has not been used explicitly within the IS field to any great extent. I used my own articles as a domain (data source) for developing this new theory. According to Buckley et al. (1976), the domain of analytic research is the researcher's own knowledge and experience. I expound on the concept of 'knowledge and experience' by using the ideas from my articles as a kind of 'virtual memory' (cf. 5.3). My approach is, to some degree, comparable with the grounded theory method, and with the work by Eisenhardt (1989), where she describes the building of theory based on case studies within social science research (cf. 5.1).

I suggest some initiatives that will increase public Internet access sustainability. The main recommendations I made have to do with public and private partnership (i.e. a collaboration between local entrepreneurs running Internet access points and the public sector):

- The first recommendation I made has to do with the general attitude toward Internet access (cf. 3.4). If ample access to Internet services is as important an advance for the development of poor countries as the 2005 United Nations Summits claims, then I contend that governments should consider Internet access as a 'public good', an essential part of the local, community infrastructure like electricity or schools. To this end, governments could collaborate with private companies or international organisations and could

provide the infrastructure for access in all parts of the country. Local entrepreneurs could surely be able to make the Internet accessible at reasonable prices even in peripheral areas (article 1, 2, 5, 6, 8).

- I next discussed the public sector's attitude toward Internet access points. Some authors suggest that public telecentres should be developed in the same manner as Internet cafés by using the same kinds of business properties (cf. 3.3). My suggestion is the opposite. I propose that the public and private sectors establish a partnership, where the public sector supplies the thousands of already existing privately owned Internet cafés with Internet based content and services. These services, in turn would benefit both the private and public sectors (e.g. e-government services for citizens) (article 10). This would also give more benefits to the users and thus help build up a basis of sustainable Internet access points.
- The third main recommendation I make is in regard to the image of Internet cafés and other public Internet access points. Again, there is a role for the public sector to participate in a partnership to make them more acceptable for common people. One suggestion is to use the cafés for official purposes, for example, to make them available for school classes (cf. 6.2.4) or to offer public library services. The manager and/or owner of the cafes would have the responsibility of using their sites for these types of functions. However, offering a variety in services could be beneficial for the cafes and could support the supply side sustainability issue.

The limitations of my work, in relation to generalisation, are to a certain extent the same limitations that are pointed to in the ten articles, for example limited samples of respondents and locations, lack of information from non-users, and the theoretical basis, due to scarcity of relevant literature. I will, however, make some additional remarks:

- In the selection of Internet café entrepreneurs, we did not find many that were unsuccessful and had closed down their cafés; in other words, we found very few unsustainable cafés.
- The data collection was carried out over a limited period of time. Our data would, possibly, have been better if we had been able to re-visit the same cafés after some time.
- We have, so far, limited the data collection to two countries. Even though they are different in many ways (e.g. culture, religion, size, level of development, different continents, etc.), these countries are not entirely representative of all developing countries. Perhaps we would gain a broader understanding of the issues with a wider selection of countries, for instance countries in Latin America which have different languages, traditions and telecentre experiences.
- I have not made a direct comparison between Internet cafés and other types of public Internet access points, like telecentres, community information centres, etc. However, I have reasoned generally, that there are possibly different consequences for these other types of business models. I feel, as well, that the financing concern could be further investigated.

These issues are obvious candidates for further research. Another clear area for continued research derives from the nature of inductive analytic research. Analytic research can only create theory and does not constitute an ultimate proof. In the next step, the resulting theory

has to be tested and verified through deduction. This means that good analytic research must, according to Buckley et al. (1976), meet at least these two conditions: the flow of logic must be explicit and detailed enough to permit others to follow and examine it on a step-by-step basis; and the conclusions must be stated in a form which is capable of being tested by others. These are two requirements I have borne in mind when I have developed and presented the new theory in detail in chapter 6.

An important and interesting task will be to test the theory in new contexts. I separate the question of Internet access from traditional constructs like Internet cafés and telecentres, and I suggest that we look to new emerging technologies for the spread of information. One such technology could be mobile phones. The use of mobile phones is a technology that has been a huge success and has spread to the most remote areas of developing countries during the last few years.

8. References

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Appendix A

Research articles

- [1] Kristiansen, S, Furuholt, B., Wahid, F., 2003. Internet café entrepreneurs: Pioneers in information dissemination in Indonesia, *International Journal of Entrepreneurship and Innovation*, 4, 4, 251-263.
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Article 1

***Internet café entrepreneurs:
Pioneers in information dissemination in Indonesia***

Stein Kristiansen, Bjørn Furuholt and Fathul Wahid

International Journal of Entrepreneurship and Innovation,
(2004) 4, 4, 251-263

Internet café entrepreneurs

Pioneers in information dissemination in Indonesia

Stein Kristiansen, Bjørn Furuholt and Fathul Wahid

Abstract: *Internet cafés represent a potential means of bridging the information gap between social groups and geographical areas. This study examines the spread of Internet cafés in Indonesia. The main objectives are to identify characteristics of Internet café entrepreneurs and to enhance the understanding of preconditions for the provision of Internet access by small-scale private enterprises. A survey methodology is used and the data reveal clear statistical associations between entrepreneurial adaptations, such as connection types and service variety, and success variables. The authors' policy recommendations include government intervention, primarily in infrastructure development and awareness creation, for a more equitable spread of access to information through the Internet.*

Keywords: *education; location; infrastructure; consumer awareness; Internet entrepreneurs*

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Access to information is of crucial importance for business start-ups and success. There is a tendency for business information to flow more fluently in developed economies as compared with poor and developing areas. Information market failures are more prominent in populations with a high percentage of uneducated people and huge economic and social differences among individuals and organizations (Stiglitz, 1989; Dove and Kammen, 2001). In particular, small-scale entrepreneurs in poor areas often lack access to new ideas, knowledge and options for business adaptations of importance for the development of competitive strength in gradually

more open economies. The information divide tends to be cumulative, both between rich and poor countries and within developing areas, thus hindering entrepreneurial endeavour where it is most needed. Information market failures seem to be on the increase in developing countries (Ponte, 2001) and represent a severe constraint in many contexts (Bappenas, 1999).

A number of studies indicate that the availability of efficient information and telecommunications infrastructure has considerable impacts on economic growth (Mwesige, 2003; Wei, 1999). Authors have also proposed that increased access to the Internet can be

used as a strategy for the spread of relevant business information, and thereby development potentials, to small-scale enterprises in areas that are lagging behind (Grewal *et al.*, 2003; James, 2003; Little *et al.*, 2001). However, the spread of the Internet itself is slow in emerging economies, and people's access is dependent on their location, income and education. The extension of infrastructure and the expansion of Internet access is a private business concern in most developing, as well as developed, countries today. Therefore, policy instruments to improve flows of information and reduce information market failures through use of the Internet need to be fine-tuned to the operations and obstacles of private entrepreneurs at specific locations.

The extension of infrastructure for use of the Internet in developing countries has generally been slower than in economically rich parts of the world. This is mainly due to low demand and thereby low profitability in businesses related to information and communication technology (ICT). Studies of the spread of Internet usage conclude rather unsurprisingly that per capita income and related telephone and personal computer densities are the most important determinants of intercountry differences in Internet user rates (Madden *et al.*, 2000; Kiiski and Pohjola, 2002; Grubestic, 2002; Zhu and He, 2002; Wilson and Wong, 2003; Beilock and Dimitrova, 2003). Kiiski and Pohjola (2002) also found that Internet access cost represented a statistically significant determinant of user rates in different countries. We can therefore see the amplifying tendencies of an initial low per capita income, generating low demand, low user density, and hence producing restrictively high access costs.

Expansion of Internet access in poor areas is facilitated by arrangements for public use, such as Internet kiosks, cybercafés or multipurpose community telecentres (Rogers and Shukla, 2001). The fact that only limited costs are incurred in the payment for use at such places represents a huge advantage in low-income markets. High fixed costs for the purchase of equipment and leased lines can be shared and only charged to the users according to the time spent online. The Internet café concept has also been successfully spread to poor countries because it combines reasonably priced access to the Internet with the comfortable environment of a coffee house or a bar and the chance to socialize with fellow users and to pick up new knowledge and ideas on computer usage. The potential variety of revenues for the Internet café owner also represents an entrepreneurial incentive. For many café owners, Internet access is only a means to attract customers to their restaurant, amusement arcade or showroom for computer hardware or software.

This paper aims to identify characteristics of private

Internet café entrepreneurs and reasons for success in their businesses at a selection of locations in Indonesia. The main objectives are to improve our understanding of mechanisms behind the spread of Internet access in economically poor contexts and to refine policy instruments for a more even distribution of access to information among geographical areas and social classes. Under the present political system and liberalized market economy, private innovative behaviour and the search for profitable business opportunities represent the main forces behind the spread of Internet access to new users. It is hoped that knowing the rationale behind small-scale entrepreneurs' business decisions and the preconditions for their experiences of success will enhance our insight into the process of diffusing information in developing economies. The paper is organized as follows: after this introduction follows a historical overview of the development of Internet use and Internet cafés in Indonesia. The next section presents the methodology and data collection procedures, before the outline of a theoretical perspective in section four. The statistical analyses follow in section five, and the article concludes with policy recommendations and perspectives for further research.

Development of the Internet and Internet cafés in Indonesia

The growth of Internet service providers¹ (ISPs) is a measure of Internet infrastructure development in Indonesia. In 1994, the first commercial ISP, IndoNet, was established in Jakarta (Purbo, 2002), and 15 were in operation two years later. At that time, 15 separate international connections were used from the Indonesian ISPs to the Internet. To increase the efficiency of connections, the Association of Indonesian Internet Service Providers, APJII, took the initiative to form a task force for a joint Indonesian Internet Exchange (IIX) in 1997 (Alam, 2000). After the establishment of the IIX, Internet use in Indonesia grew even faster. By the end of 2002, 180 ISP licences had been granted, 90 of them were operational, and 70 of them were connected to the IIX (APJII, 2003).

According to APJII (2003), the number of Internet subscribers² increased from 134,000 in 1998 to 667,000 by the end of 2002. Interestingly, from 2001 to 2002 the number of home subscribers decreased and was compensated by an increasing number of corporate subscribers (from 10,539 in 2001 to 39,589 in 2002). Seventy per cent of the income earned by the ISPs was from corporate subscribers in 2002 (Widodo, 2003). Only 20 ISPs are targeting home subscribers (Pamuji, 2003). The number of Internet users increased by more

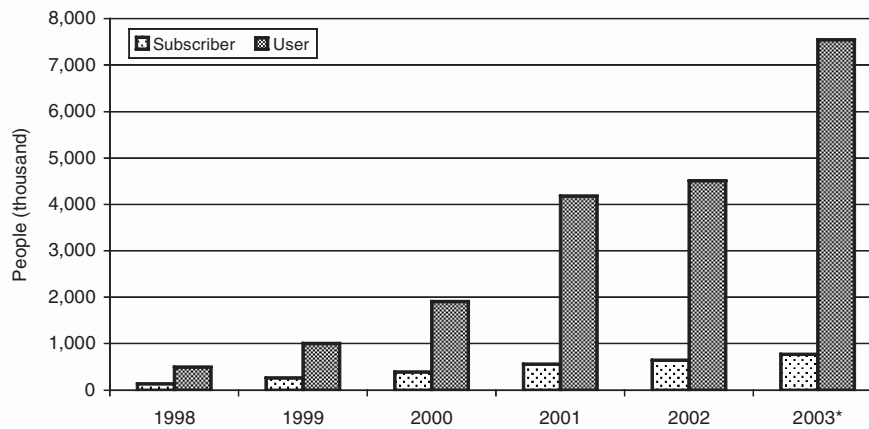


Figure 1. Development of Internet subscribers and users in Indonesia.
*predicted.

than 770% over a period of four years, from 512,000 in 1998 to 4,500,000 in 2002. APJII predicts that the number of Internet users in Indonesia will exceed 7.5 million by the end of 2003 (APJII, 2003). Considering its population of 220 million people, the density of Internet users is still low, slightly more than 2% and still lower than the density of phone lines, at 3% (Directorate General of Post and Telecommunications, 2001). The development of Internet subscribers and users is depicted in Figure 1.

The development of Internet cafés, known in Indonesian as *warnet* (*warung Internet*), showed remarkable growth around the year 2000. According to Basuni (2001), approximately 1,500 Internet cafés were in operation in the country in 2001. In 2002, Purbo (2002) found that there were more than two thousand Internet cafés in Indonesia. A combined list of Internet cafés from several sources in our study supports this number. The cafés are highly concentrated, the vast majority being found in the big cities in Java, such as Jakarta, Bandung, Yogyakarta, Surabaya and Semarang (see the map in Figure 2). Around two-thirds of Indonesian Internet users gain their access through Internet cafés. In May 2000, the Indonesian Internet Café Association (Awari) was founded, and many regional associations have followed (such as Awayo in Yogyakarta and Awaram in Mataram). According to Purbo (2002), Internet café associations are struggling to expand their own network and implement self-financed and community-based networks to reduce dependence on the large-scale Indonesian telecommunication

provider services. The implementation of Wireless Local Area Network (WLAN) normally makes access cheaper and faster (11–54 Mbps). (For an overview of various connection types, see Appendix 1.) Already the prices for Internet use in cafés in the large cities of Java are relatively low, around Rupiah 3,000 (Euro 0.31) per hour. This can be compared with around Rupiah 10,000 in areas with less developed infrastructure and business competition, such as in Lombok, or with Euro 3.5 per hour in an African context (Uganda) (Mwesige, 2003).

Data collection and methodology

This paper is primarily based on a survey of Internet café owners in Indonesia. Three geographical areas were selected for the study: Yogyakarta, Surabaya and Lombok. Yogyakarta was selected as a typical university city with a large proportion of the population being active students at the 100 institutions of higher education within this small province. Surabaya was selected because of its dominating role as a leading industrial city in Indonesia. The island of Lombok was selected mainly because of the dominant tourist industry in the area. Hence we have tried to include Internet café owners targeting three of the main user groups of Internet cafés, namely students, professionals and tourists.

The selection of Internet café owners to be included in the survey within the three areas was made on the basis of an overview of the total population of Internet cafés in these locations. The overview was obtained

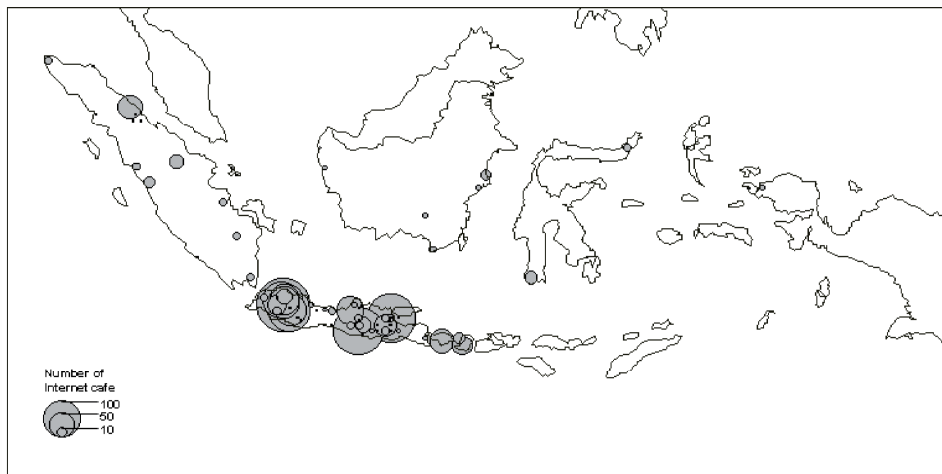


Figure 2. Map of Internet cafés in Indonesia.

Sources: www.natnit.net, and field observations in Yogyakarta, Surabaya and Lombok.

from various sources, of which <http://www.natnit.net> was the most complete, covering approximately 1,500 Internet cafés in Indonesia. The list was corrected during fieldwork when we found that some had closed down and others had been newly established. We have excluded from our survey Internet cafés owned and operated by larger institutions such as universities and private or government companies. The remaining (approximate) total populations of cafés are as follows: 130 in Yogyakarta, 100 in Surabaya and 30 in Lombok.

Preliminary interviews with 10 owners and 10 users of Internet cafés in Yogyakarta formed the basis for developing the questionnaire (in the Indonesian language) as the main research instrument for the survey. The questionnaire was tested by a pilot study in December 2002, and was refined before the final data were collected in January 2003. Respondents were all owners of the sampled Internet cafés.

A clustered-proportional sampling was used to select respondents. The area of Yogyakarta city was divided into five geographical clusters based on the main lines of demarcation. A north-south distinction was made using the railway as a divider. The northern area was divided into three clusters, and the southern into two based on the main road partitions. We distributed 66 questionnaires randomly to around 50% of the total population in each cluster. We obtained 44 responses, 43 of which

were usable. A similar procedure was deployed in Surabaya, dividing the city into four geographical clusters partitioned by main highways. We distributed 50 questionnaires and obtained 41 responses, 39 of them valid. The island of Lombok was divided differently: there was one educational cluster in the vicinity of educational institutions in the capital town (Mataram), one shopping-mall cluster, and lastly a tourist area cluster. We distributed the questionnaires to 50% of the total population in each cluster, and obtained 11 responses, all of them valid. On average, the response rate was 73%. The total number of Internet cafés in our sample was 93. The average age of the Internet cafés was 3.4 years, varying between one and eight. Nine cafés were in operation before 1999, 61 were started in 1999 and 2000, while 21 were 'late starters', established in 2001 and 2002. Table 1 shows descriptive statistics from the survey.

In examination of the survey data, correlation analysis was the main tool used. Data from the questionnaires have been complemented by five in-depth interviews with Internet café owners in Yogyakarta and Lombok. The qualitative information from interviews before and after the survey helped us in developing hypotheses for statistical testing and in interpreting some of the quantitative data.

Table 1 reveals that almost 90% of the entrepreneurs

Table 1. Descriptive statistics.

	n	%
<i>Location</i>		
Yogyakarta	43	46.2
Lombok	11	11.8
Surabaya	39	41.9
<i>Gender</i>		
Female	10	10.8
Male	83	89.2
<i>Education level</i>		
Elementary school	1	1.1
Junior high school	1	1.1
Senior high school	9	9.7
Diploma III	10	10.8
Bachelor	64	68.8
Master	8	8.6
<i>Age (years)</i>		
<= 25	14	15.7
26-30	35	39.3
31-35	19	21.3
36-40	9	10.1
> 40	12	13.5
<i>Work experience</i>		
Never	31	33.7
Yes	61	66.3
Public	7	11.1
Private	33	52.4
Self-employed	23	36.5
Non-IT-related	35	59.3
IT related	24	40.7

were male and close to 90% had university level education. There were café owners from all age groups, but predominately between 26 and 30 years. Two-thirds had previous work experience, mainly in the private sector.

A theoretical perspective

This research aims to identify characteristics of Internet café entrepreneurs and to assess the main individual and institutional preconditions for success in that business in the Indonesian context. There is some conventional entrepreneurship theory, as well as empirical studies of the supply of and demand for entrepreneurial services in economically poor contexts (Kristiansen, 2001). From this literature we draw arguments from the personal and social qualification explanation of entrepreneurship supply (Hisrich and Peters, 1998). Variables normally included in explanations of individual entrepreneurial business endeavour comprise age, gender, education, previous work experience, and access to information and assets of social and financial capital. Also, a number of psychological qualities are often found to count in studies of reasons behind business start-up and success.

Several studies support the argument that

demographic characteristics, such as age and gender, and individual background, such as education and previous employment, have an impact on entrepreneurial intention and endeavour. Mazzarol *et al* (1999) found that females were generally less likely to be founders of new businesses than males in an Australian context. Similarly, Kolvereid (1996) concluded that males had significantly higher entrepreneurial intentions than females in the Scandinavian countries. About 10 years ago, women accounted for only about 20% of new firm formations in this region. Although age is not normally regarded as a significant determinant of business start-ups, Reynolds *et al* (2000) found that individuals aged from 25-44 years were the most active in entrepreneurial endeavour in Western countries. Findings from a study in India also indicated that successful entrepreneurs were relatively young (Sinha, 1996).

The same study from India revealed that *educational background* was of importance for entrepreneurial intention as well as for business success. Especially in a technologically demanding business such as computer and telecommunication operations we can expect education to have a substantial impact on innovativeness and business performance. Lee (1997) studied women entrepreneurs in Singapore and found that university education had a great impact on the need for achievement and thus also on the propensity to attain success in business. In a survey of factors behind business success in Africa, Ramachandran and Shah (1999) found that formal education, both secondary and university, was significantly correlated with firm growth. In a study of Asian values and development, Cummings (1996) concluded that the extensive provision of education in Asian countries such as South Korea, Singapore, Taiwan, Malaysia, Thailand and China had facilitated access to information and entrepreneurial drive there.

Many empirical studies of entrepreneurship have found a relationship between *work history* and variety of experiences on the one hand, and innovative capacity and propensity to succeed on the other (Burt, 1992; Sanchez and Perez, 1998). Kristiansen and Indarti (2003) found that previous work experience among Indonesian students had a significant impact on important capacities for entrepreneurial action.

In addition to age, gender, education and work experience, several individual and social factors may contribute to entrepreneurial drive and the capacity to start and succeed in the Internet café business. In our questionnaire we have included five questions in which the respondents are asked to indicate their level of agreement on specific items (1 = strongly disagree; 5 = strongly agree). The five questions are related to leader-

ship skills, mental maturity, social networks and access to sources of information and financial capital. A combination of the five items makes up a variable termed *entrepreneurial readiness*, which is closely related to the term 'entrepreneurial orientation' (Swierczek and Ha, 2003; Covin and Slevin, 1989). Answers to the five questions are combined in a multiple-item scale to improve the reliability of the interval level measurement (Remenyi *et al*, 2000).

Leadership skills are obviously of importance for entrepreneurial behaviour. Probably of similar importance is the self-confidence to state that one has the necessary leadership skills to be an entrepreneur. A person's belief in his or her capability to perform a given task, self-perception or self-efficacy, plays a role in the development of entrepreneurial intention (Ryan, 1970; Cromie, 2000). Bandura (1977, p 2) pointed to the fact that 'people's level of motivation, affective status and actions are based more on what they believe than on what is objectively true'.

Mental maturity and social skills are valuable qualities in the process of establishing and bringing to success a new innovation (Markman and Baron, 2003), such as an Internet café. We asked respondents if they had the mental maturity to succeed as entrepreneurs. Several theoretical and empirical studies indicate that a certain degree of mental maturity forms a necessary basis for entrepreneurial motivation and business accomplishment. Unless people feel mature and believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of adversities (Pajares, 2002).

Social networks have an impact on the likelihood of successful entrepreneurial endeavour. The study of entrepreneurship has increasingly reflected the general agreement that entrepreneurs and new companies must engage in networks to survive (Huggins, 2000). Networks represent a means for entrepreneurs to reduce risks and transaction costs and also to improve access to business ideas, knowledge and capital (Aldrich and Zimmer, 1986). A social network consists of a series of formal and informal ties between the central actor and other actors in a circle of acquaintances, and represents channels through which entrepreneurs gain access to the necessary resources for business start-up, growth and success (Kristiansen, 2003b).

Access to information has been proved to make a clear difference between success and failure, both in the start-up and the running of a business (Kristiansen, 2002). Barr (2000) made a distinction between the various forms of business information of importance for entrepreneurial development. Information on markets and technological aspects, and information on design,

trustworthiness of potential partners and government policies were the most important of these. Rogers (1995) underlined the need for information and knowledge, especially in the decision-making phase of innovative actions.

Access to financial capital is often regarded as the crucial element in the initiation phase of a business innovation. There are many empirical studies underlining the importance of access to capital for small-scale business starters, especially in developing economies (Masten and Brown, 1993; Steel, 1994; Meier and Pilgrim, 1994). Potential sources of capital may include personal savings, extended family networks, community saving and credit systems, joint ventures or financial institutions and banks.

We shall analyse statistically any associations between these individual background variables and success indicators in the operation of an Internet café business. However, we shall also use a set of intermediate variables, termed entrepreneurial adaptations. Based on our in-depth interviews with Internet café entrepreneurs in Indonesia (see the 'Data collection and methodology' section), we found reasons to expect statistical associations between the individual background variables and the business adaptability variables presented below. We also expected to find significant associations between these intermediate variables and our measured success variables. The statements below can be regarded as propositions for the following quantitative analyses. To support our assumptions we have included references to information or quotations from entrepreneurs who were interviewed in the qualitative part of the data collection.

Start-up time. We presume that those business owners who start early are the most innovative and entrepreneurial, possibly influenced by various individual background variables. Getting into a competitive business position early also makes good prospects for advancements and further progress. Mr Purnomo, for instance, was among the early starters of Internet cafés in Yogyakarta. He is a young university graduate in informatics who is highly satisfied with his early start-up and the accompanying optimal geographical location among university institutions in the northern part of the city. He maintains high profits in spite of the increased competition.

Market stability. The establishment of a stable group of customers who can support the company's continued operation and technical adaptations will probably require individual entrepreneurial skills and will be of importance for business success. As stated by the owner of 'Bayonet' in Yogyakarta.

From the very beginning, we have intended to keep close with the customers, in order they are not running away from Bayonet to other Internet cafés.

Technological advancement (type of Internet connection). The type of Internet connection will probably be of importance for success, and the more entrepreneurial café owners are more likely to be at the forefront of technological progress. As stated by an entrepreneur in Lombok who had been working abroad for many years:

Access speed is very important. The customers now compare, and hence the quality of infrastructure is very important.

Financial flexibility. There are reasons to believe that entrepreneurs who are best positioned socially are also best able to raise financial capital from various sources, and that financial flexibility is of importance for business growth and success. Mr Hananto, for instance, one of the most successful Internet café entrepreneurs in Yogyakarta, found that his family connections all the way up to a former minister in Jakarta helped a lot in raising the initial capital and in financial flexibility at later stages of expansion and market adjustments.

Variety of services. As already discussed, Internet cafés may offer an assortment of services, from advanced IT-related services to various forms of entertainment and secretarial services. Again, there are reasons to believe that the most entrepreneurial business starters will spread their activities to raise income from different sources, and that the variety of services has an impact on business success. Our in-depth interviews indicate that success is influenced by the ability to move into demanding and high-value services such as software development and homepage design. Mr Hananto, for example, told us that his Internet café was 'just like the display of a store. My real business is in software development.'

Based on the foregoing theoretical discussion, we propose the organization of variables in Table 2 as a basis for the statistical analyses. We expect that age, gender, education, former work experience and entrepreneurial readiness will all have an impact on start-up time and other measures of business adaptability, such as market stability, technological advancement (connection type), financial flexibility and the variety of services. Regarding impacts on success variables, we expect to find statistical relationships both with background variables, such as education, former work experience and entrepreneurial readiness, and with variables mentioned under entrepreneurial adaptations.

Table 2. Organization of variables for statistical analyses.

Background variables	Entrepreneurial adaptations	Success variables
Age	Start-up time	Entrepreneur's perception of success
Gender	Market stability	Measured profitability
Education	Connection type	
Work experience	Financial flexibility	
Entrepreneurial readiness	Variety of services	

Statistical analyses

The analysed variables fall into three groups, as illustrated in Table 2. Background variables represent individual and social entrepreneurial qualities. Age, gender, education and work experience are easily quantifiable, while the entrepreneurial readiness variable is measured by a multiple-item scale based on the entrepreneurs' own perceptions of their qualifications. The adaptation variables aim to measure accommodations within the market setting and the competitive game towards business success. The start-up time is measured either as the number of years in operation or by making a distinction between early, medium and late business starters. Market stability is measured as the percentage of regular customers among all clients. Connection type is the technology currently in use for Internet access, which is normally one of five alternatives (see Appendix 1). For financial solutions, we distinguish between personal savings, family capital and third-party sources of investment, indicating increasing levels of flexibility. With regard to variety of services, we make distinctions between a series of non-IT-related services such as bars or restaurants, non-IT shop or tourist-oriented services, and IT-related services such as computer games, Website development or IT training and consulting. Success is measured by two different variables. One is profitability, which is quantified on the basis of calculated annual income and stated total investment, excluding operational expenses. The other is a multi-item subjective measure. We asked about the entrepreneurs' perceptions of success as indicated by five qualities: computers' utilization rate, growth of net income, payback period, general consideration of success, and assessment of business growth. Both success measures are based on information revealed by the entrepreneurs by filling in the questionnaire. Scores are generally high on both variables, suggesting that the Internet café business is relatively good in the selected locations, in spite of increasing competition. The average score for profitability is 164.68 (sd 104.75), and

for the multi-item measure the average is 3.31 (sd 0.94).

In the following section we first analyse statistical associations between background variables and adaptation and success variables. Next we search for significant relationships between adaptation and success. We use correlation analyses in most cases, either Pearson's when both variables are at interval measurement levels, or cross-tabulation when both variables are categorical. Additionally, when correlation analyses are not applicable, we use means comparison. T-test is used to compare means between two groups (eg market stability between two gender groups), while one-way ANOVA is used to compare means among several (more than two) groups (eg success variables and different types of Internet connection). When any significant difference is found, we deploy Tukey's honestly significant difference test in *post hoc* multiple comparison to see significant differences between specific groups. Statistical analyses are made at 10%, 5% or 1% significant levels.

Entrepreneurial background and business adaptation/success

We find no significant correlation between the *age* of entrepreneurs at start-up and number of years of operation of the Internet café business. Average age at start-up is 28.6 years. Also, there is no significant correlation between age and percentage of regular customers (market stability) or the type of Internet connection (grouping ISDN/ADSL as one type due to the limited number of Internet cafés using such connections). Using four cut-off points of age (25, 30, 35, 40), we find that the use of personal savings as the source of capital is significantly higher for lower age groups (cut-off point 35), while the use of third-party or joint venture capital is more customary at higher ages. As regards the variety of services, we find that Internet café owners who offer Web hosting services ($n = 12$, $mean = 29.33$, $sd = 3.42$) are significantly ($t = 2.16$, $p < 0.05$) younger than those do not ($n = 76$, $mean = 32.22$, $sd = 8.08$). We also find that entrepreneurs offering copying and tourist-oriented services are significantly older than those who do not. No significant differences are found between age groups as regards the number of different services offered in the cafés. The measured profitability of entrepreneurs at the age of 25 or older is significantly ($t = 2.32$, $p < 0.05$) higher than of those who are younger (means of 170.41 and 122.46 respectively). Other significant statistical associations between age and success variables were not found.

There is no significant association between *gender* and number of years in operation. The percentage of regular customers of female Internet café owners is somewhat higher than of male owners (means, 54% and

47% respectively), but the difference is not statistically significant. Neither is there any significant association between gender and the type of Internet connection or the use of various sources of capital. As regards variety of services, we find that male entrepreneurs ($n = 82$, $mean = 3$, $sd = 2.49$) offer a significantly higher number of IT-related services ($t = -6.43$, $p < 0.01$) compared with females ($n = 10$, $mean = 1$, $sd = 0.47$). We also find that males significantly more often offer Website development as a part of their service portfolio. Interestingly, there is no significant difference between the genders as regards any of the success variables.

The entrepreneurs' number of years in formal *education* is not significantly correlated with start-up time. As regards market stability, we find that number of years in education obviously correlates significantly with percentage of regular customers ($r = 0.34$, $p < 0.01$). There is no significant association between education and the Internet connection type currently in use. Similarly, we find no significant association between number of years in formal education and source of capital for business start-up or variety of services. Remarkably, there is also no significant correlation between number of years in formal education and any of the success variables.

Analysing the impact of former *work experience*, we find no significant association with the number of years in operation or the market stability measure. Previous work experience correlates significantly (Cramer's $V = 0.31$, $p < 0.05$) with the type of Internet connection. Users of WLAN have a higher tendency to lack any previous work experience when compared with users of other connection technologies. We also find a significant ($Phi = 0.47$, $p < 0.01$) correlation between the use of capital from third-party sources and previous work experience. Entrepreneurs with private and self-employed work experience tend to avoid third-party investments more than those with public employment background. Suppliers of more advanced café services such as IT consulting and system and Website development are more likely to have had previous work experience ($Phi = 0.18/0.19$, $p < 0.10$). There is no significant association between work experience and any of the success variables.

Distinguishing between early, medium and late starters, we find that the early starters have a significantly higher score on *entrepreneurial readiness* compared with medium/late starters (means, 4.3 and 3.8 respectively). However, no significant correlation is found between entrepreneurial readiness and the age of Internet cafés. Neither has entrepreneurial readiness any significant correlation with market stability measured as the percentage of regular customers among all clients. Also, no significant correlation is found between

entrepreneurial readiness and the use of different types of Internet connection. Similarly, we find no significant difference between entrepreneurs using the various sources of capital as related to their scores on entrepreneurial readiness. Entrepreneurs who offer a computer games service in addition to the Internet café business have a significantly ($t = -1.96, p < 0.10$) lower entrepreneurial readiness ($n = 37, mean = 3.70, sd = 0.64$) than those who do not ($n = 53, mean = 3.99, sd = 0.72$). Entrepreneurial readiness is significantly correlated ($r = 0.28, p < 0.01$) with perceptions of success, while not with measured profitability.

Entrepreneurial adaptations and success

Start-up time measured as number of years in operation is significantly correlated with the entrepreneurs' perceptions of success and with the calculated profitability. Distinguishing between early/medium and late starters, there is similarly a significant difference in the way that late starters experience less success, as regards both perceptions and calculated profitability.

We also find that the percentage of *regular customers* (market stability) is significantly correlated with the entrepreneur's perception of success ($r = 0.21, p < 0.05$), while not with measured profitability.

As regards *connection type*, there are significant differences in perceptions of success ($F = 2.89, p < 0.05$) and measured profitability ($F = 4.55, p < 0.01$) between Internet cafés using different types of connection. More specifically, Internet cafés using leased line connections have a significantly higher profitability than those using ADSL/ISDN and WLAN connections. As regards perceptions of success, Internet cafés using dial-up connections experience significantly less success than those using other types of connection, which can be explained by the higher price of dial-up connections.

Measuring associations between *financial flexibility* and success, we find a significant difference in perceptions of success between those who use their family as a source of capital and those who do not take advantage of family investment. In this case, those who use family investment perceive a significantly ($t = -1.81, p < 0.10$) higher level of success ($n = 20, mean = 3.67, sd = 1.05$) than those who do not ($n = 70, mean = 3.25, sd = 0.87$). We also find that entrepreneurs who utilize third-party sources of investment experience a significantly higher return on investment (measured profitability) than those without this financial flexibility.

When analysing *variety of services* we find that those who include IT training in their service portfolio have a higher calculated profitability than those who do not (means are 227.54 and 148.73 respectively, $t = -2.59, p < 0.05$). On the other hand, the perception of success is

significantly higher for those offering computer games when compared with those who do not (means, 3.59 and 3.14 respectively, $t = -2.30, p < 0.05$).

Results of the analyses of entrepreneurship and success are summarized in the model depicted in Figure 3.

Conclusion

Internet cafés represent important points of access to the Internet for people in Indonesia. Services are reasonably priced where available, due to a high density of customers and heavy competition among suppliers. In the three geographical areas included in our study, entrepreneurial services in the Internet café market have been remarkably abundant. In Indonesia in general, the numbers of Internet cafés and Internet users have also increased with an astonishing speed over the last few years. The concentration of services and demand in the larger cities in Java is significant, however. The demand for and the supply of Internet access are interdependent, and both are reliant on the available physical infrastructure.

Internet café entrepreneurs are characterized by extraordinary high levels of education. They are young, and almost 90% of them are males. Those who start early are significantly more successful than late starters. This is fully in accordance with our expectations, based on theory and previous empirical findings. Seventy per cent of them have never had any previous formal employment experience. Traditional entrepreneurial background variables (age, gender, education, work experience and entrepreneurial readiness) contribute only marginally to explaining the variance in perceived and calculated business success. Only age and entrepreneurial readiness are significantly correlated with each one of the success variables. Regardless of gender, educational background and work experience, the café entrepreneurs in our survey seem to be handling their businesses relatively successfully. Entrepreneurial shortcomings in one field seem to be compensated for by competence in other areas. For instance, female entrepreneurs offer fewer profitable IT-related services, but seem to be cleverer than men in maintaining good relations with regular customers. Also the lack of formal education can probably be compensated for by an eagerness to learn and to enter into the field of IT expertise. Work experiences from various sectors, such as public, private and self-employment, can probably substitute for each other, and lack of work experience or IT-related practice can also be replaced by skills obtained from activities other than employment. The lack of explanatory power of conventional entrepreneurship theory points to a need for more research in this field of business studies.

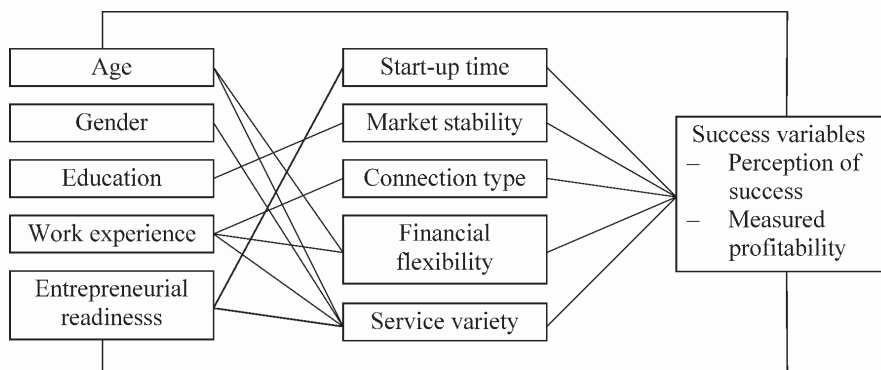


Figure 3. Significant statistical associations between variables.

However, all the background variables are significantly associated with one or more of the adaptability variables, which again show significant associations with one or both of the success variables. We have noticed that increasing service variety, both in the direction of IT training and computer games, contributes positively to success. This fact points to different possible paths for further Internet café development. As stated by Mr Hananto in Yogyakarta, games steer young users in another direction, rather than just seeking information on the Internet: 'By using the Internet for information, they will be more informed and their knowledge will be updated.' Various types of Internet cafés may therefore contribute differently to bridging the information gap in this society.

In the statistical analyses we have observed, entrepreneurs from the younger age groups are fully able to start and succeed in the Internet café business, even based on only personal savings and without the profitable financial flexibility that is more common for older entrepreneurs. This fact indicates that capital entry barriers are low in this business, probably lower than normally expected due to the availability of second-hand computers, rented premises, and the possibility of starting with only a couple of PC units.

The prices for Internet use are generally low in the cafés in the areas studied, especially in Yogyakarta and Surabaya where market density is highest and competition toughest. Competition has been steadily increasing over the last few years and offers a valid explanation of the low prices. Apparently the entrepreneurs find alternative sources of profits in accompanying sales of IT- and non-IT-related products and services.

Associations of Internet café owners have been established and have contributed to improving infrastructure and facilities, while not keeping prices high through price cooperation as originally intended. Information about technological options and market potential seems to be flowing well to educated people, especially in the central parts of the country. People follow the news through media and an extensive intra- and international mobility, and seem to have access to the necessary capital for business start-up. There is an abundance of well educated young people with an eagerness to start their own enterprises. Unemployment rates in Indonesia are very high since the 1997 economic crisis, and not least among young and educated people. There is a tradition of swift 'copying' of successful business ideas in Indonesia (Kristiansen, 2003a), also offering an explanation of the fast diffusion of the Internet café innovation. From a national point of view, the main challenges remaining are to develop infrastructure and to enhance the demand for Internet access in more remote areas of the country too. By setting up the physical requirements and establishing the market, entrepreneurs will most probably be available to 'fill the gap' and provide Internet café services.

Policy recommendations consequently include government intervention, primarily in infrastructure development and awareness creation, for a more equitable spread of access to information through the Internet. Various government agencies could play a more prominent role in the creation of demand for telecommunication and Internet infrastructure. For instance, education, health and local government institutions in all districts of the country could constitute

a substantial market for Internet services, bringing demand above a threshold level for profitability in private business infrastructure and service supply, even in peripheral areas with low per capita incomes. Government regulation of markets in Indonesia has generally lost credibility due to the prevailing extensive corruption at all levels of administration, and full transparency should be mandatory for any business transaction, including with government institutions. For individual business entrepreneurs, policy recommendations include efforts to keep updated in technological advances, to spread the Internet café business over various activities, to utilize social networks for financial flexibility, and to be dynamic in the search for new business locations.

The research presented in this paper has certain limitations. First, the research sites are limited to two vibrant cities in Java and an area dominated by tourism in Lombok. Second, only entrepreneurs surviving the competitive game of the Internet café business are included in the survey. Other results might have been reached if selections of sites and respondents had been different. Also, all data have been obtained from the entrepreneurs themselves, including the information on success variables. More objective and unbiased measures of success are difficult to find, but might change some of our research findings. The present research could be followed up by including additional locations and by a similar study of characteristics of those entrepreneurs who pull out of the Internet café business following the increasing competition. It would be of interest to know more about the differences between survivors and losers in this business. Prospects for further research also include more elaborate studies of the demand side of Internet café services. We propose investigations of the motives and behaviour of Internet café users of various categories, such as students, professionals and tourists. Only by knowing more about the demands of potential Internet café customers can a more comprehensive understanding of the spread of access to information through the Internet be obtained. Finally, we suggest that more research should be conducted on the roles in information dissemination of Internet cafés of various types. One distinction could be that between game and amusement centres on the one hand, and Internet cafés as sources of novel information for personal enrichment and business development on the other.

Acknowledgments

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Mada University, Indonesia, funded by the Norwegian Ministry of Foreign Affairs.

Notes

¹ An ISP (Internet service provider) is a company that provides access to the Internet, as well as other services such as e-mail accounts.

² An Internet subscriber is someone who subscribes to Internet access from an ISP. An Internet user is an individual who uses the Internet; he or she is not necessarily a subscriber.

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Appendix 1. Internet connection types.

Connection	Speed	Price (Rupiah)/month *	Description **
Dial-up	56 Kbps	Rp1,500,000	Dial-up connections utilize traditional copper lines and modems, over a public telephone network, to transmit signals between computer devices. Dial-up connections offer the slowest transmission speeds.
ISDN	64 Kbps ++	Rp2,500,000 (64 Kbps); Rp7,000,000 (128 Kbps)	Abbreviation of <i>Integrated Services Digital Network</i> , an international communications standard for sending voice, video and data over digital telephone lines or normal telephone wires. ISDN supports data transfer rates of 64 Kbps (64,000 bits per second).
ADSL	1.5 Mbps ++	Rp5,000,000(for 64/512 Kbps)	Short for <i>Asymmetric Digital Subscriber Line</i> , a technology that allows more data to be sent over existing copper telephone lines. ADSL supports data rates of from 1.5 to 9 Mbps when receiving data and from 16 to 640 Kbps when sending data.
Leased line	64 Kbps–2048 Kbps	Rp4,700,000 (64 Kbps); Rp82,100,000 (2048 Kbps)	A permanent telephone connection between two points set up by a telecommunications common carrier. Unlike normal dial-up connections, a leased line is always active. The fee for the connection is a fixed monthly rate. The primary factors affecting the monthly fee are distance between end points and the speed of the circuit. For example, a T-1 channel is a type of leased line that provides a maximum transmission speed of 1.544 Mbps.
WLAN	11–54 Mbps	Rp800,000 (64 Kbps, for the first 100 hours, plus Rp187/minute overtime); Rp1,280,000 (128 Kbps for the first 100 hours, plus Rp320/minute overtime)	Acronym for <i>Wireless Local Area Network</i> , a type of network that uses high-frequency radio waves rather than wires to communicate between nodes.

* Monthly price varies from ISP to ISP.

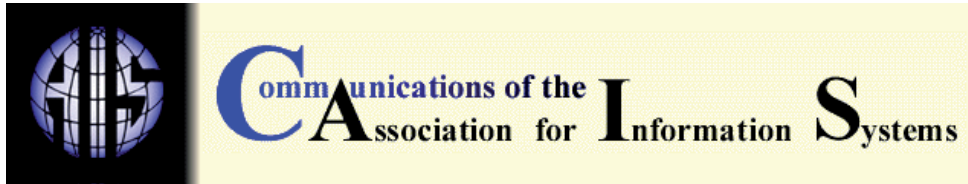
** The descriptions are mainly copied from Wikipedia (www.wikipedia.com).

Article 2

Information diffusion agents and the spread of Internet cafés in Indonesia

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GLOBAL DIFFUSION OF THE INTERNET III: INFORMATION DIFFUSION AGENTS AND THE SPREAD OF INTERNET CAFÉS IN INDONESIA

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ABSTRACT

The paper identifies characteristics of early adopters of the Internet café business in a developing country. The study is based on innovation diffusion and entrepreneurship theory and uses a combination of in-depth interviews and survey methodologies. The data, obtained in Indonesia, show that most early adopters are highly educated, have previous IT-related work experience, and score high on the 'entrepreneurial readiness' variable. Students and youngsters are the main market segments. Early and late adopters alike are innovative. Innovation diffusion depends on adequate infrastructure and awareness among potential customers. Policy recommendations include increasing government commitment to infrastructure development to provide more equitable access to information in society.

Keywords: entrepreneurs, Internet diffusion, Internet cafés, Indonesia

I. INTRODUCTION

In poor countries, public access to the Internet represents an important means for opening small-scale businesses' and ordinary citizens' gates to modern information. Today in Indonesia, Internet cafés constitute the point of access for 2/3 of Internet users [Kristiansen, Furuholt and Wahid, 2003]. Just as ICT became a profitable activity in modern societies [Melody, 1985], the establishment of Internet cafés represents employment and profit opportunities for entrepreneurs in developing economies.

Public access points to the Internet fall into three groups: (1) telecentres, (2) Internet or cyber cafés, and (3) information access points (IAP). These three differ in ownership, financing, and variety of services. Telecentres operate mostly as not-for-profit organisations, relying on sources of external funding, including government institutions, multilateral agencies, and non-

Global Diffusion of the Internet III. Information Diffusion Agents and the Spread of Internet Cafes in Indonesia by F. Wahid, B. Furuholt, and S. Kristiansen

governmental organisations. By our definition, telecentres include Internet access in public libraries. Internet cafés normally represent business opportunities for the owners and are based on service fees above costs [Salvador, Sherry, and Urrutia, 2003]. Internet cafés may offer bar or dining services or ordinary kiosk businesses. Information access points are terminals for short-term rent in shopping malls, airports, and other public sites. IAPs are common in developed areas of the world. Although telecentres are common in some developing countries (e.g. in Africa and South America), Internet cafés are the principal means of accessing the Internet in others, such as Indonesia.

In spite of the increasing importance of Internet cafes, very limited research has been reported on their diffusion, even in areas, like Indonesia, where they represent a major means of access to digital information and communication.

Compared with 'more advanced non-Asian countries', Asian countries have been laggards in the adoption of ICT and the use of the Internet [Wong, 2002, p. 172]. Within Asia, a significant digital divide also exists between Japan, South Korea, Taiwan, Singapore, and Hong Kong on the one hand and other developing Asian countries, included Indonesia, on the other. We also see an increased concentration of information flows to urban and geographically central areas of developing countries [Wong, 2002; Mwesige, 2003]. Economically disadvantaged countries and rural and peripheral districts fall further behind in human resource development, economic progress, and political participation. Reasonably priced public Internet access could contribute to reducing the 'digital divide' and 'information poverty' in economically lagging regions of the world.

Indonesia is in the focus of our research. It is the fourth most populous country in the world, occupying a vast territory with huge poverty problems and economic and socio-cultural disparities. In Indonesia, we see that Internet use and Internet cafés spread mainly in the larger cities in the centrally located island of Java. Facilitating the spread of information technology and related Internet access, especially to the 'outer islands' and lagging areas of the country, remains a strong need. In the Indonesian cultural and business context, innovations with relatively low capital entry barriers generally spread fast in an area as soon as profitability is proven. Potential 'copycats' are abundant among the many unemployed and skilled people, and economic plagiarism is culturally accepted [Kristiansen, 2003]. In spite of its multitude of ethnic groups, languages, and cultures, Indonesia can be classified as a 'high-context' [Hall and Hall, 1990] or collectivist culture [Hofstede, 1980]. People in such cultures generally want to maintain an image that is similar to the group, and they easily follow new ideas and trends that are accepted by leaders or role models in their societies. In spite of the observed digital divide and the geographical concentration of information flows and Internet cafés in Indonesia, the Internet café innovation can be expected to spread more quickly throughout the country for the following reasons:

1. Business entrepreneurs are abundant, ready to implement new business ideas with proven success from other localities. Entrepreneurial intentions are high in Indonesia, and young people with a university education tend to regard self-employment and business start-ups as prestigious activities that are within the reach of skilled people with a solid social network [Kristiansen and Indarti, 2004]. Unemployment rates are high, meaning that millions of people have to be entrepreneurial simply to survive. Economic growth rates below targets and continuous high population growth contribute to a further escalation of unemployment (from 40 million in 2003 to 42.5 million in 2004) among the 220 million population [Jakarta Post, 2003].
2. Because the technological composition and scale of Internet café operations can be adjusted, capital entry barriers are relatively low. Second-hand equipment may easily be applied, and a business may start with only a hand-full of computers.
3. Potential Internet café customers are present at many locations. Students and youngsters are traditionally the pioneers in Internet adoption and use, and there are many of them in most of the

country's 33 provinces. Approximately 12 million students are enrolled in senior secondary and tertiary education [www.bps.go.id]¹. State universities are established in all provincial capitals, and approximately 1,300 private institutions of higher learning are spread throughout the country. Junior and senior high schools are found even in smaller towns and villages in remote areas, and their students constitute a substantial potential market for Internet use. Literacy rates are high among the population (85-90%) and increasing numbers of young people can read texts written in English. In rural areas the population is mostly living in villages comprising several thousand people, potentially reaching a threshold level for the establishment of small Internet cafés, as long as infrastructure is available. A lack of computer literacy can be overcome by competent guidance from café owners and employees.

Two main research questions form the core of this paper:

First, we aim to identify main characteristics of pioneering Internet café entrepreneurs in a developing economy. Pioneering Internet café entrepreneurs, also called 'information diffusion agents', are those who start an Internet café at an early stage of Internet café diffusion within a region. They are principal vehicles in the diffusion process, but their efforts have to be analysed in relation to Internet café technology, the market for Internet café services, and the general economic, social, and cultural context.

Second, we want to find out what lessons can be learned from innovators and early adopters of the Internet café business operating within centrally located and relatively well-developed areas of Indonesia. What are the main contextual elements that could be improved and accommodated in a strategy for diffusing that innovation into more rural and remote areas of the country?

The research is based on a combination of qualitative and quantitative methods. We conducted in-depth interviews with Internet café entrepreneurs and users and carried out a survey among Internet café owners at three different, but relatively central, locations in Indonesia.

The remainder of the paper falls into five parts. The next section offers an overview of the development of the Internet and Internet cafés in Indonesia. Section III presents the theoretical basis for our empirical analyses, mainly innovation diffusion and entrepreneurship research. Data collection and methodology are described in Section IV, followed by the empirical analyses in Section V. The conclusion discusses prospects for further research and policy recommendations.

II. DEVELOPMENT OF THE INTERNET AND INTERNET CAFÉS IN INDONESIA

Numerous studies deal with the use and spread of the Internet [Madden et. al., 2000; Kiiski and Pohjola, 2002, Grubestic, 2002]. Most cross-national work on this topic has been limited to OECD countries, while some studies focus on the developing world [Zhu and He, 2002; Wilson and Wong, 2003]. A study of Internet diffusion in nearly 40 countries was carried out by The Mosaic Group through The Global Diffusion of the Internet (GDI) Project [<http://mosaic.unomaha.edu/gdi.html>]. The most significant determinant explaining global inter-country differences in the Internet usage rates seems to be per capita income. Other determinants of statistically significant value include telephone and personal computer densities [Beilock and Dimitrova, 2003] and Internet access cost [Kiiski and Pohjola, 2002].

Indonesia has 0.11 Internet hosts² per 1,000 people, compared with 13.45 in neighbouring Singapore [Wong, 2002] and 417 in the US [Roycroft and Anantho, 2003]. The estimated annual per capita expenditure on ICT-related services is 9 USD in Indonesia and 2,348 USD in Singapore. The disparity of ICT adoption among countries is wider than the disparity in their GDP per capita, indicating that the digital divide is increasing [Wong, 2002].

¹ Badan Pusat Statistik, Central Bureau of Statistics, Indonesia. Accessed in Jan., 2004.

² Internet host is computer connected to the Internet that provides services such as Web pages, e-mail boxes, or data routing.

In spite of modest ICT expenditures and a low number of Internet hosts, use of the Internet in Indonesia is growing quickly. The number of Internet service provider (ISP)³ licenses issued increased from one in 1994 to 180 by the end of 2002 [Purbo, 2002; APJII, 2003]. In 1996, Indonesian ISPs connected to the Internet via 15 separate international connections. To increase the efficiency of connections, the Association of Indonesian Internet Service Providers (APJII) formed a task force in 1997 for one joint Indonesian Internet Exchange (IIX)⁴ [Alam, 2000]. After the establishment of the IIX, the use of the Internet in Indonesia grew rapidly and the number of Internet subscribers⁵ increased from 134,000 in 1998 to 667,000 at the end of 2002 [APJII, 2003]. Interestingly, from 2001 to 2002 the number of home subscribers decreased but the number of corporate subscribers increased, from 10,539 in 2001 to 39,589 in 2002.

The number of Internet users increased by more than 770% between 1998 and 2002, from 512,000 to 4,500,000. The APJII predicted that the number of Internet users in Indonesia would exceed 7.5 million by the end of 2003 [APJII, 2003].⁶ Given Indonesia's large population of 220 million, the density of Internet users is still low, slightly more than 2%, and lower than the density of phone lines (3%) [Directorate General of Post and Telecommunications, 2001]. Figure 1 shows the growing number of Internet users, subscribers, and ISPs. As can be seen, many ISP license holders are not operational. Most of them are speculating on future market and infrastructure development and many aim for the growing corporate market [Pamuji, 2003; Jakarta Post, 2004b]. The number of subscribers in Figure 1 includes both individual and corporate customers.

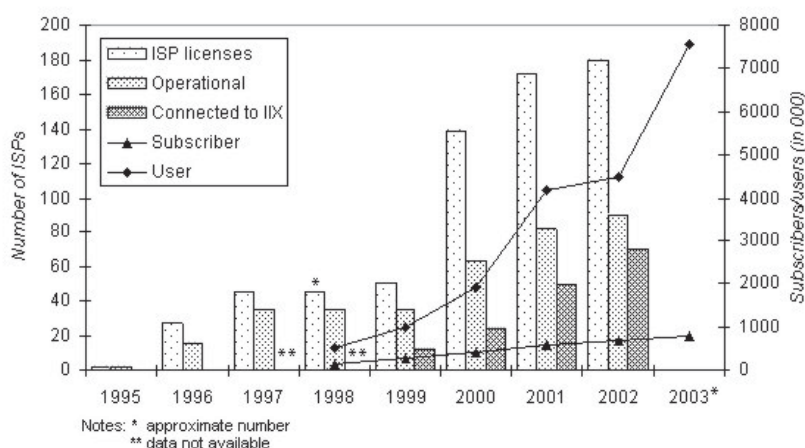


Figure 1. Number of Internet Users, Subscribers, and ISPs in Indonesia

Widespread public use of the Internet explains why the number of Internet users grew faster than the number of subscribers. Expansion of Internet access in poor areas is generally facilitated by arrangements for public use. Although fewer than 10% of Internet users in developed countries make use of Internet cafés [Liff and Laegran, 2003], two-thirds of Internet users in Indonesia gain their access through Internet cafés. These venues make computers available at various rates and connection speeds, enabling customers to search for information and communicate electronically

³ An ISP (Internet Service Provider) is a company that provides access to the Internet, e-mail accounts, and other services.

⁴ An Internet Exchange (IX) is a physical infrastructure facility allowing multiple ISPs to exchange Internet traffic.

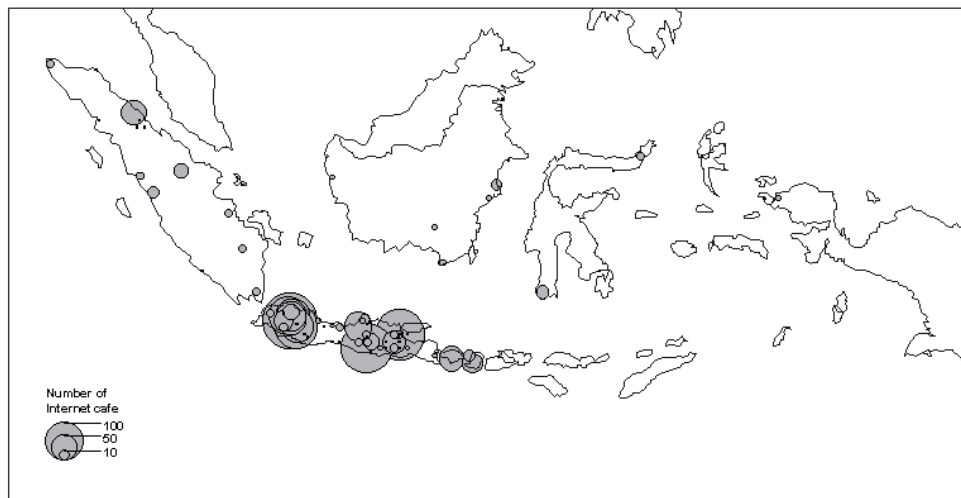
⁵ An Internet subscriber is someone who subscribes to Internet access from an ISP. An Internet user is an individual who uses the Internet but is not necessarily a subscriber.

⁶ The number of Internet users exceeded 8 million in early 2004 [Jakarta Post, 2004a].

via e-mail and on-line chat. Internet café employees provide valuable guidance in Internet use and information access to inexperienced users. In poor areas, Internet cafés offer an economically feasible means of accessing the Internet. Users pay not for equipment or leased lines, but only for the time they spend on-line.

Internet cafés in Indonesia are located primarily in the larger cities, around universities, and at tourist sites. The spread to smaller towns and villages has been slow. Rural areas lack committed business entrepreneurs. Few residents are sufficiently aware of the Internet to create demand. The telecommunication infrastructure does not always allow Internet services to be offered at prices that are affordable for low-income individuals yet high enough to yield a profit for investors. However, solar and satellite technology development is in progress, potentially supplying Internet access through kiosks or cafés also in remote areas of poor countries [James, 2003; The Economist, 2002]. For example, villagers with neither electricity nor telephone connections in remote areas of India and Laos are gaining Internet access. In addition to technological development, further spread will also depend on the attractiveness of the services that Internet connectivity can provide.

Known as *warnet* (*warung internet*), Internet cafés in Indonesia showed remarkable growth around the year 2000. Basuni [2001] estimates approximately 1500 Internet cafés were in operation in the country in 2001. In 2002, Purbo [2002] found that the number was 2,000. In our study, a combined list of Internet cafés from several sources supports this number. The cafés are highly concentrated and nearly all are found in the larger cities such as Jakarta, Surabaya, Bandung, Semarang, and Yogyakarta on the centrally located and densely populated island of Java. Other major concentrations of Internet cafés are located in the industrial city of Medan in Sumatra, west of Java, and the tourist sites of Bali and Lombok, located east of Java. The present distribution of Internet cafés is illustrated in Figure 2.



Sources: <http://www.natnit.net>, and field observations in Yogyakarta, Surabaya, and Lombok.

Figure 2. Map of Internet Cafés in Indonesia.

To reduce their dependence on the large-scale Indonesian telecommunication services, Internet café associations struggle to expand their own network and implement self-financed and

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community-based networks [Purbo, 2002]. The Indonesian Internet Café Association (Awari) was founded in May 2000, and many regional associations sprung up (such as Awari in Yogyakarta and Awaram in Mataram). They promoted the implementation of WLAN (Wireless Local Area Network) to provide access that is cheaper and faster (11-54 Mbps) than fixed line networks. (For an overview of various connection types, see Appendix 1. A structural overview of Internet café connection types is presented in Figure 3. Thanks to these efforts, the cost of Internet use in cafés in the largest cities of Java is relatively low, around 3,000 rupiah (USD 0.35)⁷ per hour. In contrast, Internet access costs approximately 25,000 rupiah (USD 2.94) in areas with less developed infrastructure and business competition, like certain areas of Lombok, and costs 4 USD per hour in Africa (Uganda) [Mwesige, 2003]. Prices are influenced by the quality and extent of infrastructure and by competition, which is influenced by demand for telecommunication services.

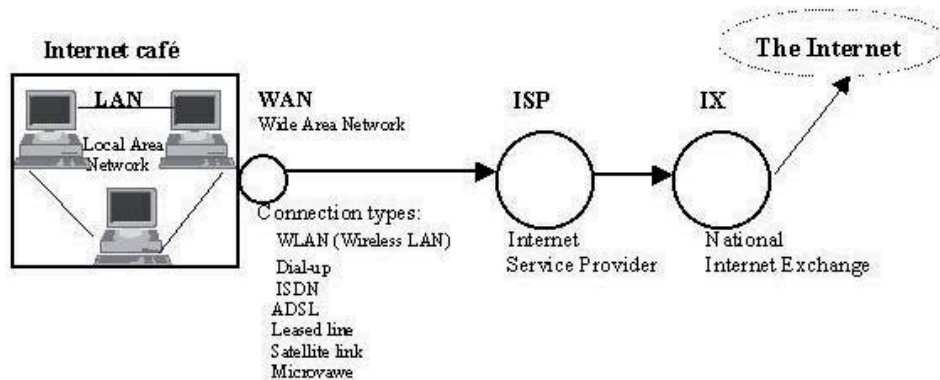


Figure 3. Internet Café Organisation and Connection Types

III. A THEORETICAL FRAMEWORK

The diffusion of innovation is the process by which a new technology or practice spreads through a population of potential adopters [Rogers, 1995]. Many previous studies concluded that the process is determined both by the attributes of the technological applications as perceived by the potential adopters and by the characteristics of different users [Corrocher, 2003]. Hägerstrand [1967] argued that the diffusion of innovation is a function of communication, and thereby normally influenced by physical distance. However, current research pays considerably more attention to social relationships among entrepreneurs and potential adopters who do the communicating. Therefore researchers' awareness is increasingly focused social structures and social prestige within specific geographical and cultural contexts of innovation diffusion [Redmond, 2002].

Based on our review of studies of entrepreneurship and innovation diffusion, we postulate that the speed and pattern of diffusion of the Internet café innovation is dependent on four factors:

⁷ 1 USD = 8,500 Indonesian Rupiah (IDR), November 2003

- the technology;
- the entrepreneurs who could implement the innovation at a new location;
- the local markets for Internet cafés; and
- the economic, social, and cultural contexts of the technology, entrepreneurs, and markets.

The four factors will be discussed below and some hypotheses will be derived under each. Figure illustrates the conceptual basis of the research.

THE TECHNOLOGY

In most innovation diffusion research, characteristics of the innovation itself or the associated technology receive primary attention. Five characteristics of the innovation influence its rate and pattern of adoption diffusion paradigm within studies of IT and society [Rogers 1995]. Potential adopters are more likely to accept an innovation if they perceive positively its (1) relative advantage, (2) compatibility, (3) trialability and (4) observability, and are not hindered by its (5) complexity. Measures of these qualities are used frequently in empirical research and, in most cases, explain between 50% and 90% of the variance in the rate of adoption [Rogers, 1995, p. 206]. A considerable body of IT acceptance literature arose as a consequence of Rogers' pioneering innovation diffusion paradigm within studies of IT and society [Kendall et al., 2001; Eastin, 2002].

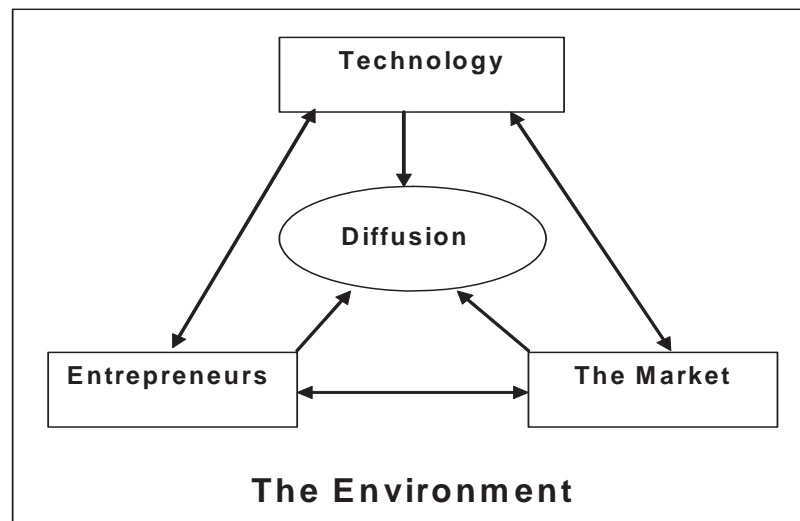


Figure 4. A Conceptual Model

The *relative advantage* of a business innovation is the perceived or calculated benefit of implementing that technology. Potential adopters will consider an innovation based on their

assessment of costs and benefits of adoption. However, the value of adopting an innovation at early stages of diffusion may be hard to quantify. Since advantages are often tacit, and total costs may be unknown, entrepreneurs may differ in their assessments of costs and benefits. *Compatibility* is the degree to which an innovation is perceived as being consistent with potential adopters' values, past experiences, and needs [Rogers, 1995, p. 37]. The term refers not only to technical features but also to socio-cultural values, traditions, and needs of potential adopters and their customers [Weiss and Dale, 1998]. Potential diffusion agents, or entrepreneurs, make assessments of innovations based on their objectives and perceived norms of conduct in the society. Usually, innovators and later adopters of tradition-breaking innovations differ significantly in their personality characteristics [Foxall, 1996; Gallivan, 2003].

Because of differences in their experiences, knowledge and skills, entrepreneurs or adopters will also perceive *complexity* differently. Complexity is normally a measure of the difficulty entrepreneurs perceive in adopting the technology and gaining the access to markets. The more technically knowledgeable and competent a person, the less complex they perceive the innovation to be [Kendall et al., 2001]. *Observability* is the degree to which benefits of the new technology are visible to potential adopters. *Triability* of innovations is the extent to which potential adopters can try a new technology before making an adoption decision. Being able to try out a new technology before deciding whether or not to adopt is an important benefit, especially for early adopters. Laggards can more easily learn from experiences among early adopters in their vicinity.

In most cases, it is not the objective qualities of the innovation that determines the speed and pattern of Internet café diffusion, but the entrepreneurs' or diffusion agents' perception of it. Market potential and contextual qualities strongly influence individual perceptions of technologies and business opportunities, probably more than measurable qualities of the innovation. We shall keep in mind the technology characteristics mentioned above in later discussion of the market and the environment. As a basis of our technology-related hypotheses, however, we shall more strongly emphasise the continuous change of technology and the related capital raising requirements in the innovation process.

Like many other innovations, the Internet café concept and technology are multifaceted and rapidly changing. Internet café proprietors in varying locations or times may use different technologies and business models. The currently popular WLAN technology is altogether different from the previously dominant dial-up connection, and a high-tech IT service-centre is unlike an Internet-connected games business. We shall include in the innovation diffusion perspective the question of *reinvention* and shall challenge the assumption that late business starters or 'laggards' are technologically less advanced than early adopters. On the contrary, we postulate that reinvention is a continuous process in the Internet café business and that both innovators, early starters, the late majority and laggards [Rogers, 1995, p. 42] will have to be innovative. Late adopters are not merely copyists but may bring about substantial new innovations in the industry [Brown, 1981]. Consequently, we set forth the following hypotheses:

Hypothesis 1: Since Internet technologies are continuously changing, all Internet cafés, both early and late established, will exhibit innovative change.

Hypothesis 2: Early adopters of the Internet café concept will have to expand and re-invest to keep pace with technological development and maintain a competitive position. They are therefore expected to require a higher level of capital reinvestment in comparison with later business starters.

THE ENTREPRENEURS

In addition to technological qualities associated with the innovation, innovation diffusion studies often include personal characteristics of adopters or potential adopters, such as demographic variables and education [Rogers, 1995]. Sinha [1996] found that in India the level of education influences entrepreneurial intention and promotes business success. Cummings [1996]

concluded that in many Asian countries, such as South Korea, Singapore, Taiwan, Malaysia, Thailand, and China, the extensive provision of education facilitated access to information and encouraged the entrepreneurial drive. In a technologically demanding business like computer and telecommunication operations, we can expect education to impact innovativeness and business performance substantially. Starting an Internet café is a relatively complex process in our study context, and entrepreneurs need substantial technical competence. Rogers [1995] distinguishes between knowledge as awareness, 'how-to-do-knowledge', and knowledge of the underlying principles of the technology. For the supplier of Internet services, all three levels of knowledge requirements must be fulfilled, and we shall therefore expect that the Internet cafés pioneers are technically well skilled.

Previous work experience is important. Many empirical studies of entrepreneurship find relationships between work history and variety of experiences, on the one hand, and innovative capacity and propensity to succeed, on the other [Burt, 1992; Sanchez and Perez, 1998]. From China, Murphy [2000] found that returned migrants use their experiences and new ideas for business creation to promote changes in their local environments. These mobile people represent dynamic agents of information transfer, creativity and entrepreneurship. Given the complexity of the Internet café technology and limited options for observability and triability at a certain location, early adopters will probably gain from geographical mobility and especially from the opportunity to obtain IT-related skills from other localities.

The amount and availability of entrepreneurs in a particular trade is also influenced by general psychological qualities and individual attitudes of potential innovators, such as the need for achievement, self-efficacy, and entrepreneurial intention [Kristiansen and Indarti, 2004]. The speed and pattern of Internet café diffusion depends on diffusion agents' perceptions of the technology and its business opportunities rather than on the technology's objective qualities. Bandura [1977, p. 3] pointed out that "people's level of motivation, affective status and actions are based more on what they believe than on what is objectively true". Ajzen [1991] argued that intentions mainly depend on perceptions of personal attractiveness, social norms and feasibility. Shapero and Sokol [1982] claimed that entrepreneurial intentions are dependent on individual perceptions of desirability and feasibility, and on the propensity to act.

A person's belief in his or her ability to perform a given task, called self-perception or self-efficacy, is crucial in the development of entrepreneurial intention [Ryan, 1970; Cromie, 2000; Kristiansen and Indarti, 2004] and, thereby, entrepreneurial behaviour [Kim and Hunter, 1993]. A person must have self-confidence to state that they possess the necessary leadership skills to be an entrepreneur. We believe that such self-confidence can be a predictor of early adoption of the Internet café innovation. Similarly, a high regard for one's mental maturity and social skills helps a person successfully establish a business based on a new innovation [Markman and Baron, 2003; Pajares, 2002]. Social networks help entrepreneurs reduce risks and transaction costs and improve access to business ideas, knowledge, and capital [Aldrich and Zimmer, 1986]. Perceived access to information and financial capital makes a clear difference between success and failure, both in the start-up and the running of a business. This perception seems to be true especially in developing economies, where both information and capital are generally in short supply [Barr, 2000; Kristiansen, 2002; Marsden, 1992; Steel, 1994; Meier and Pilgrim, 1994]. Rogers [1995] underscored the need for information and knowledge, especially in the decision-making phase of innovative actions. In the empirical analyses, we shall combine these individual qualities in a variable termed 'entrepreneurial readiness'.

Based on this theoretical discussion of entrepreneurial characteristics, we set forth the following three hypotheses about the function of diffusion agents in our study:

Hypothesis 3: Early adopters are more highly educated than later adopters.

Hypothesis 4: Early adopters have more advanced technical skills than later adopters.

Hypothesis 5: Early adopters have a higher level of 'entrepreneurial readiness' than later adopters.

THE MARKET

Brown [1981] made a distinction between a firm, or technological, innovation and a consumer innovation. The Internet café concept is actually both: it is a new idea for the supplier as well as for the users of that service. In the consumer behaviour and marketing science literature, a number of models describe diffusion speed and patterns. The external influence model assumes that adoption is driven by information from sources that are external to the adoption community. In this perspective, effective imitation among the members of the social system is irrelevant [Dos Santos and Peffers, 1998]. The external influence model may fit the early adopters of the Internet café innovation studied in our research. The internal influence model, on the other hand, assumes that adoption is driven by communication within a specific community or social system; intra-community imitation is the force of diffusion [Venkatraman, Loh and Koh, 1994]. The internal influence model may fit better for later adopters of the Internet café business and for the users of the cafés. From the users' perspective, the Internet café presents a variety of services and meets multiple needs. From a study of users of Internet cafés in Gujarat, India, Joshi [2001] found that more than 80% of the cyber café users are men, are young (15-35 years), and are students or highly educated. They used the Internet cafés mostly for accessing information and news and for communicating with others via e-mail.

Early business entrepreneurs often find that customers are slow to accept the technology; therefore, the potential benefits of early adoption can hardly be realised as early profitability [Dos Santos and Peffers, 1998], and technological followers are at an advantage. The number of customers needs to reach a critical mass before business becomes profitable. Davis [1989, p. 320] introduced the terms 'perceived usefulness' and 'perceived ease of use' to explain acceptance and rejection of information technology. Perceived usefulness is 'the degree to which a person believes that using a particular system would enhance his or her job performance'. Perceived ease of use refers to 'the degree to which a person believes that using a particular system would be free of effort'. Both concepts support the idea that young persons are the likely early contributors to creating a critical mass, or threshold level, for the introduction of the Internet café innovation in a new area.

Davis' original model has been modified and further developed by Venkatesh et al. [2003] into the Unified Theory of Acceptance and Use of Technology (UTAUT). This model includes the influence of gender and age on performance, effort expectancy, and behavioural intention. This model supports the observation that young people in Indonesia are generally eager to learn, fascinated by technological progress, and easily amused by web plays and chatting. Young people are also likely to be in a position to use Internet café facilities to enhance performance at a later stage in their lives. Tourists are another valuable market segment for Internet cafés in Bali, Lombok, Yogyakarta, and other areas of Indonesia. Many visitors from abroad use the Internet, can afford access, and are in need of communication with the external world.

Purchasing power and general consumer awareness also influence the market for Internet café services. In his study of Internet users in Uganda, Mwesige [2003] found that they are typically young and educated, with a reasonable disposable income, and the necessary technical and communication skills to be online. Many people, especially in rural areas of Indonesia, still lack the income and the awareness necessary to constitute a profitable market for Internet café businesses. Awareness creation is generally much faster in urban areas, where innovations also generally spread more rapidly in outward-oriented and 'modern' milieus, and where communication networks are manifold. A 'modern' milieu is characterised by people's exposure to progressive ideas and propensity to change behaviour, instead of being tradition-bound and conformist. Likewise, a modern economic context is relatively wealthy and based on various sources of income, while a traditional society is poorer and based dominantly on agricultural earnings [Escobar, 1995]. Young and educated people in urban areas are more likely to have

both the awareness and the purchasing power necessary to create a sufficiently large market for Internet café services.

We conclude this section by presenting the following hypothesis:

Hypothesis 6: The early Internet café market is characterised by young customers, who are well educated and relatively wealthy.

THE ECONOMIC, TECHNOLOGICAL AND SOCIO-CULTURAL ENVIRONMENT

Several economic, technological and socio-cultural qualities of the environment influence the diffusion of the Internet café innovation. As mentioned earlier in this paper, per capita income is an important factor explaining Internet diffusion globally. In Indonesia, where the Internet is predominantly accessed publicly through Internet cafés, low incomes may still hinder the development of a profitable market, especially in rural areas.

Physical infrastructure influences the availability and attractiveness, and hence adoption, of the Internet [Wolcott et al., 2001]. A comparison of Internet diffusion in Turkey, Pakistan, India and China [Wolcott and Goodman, 2003] showed that China is considerably more successful in enabling Internet availability for its citizens. One reason is China's ability to roll out extensive high-capacity nation-wide telecommunication infrastructure. Bazar and Boalch [1997] and Arnum and Conti [1998] also documented that telecommunication infrastructure plays a crucial role in the spread of the Internet.

Kling [1999] argued that Internet use is influenced by technological as well as social access. Technological access refers to infrastructure and the physical availability of computer hardware and software, whereas social access refers to the mix of professional knowledge, economic resources, and technical skills required for the use of IT. People's capabilities and eagerness to change and adopt new innovations are influenced by their socio-cultural contexts [Shapero and Sokol, 1982]. Social norms and cultural values, however, are probably more predictive of entrepreneurial intention and the adoption of new innovations in collectivist cultures than in individualistic societies. Hofstede [1997] characterized Indonesia as a collectivist society, where collectivism refers to the tendency to be willing to sacrifice personal interests for the attainment of collective well-being. Individualism, on the other hand, is defined as the degree to which people prefer to act as individuals rather than as members of groups. Using Hofstede's [1997] cultural dimension framework, La Ferle, Edwards, and Mizuno [2002] found that culture plays a determining role in the spread of the Internet. Adoption is slower in collectivist societies than in individualistic ones. Begley and Tan [2001, p. 549] state that "cultural values may hold sway more powerfully in societies that emphasize conformity rather than prize individuality". Begley and Tan [2001] included Indonesia in the group of East Asian countries where culture-level social status predicted entrepreneurship interest significantly. In our case, neither Internet technology nor the café culture is consistent with traditional Indonesian customs and values. It can be expected that the service will be first implemented in 'modern' parts of the society: urban areas that are close to universities or that contain a substantial number of professionals working in globalised enterprises.

The combination of and inter-play between technological, economic, and socio-cultural characteristics of the environment leads us to the last hypothesis for empirical analysis:

Hypothesis 7: Internet cafés spread first in urban areas characterised by advanced infrastructure and a population with reasonable incomes and 'modern' values.

IV. DATA COLLECTION AND METHODOLOGY

The paper is based on a survey of Internet cafés in Indonesia. Three geographical areas were selected for study: Yogyakarta, Surabaya, and Lombok. Yogyakarta is a university city where a large proportion of the population is students at the 100 institutions of higher learning found in the

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small province. Surabaya was selected because of its dominant role as an industrial city in Indonesia with a high number of modern manufacturing and service industries. On the island of Lombok in the province of Nusa Tenggara Barat (NTB), tourism is a dominant industry. The three study areas are economically relatively well developed and centrally located within Indonesia. However, Lombok differs from the urban, Javanese study areas. Compared with the cities of Surabaya and Yogyakarta, its infrastructure is less advanced and its lifestyle is a more traditional..

The selection of Internet café owners to be included in the survey was made on the basis of an overview of the total population of Internet cafés in these three locations. This overview was obtained from various sources, of which <http://www.natnit.net> was the most complete, listing approximately 1500 Internet cafés in Indonesia. We corrected the list during fieldwork when we found that some cafés were closed down and others were newly established. We excluded from our survey a small number of Internet cafés owned and operated by larger institutions, like universities and private or government companies. Our final survey pool included 130 cafés in Yogyakarta, 100 in Surabaya, and 30 in Lombok.

Having conducted preliminary interviews with several owners and users of Internet cafés in Yogyakarta, we developed a questionnaire in Indonesian as the main research instrument. We tested the questionnaire in a pilot study in December 2002, and refined the instrument before the final data collection in January 2003. Respondents are all owners of the sampled Internet cafés. The questionnaires were distributed using a "drop-and-collect" procedure. Two or three days after delivering the questionnaires, we collected them from the Internet café owners. While collecting the questionnaires, we checked the completeness of information provided and gave a souvenir to those who returned the filled-in forms.

A clustered-proportional sampling was used to select respondents. The area of Yogyakarta city was divided into five geographical clusters based on main lines of demarcation. A north-south distinction was made using the railway as divider. The northern area was divided into three clusters, and the southern into two based on the main road partitions. We distributed 66 questionnaires randomly to around 50% of the total population of cafes in each cluster. We received 44 responses, of which 43 were usable. A similar procedure was deployed in Surabaya, dividing the town into four geographical clusters partitioned by main highways. We distributed 50 questionnaires and received 41 responses, 39 valid. The island of Lombok was divided differently: one educational cluster that is in the vicinity of educational institutions in the capital town, one shopping-mall cluster, and one tourism area cluster. Approximately 30 Internet cafés are in these three clusters. We distributed the questionnaires to 50% of the total population in each cluster and received 11 responses, all of them valid. On average, our response rate was 73%.

To complement the data from the questionnaires, we conducted in-depth interviews with five Internet café owners and 20 users in Yogyakarta and Lombok. The qualitative information helped us interpret some of the quantitative data.

In all, ninety-three Internet café owners responded to our survey. The average age of the Internet cafés is 3.4 years, varying between one and eight years. We asked about the year of establishment. Nine cafés were in operation before 1999, 63 were started in 1999 and 2000, while 21 are 'late starters', established in 2001 and 2002. Table 1 shows descriptive statistics from the survey.

V. EMPIRICAL ANALYSES

From previous findings in innovation diffusion research we expect to find an S-shaped diffusion curve for Internet cafés at the locations studied in Indonesia. The varying speed of diffusion is

Table 1. Descriptive Statistics of Internet Cafés and Entrepreneurs

	<i>n</i>	%		<i>n</i>	%
<i>Location of cafés</i>			<i>Age (years)</i>		
Yogyakarta	43	46.2	<= 25	14	15.7
Lombok	11	11.8	26-30	35	39.3
Surabaya	39	41.9	31-35	19	21.3
			36-40	9	10.1
			> 40	12	13.5
<i>Café start-up time</i>			<i>Work experience</i>		
Early starters (before 1999)	9	9.7	Never	31	33.7
Medium starters (1999-2000)	63	67.7	Yes	61	66.3
Late starters (2001-2002)	21	22.6	Public	7	11.1
			Private	33	52.4
			Self-employed	23	36.5
			Non-IT related	35	59.3
			IT related	24	40.7
<i>Gender (Entrepreneur)</i>					
Female	10	10.8			
Male	83	89.2			
<i>Education level</i>					
Elementary school	1	1.1			
Junior high school	1	1.1			
Senior high school	9	9.7			
Diploma III	10	10.8			
Bachelor	64	68.8			
Master	8	8.6			

illustrated in Figure 5. We observe a slow spread of the cafés in Indonesia in the late 1990s followed by a faster diffusion in 1999 and 2000 and a slower spread again in 2001 and 2002.

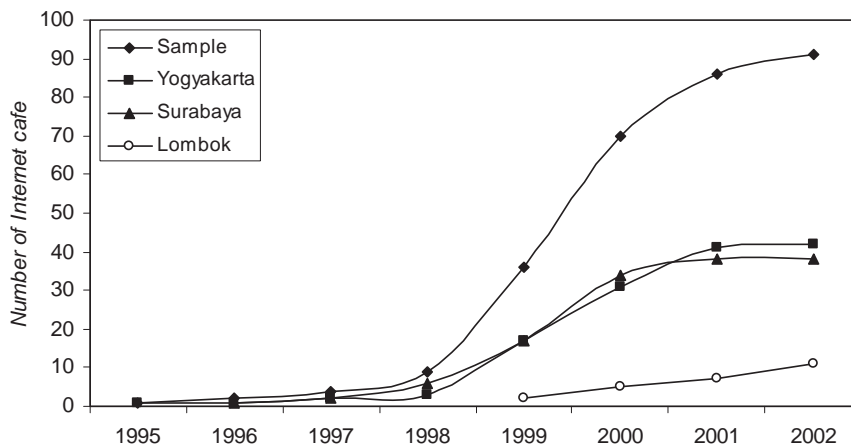


Figure 5. Diffusion Curves for Internet Cafés in the Study Areas

Traditional diffusion studies typically divide the adopters into innovators (first 2.5%), early adopters (next 13.5%), early majority (next 34%), late majority (next 34%), and laggards (last 16%) [Rogers, 1995, p. 252, Wolcott et al. 2001, p. 10]. In the following analyses, early starters (10% of respondents) correspond to innovators and early adopters in traditional diffusion studies. Medium starters (67% of our respondents) correspond to the early and late majorities, and our late starters (23% of respondents) correspond to the 'laggards' category. We compared the three groups in their use of technology, entrepreneurial, and market characteristics, and contextual qualities, as discussed Section III on theory. The distinction among the three groups is based on the time of establishment. We shall return to a discussion of analytical challenges related to similar time categorisation for various locations.

TECHNOLOGY

Table 2 shows the initial connection technology. Two-thirds of early starters initially used dial-up links, whereas less than one-fourth of the late starters used that technology. Altogether, 37 cafés started up using dial-up connection. Of these, 20 later changed to the more advanced technologies, while the remainder still use dial-up. Only one of six early starters continues to use dial-up connections. Among the late-starters, WLAN is the dominant connection technology (57.1%). Using a Chi-square test, we found significant differences ($\chi^2=12.34$, $p<0.10$) in the types of initial Internet connection among early, medium and late starters.

Table 2. Initial Connection Technology

	Dial-up (%)	Leased line (%)	WLAN (%)	Others (%)
Early starters (before1999)	66.7	0	11.1	22.2
Medium starters (1999/2000)	44.1	15.3	37.3	3.4
Late starters (2001/2002)	23.8	9.5	57.1	9.6

Our in-depth interviews with the Internet café owners indicated that the quality of the physical connection, measured as speed and reliability, is the most important consideration in the choice of technology. As stated by 'Yan', who opened his Internet Café in Mataram in 2000: "Nowadays, customers compare access speed, and the quality of infrastructure is very important. The advantage of this Internet café, compared to my competitors, is the connection. I am the only one who use my own leased line connection and I can guarantee connection stability". Price also matters, especially in the present competitive environment, which has an abundance of new establishments and a stagnant market. Several cafés using dial-up connection in Yogyakarta closed down in 2001 and 2002 because their rates were not competitive. The use of a more advanced technology for Internet connection (i.e. WLAN) among most of the later starters indicates that they are not copyists but bring innovative changes. A leading Internet café owner in Yogyakarta explained how competition and a relative deterioration of connection speed over time caused 15 café owners, of which several were late starters, to collaborate and jointly lease an advanced bandwidth connection from Broadband Network Asia.

The above discussion supports our first hypothesis: The Internet café technology is in incessant change, and later adopters are also innovative.

Our second technology hypothesis relates to required capital investments. Using the one-way ANOVA statistical analysis, Table 3 shows a significant difference in initial capital investment between medium and late starters ($F=3.298$, $p<0.05$), which cannot be explained by inflation. The technical requirements of computers increased, while the price of computers with up-to-date technology was relatively stable during that period (1999/2000–2001/2002). Our in-depth interviews indicate that investments increase over time because of a higher number of computers per café, improved quality, and the provision of additional services in the cafés. According to 'Pieter', the manager of a family-owned Internet café established with 7 computers in Yogyakarta in 1997:

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We had to enhance the business gradually during the years. In 1999 we invested in 13 new computers and upgraded the old ones with more RAM and better communication equipment. With this infrastructure it's possible to offer computer games as well, our only additional service so far. The next step will be to upgrade from dial-up connection to faster, and more expensive, communication technology, like WLAN.

The average initial capital investment for all cafés in the study is 104.33 million rupiah (USD 16,500) (standard deviation: 70.72). The average number of computers per café is 15. Several businesses, however, were initiated with investments below 30 million (3,500 USD). The lowest reported start-up capital investment was 20 million rupiah (USD 2,350). Table 3 depicts the initial and accumulated investments for the three groups of starters.

Table 3. Capital investment

	Initial investment (million rupiah)	Accumulated investment (million rupiah)	Level of reinvestment (%)
Early starters	84.0	180.0	160.0
Medium starters	93.2	126.0	47.7
Late starters	138.5	151.7	11.2

As can be seen from Table 3, early starters have the highest level of reinvestment, which reflects the ratio between accumulated reinvestment and initial capital instalment. Using one-way ANOVA, we find that there is a statistically significant difference between the early starters and the two groups of later starters ($F=10.179$, $p<0.01$). We find support for our second technology hypothesis: Early adopters have to expand and re-invest to keep pace in technological development.

THE ENTREPRENEURS

As can be seen in Table 4, the level of education is very high among the café entrepreneurs in our study. All early starters are university educated. However, the vast majority of later starters also have tertiary education, only partly substantiating hypothesis 3, which states that early adopters have a higher level of education than later adopters. Differences in levels of education among the three groups of starters are small and statistically insignificant. We therefore conclude that higher education is a distinctive characteristic of all Internet café starters. Our data show that higher education of diffusion agents is not necessarily related to engineering or technical training. Educational backgrounds from other disciplines are also common. Intelligence, rationality, a broad perspective, and a general understanding of society may be as valuable as technical education for diffusion agents [Rogers, 1995]. The lack of formal IT education can probably be compensated by an eagerness to learn and the capacity to enter into the field of IT expertise. 'Agus', of Chinese origin, used to sell perfumes before starting his Internet café in Yogyakarta in 1999. He is a non-IT graduate from Gadjah Mada University and lacked any IT experience before start-up. His ability to learn compensated for his weak initial competence: "Initially, I did a survey of Internet cafés to learn and I'm still learning, mainly from my colleagues".

Table 4. Entrepreneurial Characteristics

	University education (%)	IT-related work experience (%)	Entrepreneurial readiness
Early starters	100	66.7	4.3
Medium starters	85.3	35.1	3.8
Late starters	90.5	33.3	3.8

Regarding technical skills, the entrepreneurs report that they obtained the competence necessary for starting and running their Internet café business from self-learning (70%) and practical experience (13%), not from formal education. Around two-thirds of all business starters had previous work experience. The difference in work experience between early and later starters is significant. As depicted in Table 4, two-thirds of early starters have IT-related work experience, compared with around one-third of the medium and late starters. A high number of the early starters also have work experience from other geographical areas. These findings support hypothesis 4, stating that early adopters have more advanced technical skills than later adopters.

In our questionnaire, we included five questions on which the respondents marked their level of agreement on specific items (1=strongly disagree; 5=strongly agree). The five questions concern perceived leadership skills, mental maturity and social skills, social networks, and access to sources of information and financial capital. Answers to the five questions are combined in a multiple-item scale to reduce measurement errors [Krueger et al., 2000] and ensure that the assumption of interval level measurement is more tenable than for single-item scales [Remenyi et al., 2000]. The combination of the five items constitutes a variable that we have termed 'entrepreneurial readiness', which is closely related to the variable entrepreneurial orientation that has been used in other studies [Swierczek and Ha, 2003; Covin and Slevin, 1989]. Average scores are depicted in Table 4.

We find that the entrepreneurial readiness score for early starters are substantially higher (4.3) than for medium and late starters (3.8). Applying a one-way ANOVA analysis, we conclude that the difference is statistically significant ($p < 0.10$) and supports hypothesis 5, which states that early adopters have higher entrepreneurial readiness than later adopters.

THE MARKET

We included questions about main target market groups and the current exact market shares that various segments represent. The first is a measure of the entrepreneurs' perceptions of market groups at start-up. For example, among early starters, 88.9% regarded students as a main market segment and 55.6% view youngsters as a main target market. The second measure is of groups' present real market shares, which total 100%.

Generally, the target market groups were the same for the early, medium and late Internet café starters. Students dominated throughout, and youngsters contributed substantially to the intended market for around 50% of the café entrepreneurs. Professionals and tourists created important target market segments for around 30% of the cafés. Students and tourists constituted slightly larger target market groups for early starters than for late starters. Table 5 indicates percentages of café owners that targeted the various market segments at start-up time.

Table 5. Main Target Market Groups

	Students (%)	Professionals (%)	Tourists (%)	Youngsters (%)
Early starters	88.9	33.3	33.3	55.6
Medium starters	88.4	39.3	27.1	47.5
Late starters	76.2	33.3	23.8	52.4

Figures for the real current market segments are somewhat different from the figures in Table 5, which depict the intended target markets of the entrepreneurs, and are not comparable. For all the three start-up groups, students presently represent the main market segment (an average of 59.3% of total market), while the current market segments of professionals, tourists, and youngster represent 13.5%, 9.0% and 14.4% respectively. (Other types of customers comprise 3.8%.) 'Hernawan', a café manager in Yogyakarta, told us that his Internet café was established at that specific location because "...it is close to university campuses and boarding houses. Students are our target market. I have a philosophy: I will never die when there is gold.

Yogyakarta is the mining field. It depends on us to utilise it. There are many students in Yogyakarta.”

In conclusion, young people (defined as students and youngsters) constitute approximately 75% of the current market for the studied Internet cafés, and most of them are well educated. Hypothesis 6, stating that the early Internet café market is characterised by young customers, who are well educated and relatively wealthy, is partly supported. We lack statistical data, however, to substantiate the part of the hypothesis concerning relative wealth. This issue will be followed up in a user survey. Qualitative data indicate that Internet café users are far wealthier than average Indonesians.

Our in-depth interviews with users of Internet cafés in Yogyakarta and Lombok identify four main reasons customers visit the cafés: (1) communication through e-mail, (2) chatting, (3) searching for information, and (4) entertainment. Entertainment includes downloading music, visiting pornographic sites, playing Internet games, and gambling. In Yogyakarta and Surabaya, many Internet cafés stay open 24 hours to meet the customers' demands. The following customer cases from Yogyakarta and Lombok are typical. 'Adhian', a male 20 years old university student spends approximately eight hours per month in his favourite café. The price (25,000 rupiah / USD 3), he says, "is affordable and normal." 'Tia' (18) just finished her high-school education and is still jobless. She loves chatting, and the cost, 50,000 rupiah (USD 6) per month, is "reasonable," according to her.

THE ENVIRONMENT

When analysing the spread and use of the Internet in a complex and heterogeneous society like Indonesia, one must take into consideration region-specific cultures, community characteristics, and the social embeddedness of Internet café entrepreneurs and their customers. The country includes more than 300 ethnic groups with different languages, traditions, and identities. Differences in living standards and socio-cultural conditions are huge between urban and rural areas and between 'inner' and 'outer' islands. Our aggregate data on Internet café locations in Indonesia clearly reveal the concentration in larger cities and 'inner islands' (Java and Bali), as was illustrated in Figure 2.

In our survey, Surabaya is the most typical example of a centrally located, modern, industrialised city with a decent living standard for a substantial share of its three million residents. With a population of 500,000, Yogyakarta is a unique combination of modern values, represented by the large share of young students, and rich cultural traditions of the Sultanate capital. Lombok is a part of the 'outer islands', yet geographically close to Bali. The island is still predominantly rural and exhibits traditional value systems and lifestyles. Its capital city of Mataram, however, is increasingly a centre of education with a leading provincial university, several private colleges, and a high number of government and private secondary schools. Certain parts of the island received a substantial influx of foreign tourists. All selected Internet cafés in our study are located within the capital or tourist areas.

Table 6 depicts the dominance of Surabaya as the choice of location for early starters of Internet cafés. Combining the early and medium starters, we find that entrepreneurs in the two Javanese cities represent 93% of all Internet cafés established before 2001 in our sample.

Table 6. Location of Internet Cafés

	Yogyakarta (%)	Surabaya (%)	Lombok (%)
Early starters	33.3	66.7	0
Medium starters	45.9	45.9	8.2
Late starters	52.4	19.0	28.6

Within the three study regions, we find support for the hypothesis that a 'modern' environment is important for the choice of location. In Surabaya, most of the cafés are found in the south-western part of the city, around the large university campuses. Similarly, in Yogyakarta we see a geographical concentration of the cafés in the northern areas of the city, close to the universities. According to one Internet café owner in Yogyakarta, "the awareness of people here to use the Internet is high, and this is conducive for the business." In Lombok, apart from a few cafés at typical tourist sites, the majority of Internet access points are found around the institutions of higher learning in the modern part of the capital city. Most students in Indonesia come from wealthy families and create a local environment around universities characterised by above-average purchasing power.

In-depth interviews with business starters clearly point to the importance of awareness and infrastructure. 'Ali', an owner of an Internet café in Yogyakarta originates from the city of Palembang, Sumatra. He was asked if he would like to open another Internet café in his hometown.

No, I wouldn't. Unlike Yogyakarta, awareness among people to use the Internet there is low. Yogyakarta people are more open compared with Palembang people and generally have a higher educational level than people in Palembang. In addition, the infrastructure for running the Internet is limited there.

The monthly cost of a 64 Kbps leased-line connection in Mataram is six million rupiah (USD 700), compared with two million (USD 235) in the larger Javanese cities. According to both owners and users of Internet cafés in Lombok, diffusion of that innovation is still slow there due to the high price, the low-speed, and unreliability of connections.

Altogether, our findings support hypothesis 7 stating that Internet cafés spread first in urban areas characterised by advanced infrastructure and a population with reasonable incomes and 'modern' values.

VI. CONCLUSION, PROSPECTS FOR FURTHER RESEARCH, AND POLICY RECOMMENDATIONS

This paper has searched for characteristics of early Internet café entrepreneurs in Indonesia and for lessons learned that may be applied to diffuse Internet cafés into more peripheral and less developed areas. Unequal information access among social groups and geographical areas leads to increasing gaps in economic productivity and political participation [Arunachalam, 2003; Keskinen, 2001]. ICT is crucial for enterprises, communities and individuals to participate successfully in the global economy [Hollifield and Donnermeyer, 2003]. Those who want to be competitive must have access to information and emerging knowledge and skills. Public access to information and to the Internet increases transparency of governance and promotes the development of e-government in poor countries, both of which are important elements in fighting corruption and the moral hazard related to information asymmetry [Transparency International, 2003; BAPPENAS, 1999].

Public Internet access points could contribute substantially to enhanced information availability, especially in economically poor areas of developing countries. Two-thirds of Internet users in Indonesia gain their access through Internet cafés. The main objectives of this study, therefore, have been to contribute to a discussion of the role of information diffusion agents in the Internet café business and to learn from early adopters' experiences in order to develop strategies to bridge the information divide.

Most of the Internet café entrepreneurs in the study are young and almost 90% of them are males. The vast majority of the early entrepreneurs used dial-up connection technology, while later starters prefer the newer WLAN technology. Capital entry barriers are relatively low in the business. Some café owners succeeded with little more than a 2,000 USD investment.

Our study is grounded on previous innovation diffusion and entrepreneurship research. Because our aim is to explain differences among diffusion agents more than among technologies, the common five technology qualities in innovation diffusion research (relative advantage, compatibility, trialability, observability and complexity) are emphasised less than characteristics of entrepreneurs, markets and environments. In the analyses, a distinction is made among three groups of business starters or diffusion agents, based on their time of establishing the Internet cafés. We have partly followed Rogers' [1995] differentiation between innovators and early adopters, early and late majority, and laggards. Hypotheses were formulated to test differences between early, medium and late starters and to find variances between diffusion patterns in more and less centrally located and 'modern' areas of Indonesia.

THE HYPOTHESES

Hypothesis 1 states that since Internet technologies are continuously changing, all Internet cafés will exhibit innovative change. We found that late starters are also innovative in their choice of technology and that their initial investment is high compared with early starters. The common distinction between 'innovators' and 'laggards' is blurred when examining Internet café technologies in the Indonesian context. Our second hypothesis, that early adopters need to expand and re-invest to maintain a competitive position, is verified. Obviously, competition becomes tougher and capital requirements higher at well-established sites in the café business, and we presume that many entrepreneurs could find alternative and more profitable locations for their Internet cafés outside of the pressure areas. A remaining question is why entrepreneurs remain at high-pressure locations instead of moving to new areas of emerging markets.

Hypotheses 3, 4 and 5 are related to qualities of the entrepreneurs. We found that education at a university level is a distinctive characteristic of all Internet café starters, not just the early starters. However, we found statistically significant differences in IT-related work experience and entrepreneurial readiness among the groups of starters. It takes more of both to be an early starter. We believe that potential business starters with IT competence and entrepreneurial readiness could easily be attracted to an alternative location, even in the periphery, if business preconditions were met. This assumption is based on the fact that geographical mobility is generally high among young and educated people in Indonesia, and that many early starters of Internet cafés already have work experience from other regions.

Hypothesis 6 addresses market characteristics, stating that the early Internet café market is characterised by customers who are young, well educated, and relatively wealthy. We found only small differences among the three groups of starters and that young people, mostly well educated, represent 75% of current customers for the Internet cafés. High school and university students constitute a particularly important market segment. Given the high numbers of young and educated people from relatively wealthy families even in smaller towns in rural or peripheral areas of Indonesia, we believe that a sufficient demand for Internet café services could easily be established at many more locations. Potential entrepreneurs could be encouraged to establish their Internet café business at new locations, if infrastructure so allowed and if supported by some deliberate awareness creation among potential customers.

Our last hypothesis deals with the environment. Our statistical data support the assertion that Internet cafés spread first in urban areas having advanced infrastructure and a population with reasonable incomes and 'modern' values.

OTHER RESEARCH FINDINGS

The research indicates some differences between early, medium and late starters, especially in entrepreneurial readiness and previous IT-related work experience. Similarities among the groups are more apparent than the differences, however. Early, medium, and late starters are similar in levels of education, technological adaptability, and targeted and real market segments.

In spite of the S-shaped curves reflecting the innovation diffusion process at two of the three study locations, at a national level Internet café business starters in Indonesia can still be

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regarded as pioneers in the dissemination of the new technology and accompanying information. It should be underscored that our categorisation of diffusion agents or business starters is based on a national and not an intra-regional comparison of start-up times. For instance, most pioneering entrepreneurs in Lombok are classified as late starters. We emphasised the relative advancement of all the three study regions within a national context, while searching for a strategy for diffusing the Internet café innovation into more rural and remote areas of the country. We found that connection speed and reliability are increasingly important for the establishment and competitiveness of Internet cafés, and conclude that the price and quality of ISPs in remote areas represent main obstacles in the diffusion process.

LIMITATIONS

Our empirical analyses contain certain limitations. In spite of the short time span under scrutiny (the oldest Internet café is only eight years), we have predominantly based the analyses on the distinctions among three groups of starters. The combination of the limited total sample (n=93) and a relatively low percentage of 'early starters' (10%) makes this group small for statistically significant conclusions. Variances between entrepreneurs who start their Internet café business at various points in time could be analysed better if a larger sample of respondents were available. Also, the study would gain from a larger representation of study areas and a combination of local and national criteria for the categorisation of business starters into groups. For example, an early starter in a peripheral area would be a late starter nationally.

FUTURE RESEARCH

This study generated additional ideas for further research. More elaborate studies could be made of the market for Internet café services. Using Internet cafés to spread of information could be a profitable business, as long as public infrastructure is available and the market is sufficiently large. Competent entrepreneurs are available, even outside of Java and major cities, due to the relatively high levels of education, high unemployment rates, and geographical mobility. Therefore, the further spread of Internet cafés is dependent on infrastructure and market development. We already initiated a study of motives and behaviour of current and potential Internet café users at various locations. Only by knowing more about the demands of Internet café customers can we obtain a more comprehensive understanding of information access through the Internet. In addition, more research is needed on the relationship between the socio-cultural environment and the function of information diffusion agents and their customers.

RECOMMENDATIONS

This study recommends government intervention in infrastructure development and awareness creation for a more equitable spread of public access to the Internet. Diffusion agents are available, as long as the market and the infrastructure allow them to operate. Internet cafés multiply rapidly as soon as profitability is proven at a certain location. They popped up very quickly in our three study areas as soon as the first ones were filled with customers. Government agencies could play a stronger role in the creation of demand for Internet use, even in peripheral areas with low incomes per capita. People should be provided opportunities to observe and try information technology and modern information access points. This approach could be made through institutions in rural communities, such as secondary schools and local government offices. Finally, in spite of ongoing privatisation, government institutions should take a responsibility for equitable IT infrastructure development over the vast Indonesian territory, making the Internet accessible at reasonable prices even in peripheral areas.

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APPENDIX 1. INTERNET CONNECTION TYPES

Connection	Speed	Price (rupiah)/month *	Description **
Dial-up	56 Kbps	Rp 1.500.000 (USD 176)	Dial-up connections use traditional copper lines and modems, over a public telephone network, to transmit signals between computer devices. Dial-up connections offer the slowest transmission speeds.
ISDN	64 Kbps ++	Rp 2.500.000 (USD 294) (64 Kbps)- Rp 7.000.000 (USD 824) (128 Kbps)	Abbreviation of <i>integrated services digital network</i> , an international communications standard for sending voice, video, and data over digital telephone lines or normal telephone wires. ISDN support data transfer rates of 64 Kbps (64,000bits per second).
ADSL	1.5 Mbps ++	Rp 5.000.000 (USD 588) (for 64 /512 Kbps)	Short for <i>asymmetric digital subscriber line</i> , a technology that allows more data to be sent over existing copper telephone lines. ADSL supports data rates of from 1.5 to 9 Mbps when receiving data and from 16 to 640 Kbps when sending data.

Global Diffusion of the Internet III. Information Diffusion Agents and the Spread of Internet Cafes in Indonesia by F. Wahid, B. Furuholt, and S. Kristiansen

Connection	Speed	Price (rupiah)/month *	Description **
Leased line	64 Kbps-2048 Kbps	Rp 4.700.000 (USD 553) (64 Kbps) – Rp 82.100.000 (USD 9,659) (2048 Kbps)	A permanent telephone connection between two points set up by a telecommunications common carrier. Unlike normal dial-up connections, a leased line is always active. The fee for the connection is a fixed monthly rate. The primary factors affecting the monthly fee are distance between end points and the speed of the circuit. For example, a T-1 channel is a type of leased line that provides a maximum transmission speed of 1.544 Mbps.
WLAN	11-54 Mbps	Rp 800.000 (USD 94) (64 Kbps, for the first 100 hours plus Rp 187/minute overtime) – Rp 1.280.000 (USD 151) (128 Kbps, for the first 100 hours and Rp 320/minute overtime)	Acronym for <i>wireless local-area network</i> . A type of network that uses high-frequency radio waves rather than wires to communicate between nodes.

Notes:

*) Monthly price varies from ISP to ISP.

**) The descriptions are mainly copied from Webopedia (<http://www.webopedia.com/>).

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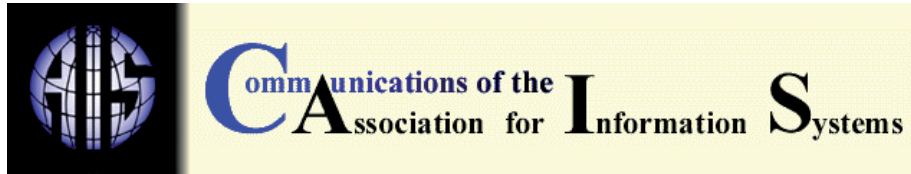
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Global Diffusion of the Internet III. Information Diffusion Agents and the Spread of Internet Cafes in Indonesia by F. Wahid, B. Furuholt, and S. Kristiansen

Article 3

Information dissemination in a developing society:

Internet café users in Indonesia.

Bjørn Furuholt, Stein Kristiansen and Fathul Wahid

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**Information dissemination in a developing society:
Internet café users in Indonesia**

*The Electronic Journal of Information Systems in
Developing Countries*

May 6, 2005

by

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**Information dissemination in a developing society:
Internet café users in Indonesia**

Abstract

The article analyses the market for Internet cafés in Indonesia and thereby studies the spread of information through the Internet in a developing society. The city of Yogyakarta was selected as the research site, due to its abundance of Internet cafés and customers. The empirical research is based on a survey comprising 270 users. Customers are typically young and educated. Males represent the majority of users but unmarried females are also regulars. User frequency is statistically associated with individual capability, electronic media exposure and financial capacity. Ten percent of customers' total monthly expenditures are on Internet cafés. Users represent a multitude of cyber cultures, and more research is needed to assess different preferences and motives for use.

Key words: Internet diffusion, user acceptance, user frequency, information asymmetry

1. Introduction

Short-term access to the Internet from public terminals is increasingly common worldwide. In rich countries such access points can be found in malls and airports, while privately owned Internet cafés represent major access points for people in economically poor countries. In Indonesia, two thirds of Internet users gain access through Internet cafés (Kristiansen, Furuholt and Wahid, 2003).

Huge differences exist in the accessibility to the Internet among countries and regions, reflecting a global digital divide and 'information poverty' in parts of the world. Also within developing countries, we see clear tendencies to increased concentration of information flows to urban and central areas (Wong, 2002; Mwesige, 2004). Economically disadvantaged countries and rural and peripheral districts within these nations tend to fall further behind in human resource development as well as in economic progress and political participation. Also in Indonesia, which is in the focus of our study, we see that Internet use and Internet cafés spread mainly in the larger cities on the centrally located island of Java. The spread to smaller towns and villages has been slow, partly due to a lack of awareness and demand among rural people, and partly because of weak or missing infrastructure. There is accordingly a need to facilitate the spread of information technology and related Internet access especially to the 'outer islands' and lagging areas of the country.

Ideally, Internet cafés in developing countries represent reasonably priced access points to sources of information for personal development, business start-up and growth, or political participation and the progress of civil society. Information has become one of the primary inputs in economic processes, and information and communication technologies (ICT) gradually become more crucial for the ability of enterprises, communities and individuals to participate successfully in the global economy (Hollifield and Donnermeyer, 2003). Accessibility to information and public access to the Internet also represent means to increased transparency and to the potential development of e-government in poor countries. Both are important elements in fighting corruption and the moral hazard related to information asymmetry (Transparency International, 2003; Bappenas, 1999).

Indonesia, the fourth most populous and largest Muslim country in the world with 220 million people, still suffers from the severe Asian economic crisis in 1997, and the country is at a critical stage in the process of democracy building. More than 40 million people are unemployed and there is an abundance of entrepreneurs searching for income and business opportunities. Disparities are huge between rich and poor and between 'inner' and 'outer' parts of the country. There is a concentration of economic activities and political power in the island of Java. Information asymmetry follows disparity and entry barriers into business as well as politics are persistently higher among the poor and peripherally located. The rapidly increasing numbers of Internet users represent a potential step in the direction of more equitable access to information.

In this article, we raise the simple question: Who are the users of Internet cafés in Indonesia? We try to find out what constitute the main market segments for Internet café businesses and what can be done to enhance business opportunities for Internet café entrepreneurs in more peripheral parts of the country. Previous research on Internet cafés in Indonesia has concluded that they are mostly owned by small-scale entrepreneurs and that reaching a market threshold is a major precondition for their further spread (Wahid, Furuholt and Kristiansen, 2004). Demand for

Internet café services probably depends on people's awareness and interest and on the quality and relevance of services offered.

Main objectives of this paper are to identify the user groups of Internet cafés in Indonesia today and to trace their main motives and gains from using their time and money at these venues. We thereby aim for presenting policy advice for the start-up of Internet cafés in more peripheral and information-poor areas of a developing country. A relatively progressive research site has been selected for a survey among Internet café customers. Yogyakarta is a university-city in the central areas of Java, where Internet cafés are in abundance.

The article is organised as follows. After this introduction, we present an overview of the spread of the Internet and Internet cafés in Indonesia. That section is followed by a description of Internet cafés in the city of Yogyakarta, Java. Thereafter, we present a theoretical discussion of Internet user acceptance before the methodology and data collection in section five. The research model and hypotheses are presented in section six, and empirical analyses are displayed in section seven. The conclusions bring the article to a close in section eight.

2. The spread of the Internet and Internet cafés in Indonesia

The recent development of Internet and Internet cafés in Indonesia is previously described by Kristiansen, Furuholt and Wahid (2003) and Wahid, Furuholt and Kristiansen (2004). Valuable information on the topic is also given by Fahmi (2002) and Purbo (2002).

The number of Internet hosts² per 1 000 people stand at 0.11 in Indonesia, compared to 13.45 in neighbouring Singapore (Wong, 2002) and 417 in the US (Roycroft and Anantho, 2003). The estimated annual expenditure per capita on services related to information and communication technology (ICT) is 9 USD in Indonesia and 2 348 USD in Singapore. In spite of the relatively modest ICT expenditures and the low number of Internet hosts, use of the Internet spreads fast also in Indonesia. Using Internet service providers³ (ISPs) as a measure of Internet infrastructure development, we find that the number of licenses increased from one in 1994 to 180 by the end of 2002 (Purbo, 2002, APJII, 2003). According to APJII (2003), the number of Internet subscribers⁴ increased from 134 000 in 1998 to 667 000 at the end of 2002. Interestingly, from 2001 to 2002 the number of home subscribers decreased and was compensated by an increasing number of corporate subscribers (from 10 539 in 2001 to 39 589 in 2002). The number of Internet users increased by more than 1400% during five years, from 512 000 in 1998 to 8 million in 2003. APJII (2004) predicted that the number would reach 12 million by the end of 2004. Considering a population of 220 million, the density of Internet users is still low, slightly more than 3.5 %, which is slightly more than the density of phone lines (3%) (Directorate General of Post and Telecommunications 2001).

The widespread public use of the Internet explains the faster growth of Internet users as compared to subscribers, and two thirds of Internet users in Indonesia today gain their access through Internet cafés.

² Internet host is computer connected to the Internet that provides services such as Web pages, e-mail boxes, or data routing.

³ ISP (Internet Service Provider) is a company that provides access to the Internet, as well as other services such as e-mail account.

⁴ An Internet subscriber is someone who subscribes to Internet access from an ISP. An Internet user is an individual who uses the Internet and he/she is not necessarily a subscriber.

Expansion of Internet access in developing countries is generally facilitated by arrangements for public use (Mwesige, 2004). Privately owned Internet cafés increasingly represent opportunities for ordinary people in economically poor areas to access the Internet. In such venues, computers are made available at various rates and connection speed, whereby regular or occasional customers can search information and make electronic connections with others via e-mail and chatting. Internet café employees normally provide valuable guidance in Internet use and information access to inexperienced users. The fact that mainly operational costs are incurred in the payment for Internet use represents a huge advantage in economically poor contexts. Fixed costs from the purchase of equipment and leased lines are left with the business owners and only charged to the users according to the time spent on-line.

Internet cafés in Indonesia are still mostly found in the larger cities, around universities and at tourist sites. The spread to smaller towns and villages has been slow. This is probably partly due to a lack of committed business entrepreneurs, and partly an impact of limited awareness and demand among potential rural customers. Another reason may be the telecommunication infrastructure, which does not always allow for the supply of Internet services at prices affordable at low-income levels and yet high enough to yield a profit to potential private investors. Solar and satellite technology development is in progress, however, potentially supplying Internet access through kiosks or cafés also in remote areas of poor countries (James, 2003, *The Economist*, 2002).

The development of Internet cafés in Indonesia, known as *warnet* (*warung internet*), showed a remarkable growth around year 2000. According to Basuni et al. (2001), approximately 1 500 Internet cafés were in operation in the country in 2001. In 2002, Purbo (2002) found that the number was 2 000. A combined list of Internet cafés from several sources in our study supports this number. The cafés are highly concentrated and the vast majority are found in the larger cities such as Jakarta, Surabaya, Bandung, Semarang and Yogyakarta on the densely populated island of Java. Other major agglomerations of Internet cafés include the industrial city of Medan in Sumatra, west of Java, and the tourist sites of Bali and Lombok, located east of Java. According to Fahmi (2002:157), there is no other 'efficient way to integrate the many islands of Indonesia except by the use of ICT', and increased connectivity to the Internet through publicly accessible kiosks or Internet cafés represents a major means to narrow the digital divide. The present distribution of Internet cafés is illustrated in figure 1.

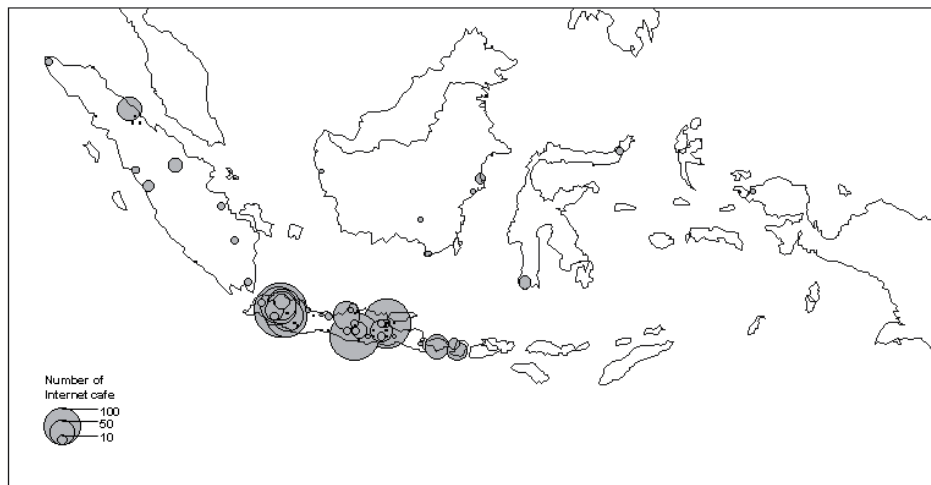


Figure 1. Map of Internet cafés in Indonesia

3. Internet cafés in the city of Yogyakarta

The city of Yogyakarta is selected as our research site. The city has a population of 500 000 and more than 100 institutions of higher learning. Yogyakarta province, with a population of 3.5 million, serves as a centre of higher education for the whole country. In line with the increasing demand for Internet access recently, not least among students, Internet cafés have been mushrooming in Yogyakarta, with the highest rate of business entrants in year 2000. The business is generally characterized by relatively low capital entry barriers, due to the possibilities to adjust the technological composition and the scale of operation. Second-hand equipment is often applied, and only a hand-full of computers is sufficient to make a start. Students represent a major market segment and many Internet cafés are found in the neighbourhood of universities and other institutions of higher learning. Necessary infrastructure for reasonably priced and high-quality Internet access is generally available in the city. Prices paid by the customers per hour are relatively low, around 2 500 – 3 000 rupiah (USD 0.29 - 0.35)

In the year 2000, more than 200 Internet cafés were established in the city. At the time of our empirical study, in November 2003, the number had been reduced to 150. In addition to these, however, there are an increasing number of Internet-based game centres established in the city, which are excluded from our survey. In a short time, the game centres have become favourite amusement venues for young people keen on spending time and money playing online games. This activity has also been adopted by some of the existing Internet cafés as an additional service to attract and keep the younger customers. Also a number of larger-scaled Internet cafés owned by the universities are excluded from our study because their ownership, pricing and market structure is untypical for the country's Internet cafés.

There are two main reasons for the reduced number of privately owned Internet cafés in Yogyakarta over the last few years. One is the increased competition, whereby unfavourable and badly-managed venues were forced to close down. The second reason is a contraction in the tourist market, not least following the Bali bombing in October 2002 and repeated travel warnings due to suspicions of terror attacks and violence, especially against American and

Australian visitors. Especially in the Sosrowijayan and Prawirotaman areas, two major tourist centres in the central and southern parts of Yogyakarta, a number of Internet cafés have been closed down recently.

Internet cafés in Yogyakarta, as elsewhere in Indonesia, are typically found in simple premises, where costs apparently are kept at a minimum and the service is limited to cyber activities. At an average, the number of computers operated by an Internet café in the city is 17, and the number of customers served in a typical day is 90. The cafés typically have one or two staff serving their customers, mostly by assigning a computer for use and collecting the money after connection is finished. Areas for socialising are minimal, and more typical café services are normally limited to a fridge where customers can find themselves a soft drink.

4. Literature review

According to Lee (1999:333), 'empirical study of Internet users remains underutilized as an area of academic research'. Even less research is conducted on users of Internet cafés, and very few reports are from developing countries. Mwesige (2004:83) notes that 'the worldwide boom of Internet cafés has not seen corresponding inquiry into this form of public access to the Internet'.

Numerous studies are conducted, however, on the adoption of the Internet technology in a global context (Madden et al., 2000; Kiiski and Pohjola, 2002; Grubestic, 2002). The majority of cross-national work on this topic has been limited to OECD countries, while some studies are also conducted with a specific focus on the developing world (Zhu and He, 2002; Wilson and Wong, 2003; Wolcott and Goodman, 2003). An extensive study of Internet diffusion is being executed by The Mosaic Group through The Global Diffusion of the Internet (GDI) Project, where nearly 30 countries have been studied over time [<http://mosaic.unomaha.edu/gdi.html>]. Per capita income seems to be the overall most important factor explaining global inter-country differences in the Internet usage rates. Other technological and economic determinants of statistically significant value include telephone and personal computer densities (Beilock and Dimitrova, 2003) and Internet access cost (Kiiski and Pohjola, 2002). A comparison of Internet diffusion in Turkey, Pakistan, India and China (Wolcott and Goodman, 2003) revealed that China is considerably more successful in enabling Internet availability for its citizens, at least for access to domestic hosts. A main reason is China's ability to roll out extensive high-capacity nationwide telecommunication infrastructure. Also Bazar and Boalch (1997) and Arnum and Conti (1998) have documented that telecommunication infrastructure plays a crucial role in the spread of the Internet. The extension of infrastructure for the use of the Internet in developing countries has generally been much slower than in economically rich parts of the world. This is mostly due to low demand and thereby low profitability of ICT businesses. The disparity in the intensity of ICT adoption among countries is wider than the disparities in their GDP per capita, indicating that the digital divide is also increasing and likely to become even more severe in the future (Wong, 2002).

Kling (1999) argued that Internet use is a question of social as well as technological access. Technological access refers to infrastructure and the physical availability of computer hardware and software, while social access refers to the mix of professional knowledge, economic resources, and technical skills required for the use of ICT. It appears that the use of the Internet in developing countries in general and of Internet cafés in particular is dominated by young and relatively wealthy people, mostly well educated and predominantly male citizens of urban areas (Robbins, 2002; Mwesige, 2004). From a study of users of Internet cafés in Gujarat, India, Joshi (2001) found that more than 80% of the cyber café users are men, most of them young (15-35

years) and students or highly educated. Most of them are fluent in the English language. Similarly from Uganda, Mwesige (2004:91) found that the typical Internet café user 'is a 25-years-old single male with no children, who has completed high school at the very minimum'. According to Oyelaran-Oyeyinka and Adeya (2004), even academics in Africa are compelled to search Internet access in cyber cafés due to the high initial investment costs of end-user equipment. The ration between incomes and costs makes Internet access in Africa remaining 'a luxury item' (Oyelaran-Oyeyinka and Adeya, 2004:70). From Peru, Barreto (2000) reported that the major constraint in spreading the Internet café concept is the lack of Internet knowledge and the need to create a 'critical mass' of users.

Davis' (1989) concepts of 'perceived usefulness' and 'perceived ease of use' still have a dominant position in the stream of theories and models on ICT user acceptance. Perceived usefulness is defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance'. Perceived ease of use refers to 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989:320). As regards Internet use, Oyelaran-Oyeyinka and Adeya (2004) have documented that 'ease of use' is regarded a major constraint even for academics in Kenya. Quibria et al. (2003) have found that Internet use and tertiary education show significant statistical association in Asian countries. The ease of use variable normally becomes less significant with increased experience among users (Szajna 1996).

In further developing the understanding of user acceptance of ICT, Davis et al. (1992) drew on psychological motivation theory and made a distinction between extrinsic and intrinsic motivation for use. Extrinsic motivation refers to an instrumental use of the technology, meaning that the expected outcome of an acceptance is 'distinct from the activity itself' (Davis et al., 1992). Intrinsic motivation, on the opposite, relates to perceived gains from using the technology in itself. In our case, the use of Internet cafés according to this distinction may be motivated by the pleasure from spending time online in the café or by the expected later outcome of this time input, such as competence for professional or business use.

Thompson et al. (1991) introduced the term 'job-fit' in their model of PC utilisation. The term is defined as the extent to which the new technology is believed to enhance performance, and thus very closely related to Davis' perceived usefulness. In the same model, Thompson et al. (1991) used a variable termed 'affect towards use', which is related to intrinsic motivation. Affect towards use is the 'feeling of joy, ... disgust, ... or hate' by the particular act of using the technology. Also Compeau and Higgins (1995) use a similar variable, termed 'affect', in their social cognitive theory.

Demographic factors, like gender and age, were not included in the original technology acceptance models (e.g. Davis, 1989). They are simply not regarded as de facto explanatory variables in ICT user acceptance theories. Empirical evidence has demonstrated, however, that both gender and age have moderating impacts on perceived usefulness and perceived ease of use (Venkatesh and Morris, 2000), and also on 'affect towards use' (Venkatesh et al., 2000; Morris and Venkatesh, 2000), and they should therefore be included in user acceptance models.

Venkatesh et al. (2003:425) have assessed the dominating information technology acceptance models and developed a 'unified theory of acceptance and use of technology' (UTAUT), where four main factors empirically are found to dominate the speed and rate of adoption. The four factors are 'performance expectancy', 'effort expectancy', 'social influence', and 'facilitating conditions'. The first is defined as individual perception of possible gains in job performance and is closely related to 'perceived usefulness' and 'job-fit'. The second is equivalent to the

perceived ease of use of the new system. Social influence is 'the degree to which an individual perceives that important others believe he or she should use the new system' (Venkatesh et al., 2003:451), while facilitating conditions mean the perception of whether financial matters and organisational and technical infrastructure exist to support the new technology. In addition, their model comprises demographic factors. Age and gender significantly moderate the basic variables in explaining ICT user intention in their studies.

5. Research model and hypotheses

In our survey, we have asked questions about Internet café user frequency, which represents our main dependent variable. User frequency is measured as online hours per month in any Internet café. According to Anandarajan et al. (2002), self-reported frequency of use is a typical and reliable measure to operationalize user acceptance where more objective criteria are not available. We have also raised questions in the survey related to the following sets of variables: individual capability, occupation, financial capacity, media exposure, and demography. The following research model forms the skeleton for statistical analyses:

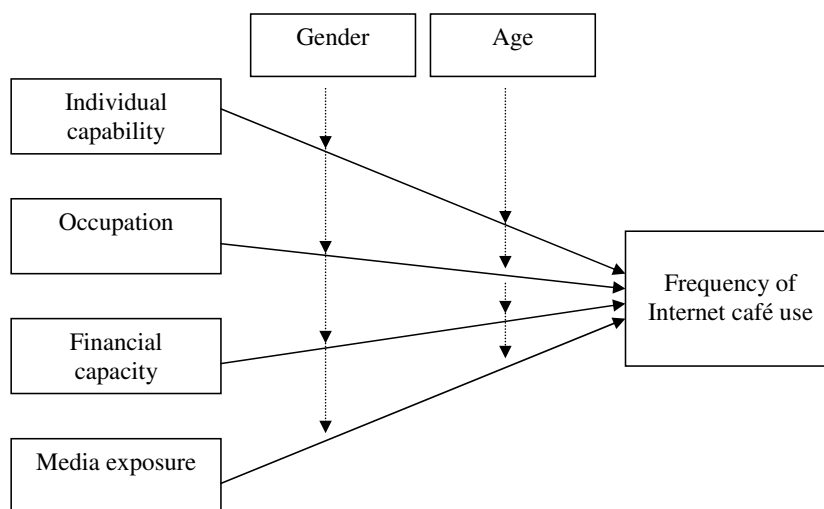


Figure 2. Research model

Individual capability is composed of the respondents' perception of their own Internet knowledge, computer knowledge, and English language proficiency, measured on a scale from 1 (beginner) to 5 (advanced). The three capability measures are weighed equally in our statistical analyses. This set of variables is related to the terms 'effort expectancy' and 'perceived ease of use', as discussed above. With increasing individual capability, Internet café customers will probably expect to use less effort and perceive the use to be easier. The variable represents various aspects of social access to Internet use, as discussed in the literature review above. According to Abbott (2001), English language proficiency matters, in addition to basic literacy and ICT competence, for the use of Internet, given the fact that English is the principal language

of the Internet medium. Our in-depth interviews indicate that the Indonesian users apply the English language between 50% and 100% of the time when accessing the Internet.

Hypothesis 1: We expect that individual capability, measured as Internet knowledge, computer skills, and English language proficiency, is associated with user frequency.

Occupation is related to 'performance expectancy' and 'job-fit', as discussed above. Perceived usefulness for job performance, as well as 'extrinsic motivation', probably differs among people with various occupations. There are reasons to believe that students will have the highest perceived usefulness and performance expectancy from Internet use. Most of them could gain in their career development from access to information on the web. We also suppose that students perceive Internet café use as relatively easy (low effort expectancy) as compared to non-students. Also, we believe that students will have the highest 'intrinsic motivation' and most positive 'affect towards use' of Internet cafés.

Hypothesis 2: We expect that frequency of Internet café use is highest among students.

Financial capacity is an element of 'facilitating conditions', as discussed above. In an economically poor society like Indonesia, income will decide people's ability to take Internet cafés into use. It seems that committed Internet café users are willing to pay substantial amounts of money for such services. Mwesige (2004) reported an average spending of USD 23.49 per month in Internet café fees, which is a high amount in the relatively poor context of Uganda. Du (1999) and Abbott (2001) also found that Internet users in China have higher than average incomes. It can be expected that Internet café use will decrease with higher incomes above a certain level, when people can afford connection from their homes. In our survey, we found it difficult to ask about respondents' income and alternatively we asked them to indicate their level of monthly expenditures.

Hypothesis 3: Frequency of Internet café use is associated with customers' general level of expenditure, up to a certain level.

Media exposure: We have asked about customers' daily use of other information media, such as television, radio and newspapers, which is related to the terms 'affect towards use' and 'social influence' in the models presented above. Du (1999) found that adopters of the Internet in China also tend to be adopters of a variety of other media technologies or appliances (e.g. cable TV, VCR, VCD, and cell phones). This confirms the notion of technology clusters, as the adoption of an innovation is powerfully related to other functionally similar technologies. We also believe that eagerness to seek information through written media can have an impact on the frequency of Internet café use.

Hypothesis 4: Frequency of Internet café use is associated with the use of other information media.

In addition to these four hypotheses regarding user frequency, we shall also make an explorative study of modifying effects or the conditional (Frankfort-Nachmias and Nachmias, 1996) demographic variables of gender and age, as suggested by previous findings referred to in the literature review.

6. Data collection and methodology

The paper is based on a recent survey of users of Internet cafés in the city of Yogyakarta. Our previous research on Internet cafés in Indonesia has focused on the business owners (Kristiansen, Furuholt and Wahid, 2003) and on the diffusion of the Internet café innovation (Wahid, Furuholt and Kristiansen, 2004), based on surveys among entrepreneurs. Previous in-depth interviews with business owners as well as with users in Yogyakarta and Lombok prepared the ground for developing a questionnaire (in the Indonesian language). Draft versions of the instrument were tested on a number of respondents before the final edition was decided. The questionnaire has formed the main research instrument for this study, while a number of additional in-depth interviews with customers have helped interpreting statistical findings. Some quotations from the in-depth interviews are presented in our empirical discussion.

The questionnaire respondents were all customers that we physically met in Internet cafés in Yogyakarta during November - December 2003. Game centres and university-owned Internet cafés were excluded from the sample. The area of Yogyakarta city was divided into five geographical clusters based on main lines of demarcation. A north-south distinction was made using the railway as divider. The northern area was divided into three clusters and the southern into two, based on the main road partitions. In each cluster, we randomly selected three Internet cafés. The number of venues for data collection thus became 15, which is 10% of the total number of Internet cafés in the city. In order to get the most realistic picture of Internet use, questionnaires were distributed at three different periods of time (morning = 08.00-12.00, afternoon = 13.00-17.00, and evening = 18.00-22.00). Within each time period we collected responses till we reached the target of six Internet café users at each venue. Less than 10% refused to fill in the questionnaire. The total number of respondents is 270.

In examination of the survey data, we mostly apply bivariate analyses. The effects of conditional variables on expected correlations between main variables are analysed by separate correlation analyses for each conditional variable. Regression analysis is subsequently used to test the effect of all independent variables (individual capacity, financial capacity, occupation, and media exposure) on the main dependent variable, which is the frequency of Internet café use.

7. Empirical findings

7.1 Descriptive statistics

The respondents in our survey are mostly young, at an average 22 years. 68% of the Internet café users are males. This is a lower percentage than previously documented in studies from other developing areas (Mwesige, 2004; Joshi, 2001). 73% of our respondents are students. 88% of the customers have accomplished a minimum of senior high school. The average number of years in school among our respondents is 13, compared with an average of 9.7 in Indonesia (Behrman et al., 2002). There is no significant difference in formal education between male and female users in our survey. However, the Internet knowledge, computer skills and English proficiency are significantly higher for men than for women.

As much as 50% of the customers have more than five years of experience in Internet access. Self-learning and informal competence sharing are the dominant ways of obtaining necessary skills for utilising the medium. As expressed by a female customer: *'I learned how to use the Internet by asking friends of my age. Many of my friends knew a lot about the Internet'*.

The average total monthly spending among our respondents is 534 000 rupiah (USD 63), which can be compared to a typical non-professional wage level in Yogyakarta around 300 000 rupiah per month (<http://www.bps.go.id/sector/wages/table3.shtml>). Internet café users in our survey spend 56 000 rupiah (USD 6.59) at an average per month for their Internet access in these venues. Prices paid per hour are relatively low, around 2 500 – 3 000 rupiah (USD 0.29 - 0.35), which can be compared to 4 USD per hour at Internet cafés in Uganda (Mwesige, 2004). The average café customer in Yogyakarta spends 2.5 hours connected per visit and only additional five minutes for waiting or socialising. Nine days per month is the average frequency of Internet café visits. Internet cafés represent the dominating access points for the great majority of the respondents. Internet café users in Yogyakarta also use much time on various other media, at an average 5.9 hours per day for electronic media and 4.3 hours per day for paper-based media and literature.

Descriptive statistics are depicted in table 1.

Table 1. Descriptive statistics

Variable	n	%
<i>Gender</i>		
- Female	86	31.9
- Male	186	68.1
<i>Marital status</i>		
- Single	250	92.6
- Married	20	7.4
<i>Nationality</i>		
- Indonesia	266	98.5
- Other	4	1.5
<i>Education</i>		
- Elementary	12	4.5
- Junior high	18	6.7
- Senior high	138	51.5
- University	100	37.3
<i>Employment</i>		
- Student	192	72.7
- Entrepreneur	25	9.5
- Government employee	2	0.8
- Employee in private company	33	12.5
- Unemployed	12	4.5
<i>Age (years)</i>		
- ≤ 20	93	35.0
- 21-30	160	60.2
- 31-40	10	3.8
- ≥ 40	3	1.1
<i>Monthly expenditure (rupiah)</i>		
- ≤ 250,000	80	34.2
- 250,000-500,000	103	44.0
- 500,001-750,000	21	9.0
- 750,001-1,000,000	9	3.8
- ≥ 1,000,000	21	9.0

7.2 Bivariate analyses of user frequency

Individual capability, measured as Internet knowledge, computer skills and English language proficiency combined, are significantly correlated with user frequency ($r=0.34$, $p<0.01$), measured as online hours per month. Using partial correlation test by including gender as a controlling variable, we find that correlation between individual capability and user frequency is stronger for male users ($r=0.38$, $p<0.01$) as compared to females ($r=0.22$, $p<0.05$). The correlation between individual capability and user frequency is also somewhat higher for younger users (below the average age) ($r=0.32$, $p<0.01$) compared to older users ($r=0.30$, $p<0.01$). The strongest correlation ($r=0.43$, $p<0.01$) between individual capability and user frequency is found when the conditional variables gender and age interact; that is among male and younger users.

The average score on our capability variable is 2.76. One of our interviewees, Kamal, is a 25 years old male Indonesian lecturer and editor. His score on individual capability is high, 4.0. He spends four hours per day, every day, on the Internet in cafés, which gives a frequency more than four times the average among our respondents. Tia, on the contrary, is an 18 years old, female student and has an English language proficiency score of 2. According to herself: '*A lack of language knowledge limits my use of the Internet.*'

We hereby find that hypothesis 1 is supported.

Occupancy: Our empirical data show that user frequency is highest among employees in private companies (40 hours per month) and business entrepreneurs (39 hours). Surprisingly, the user frequency among students is much lower, 23 hours per month. Means comparison between groups of users according to their occupation shows that student usage is significantly lower than for employees in private companies and private entrepreneurs. Hypothesis 2 is thereby falsified, while there is still an unexpected statistical association between occupation and user frequency.

Financial capacity: Internet café user frequency is significantly correlated with monthly expenditure ($r=0.13$, $p<0.05$). The degree of correlation is higher ($r=0.18$, $p<0.05$) when comparing user frequency with the lower expenditure group (below average). Correlation is negative but not significant for the higher expenditure group. Controlling for gender, we find that the correlation between average monthly expenditure and user frequency is significant for female users ($r=0.27$, $p<0.05$), while not for male users. Age is separately not a conditional variable for this relationship, but the strongest correlation between average monthly expenditure and user frequency is found among older, female users ($r=0.46$, $p<0.05$).

An in-depth interview with Dwi, a 25 years old woman from Yogyakarta, illustrates associations between financial capacity and user frequency. She lost her job and now uses the Internet for job seeking, among other things. She has currently no income and lives from savings. Dwi spends 5 000 rupiah per month on Internet café fees. '*For me, costs represent the main factor limiting my Internet use today.*'

We find that hypothesis 3 is supported.

Media exposure: The frequency of Internet café use and the time spent looking at television and video (electronic media) are significantly correlated ($r=0.12$, $p<0.1$). Including age as a conditional variable, we only find a significant correlation between user frequency and time spent watching television and video among older users ($r=0.18$, $p<0.05$), and not among the

younger ones. Gender has no impact as a conditional variable on this relationship. There is no correlation between time spent on paper-based media and user frequency.

One of our interviewees, Iwan (25) watches television five hours per day and listens to the radio for seven hours. According to himself, *'the only written literature I read is school literature before exams. I don't like reading.'* His Internet café frequency is four days per week, four hours per time, which gives a total of 64 hours per month. This can be compared to the average of 22.5 for our survey respondents.

Hypothesis 4 is partly supported.

7.3 Multivariate analysis

Turning from bivariate to multivariate analysis by using regression analysis, we find that only individual capability (Beta=0.34, $p<0.01$) and electronic media exposure (Beta=0.13, $p<0.05$) contribute significantly to explaining user frequency. The independent variables explain only 13% ($F(3,223)=12.68$, $p<0.01$) of the variance in user frequency. Including age groups and gender as dummy variables into the regression model does not affect the degree of variance explained.

8. Conclusions

This study aimed to identify characteristics of Internet café customers in Yogyakarta, Indonesia. An overall objective has been to recognize mechanisms in the spread of information in a modernising society by enhancing our understanding of the market for Internet café services. The typical customer is young, 22 years at an average. 68% are males, which is a lower percentage than could be expected in a poor, dominantly Muslim society. 73% of the respondents are students, and the remaining are also well educated. The majority of customers have already long-time experience in Internet use. Necessary skills are mostly obtained by self-learning and informal competence sharing. Living in a relatively poor and crisis-hidden context, the typical customer uses substantial amounts of money for online activities in Internet cafés, normally 10% of his or her total expenditures. The average café customer spends 2.5 hours connected per visit, nine days per month.

Based on ICT user acceptance theory, a research model was developed, and four main hypotheses were set forth accordingly, to analyse determining factors behind the frequency of Internet café use. Internet knowledge, computer skills, and English language proficiency, combined in a variable termed individual capability, are significantly correlated with user frequency, measured as online hours per month in Internet cafés. Individual capability has the highest influence on user frequency among young and male customers. Our data reveal, surprisingly, that the user frequency is lower among students compared with employees in private companies and business entrepreneurs. One reason may be that many students have access to on-campus data-labs with Internet connection. Six of the seven students we interviewed before the survey stated that they used alternative (and cheaper) Internet access at the campus. The result may also be explained by financial capacity. Internet café user frequency is significantly correlated with monthly expenditure, and students normally have lower total expenditures than people with permanent employment. In the higher expenditure group, there is no statistical association between total expenditure and the frequency of Internet café use, which may be explained by online access at home or at work. Also, when controlling for gender, there is a significant correlation between average monthly expenditure and user frequency for female

users, but no correlation for male customers. There is also a significant correlation between time spent on electronic media (radio, television, and video) and time spent in Internet cafés, especially among older users. Proven statistical associations between variables are depicted in figure 3.

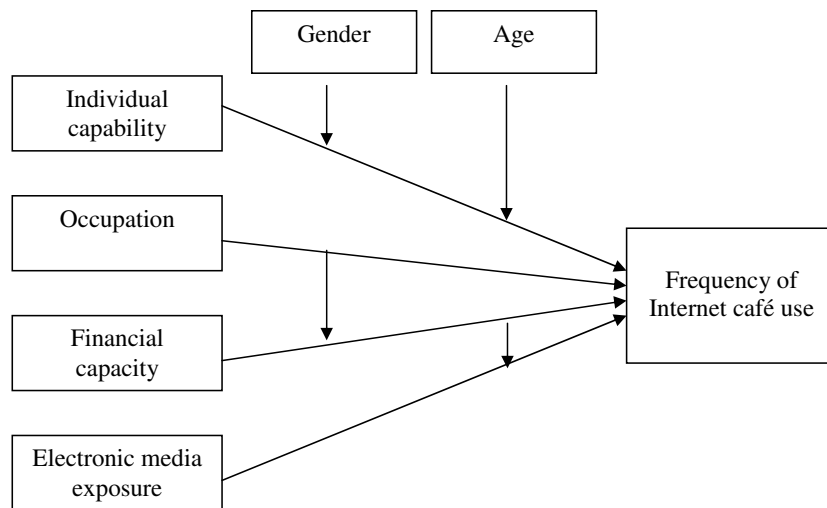


Figure 3: Proven statistical associations between variables

The multivariate analysis reveals little explanatory power of the research model (13%). One main reason may be that Internet café use is far from a single undertaking. Many demands can be met in an Internet café, and there are probably substantial differences among groups of customers searching for information for professional use, political purposes, or business development, or simply for amusement, chatting, or downloading of music or pornographic sites. Internet café use is not only the adoption and application of an information-related technology but it is also a cultural phenomenon, which needs to be studied from a social perspective. We therefore propose to look more deeply into the various forms of Internet café use and the cultures, preferences and cyber behaviours that are related to the application of that technology.

A second reason for the limited explanatory power of the research model might be the theoretical basis, the ICT user acceptance theories, which may be better suited for explaining differences between users and non-users than among more or less frequent users, who already have accepted the Internet café technology and concept. We presently lack the necessary data for making comparison between users and non-users. However, this study might be followed up by collecting data from a sample of non-users in the same economic and social context.

Also, more research is needed to offer the best policy advice on how to utilise Internet cafés for enhancing the spread of useful information in society. Already at this stage, however, some policy recommendations can be made for facilitating the further spread of Internet cafés in Indonesia, of importance for reducing information asymmetry and bridging the digital divide. In addition to infrastructure development, government institutions should play a more prominent role in awareness creation among main potential user groups. Young people and students are

obviously pioneers in Internet café use and could easily be targeted through schools and institutions of higher learning. High numbers of youngsters and students in towns and even villages all over Indonesia could constitute a critical mass for profitable Internet café establishments. In some areas, tourists may also be an important additional market segment. A threshold level of users could be established whereby private entrepreneurs could see the profit opportunities and move into more remote areas with their capital and proved skills to serve an increasing demand for information also from professionals and small-scale business people.

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Article 4

Internet for development?

Patterns of use among Internet café customers in Indonesia,

Fathul Wahid, Bjørn Furuholt and Stein Kristiansen

Information Development,

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Internet for Development? Patterns of use among Internet café customers in Indonesia

Users with better education, greater personal capability and more previous Internet experience tend to use Internet cafés in Indonesia for more serious purposes than other users. Schools could play an important role in educating young people in how to use the Web to search for information.

Fathul Wahid, Bjørn Furuholt and Stein Kristiansen

INTRODUCTION

The Internet is used for a multitude of purposes and may work as a tool of development for individuals and society. In poor countries, a majority of Internet users gain access through public terminals. We define both Internet cafés and cyber cafés as commercial venues that offer Internet access to the general public on a pay-per-use basis. This study focuses on the use of the Internet from such venues. Two thirds of Indonesian Internet users gain access through Internet cafés. Similar figures for some other developing countries are 75 percent in Peru (Boase et al., 2002) and 67 percent in urban India (Haseloff, 2005).

Internet cafés in developing countries thus offer opportunities for ordinary people to obtain access to information and to communicate. According to some sources, they also represent a threat to traditions and cultural values. In a number of countries they are even regarded as a political challenge. In China, for instance, Hong and Huang (2005) report on people's growing interest in using Internet cafés and the authorities' dilemma between promoting information and resisting democratization by this means. They also report on extensive use of Internet cafés by youngsters and even minors for commercial gambling, violent games, and viewing pornography. Large numbers of youngsters in Chinese cities have become addicted to Internet cafés. In Malaysia, the government has worked tirelessly to reduce the 'evilness' associated with cybercafés (Rathore and Alhabshi, 2005).

First and foremost, however, Internet cafés in poor countries may offer access to valuable information and meaningful communication, with lowered threshold

levels and broadened geographical scope (Wynn and Katz, 1997). From various contexts, examples of 'tele-cottage movements' are reported, where telecentres and Internet cafés offer access to business- and education-related information, job training and career counselling, agricultural extension services, and support for marketing and export of local food products (Falch, 2004). Even from rural Norway, access to the Internet through an Internet café is seen as a "cultural medium to the wider world, opening paths for new impulses" (Lægran, 2002: 157). Internet cafés may also be seen as an instrument to remove individual entry barriers to the use of information and communication technology (ICT) by personalized and entertainment activities (Huggins and Izushi, 2002). The extended use of ICT in poor countries represents an opportunity to reduce information asymmetry, increase transparency and political accountability, and mobilize participation in civil society.

Indonesia is the national study context of this research. It is the fourth largest country in the world measured by population, the third largest democracy, and the world's largest Muslim country. The democracy is still young and vulnerable, however, and threatened by huge information asymmetry and extensive corruption. The introduction of e-government based on public access to the Internet represents a means for providing public information and services and could also function as a communication tool between local governments and citizens in this specific environment characterized by thousands of islands and physical communication problems. Likewise in the economic sphere, taking steps to bridge the information gaps between rich and poor segments and central and peripheral areas of the country could be crucial for growth and equity. Information, in this research, is understood as resources of knowledge and competence that can be used by individuals for enhancing their political power, economic welfare, and social status.

The main research questions raised in this paper are the following: what are the dominating patterns of cyber activities among Indonesian Internet café users, and which factors decide cyber use patterns among them? We shall try to find out if the growing

numbers of Internet cafés are useful for the spread of information and competence in society, and we shall discuss what could be done to facilitate the spread of Internet cafés that encourage societal usefulness. The study is based on a survey among Internet café users in the city of Yogyakarta. The paper is organized in the following way. Following this introduction there is an overview of the development of Internet and Internet cafés in Indonesia. Thereafter we give a literature review, offering a discussion of ICT and development in poor countries and focusing on previous studies of the use of the Internet and Internet cafés. Our research methodology is then described, followed by the presentation of the empirical findings and the conclusion.

THE USE OF THE INTERNET AND INTERNET CAFÉS IN INDONESIA

Expansion of Internet access in developing countries is generally facilitated by arrangements for public use (Mwesige, 2004). Initial investment costs of end-user equipment limit the ownership of PCs in poor countries, compelling even academics and small-scale business people to seek Internet access in cyber cafés and other public venues (Oyularan-Oyeyinka and Adeya, 2004). Privately owned Internet cafés increasingly represent opportunities for ordinary people in economically deprived areas to access the Internet. In such venues, computers are made available at various rates and connection speeds, whereby regular or occasional customers can search for information and make electronic connections with others via e-mail and chatting. Internet café employees normally provide valuable guidance in Internet use to inexperienced users. The fact that mainly operational costs are incurred in the payment for Internet use represents a huge advantage in poor countries. Fixed costs from the purchase of equipment and leased lines are left with the business owners and only charged to the users according to time spent online.

The number of Internet users in Indonesia increased by more than 1400 percent during 5 years, from 1.9 million in early 2000 to 11.2 million in late 2004. APJII (2005) predicted that the number would reach 16 million by the end of 2005. Statistics from September 2005 indicate that Internet users in Indonesia have already reached 15.3 million (www.internetworldstats.com). The number of Internet subscribers¹ meanwhile increased from 400,000 in 2000 to 1.08 million at the

end of 2004. The widespread public use of the Internet explains the faster growth of Internet users as compared to subscribers, and two thirds of Internet users in Indonesia today gain their access through Internet cafés. Considering a population of 219 million, the density of Internet users in Indonesia is still low (7.0 percent) compared with the whole world (14.6 percent) or the average for Asian countries (8.9 percent) (www.internetworldstats.com).

The development of Internet cafés in Indonesia, known as *warnet* (*warung internet*), showed a remarkable growth around the year 2000. According to Basuni et al. (2001), approximately 1,500 Internet cafés were in operation in the country in 2001. In 2002, Purbo (2002a) found that the number was 2,000. A combined list of Internet cafés from several sources in our study supports this number. The cafés are highly concentrated, however, and the vast majority are found in the larger cities such as Jakarta, Surabaya, Bandung, Semarang and Yogyakarta, all on the densely populated island of Java. Other major agglomerations of Internet cafés include the industrial city of Medan in Sumatra, west of Java, and the tourist islands of Bali and Lombok, located east of Java. According to Fahmi (2002: 157), there is no other 'efficient way to integrate the many islands of Indonesia except by the use of ICT', and increased connectivity to the Internet through publicly accessible kiosks or Internet cafés represents a major means to narrow the digital divide. An interesting characteristic in the development and spread of Internet cafés in Indonesia is the dominant role of private small-scale businesses and 'cottage entrepreneurs' (Hill, 2003; Kristiansen et al. 2003). The present distribution of Internet cafés is illustrated in Figure 1.

Previous studies have reported on net use patterns in Indonesia, especially from Internet cafés. Based on 'history files' in Internet café computers, Harvey (2000) revealed that the Indonesian language was used in only 18 percent of the visited websites. The largest single category of non-Indonesian websites was pornographic, exceeding 50 percent of visited websites at some locations (Hill, 2003). Another study found that chatting is the most popular activity, followed by entertainment, reading online magazines, sports information, and educational use (Harkness, 2001). The recent development of Internet and Internet cafés in Indonesia is described in more detail by Kristiansen et al. (2003), Wahid et al. (2004), and Furuholt et al. (2005). Valuable information on the topic is also given by Fahmi (2002) and Purbo (2002a, 2002b).

INTERNET FOR DEVELOPMENT?

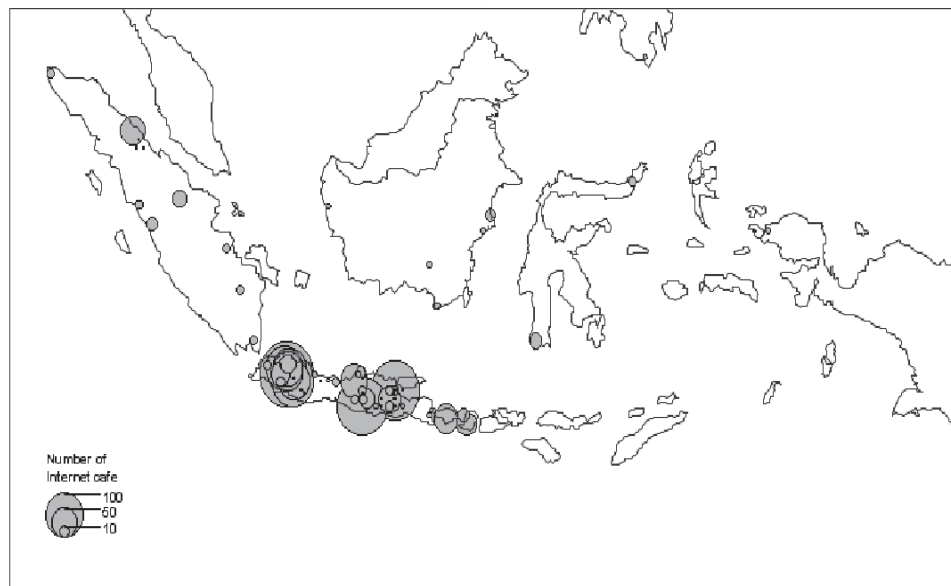


Figure 1. Map of Internet cafés in Indonesia

The city of Yogyakarta is selected as our research site. The city has a population of 500,000 and more than 100 institutions of higher learning. Yogyakarta province, with a population of 3.5 million, serves as a centre of higher education for the whole country. In line with the increasing demand for Internet access recently, not least among students, Internet cafés have been mushrooming in Yogyakarta, with the highest rate of business entrants in the year 2000. The business is generally characterized by relatively low capital entry barriers. This is due to the possibilities of adjusting the technological composition and scale of operation. Second-hand equipment is often applied, and only a handful of computers are sufficient to make a start. Students represent a major market segment and many Internet cafés are found in the neighbourhoods of universities and other institutions of higher learning. Necessary infrastructure for reasonably priced and high-quality Internet access is generally available in the city. Prices paid by the customers per hour are relatively low, around IDR [Indonesian rupiah] 2,500–3,000 (equivalent to USD 0.29 – 0.35 at the time of data collection).

In the year 2000, more than 200 Internet cafés had been established in the city. At the time of our empirical study, in late 2003, the number had been reduced to 150. In addition to these, however, there are an increasing number of Internet-based game centres, which are excluded from our survey. In a short time, the game centres have become favourite amusement venues for young people keen on spending time and money playing online games. This activity has also been adopted by some of the existing Internet cafés as an additional service to attract and keep the younger customers. Also a number of larger-scaled Internet cafés owned by the universities are excluded from our study because their ownership, pricing and market structure is untypical for the country's Internet cafés.

Internet cafés in Yogyakarta, as elsewhere in Indonesia, are typically found in simple premises, where costs apparently are kept at a minimum and the services are mostly limited to cyber activities. On average, the number of computers operated by an Internet café in the city is 17, and the number of customers served in a typical day is 90. The cafés normally have one or two staff serving their customers, mostly by

assigning a computer for use and collecting the money after connection is completed. Areas for socializing are minimal, and other café services are mostly limited to a refrigerator where customers can find themselves a soft drink.

LITERATURE REVIEW

Development is defined in this paper as enhanced chances to meet one's needs, and it depends on improved individual and institutional capacities to mobilize unutilized human, financial or natural resources (Rudebeck 1969). What is regarded as development varies according to normative perceptions, and development may be valued and facilitated differently in rich and poor countries. Individual development is obviously a process that is highly distinct from societal development, though accumulated individual progress should ideally also lead to improved standards of living in a society.

There seems to be a general agreement that the use of ICT, including Internet access, may contribute to human development in poor countries, at least when it is accompanied by social change (Avgerou, 1998). Also in terms of accumulated national development, 'ICT is seen as a knowledge enabler' (Sein and Harindranath, 2004: 19). Specifically for the use of the Internet, however, there is a danger that gaining access to the Web will be 'pampering and pacifying rather than educating and stimulating' (Jacobs, 2004: 80). Public use of the Internet may also vary from use in offices or private homes in a way that is not necessarily gainful for societal development. As stated by Hill (2003: 298), the communal locations from which most Indonesians access the web may shape the social, cultural, political and economic impacts of its use. Internet kiosks offer anonymous usage in sheltered stalls and thus access to the web 'without interference from figures of authority' (Hill, 2003: 317). From other contexts, also Lee (1999) and Boase et al. (2002) concluded that Internet cafés provide a distinct and dedicated use space, which facilitates usage that is different from home or office Internet adoption.

Especially in economically poor and politically undeveloped contexts, the value of Internet use should be assessed on the basis of its potential to serve the community and reduce the most severe impacts of poverty and arbitrary political rule. The terms 'good' and 'evil' as associated with Internet use are highly disputable and in any respect relative, but may still be applicable in the contexts of poor countries when

related to societal usefulness and potentials to mobilize resources for communal development. Generally in an economically poor country like Indonesia, individual learning and competence building may contribute more to communal development and general well-being in the society compared to meeting private needs for pleasure from online gaming or viewing pornographic Internet sites, for instance.

Boase et al. (2002), based on a large multinational survey of Internet use ('National Geographic Web Survey'), made a major distinction between two types of Internet use, namely *instrumental* and *recreational*. The distinction emerged based on exploratory factor analyses. The authors also discussed a third category, which is communication and keeping in touch with relatives and friends. Chen et al. (2002) termed this third category *social* use. Examples of instrumental use of the Internet were given from public access points in Sweden, where job hunting, doing business, tax calculation, various administrative activities, and contact with the government represent common online actions. Other instrumental activity items are sending and receiving e-mail, using online libraries and other sources of information, taking online courses, and online shopping. Recreational activity items include chatting, collective role-playing, and playing online multi-user games.

Interestingly, regression analyses in that study showed the strongest association between instrumental and recreational use: the more people use the Internet recreationally, the more they also use it instrumentally (Boase et al. 2002). Instrumental use is also statistically associated with user experience, in the way that 'veterans' use the Internet significantly more for instrumental purposes compared to 'newbies'. Recreational use is found to be more common among younger users and those with lower education. From the US, the Center for the Digital Future (2004) also found a positive correlation between user experience and instrumental use, like professional work, reading news, trading stocks, checking credit cards, and searching for jobs. Less experienced users spend more time playing online games, downloading music, and participating in chat rooms. Also, business related activities like online shopping are associated with long-time Internet use.

Jeffres et al. (2004) assessed Web diversity and various Internet uses in a metropolitan area of the US. They investigated 19 categories of interests and use, ranging from business and music to the environment, cooking,

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entertainment, and foreign cultures. The 19 items were factor analysed and five dimensions emerged: international and cultural interests; information seeking; popular culture; politics; and business and technology. The diversity of Web use is clearly correlated with frequency of Internet use and the number of years one has been using the Internet.

In a multinational survey, Shiu and Dawson (2004) found that within-culture dimensions are more significant than between-culture differences in explaining online usage in general. The four countries included in this study are Great Britain, Germany, Japan and Taiwan. For instance, young people (teenagers) use the Internet especially for activities such as communication and gaming, while older people to a larger extent use it for purchasing goods and services. From India, Haseloff (2005) reported that Internet usage in general correlates strongly with the ability to speak English. From Africa, Mutula (2003) revealed that students use Internet cafés mostly for educational purposes while business people tend to use cyber cafés to transact business and for electronic money transfer. Also from Africa, Otero (2003) found that postgraduate students in Pretoria used the Internet cafés more for educational purposes, while undergraduates used the Internet to chat, listen to music, and for other forms of entertainment.

Boase et al. (2002) also identified distinctions between those who gain access to the Internet by public terminals and those who do so at home, in an office, or at schools. Those who use public Internet terminals are generally younger and more likely to be single and students. Public Internet access also provides a place for 'disadvantaged groups' to access the Internet, such as poorer and unemployed people (Boase et al. 2002: 15).

Hong and Huang (2005) distinguished between three types of use of the Web in Internet cafés in China: entertainment, obtaining information, and chatting. In a survey from Shanghai they reported that 83 percent of customers make use of various sources of entertainment, 80 percent seek information, and 47 percent join chatting groups and participate in on-line discussions. In another study of high school students who use Internet cafés in China, the same authors found that 67 percent use them mainly for chatting, 43 percent for playing games, 38 percent for reading information, and 20 percent just for peeping at pornographic sites (Hong and Huang, 2005). From Tanzania, Chachage (2001) also reported that Internet cafés are mainly used for recreational purposes and personal communication. It is common to download 'obscene materials'.

Lægran and Stewart (2003) made a distinction between 'extenders' and 'players' among Internet café users. Both groups create new social spaces by their various activities and cyber-social relations. In the study of young people in an Internet café in rural Norway, Lægran (2002) made no clear distinction between the use of Internet for instrumental and recreational purposes. The youngsters in this study e-mail friends and chat, search for music and films, and research topics that could help realize plans for education or travelling. A main point in that research is that users virtually move out from their local areas to an extended world of information, amusement, and individual development potentials.

Internet access represents an institutional facilitation for mobilizing human resources and empowering citizens with tools for enhancing real participation in economic and political processes "through grassroots networking and communicative social action" (Belcastro, 2002: 6). As pointed to by Britz et al. (2006), access to information is not enough to make progress in society, however. The information available should also be affordable, timely, relevant, readily assimilated, and in a language that users can understand. Especially the lack of relevance may be a problem in a developing country like Indonesia. The available information is often irrelevant, while valuable data and knowledge are privatized and inaccessible. Due to these conditions, Cullen (2003) has argued that non-Western societies have no real needs to search for the inappropriate information that is available on the Internet.

Our main objectives in this paper are to identify the dominating patterns of cyber activities among Indonesian Internet café users, to search for explanations for various uses, and to discuss societal usefulness. In the following, we will make an exploratory statistical analysis of different forms of Internet use in Internet cafés. We shall keep in mind the three main forms that have been reported in this literature review, namely instrumental, recreational, and communication or social. We shall explore seven main explaining factors, which are age, education, media exposure, personal capability, financial capacity, access flexibility, and Internet experience.

METHODOLOGY

This paper is based on a recent survey of users of Internet cafés in the city of Yogyakarta on the island of Java, Indonesia. Previous research on Internet

cafés in Indonesia has focused on the business owners (Kristiansen et al. 2003), the diffusion of the Internet café innovation (Wahid et al. 2004), and information dissemination (Furuholt et al. 2005). Previous in-depth interviews with business owners as well as with Internet café users in Yogyakarta and Lombok prepared the ground for developing a questionnaire (in the Indonesian language) on the various forms of use. The present study applied that questionnaire as the main research instrument. Draft versions of the questionnaire were tested on a number of respondents before the final edition was decided.

The questionnaire respondents were all customers that we physically met in Internet cafés in Yogyakarta during November–December 2003. The area of Yogyakarta city was divided into five geographical clusters based on the main lines of demarcation. A north-south distinction was made using the Jakarta-Surabaya railroad as a demarcation line. The northern area was divided into three clusters and the southern into two, based on the main road partitions. In each cluster, we randomly selected three Internet cafés. The number of venues for data collection thus became 15, representing 10 percent of the total number of Internet cafés in the city. In order to get the most realistic picture of Internet use, questionnaires were distributed at three different periods of time, in the morning (08.00–12.00), afternoon (13.00–17.00), and in the evening (18.00–22.00). Within each time period we collected responses until we reached the target of six Internet café users at each venue. Less than 10 percent of the customers that were approached refused to fill in the questionnaire. The total number of respondents is 270.

In the following analyses, a multidimensional scaling procedure will be used for grouping data by examining resemblance in patterns of Internet use among the Internet café customers. The multidimensional scaling technique is a statistical method in the SPSS programme to identify a geometrical structure in a data set. In our case, distance measures between types of use are displayed in a two-dimensional diagram. The procedure yields a set of groups of data, which is based on their similarities and dissimilarities. The groups are subsequently compared by applying means comparison analyses. In our efforts to explain use patterns, we analyse the seven independent variables, namely age, education, media exposure, personal capability, financial capacity, access flexibility, and Internet experience. The variables are identified on the basis of the literature review and previous empirical findings and they are operationalized as follows.

1. *Education* is measured by respondents' number of years in school.
2. *Media exposure* is measured as the number of hours per day that the respondents report they spend on both electronic and paper-based media.
3. *Personal capability* (self-efficacy) is measured by the respondents' perception of their own skills and knowledge in computer and Internet usage and English language proficiency (1=beginner, 5=advanced).
4. *Financial capacity* is measured by respondents' monthly expenditures (in Indonesian rupiah [IDR]).
5. *Access flexibility* is measured by the number of various venues through which the respondents report that they can access the Internet. A number higher than 1 means that a respondent has access to the Internet in other venues than Internet cafés.
6. *Internet experience* is measured as the number of years since the respondents started using the Internet.

FINDINGS

The average café customer in Yogyakarta spends 2.5 hours connected per visit and only an additional five minutes waiting or socializing, clearly indicating that the venues are more cyber than café oriented. Nine days per month is the average frequency of Internet café visits. A large majority of the Internet café users, 68 percent, are males. Most are single (92.6 percent) and Indonesian citizens (98.5 percent). Almost three quarters (73 percent) of the respondents are students.

Descriptive statistics of the seven independent variables are depicted in Table 1. The respondents in our survey are mostly young, an average of 22 years. Most of the customers, 88 percent, have accomplished a minimum of senior high school education. The average number of years in school among our respondents is 13, compared with an average of 9.7 in Indonesian society generally (Behrman et al. 2002). Internet café customers in Yogyakarta spend much time on various other media, with an average of 5.9 hours per day for electronic media and 4.3 hours per day for paper-based media and literature. Half of the customers have more than 5 years of experience in Internet access. Self-learning and informal competence sharing are the dominant ways of obtaining necessary skills for utilizing the Internet medium. Computer skills, Internet knowledge, and English language proficiency of the customers are at moderate levels (respectively 2.8, 2.8, and 2.7 on a scale where 1=beginner and 5=advanced). The average total

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Variable	Means (SD)	<i>n</i>	%
<i>Age (years)</i>	22.22 (5.76)		
#20		93	35.0
20–30		160	60.1
>30		13	4.9
<i>Education (number of years)</i>			
Elementary (6)	12.94 (2.62)		
Junior high (9)		12	4.5
Senior high (12)		18	6.7
University (15+)		138	51.5
<i>Media exposure (hours/day)</i>	10.24 (4.49)		
Electronic media exposure	5.95 (3.73)		
Paper-based media exposure	(4.32 (2.42)		
<i>Personal capability</i>	2.76 (0.89)		
Computer knowledge	2.80 (1.04)		
Internet knowledge	2.75 (1.05)		
English proficiency	2.73 (0.99)		
<i>Monthly expenditure (rupiah)</i>	534,000 (723,000)		
#250,000		80	34.2
250,000–500,000		103	44.0
> 500,000		51	21.8
<i>Access flexibility</i>	1.41 (0.59)		
1 access venue		175	64.8
2 access venues		80	29.6
3 access venues		15	5.6
<i>Internet experience (years)</i>	4.86 (2.02)		
< 4		43	16.29
4–6		186	70.45
> 6		35	13.26

Table 1. Internet café users in Yogyakarta: descriptive statistics.

monthly spending among our respondents is IDR 534,000 (USD 63)². This can be compared to a typical non-professional minimum wage level in Yogyakarta, which is around IDR 300,000 (USD 34.8) per month. Internet café users in our survey spend an average of IDR 56,000 (USD 6.59) per month for their Internet access in these venues. Prices paid per hour are relatively low, around IDR 2,500–3,000 (USD 0.29–0.35).

Internet cafés represent the dominant access points for the great majority of the respondents. Higher learning institutions represent an alternative access point, used by 23.7 percent of the respondents, while 11.1 percent also have access in an office and 5.9 percent at home.

The respondents were asked to indicate all the various cyber activities that they engage in during their current visit in the Internet café. E-mail, chatting, and

seeking information are the most popular activities for the Internet café customers. Using the Internet for doing business and gambling in these venues is less common. The various kinds of use are depicted in Table 2.

No.	Service	<i>n</i>	% (from sample)
1	Seeking information	256	94.8
2	E-mail	238	88.1
3	Chatting	191	70.7
4	Reading online news	179	66.3
5	Research	150	55.6
6	Computer games	103	38.1
7	Downloading software for professional use	102	37.8
8	Downloading software for amusement	102	37.8
9	Downloading music	95	35.2
10	Visiting pornographic sites	74	27.4
11	Doing business	73	27.0
12	E-shopping	52	19.3
13	Gambling	43	15.9

Table 2. Internet café users in Yogyakarta: ranking of Internet café activities.

Means comparisons among user groups and Internet activities reveal that e-mail users are significantly older than non-users. The opposite is the case for chatting, computer gaming, downloading music, and downloading software for amusement. These are all activities with a significantly younger group of users. Those who use the Internet for seeking information have significantly higher education than those who do not. Those who download music and software for amusement are generally more exposed to electronic media. The use of e-mail, research, reading online news, downloading software for professional use, and doing business are associated with significantly higher personal capability. Financial capacity is also higher for those who do online business and lower for those who download software for amusement and participate in computer games. Finally, access flexibility is higher for e-mail users, those seeking information, and for those reading online news and downloading software for professional use.

Also, cross-tabulation analyses between gender and Internet activities reveal that male users significantly differ from female users as regards visiting pornographic sites ($\chi^2 = 13.55$, $p < 0.01$) and playing computer games ($\chi^2 = 5.61$, $p < 0.05$). Males more often undertake such activities. Table 3 summarises characteristics of users of different online activities.

Next in our analyses, we use a multidimensional scaling procedure with the Euclidian distance model

No.	Activity	Typical user
1	Seeking information	Older, higher education, and better access flexibility
2	E-mail	Older, higher media exposure, higher personal capability, and better access flexibility
3	Chatting	Younger, lower education, higher media exposure, and lower financial capacity
4	Reading online news	Higher media exposure, higher personal capability, and better access flexibility
5	Research	Older, higher media exposure, and higher personal capability
6	Computer games	Male, younger, lower education, and lower financial capacity
7	Downloading software for professional use	Higher media exposure, higher personal capability, and better access flexibility
8	Downloading software for amusement	Younger, lower education, higher personal capability, lower financial capacity, and better access flexibility
9	Downloading music	Younger and higher media exposure
10	Visiting pornographic sites	Male and higher media exposure
11	Doing business	Higher personal capability and better financial capacity
12	E-shopping	Higher media exposure
13	Gambling	Higher media exposure and lower financial capacity

Table 3. Internet café users in Yogyakarta: Typical users of different activities on the Internet.

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to group Internet café use patterns. Four groups are identified. Following the literature review, we term three of them *communication*, *instrumental*, and *recreational*. The fourth group is termed *business*. However, only one Internet café customer used the Internet *primarily* for business activities and this group was therefore excluded in the subsequent analyses. (Business group respondents are counted as instrumental users). The statistical grouping is depicted in Figure 2.

After running the multidimensional scaling procedure, the customers' overall priority of Internet use is measured by averaging their ranks of the various activities. The majority of users, 52.6 percent, report that they mainly use the Internet for communication, i.e. sending and receiving e-mail, and chatting. The second largest group of users, comprising 43.3 percent, are mainly into instrumental use, which is seeking information, reading online news, and research. Only 11 of our respondents (4.1 percent) go to the Internet cafés primarily for recreational purposes, like computer gaming and visiting pornographic sites. Figures are depicted in Table 4.

No.	Main use	n	%
1	Communication	142	52.6
2	Instrumental	117	43.3
3	Recreational	11	4.1

Table 4. Internet café users in Yogyakarta: Users divided among categories of prioritized use.

In Table 5, we see how the seven explaining variables in our study are associated with the three categories of use.

Means comparisons among groups show remarkably clear patterns. Compared with the other groups, those who use the Internet mainly for instrumental purposes are generally older, more highly educated, and more exposed to other media. They also have higher personal capability, financial capacity, access flexibility, and they are more experienced Internet users. Exactly the same pattern is found when we compare characteristics of those who use the Internet mainly for communication with those who predominantly visit for recreational use. The differences and patterns are illustrated in

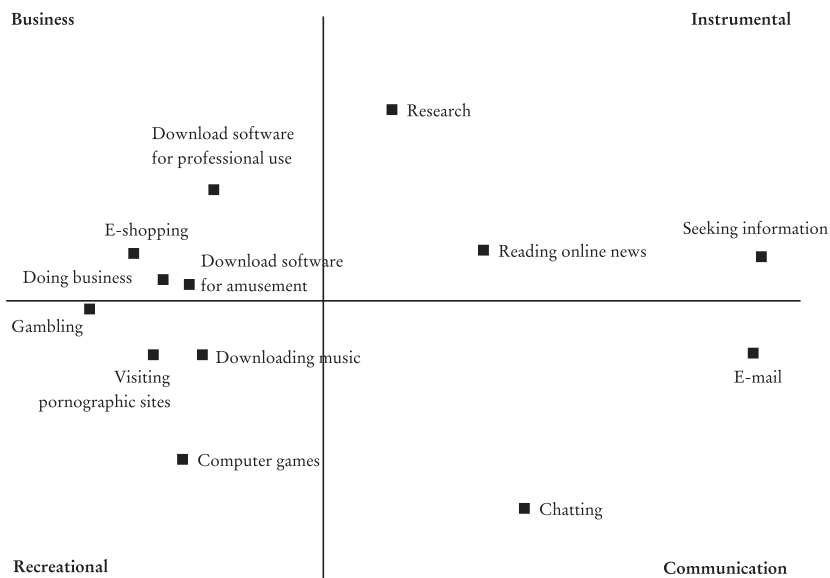


Figure 2. Internet café users in Yogyakarta. Major groups of Internet uses.

Characteristics	Main type of use		
	Instrumental	Communication	Recreational
	mean	mean	mean
Age (years)	23.75	21.47	16.00
Education (years in school)	13.40	12.79	10.33
Media exposure (hours per day)	10.89	9.74	9.60
Personal capability (1 = beginner, 5 = advanced)	2.92	2.68	2.25
Financial capacity (monthly expenditure, IDR)	627,420	477,103	283,750
Access flexibility (number of venues to access the Internet)	1.47	1.39	1.00
Internet experience (years)	5.38	4.52	4.17

Table 5. Internet café users in Yogyakarta: characteristics of Internet café users by main types of use.

Figure 3. Scales in Table 5 and Figure 3 correspond to those depicted in the descriptive statistics in Table 1.

Figure 3 clearly illustrates that customers' use of the Internet tends to change with increasing scales of all the seven variables included in our analyses. With higher age, education, financial capacity etc., there is a higher tendency to use the Web for more serious purposes. These facts point in the direction of possible enhanced societal usefulness of the Internet following increased time of experience and opportunity for usage.

CONCLUSION

This study is based on a survey of Internet café users in a centrally located city in Java, Indonesia, which is also a cultural and educational centre in the country. Our main objective is to trace patterns of Internet use and to investigate if the growing numbers of Internet cafés serve the useful purpose of spreading information and competence in an economically poor and developing society.

Seeking information, e-mailing, and chatting are the most popular single activities for the Internet café users. Internet usage for business purposes and computer games in these venues is less common but still prevalent. The majority of customers use the Internet predominantly for communication. This category comprises e-mailing and chatting. The second largest group of users mainly go to the Internet cafés for instrumental use of the Web, which is seeking information, reading online news, and doing research. It is remarkable that very few go to the Internet cafés primarily for recreational purposes, like computer gaming and visiting pornographic sites. The online use of Internet cafés primarily for business purposes hardly occurs in our sample. However, more than one quarter

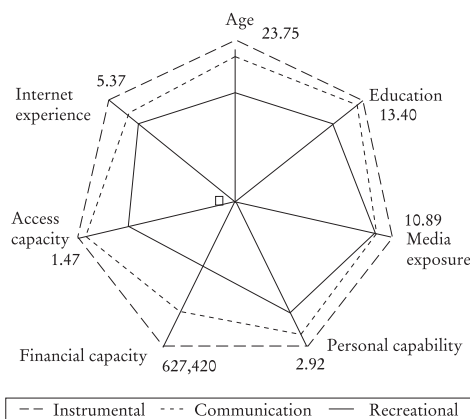


Figure 3. Internet café users in Yogyakarta. Comparing characteristics among main groups of Internet users.

report that they also use their online connection for doing business and many also do some e-shopping.

There are significant differences among Internet café customers who use these venues primarily for instrumental and recreational purposes and for communication. All the seven independent variables used in our analyses, i.e. age, education, media exposure, personal capability, financial capacity, access flexibility, and Internet experience, have explanatory power. Compared to the other categories of use, customers who mainly come for instrumental use of the Web are older and more highly educated. They are also more exposed to media, have higher personal capability and financial capacity, and they have access to the Internet at more kinds of venues and are more experienced

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Internet users. Similarly, those who primarily communicate on the Internet are older, more highly educated, more exposed to media, and have higher personal capability, financial capacity, access flexibility, and Internet experience compared to the recreational users. With higher age, education, financial capacity etc., there is a tendency to use the Web access in Internet cafés for more 'serious' purposes. These facts point in the direction of enhanced societal usefulness of Internet cafés over time and with increased age and maturity of the users. The tendency is illustrated in the Figure 4.

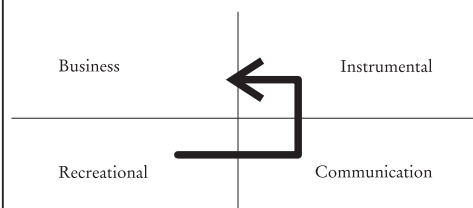


Figure 4. Internet use tendency over time.

Whether the arrow in Figure 4 will continue into the business quadrant or not is uncertain. For general Internet use, tendencies from economically more developed contexts point in that direction. It should also be underlined that many of our respondents have moved into online business activities in Internet cafés, even though this category does not represent their major use of the Web on these sites. Moreover, it is likely that predominantly business-purpose users get access to the Internet from venues other than Internet cafés, such as in their offices or homes.

This study has certain limitations. It should be noted that game centres and university-owned Internet cafés were excluded from our sample. Internet-connected amusement centres have also become favourite venues for young people who are keen on spending time and money playing online games and doing gambling. Bringing these venues into the study could have altered the main picture that appears from our study. Still, our main conclusion is clear: Internet access in public venues generally offers entries into channels of meaningful communication and sources of valuable information. Given the fact that the seriousness of Internet use tends to increase especially with education, personal capability, and Internet experience, schools in Indonesia and other developing countries could play an important role in cultivating attitudes and skills for

enhanced social utility of Web use. This means educating young people in how to use the Web to search for relevant and timely information in a language that can be understood. Potentials for enhancing and utilizing human resources for societal development would increase if Internet users were more qualified in the English language and more aware of and critical to the gains and pitfalls of various use. Also, the usefulness of Internet access could be further enhanced by capabilities to create more local Web pages and making information available in the Indonesian language.

Hill (2003) and Purbo (2002b) have argued that 'grassroots movements' drive the development of Internet access and usage in Indonesia. Many well-educated entrepreneurs have started Internet café businesses and constitute an idealistic and enthusiastic engine for development by offering Internet access together with counselling and advice. Today, the business of individual Internet use in Indonesia is neither dominated by the government nor large corporations. This could facilitate further participatory development and mobilizing of local human resources, rather than using the Internet as a means for top-down authoritarian governance or global consumerism. The documented use pattern in this study is promising in this regard and also gives hope for the role of the Internet in reducing information asymmetry and increasing political transparency.

Notes

1. An Internet subscriber is someone who subscribes to Internet access from an ISP. An Internet user is an individual who uses the Internet and he/she is not necessarily a subscriber.
2. USD 1= IDR 8,600; December 2003.

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INTERNET FOR DEVELOPMENT?

Wynn, E. and Katz, J.E. (1997) Hyperbole over cyberspace: Self-presentation and social boundaries in Internet home pages and discourse. *Information Society*, 13(4): 297–327.

Abstract

Internet cafés are important for people's access to the Internet in poor countries. These venues offer a potential gateway to valuable information, meaningful communication, and political participation for ordinary citizens. They may also represent a possible threat to traditions and cultural values. In this paper, we analyse the use of the Internet among Internet café customers in the city of Yogyakarta, Indonesia. A main objective is to assess the importance of Internet use for human resource development. Three main categories of use are identified, namely communication, instrumental, and recreational. The two first mentioned are by far the most important in our sample. Those who use the Internet mainly for instrumental purposes, i.e. seeking information, reading online news, and research, are generally

older and more highly educated with a higher personal and financial capability. This fact points in the direction of increased individual usefulness of Internet access over time.

Keywords: Cybercafés; Indonesia; Internet uses; information; Internet communication

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MORE ON INTERNET CAFÉS

University Internet cafés: one more cup of information for the road

Tanyeri, Tayfun; Cuhadar, Cem; Kiyici, Mubin; Coklar, Ahmet Naci. *First Monday*, vol. 11, no. 5, pp. np, May 2006.

Internet cafés have become main centres for information access in Turkey. Recently universities have started their own Internet cafés. The purpose of this study was to identify how students used Internet cafés in universities and the problems they faced when using them. Concludes that Turkish university students used Internet cafés for academic activities and that they found the service fees rather high. It is recommended that: students should take at least one computer course on Internet applications by their junior year to make their Internet experiences safer and more productive; Internet cafés should have all of the necessary hardware and software for students to fulfil the requirements of their university education, with properly trained support staff to assist students; Internet cafés should evolve into learning centres as well as reference points for students; and fees for basic Internet access should be minimal.

(Box continued)

(Box continued)

Less cyber, more café: enhancing existing small businesses across the digital divide with ICTs

Salvador, Tony; Sherry, John W; Urrutia, Alvaro E. *Information Technology for Development*; 11 (1) 2005, pp. 77–95.

About 10% of the world has access to information and communication technologies (ICTs). Telecenters and cyber cafés are one prevalent way to increase access. This paper suggests increasing access through currently existing, local businesses where people already gather and where proprietors already possess existing business relationships with suppliers and customers. This paper questions the prevailing emphasis on the “cyber” characteristics of access, e.g., computing and Internet access as is currently known, and attempts to refocus the conversation by considering computing and access in the context of the café, e.g., as public life in the sense of Habermas, which permits an in situ evolution of relevant access. This analysis is based on extant literature and direct ethnographic research in several public places in six countries. We offer example design perspectives based on a reflection of third places as inspiration for appropriate innovation in the provision of computing and communications.

Use of cybercafés: study of Gaborone City, Botswana

Mutula, Stephen M; Sairosse, Tomas Mauta. *Program*; 38 (1) 2004, pp. 60–66.

This paper reports on a study to determine the use of cybercafés in Gaborone, Botswana. The study involved questionnaires, interviews and observations of the management and users of the 13 cybercafés in Gaborone. The results showed that the majority of cybercafé users were students, workers and business people. Cybercafés were used largely for communication, entertainment, meeting other people, and for education. The study made recommendations to enhance Internet uptake through cybercafés in Botswana. Privacy and diversity of other services were reasons cited by users for their preference for using cybercafés rather than libraries to access the Web.

(Selected by the Editor from *Library and Information Science Abstracts*)

Article 5

A rural-urban Digital Divide?

Regional aspects of Internet use in Tanzania

Bjørn Furuholt and Stein Kristiansen

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**A RURAL-URBAN DIGITAL DIVIDE?
REGIONAL ASPECTS OF INTERNET USE IN TANZANIA.**

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Abstract:

The digital divide is the gap between those with regular, effective access to digital technologies, in particular the Internet, and those without. The global digital divide is a term often used to describe the gap between more and less economically developed nations, while at the national level, there is often an urban-rural divide. In developing countries, most Internet users gain access through public access points like Internet cafés. In this article, we take a closer look at the digital divide within Tanzania. Based on a survey among Internet café users in rural, semi-urban and central regions of the country, we find that the divide is mainly a question of finding venues with technology to access the Internet. The Internet users and usage at the different sites are surprisingly uniform, with, however, a few significant differences.

Keywords: *Digital divide, Internet access, Internet use, Internet cafés, urban, rural, Africa*

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1. INTRODUCTION

The global disparities in access to the Internet and other information and communication technologies have led to a “digital divide” between technological haves and have-nots. (United Nations, 2006). The digital divide results from the socio-economic differences between communities, which in turn affects their access to digital information, mainly but not exclusively through the Internet (Wikipedia, 2006).

The digital divide can be categorised as global, regional or national. At the national level, there is an urban-rural digital divide (Rao, 2005). In developing countries in particular, we see clear tendencies of increased concentration of information flows to urban and central areas (Wong, 2002; Mwesige, 2004). Economically disadvantaged countries and rural and peripheral districts within these nations tend to fall further behind in human resource development as well as in economic progress and political participation.

Even if the above presented access oriented definition is commonly used in literature and everyday discussions, the digital divide will not be understood if it is viewed purely as a technological phenomenon. A broader interpretation of the digital divide is necessary. Van Dijk (2006) claims that the term cannot be understood without addressing issues such as digital skills and cultural analyses of lifestyles and daily usage patterns. On the other hand, the great merit of the sudden rise of the term digital divide is that it has put the important issue of inequality in the information society on the scholarly and political agenda.

Expansion of Internet access in poor areas is facilitated by arrangements for public use, such as Internet kiosks, cybercafés, or multipurpose community telecentres (Rogers & Shukla, 2001). The Internet café (or cybercafé) concept has been successfully spread to poor countries mainly because it combines a reasonably priced access to the Internet with the comfortable environment of a coffee house or a bar and the chance to socialise with fellow users and to pick up new knowledge and ideas in computer usage.

Ideally, Internet cafés in developing countries represent reasonably priced access points to sources of information for personal development, business start-up and growth, or political participation and the progress of civil society. Information has become one of the primary inputs in economic processes, and information and communication technologies (ICT) gradually become more crucial for the ability of enterprises, communities and individuals to participate successfully in the global economy (Hollifield & Donnermeyer, 2003).

In this article, we take a closer look at the digital divide within Tanzania, a poor developing country in sub-Saharan Africa. Based on a survey performed in rural, semi-urban and central regions of the country, we investigate if there are any differences in quantity or quality of public Internet access points and their use and users. When studying the users, we concentrate on infrastructural, socio-economic, and demographic aspects.

The article is organised as follows. After this introduction, we present an overview of the socio-economic context and the spread of the Internet and Internet cafés in Tanzania. Section 3 presents the theoretical basis and relevant literature, and is followed by an outline of the methodology and data collection in section 4. Our empirical findings are depicted in section 5, and in section 6 we present the conclusions, limitations, and prospects for further research.

2. THE STUDY CONTEXT

Tanzania, a merger of Tanganyika and Zanzibar, is now a multiparty democratic republic. It was first formed and became independent from the UK in 1964.

With 37 million people and an area of 945,000 square km, Tanzania remains one of the least urbanised African countries; only 23 percent of the total population live in urban areas. Looking at the Tanzanian administrative regions, Dar es Salaam Region has the highest urban proportion (94 percent), followed by Zanzibar (40 percent) and Arusha Region (31 percent) (Tanzania national website, 2006). There has been a moderate increase in the share of the urban population between 1988 (18 percent) and 2002 (23 percent).

Dar es Salaam, with a population of 2.5 million, is the largest city, the cultural and economic centre, and the former capital of Tanzania. The relocation of the capital to Dodoma has not yet been completed. In addition to Dodoma, six other towns (regional centres) have more than 200,000 people (Tanzania national website, 2006).

According to the national website, 2.3 million people are unemployed, but the majority of people are self-employed and most of the work is seasonal in the agricultural and informal sectors. About 82 percent of the employed working age population is engaged in agriculture. Some national statistics describing Tanzania are depicted in Table 1 below.

The population of Tanzania is young and poor. More than 43% of Tanzanians are younger than 15 years, with an average age of 17.7. People in Tanzania can expect to reach 45.6 years, and one-third of the population is defined as poor. Compared to its neighbouring countries, Tanzania has a relatively high literacy rate. It is worth noticing, however, that the difference in literacy between men and women is large.

Area (sq. km.)	945,087
Population (mill.)	37.4
Labour force (mill.)	19.2
Age structure (%)	
<i>0-14 years:</i>	43.7
<i>15--64 years:</i>	53.6
<i>65 -> years</i>	2.6
Life expectancy at birth (years)	45,6
Literacy (%) (<i>Age 15 and over can read and write</i>)	
<i>Total</i>	78.2
<i>Male</i>	85.9
<i>Female</i>	70.7
GDP; purchasing power parity (PPP) (Billion \$)	27.1
GDP (PPP) per capita (\$)	700
Population below poverty line (%)	36
Unemployment rate (%)	12.9

Sources: CIA (2006) and Tanzania national website (2006)

Table 1. Country statistics

In Tanzania most people have their own local language; many of them are very different from each other. Kiswahili has become the lingua franca of eastern Africa and is the official

language, spoken by all Tanzanians. From secondary school level, all teaching is in English, the second official language of Tanzania.

The penetration of the Internet in Africa differs from one country to another, depending on each country's government policy, legal and regulatory frameworks, competition among Internet service providers (ISPs), and pricing of telecommunications services. Internet connectivity in each of the world's continents far exceeds that of Africa (Mutula, 2003). Africa with currently 850 million people, about 13% of the world population, had, in 2005, about 2 PCs per 100 inhabitants and an Internet penetration of less than 4% (table 2, below). The global average Internet penetration rate was more than 15% (ITU, 2006). The situation in Sub-Saharan Africa is even worse, and in Tanzania the ITU (2006) estimates the number of Internet users to be less than 1%.

From table 2 we see that the number of Internet users in Tanzania increased from 60 000 to 333 000, or by 455%, in the period 2000-2005. The number of Internet hosts meanwhile increased by 300%. The Tanzania Communications Commission (TCC) has licensed only nine companies to provide data communication services including Internet bandwidth. As a result of their policy, Tanzania lacks cheap and high-capacity connections to the global Internet, while there is a large and increasing demand for Internet access (Tanzania Ministry of Communications and Transport, 2003).

	Year	Internet				PCs	
		Hosts	Hosts per 10,000 inhab.	Users (000s)	Users per 100 inhab	Total (1000)	Per 100 inhab.
Tanzania	2001	1,478	0.44	60.0	0.18	120	0.36
	2005	5,908	1.57	333.0	0.89	278	0.74
Africa	2005		4.92		3.72		2.24
World	2005		421.63		15.17		13.38

Source: ITU (2006).

Table 2. Internet use and PCs

Privately owned Internet cafés increasingly represent opportunities for ordinary people in economically poor areas to access the Internet. In such venues, computers are made available at various rates and connection speed, enabling regular or occasional customers to search for information and make electronic connections with others via e-mail and chatting. Internet café employees normally provide valuable guidance in Internet use and information access to inexperienced users. The fact that mainly operational costs are incurred in the payment for Internet use represents a huge advantage in economically poor contexts. Fixed costs from the purchase of equipment and leased lines are left to the business owners and only charged to the users according to the time spent on-line. In other developing countries, like Indonesia, India and Peru, more than two thirds of Internet users gain access through Internet cafés (Kristiansen et al., 2003; Boase et al. 2002; Haseloff, 2005). Policy documents indicate that Internet cafés are the main means of Internet access in Tanzania as well (Tanzania Ministry of Communications and Transport, 2003).

Other sources of Internet access in developing countries are telecentres or multiple purpose community telecentres. The differences between telecentres and Internet cafés are mainly related to ownership, financing, and variety of services. Telecentres operate mostly as 'not-for-profit organisations', relying on various sources of external funding. In Tanzania there are only a few telecentres and we have chosen not to include them in this study.

There are no reliable statistics on the number of Internet cafés in Tanzania. Tanzania Ministry of Communications and Transport (2003) stated that the number was above 1000, while other sources estimated 300-400 some years ago (SIDA, 2001). Chachage (2001) estimated the number to be about 100, and other sources (e.g. web-directories and our own experience) indicate that 300 is an upper limit today, with the majority of them located in the commercial centre of Dar es Salaam. Due to high infrastructure prices and tough competition among them, it seems that the number of Internet cafés has decreased over the last 3-4 years.

The Internet café fee is more or less standardised over the country. Except for the most central and business oriented areas in Dar es Salaam, and special tourist sites, like the Kilimanjaro area and Zanzibar, the price is Tsh 500, or USD 0.5 per hour.

3. LITERATURE REVIEW

The digital divide is essentially a geographical division, and can be categorised as global, regional or national (Rao, 2005). The global digital divide is a term often used to describe disparities in opportunity to access the Internet between wealthy and poor nations, or between developed and developing countries. The extension of infrastructure for the use of the Internet in developing countries has generally been much slower than in economically rich parts of the world. This is mostly due to low demand and thereby low profitability of ICT businesses. The disparity in the intensity of ICT adoption among countries is wider than the disparities in their GDP per capita, indicating that the digital divide is also increasing and likely to become even more severe in the future (Wong, 2002).

At the regional level, Africa is in a particularly bad condition. According to the UN ICT Task Force (2002), the digital divide is at its most extreme in Africa, where the use of ICT is still at a very early stage of development compared to other regions of the world. Sub-Saharan Africa remains at the bottom of the list of developing regions in Internet usage surveys around the world and we will, for instance, see that Sub-Saharan Africa have only one-third of the Internet penetration compared to North Africa or one-thirtieth of the European penetration (ITU, 2006).

In developing countries, in particular, we see clear tendencies of increased concentration of information flows to urban and central areas (Wong, 2002; Mwesige, 2004). Economically disadvantaged countries and rural and peripheral districts within these nations tend to fall further behind in human resource development as well as in economic progress and political participation and thus widening the intra-country or national digital divide.

In academic literature, we find many articles covering the global and regional digital divide, in particular describing the gap between more and less industrially developed nations (e.g. James, 2005; Wade, 2004; Warschauer, 2003; Lucas & Sylla, 2003; Norris, 2001). Some authors, like Gyamfi, (2005) cover the regional aspect of the digital divide in Sub-Saharan Africa, while there are very few papers dealing with the intra-country digital divide, in particular in Africa.

Even if the above presented access oriented definition is commonly used in literature and everyday discussions, the digital divide will not be understood if it is viewed purely as a technological phenomenon. A broader interpretation of the digital divide is necessary (Joseph, 2001; De Haan, 2004; Rao, 2005). In line with this, Van Dijk and Hacker (2003) claim that the extent and the nature of the digital divide and information inequality depend on a multifaceted concept of access, where they distinguish between four kinds: "mental access", "material access", "skills access", and "usage access". While the public opinion and public policy, so far, have been strongly preoccupied with the second kind of access, lack of computers and network connections, they have observed that access problems of digital technology gradually shift from the first two kinds of access to the last two kinds.

Kling (1999) argued that Internet use is a question of social as well as technological access. Technological access refers to infrastructure and the physical availability of computer hardware and software, while social access refers to the mix of professional knowledge, economic resources, and technical skills required for the use of ICT. Chen & Wellman (2004) were looking at Internet use in eight countries: UK, US, Germany, Italy, Japan, Korea, China and Mexico. Across these eight countries, socioeconomic status, gender, life stage, and geographic location significantly affected people's access to and use of the Internet. The study reveals that Internet users are more likely to be well-off and better educated than non-users and, that men are more likely than women both to access and to use the Internet regularly. In both developed and developing countries, the Internet penetration rate among younger people is substantially higher than that among older people. Students who can get online via school connections make up a big share of Internet users in developing countries, and geographic location also affects access to and use of the Internet, with more affluent regions having higher Internet penetration rates than poorer ones. Moreover, the intersection of socioeconomic status, gender, age, language and geographic location tend to increase the digital divide in mutually reinforcing ways within and between countries. The largest gap is between better-educated, affluent, younger, English speaking men in developed cities and less-educated, poor, older, non-English speaking women in underdeveloped rural areas.

Rao (2005) highlights India in the context of digital divide by discussing its infrastructural bottleneck that includes electricity, IT penetration, teledensity, and Internet industry. Within India, some states are more digital than others and within a state, there is an urban-rural digital divide. Within urban areas, there is educated-uneeducated digital divide and amongst educated there is a rich-poor digital divide.

This broader interpretation of the digital divide also contains a cultural dimension. Mosse and Sahay (2003) tell that attempts to deploy ICT in Mozambique face critical problems due to a variety of constraints ranging from inadequate infrastructure to manpower shortages, to a culture that does not yet value the "efficient use of information". Van Dijk (2006) claims that the digital divide cannot be understood without addressing issues such as attitudes toward technology, the channels used in new media diffusion, educational views of digital skills, and cultural analyses of lifestyles and daily usage patterns. He has studied the digital divide research during a period of time and states that the deeper social, cultural, and psychological causes behind the inequality of access have not been addressed so far.

According to UN ICT Task Force (2002), in Sub-Saharan African countries, the divide between urban and rural areas is even greater than in the rest of the world. Most of the services and users are concentrated in the towns, while the majority of Africans are scattered in small communities spread-out across vast rural areas. Very limited diffusion of the telecommunications networks into rural areas (often over 75 percent of the country's telephone lines are concentrated in the capital city) and irregular or non-existent electricity supplies are a common feature and a major barrier to the use of ICT, especially outside the major towns.

Kasusse (2005) has investigated the strategies of bridging the digital divide in Tanzania's neighbouring country, Uganda. Even as communication barriers fell, he found that new divides had emerged and Internet access, though certainly affordable to the middle class in the urban area of Kampala, is still mostly non-existent for the 90% of Ugandans who live away from Kampala. This shows that the digital divide is not only a hardware divide regarding telephone lines and computers. It is also a mental divide, defined by illiteracy, command of English, and feelings of ease and familiarity with these technologies.

Even if we agree in a broad definition of the digital divide concept, the first step in the direction of bridging the digital divide in a country is to provide access to the Internet in rural areas. In developing countries, most Internet users gain access through public access points

like Internet cafés (Kristiansen et. al, 2003). In China, Liang & Ning (2004) predicts that Internet adoption in smaller cities will continue to grow with the popularization of Internet cafés. Mathur & Ambani (2005) claim that private profit-making institutions, like cybercafés, can develop solutions to capture the hitherto unrecognized markets, make profits, and at the same time provide aid to the rural societies in India. From Malaysia, Alhabshi (2004) reports that in an area, which is politically marginalized and physically ignored, the digital divide is bridged by way of structurally poor and financially weak cybercafés. In a study of cybercafé industry in Africa, Mutula (2003) states that they have become important access points for a majority of Internet users.

This basis of theoretical and empirical studies will be used in the upcoming analysis of Tanzanian data to investigate if there are any differences in quantity or quality of public Internet access points and their use and users. When studying the users, we have concentrated on infrastructural, socio-economic, and demographic aspects.

4. DATA COLLECTION AND METHODOLOGY.

This paper is based on recent surveys of users of Internet cafés in five towns in Tanzania (see map, figure 1 below). Previous in-depth interviews with business owners as well as with users prepared the ground for developing a questionnaire in the Kiswahili language. Draft versions of the questionnaire were tested on a number of respondents before the final version was decided. The questionnaire has formed the main research instrument for this study.



Figure 1. Tanzania – research sites

The survey was executed during two periods in 2004. In January/February, the survey took place in three rural regions, Iringa, Mbeya, and Songea in the south-western part of the country, along the main road from Dar es Salaam towards Malawi and Zambia. The three regions have between one and two million inhabitants (see table 3, below). The distance from Dar es Salaam is between 500 and 1000 kilometres. All the seven Internet cafés we visited

were found in the regional centres (towns), three in Mbeya, three in Iringa, and one in Songea. This resulted in a sample of 63 respondents. In September 2004 we carried out the second phase of the survey in Morogoro and Dar es Salaam. Morogoro region, about 200 km west of Dar, between Dar and Dodoma, has a population of 1.7 million and 260,000 people in the regional centre. The town has some industry and a number of educational institutions, including two small universities. We collected 41 questionnaires in four of the six cafés in town (no selection criteria) from all customers, at different time (morning and afternoon) on two days. Dar es Salaam is the biggest city in Tanzania, with 2.5 million people. Through our own mapping, combined with various other sources, we have registered 61 Internet cafés, mainly in the Kinondoni and Ilala areas. From this list, we selected 12 of the cafés, based on an even distribution across the two areas. In some cases, we did not get permission to distribute questionnaires to the customers from the managers, and then we went to the next, nearby café. Half of the cafés were visited in the morning, half in the afternoon. All customers present were asked to fill in the questionnaire and all together 161 valid answers were collected in Dar. The total number of respondents is 265.

Region	Population	% urban pop	# ICs	People per IC
Dar es Salaam	2 497 940	94.00	61	40 950
Morogoro	1 759 809	13.00	6	293 302
Iringa-Mbeya-Songea	4 682 545	10.78	7	668 935

Table 3 - Tanzania regions, population and number of inhabitants per Internet café.

Dar es Salaam is a typical urban and geographically central region, while Iringa, Mbeya and Songea are rural and geographically distant. Based on the geographical position, the infrastructure and the public services, we have classified Morogoro as semi-urban in this regard.

In examination of survey data, we have used simple statistical analysis. A number of additional in-depth interviews with customers in Morogoro and Dar es Salaam have helped us in interpreting statistical findings. In our statistical analyses, we investigate a number (ten) of variables across the three levels of rurality, namely age, gender, education, employment, financial capacity, Internet café expenses, personal capability (skills and knowledge), Internet café use frequency, Internet experience, and access flexibility. The variables are identified on the basis of the literature review and previous empirical findings and they are operationalised as follows.

The operationalisation of variables like *age* and *gender* is obvious. For the *education* variable, we make the distinction between three levels, namely elementary, high school, and university. In the analyses, we count the number of years in schooling. For the *employment* variable, we make a distinction between the following categories: student, self employed, government employee, private company employee, and unemployed. *Financial capacity* and *Internet café expenses* are measured by respondents' reported monthly expenditures (in Tanzanian shillings, Tsh). *Skills and knowledge* is measured by the respondents' perception of their own skills and knowledge in computer and Internet usage and English language proficiency (1=beginner, 5=advanced) and *personal capability* is the sum of the three numbers. *Internet café use frequency* is measured as the number of days per month the user reports to visit an Internet café and the hours spent per visit. *Internet experience* is measured as the number of years since the respondents started using the Internet, and, at last, the *access flexibility* is measured by the number of various venues through which the respondents report that they can access the Internet. A number that is higher than 1 means that a respondent has access to the Internet in other venues than Internet cafés.

5. EMPIRICAL FINDINGS AND DISCUSSION

Based on the literature review, we find it suitable to group the digital divide into 4 categories: Infrastructural, socio-economic, demographic, and cultural. The infrastructural digital divide is the basic one, dealing with physical access to ICT resources and to the Internet. The socio-economic category is about financial, educational and geographical conditions, while ordinary demographic dimensions, like age, gender, marital status, and ethnicity constitute the third group. The cultural category is difficult to define exactly, but it consists of elements like motivation, attitudes (for example to information and technology), and religion. In this paper, we have looked at the first three categories, when studying the Internet café users.

There is a very clear geographical digital divide between urban and rural areas in terms of public internet access points, and access to the Internet. Table 3, above, shows that there are 16 times more people per Internet café in the rural regions of Iringa, Mbeya and Songea compared to urban Dar es Salaam, and in the semi-urban region, Morogoro, there are 7 times more people per café.

On the other hand, we found that the use and users of the cafés in the three different areas are remarkably uniform, which, to some degree, question the described socio-economic or demographic aspects of the digital divide between urban and rural parts of a developing country. Out of ten investigated variables, only three (gender, age and total monthly expenditure) significantly differ across levels of centrality. There are, however a few other, smaller, differences, worthy of commenting.

The descriptive statistics in table 4 show that the semi-urban users are youngest, and also the rural users are younger than the urban users in Dar es Salaam. This combined with the lower share of students in Dar es Salaam, shows that young people, and in particular students represent a main user group in rural areas. This is in accordance with a study from Indonesia which states that the early Internet café market in developing countries is characterised by students and “youngsters” (Wahid et. al., 2004).

Looking closer to the combination of the users’ profession and the number of alternatives for Internet access, we see that there is a high portion of governmental employees among the rural users, while very few of those users have alternative Internet access at their work place. This confirms the SIDA (2001) assertion, that the level of automation (in the governmental sector) is low and is exacerbated by shortage of skills, equipment and money.

While the female share of the Internet café users is close to 40% in the urban areas, it is only 25% in Iringa, Mbeya and Songea. These numbers illustrate the difference in public participation between the two genders in developing countries in general, and in rural areas in particular, indicating that there is a “gender digital divide” within Tanzania.

The users’ financial status, represented by their own stated monthly expenditure, shows a significant and interesting difference between the rural and the urban/semi-urban regions. The rural users have only one third of the purchasing power compared to the two other groups. At the same time, they spend almost the same amount of money on Internet café fees. One probable explanation is the informal economy in the rural, agriculture based areas. Due to an extensive barter economy, people neither have, nor need cash to the same degree as in the urban regions. This is, of course, a serious limitation to the spread of commercial Internet café business to these areas.

	<i>Dar es Salaam</i>	<i>Morogoro</i>	<i>Iringa, Mbeya, Songea</i>
Number of respondents	161	41	63
Gender distribution (% male/female)	61.0/39.0	62.2/37.8	74.6/25.4
Age (average, years)	27.6	24.1	25.7
Education (%)			
<i>Elementary</i>	10.8	0.0	3.2
<i>High school</i>	56.4	69.7	65.1
<i>University (diploma/Bachelor/Master)</i>	32.8	30.3	31.7
Education (average, years)	11.55	11.73	11.68
Employment (%)			
<i>Students</i>	32.1	50.0	46.0
<i>Self employed</i>	20.1	2.8	11.1
<i>Governmental</i>	8.8	2.8	15.9
<i>Private company</i>	28.3	38.9	14.3
<i>Unemployed</i>	10.7	5.6	12.7
Monthly total expenditure (average, Tsh)	247,515	248,170	85,454
Monthly spending in Internet cafés (average, Tsh)	12,016	13,980	11,642
Skills and knowledge			
<i>Computer knowledge</i>	2.7	2.4	2.7
<i>Internet knowledge</i>	2.8	2.9	2.9
<i>English proficiency</i>	3.3	3.5	3.9
Personal capability	8.80	8.76	9.39
Internet experience (average, years)	4.84	4.44	4.00
Internet café use frequency (hours per month)	22.9	27.6	20.7
<i>Number of visits (days/month)</i>	12.7	13.8	13.8
<i>Time spent per visit (hours)</i>	1.8	2.0	1.5
Alternative places to access the Internet (%)			
<i>home</i>	5.0	9.8	6.3
<i>at work place</i>	17.4	22.0	6.3
<i>at school/university</i>	11.8	14.6	15.9
Access flexibility	1.18	1.34	1.19

Notes: 1 USD = 1,050 Tanzanian Shillings (Tsh).

Table 4 Descriptive statistics – the IC users

As presented in table 4, the users' educational level is remarkably similar. The average number of years in school varies by less than two percent over the three regions. Around one-third of the users, with marginal difference between rural and urban areas, have got some university education. The main impression is that the Internet café users are well-educated, which is also well documented in the literature (e.g. Chachage, 2001; Mwesige, 2004; Haseloff, 2005).

The personal capability value is a little higher for the rural users, mainly due to their perception of their own English language competence. The difference is, however, not statistically significant and has no obvious explanation other than random variations.

The semi-urban users from Morogoro are more frequent users of Internet cafés than rural or urban users. The difference is marginal, however, and is in accordance with the monthly spending on Internet café fees. The use frequency has a remarkably minimal variation across the three sites, even if the rural users have considerably less money to use.

We are a little surprised by the lack of variation in access flexibility. It is generally low. On average, the number of alternative places to access the Internet is very similar over the three sites, even if there are some differences between the access possibilities at work. This indicates that, except for the Internet café density, there is no difference in people's chance of finding places to use the Internet.

Next in our analyses, we investigate if there are any differences in type of use between the three research sites. The popularity index (table 5) is based on questions in the survey regarding the importance of various forms of use during respondents' current visit in the Internet café. The users ranked the 13 alternatives by number 1 to 13 (1=most important), and the table is the result of the average values from the users' rankings. The correspondence between the three rankings is more striking than the differences, showing that the use of Internet cafés seems rather uniform across the levels of centrality. It is worth noticing, however, that communication (e-mail and chatting) are ranked higher in the urban and semi-urban regions, while information searching activities (information seeking, research, and reading news) are all together the most popular rural activities. The reason for the lower communication ranking in the rural regions might be the low number of Internet users in that area. People in Iringa, Mbeya and Songea have fewer people to communicate with, on the net, than people in urban parts of the country.

<i>Internet service</i>	<i>Dar es Salaam</i>	<i>Morogoro</i>	<i>Iringa, Mbeya, Songea</i>
Email	1	1	5
Information seeking	2	2	1
Chatting	3	3	4
Research	4	4	2
Reading online news	5	6	3
Downloading software for professional use	6	7	8
Computer games	7	9	10
Downloading music	8	5	6
Downloading software for amusement	9	8	7
E-shopping	10	11	11
Doing business	11	13	13
Visiting pornographic sites	12	9	12
Gambling	13	12	9

Table 5.: Ranking of Internet services used in the Internet cafés.

In their research from Indonesia, Wahid et al. (2006) have found that the purpose of Internet usage in Internet cafés change over time. With higher education, there is a tendency to use the Web access in Internet cafés for more 'serious' purposes. Also our data reveal that well

educated people in the rural areas use their Internet access for more instrumental purposes, like information seeking and research.

6. CONCLUSIONS.

The Internet users in Internet cafés are surprisingly uniform over the three levels of centrality. We can see, however, some small traces of difference between urban and rural Internet users, in the way that the users are becoming more “elite” in the rural regions, where access is scarce. Rural users tend to be younger, better educated, and they are willing to spend relatively more money on Internet use. They are also, to some degree, using the net for more “instrumental” purposes, like research and information seeking. Another, more obvious difference, is the “gender divide” – showing that the share of female users is considerably lower in rural regions.

Our study tells that the digital divide within a developing country like Tanzania is first and foremost a question of differences in the possibility of access to the Internet and ICT in rural and urban areas. It is mainly a technological divide but the problems when it comes to bridging this divide seem to be a combination of political and financial obstacles. Our policy recommendation is therefore to make the conditions favourable for entrepreneurs and organisations to set up public Internet access points, and to give people in rural and geographical distant regions the same necessary qualifications to utilise the Internet for their own human development, and thus bridge the divide.

A limitation in our study is the lack of information about non-users. To expand the knowledge of the digital divide within countries, we need to know more about the “have nots”, the people that are not using the Internet and ICT today. Therefore, this study might be followed up by collecting data from a sample of non-users in the same social and economical contexts as the users, and even from areas with no Internet access at all.

In general, we have found it suitable to group the digital divide concept into four categories, infrastructural, socio-economic, demographic, and cultural divide. Even if we mainly have studied the first three groups, we are aware of the cultural aspects and see that studying this dimension as a next step, might bring us into an uncovered and interesting field of research.

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Article 6

Internet Cafés in Asia and Africa – Venues for Education and Learning?

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Internet Cafés in Asia and Africa – Venues for Education and Learning?

ABSTRACT

This paper examines the use of Internet cafés in two developing countries; Indonesia and Tanzania. The research is based on surveys of some 500 respondents in total in the two countries, supported by in-depth interviews. The findings show that Internet cafés are used for competence development today, and that they have the potential to be suitable arenas for human resource development for a wide range of users. For the users, access speed and price are important obstacles to increased use. More research is needed to see how Internet cafés can attract new user-groups to help reduce the digital divide within a developing country.

1. INTRODUCTION

Major differences exist in Internet accessibility among countries and regions, reflecting a global digital divide and information poverty in parts of the world. In addition, within developing countries we see clear tendencies towards increased concentration of information flows to urban and central areas (Wong, 2002; Mwesige, 2004). Economically disadvantaged countries and rural and peripheral districts within these nations tend to fall further behind in human resource development as well as in economic progress and political participation.

Expansion of Internet access in poor areas is facilitated by arrangements for public use, such as Internet kiosks, cybercafés, or multipurpose community telecentres (Rogers and Shukla, 2001). The Internet café (or cybercafé) concept has been successfully spread to poor countries mainly because it combines reasonably priced access to the Internet with some food and beverage services together with the chance to socialise with fellow users and to pick up new knowledge and ideas on computer usage.

Internet cafés in developing countries thus offer opportunities for ordinary people to obtain access to information and opportunities to communicate. They might, however, also represent a threat to traditions and cultural values. Rathore and Alhabshi (2005) report from Malaysia that cybercafés have primarily emerged as entertainment hubs. The illicit activities in some of these cafés pose a cultural threat to the norms of the Malaysian society and the government has worked relentlessly to reduce the 'evilness' associated with cybercafés. In some countries, they are even regarded as a political challenge. In China, for instance, Hong and Huang (2005) report on people's growing interest in using Internet cafés and the authorities' dilemma as between promoting information and resisting democratization by this means. They also report an extensive use of Internet cafés by youngsters and even minors for commercial gambling, violent games, and viewing pornography. A high number of Internet cafés have been closed down by the Chinese authorities aiming to fight 'unethical' use of the Internet and to build a safer environment for young Chinese people.

On the other hand, cybercafés can function as centres for support, education and learning about new tools and therefore could help people to overcome skill deficits which would normally exclude them from access to information and new technologies (Haseloff, 2005).

In spite of the increasing importance of Internet cafés, very limited research has been reported on their diffusion, even in areas of Asia and Africa, where they represent a major means of access to digital information and communication. Internet cafés can be a vital venue for learning and thus developing human resources in poor countries. In this paper, we examine whether this is actually happening.

This paper is based on research conducted over a three year period on Internet café entrepreneurs and users in Indonesia, and corresponding research in Tanzania that started in 2004. We have found interesting comparisons between the two countries, which make further extensive research promising.

The main objective of this paper is to find out to what degree Internet cafés are used for human resource development today and if they have the potential for being important arenas for learning in developing countries in general. To meet these objectives, we have tried to find contextual explanations of similarities and differences in Internet café user patterns and frequency in Indonesia and Tanzania. Our aim is to present information useful for the arrangement and start-up of Internet cafés in information-poor areas of developing countries and to provide a motivation for including Internet cafés an element in national human resource development through individual competence building.

The article is organised as follows. After this introduction, we present the theoretical basis from relevant literature, followed by an overview of the socio-economic context and the spread of the Internet and Internet cafés in Indonesia and Tanzania. Section four describes the methodology and data collection. Our empirical findings are presented in section five. In section six we provide conclusions, limitations and prospects for further research.

2. INTERNET CAFÉS IN THE DEVELOPING WORLD

Privately owned Internet cafés increasingly represent opportunities for ordinary people in economically poor areas to access the Internet. In such venues, computers are made available at various costs and connection speeds, enabling regular or occasional customers to search for, and process, information and to make electronic connections with others via e-mail and chatting. Internet café employees normally provide valuable guidance in computer use and information access to inexperienced users. The fact that it is mainly operational costs that have to be paid for by Internet users represents a huge advantage in an economically poor context. Fixed costs from the purchase of equipment and leased lines are left to the business owners and only charged to the users according to the time spent on-line.

In Indonesia, two thirds of Internet users gain access through Internet cafés (Kristiansen et al., 2003), and policy documents from Tanzania indicate that Internet cafés are the main means of Internet access in Tanzania as well (Tanzania Ministry of Communications and Transport, 2003). Also in other developing countries, like India, cybercafés play an important role as public Internet access points. Almost 70% of Indian Internet users frequent cybercafés and these are the main access point for almost half of the users (Haseloff, 2005:9).

Other sources of Internet access are Telecenters and Internet Access Points. The differences between Telecentres and Internet cafés are mainly related to ownership, financing, and the variety of services. Telecentres operate mostly as 'not-for-profit organisations', relying on various sources of external funding. Internet cafés normally represent profit opportunities for

the owners and are based on service fees above costs (Salvador et al., 2005). Internet cafés also normally offer additional bar or dining services, or ordinary convenience store businesses, but their main offer is concentrated around Internet use. Information Access Points are represented by an increasing number of terminals for short-term rent in shopping malls, airports and other public sites, especially in developed areas of the world.

Empirical studies of Internet users remain under-represented as an area of academic research (Lee, 1999). Even less research is conducted on users of Internet cafés, and very few reports are from developing countries. Mwesige (2004: 84) notes that “the world-wide boom of Internet cafés has not seen (a) corresponding inquiry into this form of public access to the Internet”. Some works on Internet cafés in Africa have recently been published, however. Mutula (2003) provides an overview of cybercafé culture and the growth of this industry in Africa, while Sairosse and Mutula (2004) have mapped the users and use of cybercafés in Gaborone City in Botswana. They found that cybercafés are increasingly playing a social role as well as being centres of communication through e-mail. They also found some educational use through e-learning. Chachage (2001) reports that the main use of the Internet in Internet cafés were e-mail and that the majority of Internet café users and staff in Tanzania lack knowledge in using Internet resources.

Numerous studies have been conducted, however, on the adoption of the Internet technology in a global context (Madden et al., 2000; Kiiski and Pohjola, 2002; Grubestic, 2002). The majority of cross-national work on this topic has been limited to OECD countries, while some studies have also been conducted with a specific focus on the developing world (Zhu and He, 2002; Wilson and Wong, 2003; Wolcott and Goodman, 2003). An extensive study of Internet diffusion is being executed by The Mosaic Group through The Global Diffusion of the Internet (GDI) Project (<http://mosaic.unomaha.edu/gdi.html>) where nearly 30 countries have been studied over a period of time. Per capita income seems to be the overall most important factor explaining global inter-country differences in the Internet usage rates. Other technological and economic determinants of statistically significant value include telephone and personal computer densities (Beilock and Dimitrova, 2003) and Internet access cost (Kiiski and Pohjola, 2002).

The extension of infrastructure for the use of the Internet in developing countries has generally been much slower than in economically rich parts of the world. This is mostly due to low demand and thereby low profitability of ICT businesses. However, the disparity in the intensity of ICT adoption among countries is wider than the disparities in their GDP per capita, indicating that the digital divide is also increasing and likely to become even more severe in the future (Wong, 2002).

Kling (1999) argued that Internet use is a question of social as well as technological access. Technological access refers to infrastructure and the physical availability of computer hardware and software, while social access refers to the mix of professional knowledge, economic resources, and technical skills required for the use of ICT. It appears that the use of the Internet in developing countries in general and of Internet cafés in particular is dominated by young and relatively wealthy people, mostly well educated and predominantly male citizens of urban areas (Robbins, 2002; Mwesige, 2004).

To study the adoption of Internet, researchers have used established theories from the Information Systems literature. Davis' (1989) concepts of 'perceived usefulness' and 'perceived ease of use' still have a dominant position in the stream of theories and models on ICT user acceptance. As regards Internet use, Oyelaran-Oyeyinka and Adeya (2004) have documented that 'ease of use' is regarded as a major constraint even for academics in Kenya. Quibria et al. (2003) have found that Internet use and tertiary education show significant

statistical association in Asian countries. The ease of use variable normally becomes less significant with increased experience among users (Szajna, 1996). This suggests that Internet use may increase when users gain knowledge and experience.

Demographic factors, like gender and age, were not included in the original technology acceptance models (e.g. Davis, 1989). Venkatesh et al. (2003) have assessed the dominating information technology acceptance models and developed a 'unified theory of acceptance and use of technology' (UTAUT), where four main factors empirically are found to dominate the speed and rate of adoption. The four factors are 'performance expectancy', 'effort expectancy', 'social influence', and 'facilitating conditions'. In addition, their model comprises demographic factors. Age and gender significantly moderate the basic variables in explaining ICT user intention in their studies. Therefore, in the following we shall concentrate on contextual and socio-economic explanations for variations in Internet and Internet café use between and within developing countries.

3. SOCIO-ECONOMIC CONTEXT AND IT INFRASTRUCTURE IN INDONESIA AND TANZANIA

Today, both Indonesia and Tanzania are multiparty democratic republics. Indonesia achieved independence from the Netherlands in 1949 while Tanzania, a merger of Tanganyika and Zanzibar, became independent from the UK and was formed in 1964.

Indonesia, the fourth most populous and largest Muslim country in the world with close to 240 million people, still suffers from the severe Asian economic crisis of 1997, and the country is at a critical stage in the process of democracy building. More than 40 million people are unemployed (Jakarta Post, 2003). Disparities are huge between rich and poor and between 'inner' and 'outer' parts of the country. There is a concentration of economic activity and political power on the island of Java. Information asymmetry follows disparity, and entry barriers into business as well as politics are persistently higher among the poor and peripherally located. The rapidly increasing numbers of Internet users represent a potential step in the direction of more equitable access to information.

With 37 million people and an area of 945,000 square km, Tanzania has 15% of Indonesia's population on 50% of the land mass. Tanzania remains one of the least urbanised African countries—urban population is only one-third of the total. The per capita GDP is estimated to be less than one-fifth of Indonesia's, but is probably understated because of the size of the informal sector. According to the Tanzania national website (2004), 2.3 million people are unemployed, but the majority of people are self-employed and most work is seasonal in the agricultural and informal sector. SIDA (2001:7) concludes:

'Tanzania is a country of paradoxes. On the one hand the economic climate has improved, but on the other hand severe poverty persists. Multi-party democracy has been introduced, but poor people still have few chances of influencing their own futures'.

Some national statistics, describing Indonesia and Tanzania are depicted in table 1, below. The difference between them, regarding social, financial and technological status is significant; Indonesia appears far more developed than Tanzania. The size and per capita GDP have been mentioned above. The age structure, life expectancy, literacy rate, poverty and health problems (e.g.HIV/AIDS) clearly favour Indonesia.

The population of Tanzania is far younger than that of Indonesia, with more than 44% of Tanzanians younger than 15 years. The average age in Tanzania is calculated to be 17.6,

compared to 26.1 years in Indonesia. While people in Tanzania can expect to live to be 44.4 years, statistically, Indonesians have a life expectancy of 69.3 years, almost 25 years older. Both countries have a large proportion of poor people, one quarter in Indonesia and one-third in Tanzania. The literacy rate is also higher in Indonesia, but the difference is rather small. Compared to its neighbouring countries, Tanzania has a relatively high literacy rate. It is worth noticing, however, that there is a significant difference in literacy between men and women in Tanzania.

In Indonesia, 88% of the people are Muslims. Less than 10% are Christians and there are small minorities of Buddhists and Hindus. The Tanzanian population is divided into three large segments, Muslims, Christians and indigenous believers. The UK Foreign and Commonwealth Office (2004) estimates the religious distribution in Tanzania to be 45% each of Muslims and Christians and 10% traditional believers.

Both Indonesia and Tanzania have their lingua franca. Bahasa Indonesia is the dominant and official language and is spoken all over Indonesia. In Tanzania most people have their own, local languages, often quite distinct from each other. However, Kiswahili has become the lingua franca of eastern Africa and is the official language, spoken by all Tanzanians. From secondary school level, all teaching is in English, the second official language of Tanzania.

Table 1
Country statistics

	Indonesia	Tanzania
Area (sq. km.)	1,919,440	945,087
Population (mill.)	238.5	36.6
Labour force (mill.)	100.5	13.5
Age structure (%)		
<i>0-14 years:</i>	29.4	44.2
<i>15--64 years:</i>	65.5	53.2
<i>65 -> years</i>	5.1	2.6
Life expectancy at birth (years)	69.3	44.4
Religion (%)		
<i>Muslim</i>	88	38
<i>Christian</i>	8	30
<i>Other</i>	4	32
Literacy rate (% of people aged 15 and over that can read and write)		
<i>Total</i>	88.5	78.2
<i>Male</i>	92.9	85.9
<i>Female</i>	84.1	70.7
GDP; purchasing power parity (PPP, billion \$)	758.1	21.6
GDP (PPP) per capita (\$)	3,179	590
Population below poverty line (%)	27	36
Official unemployment rate (%)	10.5	12.9

Sources: CIA (2004) and Tanzania national website (2004)

The telecommunications and ICT infrastructure, as described in table 2, shows significant differences between the two countries, as well. In spite of modest ICT expenditures and a low number of Internet hosts, the use of the Internet in Indonesia is growing quickly. The number of Internet service provider (ISP) licenses issued increased from one in 1994 to 180 by the end of 2002 (Purbo, 2002; APJII, 2004). The number of Internet users increased by more than

770% between 1998 and 2002, from 512,000 to 4,500,000. APJII (2004) predicted that the number will be 12 million by the end of 2004. Given Indonesia's large population, the density of Internet users is still low, slightly more than 2%, and lower than the density of phone lines (3%) (Directorate General of Post and Telecommunications, 2001).

The Tanzania Communications Commission (TCC) has licensed nine companies to provide data communication services including Internet bandwidth. As a result of their policy, Tanzania lacks cheap and high capacity connections to the global Internet, and there is a large unsatisfied demand in the country for Internet access (Tanzania Ministry of Communications and Transport, 2003). The number of ISPs in Tanzania increased from one in 1993 to 23 in 2002, servicing between 10,000 and 15,000 subscribers (Tanzania Ministry of Communications and Transport, 2003). The number of Internet users however has been difficult to identify. The CIA (2004) estimates the number to be 80,000 in 2002. This gives a density of Internet users of 0.2%, or one-tenth of Indonesia.

Wahid et al. (2004) estimate the number of Internet cafés in Indonesia to be around 2000. The cafés are highly concentrated and the vast majority are found in the larger cities on the centrally located and densely populated island of Java. Other major agglomerations include the tourist sites of Bali and Lombok.

There are no reliable statistics on the number of Internet cafés in Tanzania. Tanzania Ministry of Communications and Transport (2003) reports that there are reputed to be over 1,000 cybercafés, more than any other sub-Saharan African country, while SIDA (2001:17) states that:

'The number of Internet cafés in operation in Tanzania is hard to assess. Estimates from "insiders" range from 100 to 1,000, with the most realistic estimate being 300-400'.

Chachage (2001) estimates the number to be about 100. Other sources (e.g. web-directories and our own experience) indicate that SIDA's number (300) is an upper limit.

Table 2
Telecommunications and Internet statistics

	Indonesia	Tanzania
Telephones – main lines in use (mill.) - 2002	7.8	0.2
Telephones – mobile cellular (mill.) - 2002	11.7	0.7
Teledensity – (lines per 100 people) - 2002	3	1.2
ISPs – 2002	180	23
Internet hosts – 2002	61,279	1,731
Internet subscribers	667,000	14,000
Internet users – 2002	4,500,000	80,000
Television broadcast stations - 1999	41	3
Internet cafés – 2002	2000	300-400

Sources: Directorate of Post and Telecommunications (2001), Tanzania Ministry of Communications and Transport (2003), APJII (2004), SIDA (2001)

4. DATA COLLECTION AND METHODOLOGY

This paper is based on recent surveys of users of Internet cafés in the city of Yogyakarta in Indonesia and in five towns in Tanzania. Previous in-depth interviews with business owners

as well as with users prepared the ground for developing a questionnaire. Draft versions of the questionnaire were tested on a number of respondents in Indonesia before the final version was decided upon. This questionnaire formed the main research instrument for this study.

In Indonesia, the questionnaire respondents were all customers whom we physically met in Internet cafés in Yogyakarta during November - December 2003. Yogyakarta is a university city, a provincial capital, and has approximately 500,000 inhabitants. For our purposes, Yogyakarta city was divided into five geographical clusters based on main lines of demarcation. In each cluster, we randomly selected three Internet cafés. The number of venues for data collection thus became 15, which is 10% of the total number of Internet cafés in the city. In order to get the most realistic picture of Internet use, questionnaires were distributed at three different times of day. Within each time period we collected responses from six Internet café users at each venue. The total number of respondents is 270.

In Tanzania, the survey was executed during two periods in 2004, based on the same questionnaire as in Indonesia, translated into Kiswahili. In January/February, the survey was administered in three towns, Iringa, Songea and Mbeya, in the south-western part of the country, along the main road from Dar-es-Salaam towards Malawi and Zambia. The three cities are all mid-sized, with between 100,000 and 250,000 inhabitants each. None of them are typical university-towns or tourist sites. All the seven Internet cafés that we found in the three towns were visited, three in Mbeya, three in Iringa, and one in Songea. This resulted in a sample of 63 respondents. In September 2004 we carried out the second phase of the survey in Morogoro and Dar-es-Salaam. Morogoro, 220 km east of Dar, has 260,000 people some industry and a number of educational institutions, including two small universities. We collected 41 questionnaires in four of the six cafés in town (no selection criteria) from all customers, at different times (morning and afternoon) on two days. Dar-es-Salaam is the biggest city in Tanzania, with 2.5 million people. Through our own mapping, combined with various other sources, we found close to 40 Internet cafés, mainly in the Kinondoni and Ilala areas. From this list, we selected 12 of the cafés, based on an even distribution across the two areas. In some cases, we did not get permission from the managers to distribute questionnaires to the customers and in those cases we went to the next, nearby café. Half of the cafés were visited in the morning, half in the afternoon. All customers present were asked to fill in the questionnaire and all together 161 valid answers were collected in Dar. The total number of respondents in Tanzania is 265.

A number of additional in-depth interviews with customers in Yogyakarta and Lombok and in Morogoro and Dar-es-Salaam have helped us in interpreting statistical findings. Some quotations from the in-depth interviews are presented in our empirical discussion.

5. EMPIRICAL FINDINGS AND DISCUSSION

Table 3 presents the user statistics. It shows that one main difference between the research sites in Tanzania and Indonesia is the role of Yogyakarta as one of the main university sites of Indonesia. This was reflected in the composition of the respondents. Fully three quarters of the Indonesian respondents were students, compared to less than 40% in Tanzania. Some of the differences among users can therefore (partially) be explained by this, for example average age, marital status and monthly expenditure.

One-third of the Indonesian Internet café customers were women, which is a substantial percentage in a poor, predominantly Muslim society. In Tanzania the female share is a little higher, 37%. These numbers illustrate the difference in public participation between the two genders in developing countries, in general. One challenge within this context, i.e. to increase

the number of female users, will be to make the Internet cafés more presentable and suitable for women. Saidi, a teacher from Zanzibar, Tanzania explained that:

‘Women feel shy for the boys when they visit an Internet café, that’s a cultural obstacle. They need arrangements for sitting for themselves to feel comfortable.’

The age difference looks marginal between the two national user groups, and might, to some extent be explained by the population composition (see above). But, looking at the age distribution of the total population, where Tanzanians are, on average, more than 8 years younger than Indonesians, we observe that the Tanzanian Internet café users are older than we could expect.

Table 3
Descriptive statistics – the IC users

	Yogyakarta in Indonesia	Tanzania
Number of respondents	270	265
Gender distribution, Male/Female (%)	68/32	63/37
Age - average	22.2	25.6
Marital status – single (%)	92.6	77.6
Education		
<i>Elementary (6-7 years)</i>	4.5	8.9
<i>High school (junior/senior; 9-12 years)</i>	58.2	58.6
<i>University (Diploma/Bachelor/Master; 13 years +)</i>	37.3	32.3
Employment		
<i>Students</i>	72.2	38.1
<i>Self employed</i>	9.3	15.5
<i>Governmental</i>	.7	9.8
<i>Private company</i>	12.2	26.3
<i>Unemployed</i>	4.4	10.5
Monthly total expenditure (USD)	62.20	200.95
Monthly spending in Internet cafés (USD)	6.51	11.60
Internet café fees, price per hour (USD)	0.29-0.35	0.50-1.14
Skills and knowledge		
<i>Computer knowledge</i>	2.80	2.78
<i>Internet knowledge</i>	2.75	3.10
<i>English proficiency</i>	2.73	3.73
Frequency of use of Internet cafés – days/month	9.1	13.2
Time spent per Internet café visit - hours	2.6	1.8
Alternative places to access the Internet		
<i>home</i>	5.9	4.6
<i>At work place</i>	11.1	9.0
<i>At school/university</i>	23.7	8.5

1 USD = 1,050 Tanzanian shillings (Tsh) = 8,600 Indonesian rupies (Rp)

Based on the background of the high proportion of students among Indonesian users, we find surprisingly small differences when it comes to educational level between the two countries. Around one-third of the users in both countries have some university education. The main impression is that the Internet café users are well-educated, which is also well documented in

the literature (e.g. Chachage, 2001; Mwesige, 2004; Haseloff, 2005). Less than one out of twenty Indonesian users have only completed their primary education, while in Tanzania close to 10% of the users have only elementary (6-7 years) education, which is a little higher than might be expected. This finding suggests the need for closer study into finding ways to attract a wider range of user groups to Internet cafés in general.

While there were almost no governmental employees among the Indonesian users, 10% of the Tanzanians had governmental positions. One explanation could be the lack of alternative places to access the Internet for this group. According to SIDA (2001:28),

'... the level of automation (in the governmental sector) is low and is exacerbated by shortage of skills, equipment and money'.

There is a surprisingly high share of unemployed people among the Tanzanian users (10%), considering the relatively (compared to per capita GDP) expensive Internet café fees.

Tanzania is categorised as one of the poorest countries in the world. Even if Tanzanians, on average, are poorer than Indonesians (one-fifth of the per capita GDP), the Internet café users there spend three times more money as a total and 80% more on Internet café fees than the Indonesians. There are various potential explanations for these numbers; the most obvious is the users' employment position, where the Indonesians are dominated by students, while there is a large portion of professionals (more than 40%) among the Tanzanians. Our impression is that all users spend a surprisingly large amount of money on Internet café fees. Tanzanians spend more than 5%, while Indonesian Internet café users spend as much as 10% of their monthly expenditures on Internet café fees.

Users in Tanzania visit the cafés more frequently than Indonesians in Yogyakarta, but they spend a shorter time per visit. Altogether the two groups spend almost exactly the same time in the Internet cafés during one month.

As mentioned above, the educational level is remarkably similar between the two national groups of users, and the two groups have an almost parallel perception of their own computer knowledge. The Tanzanians' perception of their Internet knowledge is a little higher than the Indonesians and there is a clear difference in the understanding of their own English language proficiency. On a scale from one to five (five is best), the Tanzanian users score as high as 3.73 on average, compared to 2.73 among Indonesians. The explanation is, most probably, the wide use of the English language in the Tanzanian school and society.

When looking at the various types of use of Internet cafés from table 4, one main finding from our surveys is that the Internet cafés, to a high degree, are used for competence development. Seeking information (rank 1) and research (rank 5/4), both fall into that category, while e-mail, reading news, downloading information and software for professional use, and doing business all may contain important elements of competence building. The correspondence between the two rankings is more striking than the differences, suggesting that the use of Internet cafés is somewhat similar even in the different context in the different countries.

Through in-depth interviews, we have tried to trace the change, or development, in Internet café use for various user groups. Many, especially young people, start with pure entertainment and socialising, such as through chatting, games etc. We found however, that the use changes over time, being more 'serious' or useful after a period of time. Gaspar, the manager of an Internet café in Dar-es-Salaam, had noticed about his customers:

'... at first (they) use e-mail only. After a while, instead of only waiting, they start to read news, seek other information and sometimes end up with more professional uses. Young people who come for entertainment – after they have played games for some

time, seek information for their school work and now or then print the information for later use’.

Purnomo, the owner of an Internet café in Yogyakarta told us:

‘After the economic crisis – users are more selective in their spending. Generally, there is a change in motivation for using the Internet café among students. They used to use the Internet for entertainment, but today they use it for specific purposes, such as searching articles to support their thesis or for communication’.

Donny, running the B@yonet Internet café in Yogyakarta, similarly related that:

‘We see that students (including high school pupils) now search information in the Internet, not in libraries anymore.’

Table 4

Internet café use (during this visit) in **Indonesia** (n=266) and **Tanzania** (n=265)

Type of use	Indonesia			Tanzania		
	n	% of sample	Rank	n	% of sample	Rank
Seeking information	256	94.8	1	192	72.5	1
E-mail	238	88.1	2	191	72.1	2
Chatting	191	70.7	3	161	60.8	3
Reading online news	179	66.3	4	136	51.3	5
Research	150	55.6	5	152	57.4	4
Computer games	103	38.1	6	98	37.0	6
Downloading software for professional use	102	37.8	7	87	32.8	8
Downloading software for amusement	102	37.8	7	86	32.5	9
Downloading music	95	35.2	9	94	35.5	7
Visiting pornographic sites	74	27.4	10	46	17.4	12
Doing business	73	27.0	11	57	21.5	11
E-shopping	52	19.3	12	61	23.0	10
Gambling	43	15.9	13	34	12.8	13

Our findings are in line with those of studies in other parts of Africa. Odera (2003) investigated why students in Pretoria, South Africa, used the Internet café and found that postgraduates tended to use the Internet as an educational resource, while undergraduates used the Internet to chat, listen to music, send free SMS, and other forms of entertainment.

Where do people learn to use the Internet? Table 5 shows that only a few of the Internet café users have learned to use the Internet at school or through formal courses. Most of the training has taken place in the cafés, where the users have learned by themselves supported by friends and staff. Almost half of the Tanzanian users have learned from the Internet café staff, while most of the Indonesian users have learned to use the Internet by themselves combined with help from their friends in the cafés.

Felix, a 20 years old student in Morogoro used the Internet for the first time one year ago: *‘I learned it from myself and from the staff – they are most helpful and have helped me very much.’* The manager of the Sea Boys Internet café in Dar-es-Salaam has more than 50%

regular customers. *'They become my friends and then I advise them on how to use the computers and access the Internet'*. Sheila, a 19 years old high school student in Yogyakarta is using the Internet 3-4 times a week. She learned it by *'... asking friends of same age. Many friends knew a lot of the Internet'*.

Table 5
How did you learn to use the Internet?

Source of knowledge	Indonesia		Tanzania	
	n	%	n	%
Formal course	29	10,90	79	29,81
Self-learning	169	63,53	66	24,91
Asking friend	176	66,17	78	29,43
Internet café staff	62	23,31	118	44,53

Finally we looked at barriers to Internet use in Internet cafés (see table 6) and found that users from Indonesia and Tanzania look differently at the obstacles to increased use. Tanzanians rank cost as the most important factor. More than 50% of the respondents would have used the Internet more if the price was reduced. Looking at the national differences between general economic level (table 1) and the Internet café fees (table 3), this is easy to understand. The price is two to three times higher in Tanzania than in Indonesia.

While infrastructure quality (access speed) is ranked as obstacle number one in Indonesia, this is only the third most important hindrance in Tanzania. In Indonesia, there are only marginal differences between the three highest ranks. In Tanzania, costs have a much higher score than the other barriers. We have included some quotations from in-depth interviews to illuminate the cost and infrastructure issues:

Arafa, a 24 year old female Internet café customer in Dar-es-Salaam thought that:

'In Tanzania it is very expensive to use the Internet and lack of cash is the first and most serious limitation to my use of Internet cafés, then comes spare time'.

Bambang is a 28 year old engineer from Yogyakarta. He has been using the Internet since 1998 and says that the reason he uses this specific Internet café is the access speed.

'The connection is fast. Usually big Internet cafés have good bandwidth. Small Internet cafés with limited budgets often lease only limited Internet bandwidth. The rental price is not my main consideration, as long as the rate is compensated by the speed of access.'

Sheila, a female student in Yogyakarta, also feels that bad infrastructure is a problem for her:

'I don't like to open Indonesian websites. It takes too much time to download because of the quality of the servers they use. Because of that, I use English 90% of the time when accessing the Internet and I'm sure I would use the Internet even more if it was equally easy to access the Indonesian websites'.

The significance of the amount of useful information being identified is interesting to examine more closely. This has higher relevance in Indonesia than in Tanzania, where less than 10% of the respondents have pointed to this factor as an obstacle to increased use. One explanation could be their English language proficiency (see table 3). From our detailed numbers, we can see that the Indonesian users use English and Bahasa Indonesia equally when accessing the Internet, while the Tanzanians use Kiswahili to a very limited degree (less than 20%). Although some Indonesian users prefer to use English when they access the

Internet, many still regard a lack of useful information in Indonesian as an obstacle to increased Internet use.

Independent of their language knowledge, the amount of web-based information in their own language is an interesting issue in this connection. The Tanzania Ministry of Communications and Transport, (2003:4) states that:

‘While there are many Tanzanian websites, most of these are in English ... However, an encouraging phenomenon is that Kiswahili is recognised as being the African language with the greatest web presence’.

Table 6
Factors limiting Internet use

Obstacle	Rank of perceived severity	
	Indonesia	Tanzania
Access speed	1	3
Cost	2	1
Spare time	3	2
Amount of useful information/services	4	5
Personal skills	5	4

The barriers to Internet use in Internet cafés corresponds to a certain degree with some of the general theory we presented in section 2. Access speed is clearly linked to “perceived ease of use” and amount of useful information to “perceived usefulness” in the Technology Acceptance Model (Davis, 1989) and UTAUT (Venkatesh et al., 2003). Kiiski and Pohjola (2002) point to the importance of Internet access cost as an explanation of differences in Internet usage.

6. CONCLUSIONS

In our study, we show that Internet cafés are today the main access point to computers and to the Internet for people in developing countries such as Indonesia and Tanzania. If they are spread further into rural areas, they have the potential to be important tools for bridging the digital divide within such countries and to level the information asymmetry.

For a wide range of users, we have shown that Internet cafés are perceived as suitable and economically acceptable sources of information and knowledge. Tanzania and Indonesia are two developing countries at very different levels of development. We found, however, that the users of Internet cafés and their use are so uniform that we find it natural to draw general conclusions. The cafés are, to a large extent, used as arenas for human resource development, through research, information seeking and other professional use, and we found that users are willing to spend a high proportion of their income on Internet café fees.

In this paper, we have tried to describe the Internet café as a ‘classroom’ for learning, both to use computers and to access information on the global Internet. Our study shows that today, Internet cafés act as Internet training schools, places for learning, and that they will have a potential to extend this training to a broader area of knowledge with increased competence and contribution from the Internet café staff. Today, the users are, in general, well educated. For the Internet cafés to become more attractive for ordinary, less educated people in developing countries, it is important to raise the competence and to increase the awareness of

the Internet café staff. Then they will be able to help and guide the users in a more effective way. Training courses, combined with practical use, could be a valuable source for additional income for the Internet café business, and is a useful way to extend the customer base and the market.

Sending and receiving electronic mail is the most common use of the Internet among all Internet café users. The Internet café use pattern seems to change over time. New and young users start their 'career' with entertainment and socialising, like chatting and playing games. After a while, more serious use, like information retrieval and research takes over.

Due to the English language's dominant position on the World Wide Web, English language proficiency plays an important role for users in obtaining full benefit from their Internet café use. Tanzanian users derive advantage from the extensive use of English language in Tanzanian society.

Low infrastructure quality (access speed) is the most important obstacle to increased use among Indonesian users, while costs are considered most important among more than half of the Tanzanian users. All together, access speed and price are the highest ranked factors limiting Internet use in Internet cafés. These two factors are linked together, and must be important government challenges in supporting improvements in and the spread of affordable Internet access.

A limitation in our study is the lack of information about non-users. To make interesting comparisons between users and non-users, this study might be followed up by collecting data from a sample of non-users in the same social and economical contexts.

Another interesting question is to see how Internet cafés can attract new groups of users to develop their competence. In Tanzania, one café was visited regularly by local classes of students (from college and high school). We want to investigate if such 'official' use of Internet cafés, or other initiatives, might raise their status and remove culturally based prejudices and obstacles against Internet café use, and thereby increase their importance for the spread of information and competence in rural and information poor areas of developing countries. Mtumwa, a female manager of a small Internet café in Zanzibar, Tanzania, told us that:

'People from Zanzibar don't like Internet cafés very much – because you can watch dirty sites. They think that's the only reason for people to use the Internet, but that's not true!'

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Article 7

***Gaming or gaining?
Comparing the use of Internet cafés
in Indonesia and Tanzania***

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Gaming or gaining? Comparing the use of Internet cafés in Indonesia and Tanzania

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KEYWORDS

Cybercafé;
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Utility gap;
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Asia

Summary

Main objectives of this study are to map and compare patterns of Internet use in poor contexts and to enhance the understanding of social gains from Internet access. The term 'utility gap' is introduced, defined as a divergence between optimal benefits and real social profit from regular Internet use at a specific site. Internet cafés are the most common venues for accessing the Internet in poor countries, and this research is based on a survey of customers in such cafés in two countries. The selected cities of Dar es Salaam in Tanzania and Yogyakarta in Indonesia represent typical poor African and Asian contexts for Internet use, which are worthy of comparing. At both locations, usage frequency tends to increase with higher individual competence and capacities. Type of use is influenced by age and gender, as well as by competence, capacities, and usage frequency. A high percentage of users utilise their Web access for socially gainful activities, and limited time is spent on games and gambling. Use patterns are quite similar in the two cities. However, the utility gap appears to be bigger in the Tanzanian than in the Indonesian context. Indonesians use access to the Web from Internet cafés primarily for instrumental purposes, like seeking information, while Tanzanians spend more resources for online recreation. The paper concludes that education and Internet experience are important for enhanced social gains from public Internet access.

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Introduction

Internet cafés in poor countries represent opportunities for poor people to access the Web and gain from available

amusement, information, and channels for communication. The extensive use of public access points partly compensates for limited telecommunication infrastructure and computer density in such countries. In Indonesia, as many as two-thirds of Internet users get their access through Internet cafés (Kristiansen, Furuholt, & Wahid, 2003). Studies from other developing countries estimate comparable figures: 75% in Peru (Boase Chen, Wellman, Prijatelj, 2002) and 67% in urban India (Haseloff, 2005). Internet cafés are the main means of Internet access also in Tanzania

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(Tanzania Ministry of Communications and Transport, 2003). Payments for Internet use at such venues is mainly to recoup operational costs, representing an advantage in economically poor context. Still, the use of Internet cafés may be costly and take a substantial share of poor people's budgets.

Globally, domestically, and socially, people's access to digital technologies is unequally distributed. Main reasons are found in per capita incomes, levels of education, policy and institutional frameworks, and infrastructural facilities (Beilock & Dimitrova, 2003; Grubestic, 2002; Wilson & Wong, 2003). Poor people in developing countries suffer from these inequalities. In addition to the multi-faceted digital divides, there are also 'utility gaps', which limit the value of Internet access for certain regions or groups of people. A utility gap is defined as the divergence between optimal benefits from Internet access and the social gains from real Internet usage at a specific site. Social gains from individual activities on the Internet include positive externalities, such as knowledge creation (Dee, 2004; Thompson & Garbacz, 2007) and network effects (Prüfer & Jahn, 2007; Shapiro & Varian, 1999). In particular, social profits from individual learning and knowledge creation may differ among various types of Internet use.

The term gaming is used in this paper to denote the use of the Internet for recreational purposes or illegal practices with small or negative social gains. That may be harmless amusement and individual diversion, like computer games and listening to music, or it may be violating ethical norms or legal laws. In the dominantly Muslim society of Indonesia for instance, both gambling and pornography are regarded as elements of a social disease, *pekat*, and formally strictly forbidden in all formats including on the Internet. Gaining, on the other hand, is defined as investment of time and money on Internet access for purposes that create substantial learning externalities and thus social profits. Examples are access to online literature and other sources of novel information.

Financial capital and human resources should be utilised for productive purposes and knowledge creation for poor countries in need of economic and political development. Internet use that supports such development should be encouraged. An important question is how to facilitate such Internet use without government intervention in filtering and censorship. There is generally a danger that access to the Web will be 'pampering and pacifying rather than educating and stimulating' (Jacobs, 2004, p. 80). From China, Hong and Huang (2005) reported on extensive use of Internet cafés by youngsters and minors for commercial gambling, violent games, and viewing pornography, resulting in large numbers of young and urban Internet cafe "addicted" to these uses. According to Rathore and Alhabshi (2005, p. 18), the government in Malaysia has worked "relentlessly to reduce the 'evilness' associated with cybercafés, but has been unable to eradicate any of the problems." A report from Indonesia indicates overwhelming traffic on pornographic Web pages in Internet cafés, and that the lack of "interference from figures of authority" may have a negative impact on forms of Internet use (Hill, 2003, p. 317). It should be noted that there is no government censorship or filtering of Internet use in either of the two countries under study, Indonesia and Tanzania (Open Net Initiative, 2007).

One city in Indonesia and one in Tanzania were selected as study sites in this research. Surveys of Internet café users at the two locations were conducted to compare user characteristics, frequency of use, and types of usage. Focus was on the distinction, though not easily defined, between Internet use mainly for individual amusement and predominantly as means for enhanced competence, human resource development, and professional work.

A main objective of this paper is to identify possible reasons for the utility gaps in Internet use in poor countries. People's ability and willingness to utilise their access to the Web for different purposes may be influenced by site-specific infrastructure and socio-economic conditions, demography, and individual competence and capacities. The paper analyses and compares potential impacts of contextual characteristics on individual use of the Internet from public access points in the two selected cities.

The following section will review the literature on Internet use as a basis for developing a research model. The study contexts of Dar es Salaam and Yogyakarta with their telecommunication infrastructure and Internet cafés are presented in the section Study context. Methodology section describes the research methodology, and section Findings and discussion presents and discusses the empirical findings and statistical analyses. The Conclusion will summarise the main findings of the study.

Who seeks what on the Internet? A literature review

The value of Internet use should be assessed on the basis of its potential to serve the community and reduce the most severe impacts of poverty and arbitrary political rule, especially in economically poor and politically undeveloped contexts. The terms "good" and "evil," as above are highly disputable and contain subjective judgements that are difficult to generalise. They will be avoided in this paper. The terms "serious" and "unserious" as associated with Internet use are also dubious and in any respect relative, but may still be applicable in the contexts of poor countries when related to societal usefulness and potentials to mobilise resources for communal development. In this paper, more serious use of the Internet correlates with expectations of higher learning effects and thus higher social gains. In economically poor countries like Indonesia and Tanzania, individual learning and competence building may contribute more to the communal development and general well-being of the society than to meeting individuals' desires for pleasure from online gaining or viewing pornographic Internet sites.

There are reasons to believe that variances in usage frequency and types of use of the Internet from Internet cafés are related to age and gender, users' competence, and various forms of individual capacities. Comparing the users and the uses of Internet cafés at different sites also invites analyses of contextual qualities that could help explain differences in these dependent variables. In the following, theories and previous findings on the relationships among demographic variables and Internet use are first presented. Thereafter, the relevance of differences in users' competences is discussed, and finally a review is made of literature

emphasising impacts of individual capacities on Internet use. Throughout the literature review, focus is on the potential contextual variances that may affect the use of public Internet access.

Previous studies have found that Internet café customers are predominantly young and male (Haseloff, 2005; Joshi, 2001; Robbins, 2002; Mwesige, 2004). The premises of the cafés are often very basic and the atmosphere is generally informal and relaxed, fit for youth cultures. However, according to Oyelaran-Oyeyinka and Adeya (2004), even older people in Africa are compelled to search Internet access in cybercafés due to the high initial investment costs of end-user equipment.

Based on a multi-national survey of Internet use, and by making a distinction between “instrumental” and “recreational” use, Boase et al. (2002) found that recreational use is more common among younger users. The authors do not offer definitions of instrumental and recreational, but examples of instrumental use are sending and receiving e-mail, using online libraries and other sources of information, taking online courses, doing business, and various administrative activities. Examples of recreational use include chatting, collective role-playing, and playing online multi-user games. These authors additionally discussed a third category of use, which is “communication” and keeping in touch with relatives and friends. Also Shiu and Dawson (2004) found that teenagers in Great Britain, Germany, Japan and Taiwan use the Internet especially for activities such as communication and gaming, while older people to a larger extent use it for instrumental purposes such as purchasing goods and services.

Li and Kirkup (2007) compared the use of the Internet among Chinese and British students and found that men in both countries played more computer games than women. The Chinese were the most active game players. Generally, women were more inclined to use the Internet for study purposes and men for “personal interests.” Gender differences in type of use were higher among the British than in the Chinese group, and the British students were generally more inclined to use Web-connected computers for study purposes. From the US, Montgomery (2000) concluded that a comprehensive policy agenda is needed to promote the positive potential and minimise the harms of new digital media in the lives of youth.

Users of the Internet generally tend to be more educated than non-users (Chachage, 2001; Haseloff, 2005; Mwesige, 2004). Quibria, Ahmed, Tschang, and Reyes-Macasaquit (2003) found that Internet usage and tertiary education show significant statistical association in Asian countries. Lim (2003) reported that especially well-educated youth frequent the Internet cafés in Indonesia. According to Abbott (2001), proficiency in the English language matters, being the principal language used on the Internet, as does basic literacy and ICT competence. In India, most Internet café users are also found to be fluent in the English language (Haseloff, 2005; Joshi, 2001). From Africa, Roycroft and Anantho (2003) found that the presence of English as an official language had a positive impact on Internet adoption. In the mentioned study of Boase et al. (2002), instrumental users had higher education than those using the Internet mainly for recreational purposes. There are also clear indications that the general level of education in a specific

society may influence usage frequency and the type of use in that context (Oyelaran-Oyeyinka & Lal, 2005).

Instrumental use is statistically associated with user experience, in the way that “veterans” use the Internet significantly more for instrumental purposes compared to “newbies” (Boase et al., 2002; Center for the Digital Future, 2004). Less experienced users tend to spend more time playing online games, downloading music, and participating in chat rooms. From Indonesia, previous studies have reported on Web use patterns among a dominantly young and male user group. Based on “history files” in Internet café computers in Indonesia, it was found that pornographic websites exceeded 50% of visited sites at some locations (Hill, 2003). Another study from Indonesia found that chatting is the most popular online activity, followed by entertainment, reading online magazines, sports information, and educational use (Harkness, 2001). From another context, Jeffres, Atkin, Neuendorf, and Lin (2004) found that the diversity of Web use is clearly correlated with frequency of Internet use and the number of years one has been using the Internet. Generally, it seems that the more people use the Internet recreationally, the more they use it instrumentally (Boase et al., 2002).

As regards users’ occupation, students tend to be a dominant user group of the Internet in developing countries in general (Robbins, 2002) and of Internet cafés specifically (Furuholt et al., 2005; Mwesige, 2004). From Africa, Mutula (2003) revealed that students use Internet cafés mostly for educational purposes while business people tend to use cybercafés to transact business and for electronic money transfers. Also from Africa, Odero (2003) found that postgraduate students used the Internet cafés more for educational purposes, while undergraduates used the Internet to chat, listen to music, and for other forms of entertainment. Omotayo (2006) found that many students in Nigeria cannot afford to pay the fees charged in commercial cyber cafés. University teachers are also regular users of Internet cafés in Africa (Oyelaran-Oyeyinka & Adeya, 2004). Generally, people employed in the service sector tend to be regular and frequent users of Internet cafés in developing countries (Haseloff, 2005).

The gap between incomes and costs still make Internet access in Africa “a luxury item” (Oyelaran-Oyeyinka & Adeya, 2004, p. 70). Nevertheless, it seems that committed users of Internet cafés are willing to pay substantial amounts of money for such services (Furuholt et al., 2005). Mwesige (2004) reported an average spending of 23.5USD per month among Internet café customers, which is a high cost in the relatively poor economic context of Uganda. From China, both Du (1999) and Abbott (2001) found that Internet users have higher than average incomes. Also from India, Haseloff (2005) reported that the use of Internet cafés is strongly correlated with levels of income, as well as with general social status. It can be expected, however, that Internet café use will decrease with higher incomes above a certain level, when people can afford connection from their homes (Furuholt et al., 2005).

Du (1999) also reported that regular users of the Internet in China similarly tend to be early adopters of a variety of other media technologies or appliances, like cable television and cellular phones. Eagerness to seek information through newspapers and other written media may also have an

impact on the frequency of Internet café use (Jeffres et al., 2004). There is some evidence that an excess of watching television, however, does not enhance the viewers' relative level of knowledge or eagerness to seek information in a society (Wahid, Furuholt, & Kristiansen, 2006). Generally, those who use Internet cafés frequently tend to have a good level of knowledge of various new technologies and also have regular access to the Internet at other venues, like in an office or at home (Haseloff, 2005; Lachmayer, 2003).

In this research, usage frequency and type of use are the dependent variables. Main independent variables are grouped into four, which are geographical context, demographical variables, individual competences, and personal capacities. Based on the preceding literature review, this exploration investigated statistical associations between the sets of variables as illustrated in Figure 1.

The operationalisation of variables like *age* and *gender* is obvious. For the *education* variable, distinctions are made among four levels, namely elementary, junior high, senior high, and university. The analyses count the number of years in schooling. *Personal capability* (self-efficacy) is measured by the respondents' perceptions of their own skills and knowledge in computer and Internet usage and English language proficiency (1 = beginner, 5 = advanced). *Internet experience* is measured as the number of years since the respondents started using the Internet. For the *occupation* variable, a distinction is made among the following categories: student, entrepreneur, government employee, private employee, and unemployed. *Financial capacity* is measured by respondents' reported monthly expenditures. *Media exposure* is the number of hours spent per day on electronic and paper-based media by the respondents. *Access flexibility* is measured by the number of various venues through which the respondents report that they access the Internet. A number that is higher than one means that a respondent has access to the Internet in venues other than Internet cafés. For the dependent variables, the extent of Internet use is the reported average hours per week or per month connected to the Internet. The respondents selected among 13 pre-specified activities

undertaken during their visit in the Internet café to indicate types of use.

Study contexts

The paper is based on recent surveys of users of Internet cafés in the cities of Yogyakarta in Indonesia and Dar es Salaam in Tanzania. The two cities represent a variety of economic and cultural qualities. Dar es Salaam is the commercial centre in a poor African country of 38 million people. The city of Yogyakarta is a cultural hub in a mid-income developing country of 223 million people. The two cities have in common, however, a dominating position within their respective national systems of higher education.

Table 1 reveals that the number of Internet users in Indonesia increased by more than 245% during 4 years, from 4.2 million in 2001 to 14.5 million in 2004. Meanwhile, the number of Internet hosts increased by 144%.

The widespread public use of the Internet explains the faster growth of Internet users as compared to hosts. Considering the size of the population, the density of Internet users is still low (6.5%), below the average percentage of Internet users in the world (13.6%) and in Asia (8.1%) (www.internetworldstats.com). The development of Internet cafés in Indonesia, known as *warnet* (*warung internet*), showed a remarkable growth around year 2000. According to Basuni (2001), approximately 1500 Internet cafés were in operation in the country in 2001. In 2002, Purbo (2002) found that the number was 2000. A combined list of Internet cafés from several sources in our study supports this number. The cafés are highly concentrated and the vast majority are found in larger cities on the island of Java, such as Jakarta, Surabaya, Bandung, Semarang and Yogyakarta.

The city of Yogyakarta has a population of 500,000. It is the regional capital of the province of 3.5 million people with the same name. The province is still a sultanate within the Indonesian state, and the sultan-governor plays a crucial

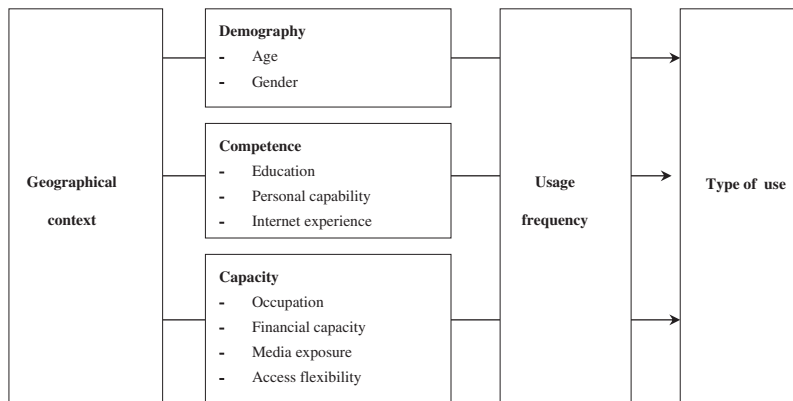


Figure 1 The research model.

Table 1 Selected indicators of ICT development in Indonesia and Tanzania*.

Country	Year	Pop. (Mill)	GDP		Internet				PCs	
			Total (Bill. US\$)	Per Capita (US\$)	Hosts	Hosts/ 10,000i- nhab.	Users (000s)	Users per 100 inhab.	Total (1000)	Per 100 inhab.
Indonesia	2001	209.2	145.3	695	45,660	2.18	4200	2.01	2300	1.10
	2004	222.6	239.0*	1111*	111,630	5.01	14,508	6.52	3022	1.36
Tanzania	2001	33.6	9.5	281	1478	0.44	60	0.18	120	0.36
	2004	37.7	9.7*	282*	5908	1.57	333	0.88	278	0.74

*2003 data. Source: <<http://www.itu.int/ITU-D/ict/statistics/>>.

role in economics, politics, and cultural affairs in the region. The city is a centre of higher learning in the country and has approximately 100 universities and colleges. Internet cafés in Yogyakarta, as elsewhere in Indonesia, are typically found in simple premises, where costs apparently are kept at a minimum and the services are mostly limited to computer activities. At an average, the number of computers operated by an Internet café in the city is 17, and the number of customers served in a typical day is 90. Areas for socialising are minimal, and café services are limited to a fridge where customers can find themselves a soft drink. Prices paid by the customers per hour are relatively low, around IDR 2500–3000 (equivalent to USD0.29–0.35 at the time of data collection). Most Internet cafés currently use wireless Internet connection through frequency 2.4GHz radio wave. Typically, an Internet café subscribes for 512 kbps Internet bandwidth, resulting in an access speed of around 30 kbps for each computer. In Internet cafés in Yogyakarta as well as in Dar es Salaam, one or two employees normally provide valuable guidance in Internet use to inexperienced users.

In Tanzania, the number of Internet users increased from 60,000 to 333,000, or by 455%, in the period 2000–2004 (Table 1). The number of Internet hosts meanwhile increased by 300%. The density of users is still as low as 0.88%, even far below the African average of 2.6%. The Tanzania Communications Commission (TCC) has licensed only nine companies to provide data communication services including Internet bandwidth. As a result of their policy, Tanzania lacks cheap and high-capacity connections to the global Internet, while there is a large and increasing demand for Internet access (Tanzania Ministry of Communications and Transport, 2003). There are no reliable statistics on the number of Internet cafés in the country. Tanzania Ministry of Communications and Transport (2003) stated that the number was above 1000, while other sources estimated 300–400 some years ago (SIDA, 2001). Chachage (2001) estimated the number to be about 100, and other sources (e.g. web-directories and our own experience) indicate that 300 is an upper limit today, with the majority of them located in the commercial centre of Dar es Salaam. Due to high infrastructure prices and tough competition among them, it seems that the number of Internet cafés has decreased over the last 3–4 years.

With a population of 2.5 million, Dar es Salaam is the largest city, the cultural and economic centre, and the former capital of Tanzania. The relocation of the capital to

Dodoma has not yet been completed. The city is an old harbour and centre of domestic and international shipping and trade. It hosts the oldest and biggest national university, along with a number of smaller state and private institutions of higher learning. Most Internet cafés in the city are found in simple, narrow premises, and they usually offer a very limited selection of services apart from computer use. The number of computers varies from 7 to 20, with 11 as an average. The normal rate is TSH 500 (USD0.5) per hour but goes as high as 1USD/h in some cafés located in central business areas. Access speed is generally low and fluctuating due to poor infrastructure. Unstable electricity supply is a continuous problem.

Methodology

Questionnaires formed the main research instrument of this study. Previous in-depth interviews with business owners as well as with users in both countries prepared the ground for developing the instrument. Drafts of the questionnaire were tested on a number of respondents in Indonesia and Tanzania before the final version was decided. The questionnaire was originally developed in English and later translated into Indonesian and Kiswahili. The translations were checked by independent re-translations into English. At both research sites, the Internet café customers were offered an economic compensation equivalent to 1 h Internet café fee, for using their time to complete the questionnaires.

In Indonesia, the questionnaire respondents were all customers whom the researchers physically met in Internet cafés in Yogyakarta during November–December 2003. The area of Yogyakarta city was divided into five geographical clusters based on main lines of demarcation. Three Internet cafés were randomly selected in each cluster. Internet-based game centres were excluded. The number of venues for data collection thus became 15, which is around 10% of the total number of Internet cafés in the city. In order to get the most realistic picture of Internet use, questionnaires were distributed at three different times of the day. Within each time period, anonymous responses were collected from six Internet café users at each venue. The total number of questionnaires distributed was 300, of which 270 of them were returned and 266 found valid.

In Tanzania, a similar procedure was followed. Dar es Salaam is administratively divided into three districts, which

are Kinondoni, Ilala, and Temeke. Most Internet cafés are found in the Kinondoni and Ilala areas, along main roads, near schools, boarding houses and hospitals, and in the city centre (Ilala). The survey was made in September 2004. Through our own mapping, combined with various other sources, 40 Internet cafés were identified in the areas of Kinondoni and Ilala. From this list, a random selection was made of six cafés in each of the two. If permission to distribute questionnaires to the customers was denied by the managers, the nearest café was alternately selected. Half of the cafés were visited in the morning and the other half in the afternoon. All the present customers were asked to fill in the questionnaire anonymously, and 161 valid forms were collected.

The facts that answers have been given in full anonymity and that respondents were selected from a high number of Internet cafés at various locations and at different times of the day contribute to the reliability of the data. Regarding validity, previous in-depth interviews have been crucial for expressing questions in the two languages in ways that are understood equally by all respondents. Construct validity is assured by basing the questionnaire within the general theoretical framework of the topic.

The following statistical analyses first apply bivariate correlation analyses using Pearson's coefficient. Cross-tabulation (Chi-square test) is used for analysing the association between variables measured in nominal values. *t*-Test is used to compare means between two groups, while one-way ANOVA is used to compare means between more than two groups. When any significant difference is found, least significant difference (LSD) test is applied in post hoc multiple comparisons to see significant differences between specific groups. In the following statistical analyses, only significance levels lower than 0.05 ($p < 0.05$ and $p < 0.01$) were accepted. Also in the upcoming analyses, a multi-dimensional scaling procedure is applied (the Euclidian distance model) for grouping data by examining resemblance in patterns of Internet use among the Internet café customers at each of the two sites. The multi-dimensional scaling technique is a statistical method in the SPSS program to identify a geometrical structure in a data set. In our case, distance measures between types of use are displayed in a two-dimensional diagram. The procedure yields a set of groups of data, which is based on their similarities and dissimilarities. The groups are subsequently compared by applying means comparison analyses.

Findings and discussion

In this section, bivariate analyses are made first, searching for statistical associations between sets of variables. Independent variables are grouped according to Figure 1, namely into context, demography, competence, and capacity. The two dependent variables are usage frequency and type of use.

As can be seen from the descriptive statistics in Table 2, the average Internet café user in Yogyakarta is 24.2 years old, which is significantly younger than the 27.7-year average in Dar es Salaam ($t = -4.09$, $p < 0.01$). The male dominance is also significantly stronger among Indonesian

users compared to the Tanzanians, 68.4% and 61.0% of the respective totals.

Comparing users' competence between the two sites, education is significantly higher in Yogyakarta than in Dar es Salaam ($t = 4.30$, $p < 0.01$). Similarly, Internet experience is also higher at the Indonesian site ($t = 4.42$, $p < 0.01$). There seems to be no significant difference in personal capability between the two locations, but looking at the details behind the average figures reveals a disparity in perception of English language proficiency. The Tanzanian users score as high as 3.32 on average, compared to 2.73 among Indonesians. The most likely explanation is the widespread use of the English language in the Tanzanian education and administrative systems.

As regards users' occupations, the prevalence of student users is much higher in Yogyakarta, as could be expected at this hub of higher education. Here, as much as 72.3% of the café customers are students, compared to 32.1% in Dar es Salaam. Meanwhile, there is a predominance of private employees and entrepreneurs among the Internet café users in Dar es Salaam. In the Tanzanian city, 8.8% of the users hold government positions, compared to 0.8% in Yogyakarta.

One of the most remarkable differences between the two research sites is the users' financial capacity, which is significantly lower in Yogyakarta ($t = -11.09$, $p < 0.01$). In spite of Tanzania's much lower than Indonesia's per capita gross domestic product, the average total monthly expenditure of Internet café customers is equal to USD236 in Dar es Salaam and USD 62 in Yogyakarta. There are various potential explanations for these numbers; the most obvious is the users' employment. Users in general tend to spend a surprisingly huge amount of money in Internet cafés. Tanzanians use more than 5% of their monthly expenditures on access fees in such venues, while Indonesian Internet café customers spend as much as 10% of their total in Internet cafés. Finally in this part of the analyses, Table 2 reveals that media exposure and access flexibility are significantly higher in Yogyakarta (respectively $t = 2.61$, $p < 0.01$ and $t = 3.97$, $p < 0.01$).

Next, analyses are made of correlations between independent variables (contexts, demography, competence, and capacity) and usage frequency in cybercafés at the two sites. Findings are depicted in Table 3 for variables on interval scale and in Table 4 for nominal variables.

Age has no significant correlation with usage frequency in Dar es Salaam, while the online time in Internet cafés increases significantly with age in Yogyakarta (Table 3). Lack of earnings may limit the Internet access time for the young Indonesian student users. In Dar es Salaam, males use the Internet more frequently than female customers as can be seen from Table 4. These numbers may illustrate a general difference in public participation between genders in the study areas.

As expected from the literature review, usage frequency increases significantly with all competence variables, which include education, personal capability, and Internet experience (Table 3). The impact of education on usage frequency is higher in Dar es Salaam, where the general level of education is lower. Meanwhile, the correlation of the personal capability variable to usage frequency is stronger in Yogyakarta. English language proficiency is a part of the personal capability variable, and the fact that English is the

Table 2 Descriptive statistics.

Variable	Yogyakarta (n = 270)			Dar es Salaam (n = 161)		
	Means (SD)	n	%	Means (SD)	n	%
Age	24.2 (5.8)			27.1 (9.0)		
≤20		60	22.9		31	20.7
21–30		174	66.4		71	47.3
31–40		24	9.2		32	21.3
≥41		4	1.5		16	10.7
Gender						
Female		84	31.6		57	39.0
Male		182	68.4		89	61.0
Education (years)	12.9 (2.6)			11.6 (3.3)		
Elementary		12	4.5		17	10.8
Junior high		18	6.8		54	34.1
Senior high		137	51.9		35	22.2
University		97	36.7		52	32.9
Personal capability	8.3 (2.7)			8.8 (4.4)		
Internet experience	5.9 (2.0)			4.8 (3.3)		
Occupation						
Student		191	72.3		51	32.1
Entrepreneur		25	9.5		32	20.1
Government employee		2	0.8		14	8.8
Private employee		33	12.5		45	28.3
Unemployed		13	4.9		17	10.7
Financial capacity (USD)	62.1 (84.5)			235.7 (185.6)		
≤50		138	59.7		27	16.8
51–100		66	28.6		49	30.4
≥101		27	11.7		85	52.8
Media exposure	9.8 (4.6)			8.5 (5.3)		
Access flexibility	1.4 (0.6)			1.2 (0.6)		

Table 3 Correlations between usage frequency and independent variables.

Variable	Correlation coefficient	
	Yogyakarta	Dar es Salaam
Age	0.16*	0.10
Education	0.15*	0.20*
Personal capability	0.35**	0.21*
Internet experience	0.21**	0.26**
Financial capacity	0.14*	0.10
Media exposure	0.10	0.20*
Access flexibility	0.22**	0.05

* $p < 0.05$; ** $p < 0.01$.

language of instruction in Tanzania schools may explain this difference. The correlation between Internet experience and usage frequency is strong and significant at the $p < 0.01$ level in both cities.

Table 4 Means comparison of usage frequency across gender and occupation.

Variable	Frequency of use (h/month)	
	Yogyakarta	Dar es Salaam
All users	30.60	26.99
Gender		
Females	26.80	18.45
Males	32.32	30.26
t-Value	0.91	1.67*
Occupation		
Students	25.67	15.17
Self-employed	48.36	29.76
Government employees	18.00	44.92
Private employees	48.00	36.23
Unemployed	25.75	19.04
F-value	2.86**	2.12*

* $p < 0.05$; ** $p < 0.01$.

As regards occupation, government employees have the highest usage frequency in Dar es Salaam, much higher than in Yogyakarta. They often lack Internet access in their offices (SIDA, 2001), and Internet cafés offer the only opportunity for e-mail communication or searching for online information. Among other occupation groups, the Internet is used more frequently in Yogyakarta than in Dar es Salaam. This is especially the case for students and self-employed people. The correlation of financial capacity with frequency of use is significant only in Yogyakarta. In other

words, usage frequency does not increase with higher monthly expenditure among Internet café customers in Dar es Salaam. As mentioned, the typical Internet café customer in Dar es Salaam is far above the Tanzanian average as regards financial capacity, and there are reasons to believe that the relatively high Internet café fees keep a lot of potential users away. Internet user density is also generally very much lower in Tanzania than in Indonesia. As mentioned, both media exposure and access flexibility are higher in Yogyakarta. Time spent on electronic and paper-based media is only statistically associated with usage frequency in Dar es Salaam. The reason may be that media exposure for Internet café customers in Yogyakarta is already very high. Access flexibility shows a positive correlation with usage frequency only in Yogyakarta. In Dar es Salaam, flexibility is probably still too low to make any significant impact on time spent online.

Next in the analyses are any differences in *type of use* between the two research sites. The popularity index of various Internet use (Table 5) is based on questions in the survey regarding the importance of various forms of use during respondents' current visit in the Internet café. E-mail, information seeking, and chatting are the most popular activities for the Internet café respondents at both research sites. Using the Internet for visiting pornographic sites and gambling in these venues is much less common at both sites. Also doing business on the Web is a relatively rare activity. There is actually a remarkable equality in patterns of respondents' use of Internet cafés in the two cities.

For the further analyses of types of use, a multi-dimensional scaling procedure is applied to group Internet café use patterns.

Four groups are identified by this statistical analysis (Figure 2). Following previous research referred to in the literature review, three of them are termed *recreational*, *communication*, and *instrumental*. The fourth group is termed *business*. Gaming activities fall into the recreational

Table 5 Popularity of Internet services.

No.	Service used	Popularity rank	
		Yogyakarta	Dar es Salaam
1	E-mail	2	1
2	Information seeking	1	2
4	Chatting	3	3
3	Research	5	4
5	Reading online news	4	5
6	Downloading software for professional use	7	6
7	Computer games	6	7
8	Downloading music	9	8
9	Downloading software for amusement	8	9
10	Visiting pornographic sites	10	12
11	E-shopping	12	10
12	Doing business	11	11
13	Gambling	13	13

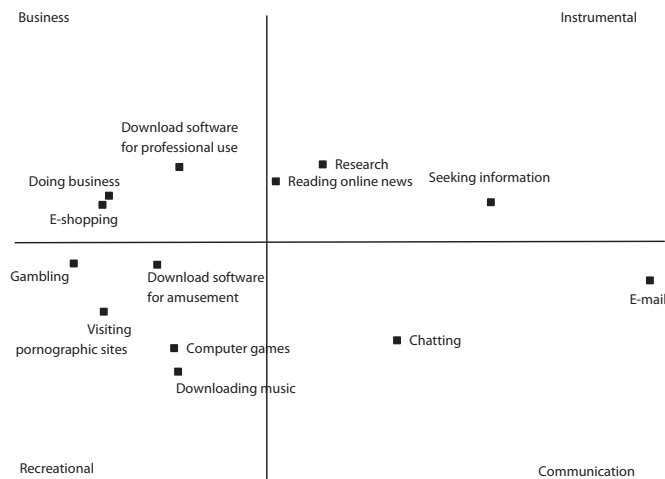


Figure 2 Categorizing types of Internet use.

quadrant, while gaining according to our definition falls mainly in any of the three others. Using the term serious below, business and instrumental use is *a priori* regarded to yield higher learning effects than communication and recreational use. Presumably, more serious use also implies higher social gains.

Table 6 reveals that Internet café customers in Yogyakarta participating in this study are more inclined to utilise their Internet access for instrumental use, like seeking information and reading online news, compared with respondents in Dar es Salaam. A significantly higher share of the customers in Dar es Salaam use the Internet for recreational purposes and amusement, like gambling and playing online computer games. Cross-tabulation analyses between type of use and site reveals that the differences are clear, as indicated by a Chi-square value of 46.72 ($p < 0.01$). There is thus a tendency that study participants in Yogyakarta are gaining more and that the utility gap here is lower for those participants in the study than in Dar es Salaam. Limited financial capacity among the Indonesian users could possibly make them more concerned about prioritising instrumental use before recreational. The higher levels of education and

Internet experience and the higher share of university students in Yogyakarta may offer additional explanations on the overall more serious use here than in Dar es Salaam.

As can be seen from Table 7, there is a strong correlation between age and type of use by participants in this study at both research sites. In Yogyakarta, older respondents indicated they were more exposed to communication and instrumental and less to recreational use of the Internet. At an average, instrumental users are 5- years older than recreational users. Meanwhile in Dar es Salaam, only the use for business purposes is significantly correlated with age in the way that business users are older than those who give priority to recreational, communicative, or instrumental use. Gender also has a correlation with type of use, but only from the respondents in Yogyakarta. Here, male participants used the Internet cafés significantly more for recreational purposes than females. Females in Yogyakarta used the Internet more for communication than males (Chi-square = 10.93; $p < 0.05$). Other differences in use between genders at the two sites are negligible.

As can also be seen from Table 7, there is a clear tendency towards more serious use of the Internet with higher education, especially for users in Yogyakarta, where differences are statistically significant. Instrumental and business users have more years of schooling than recreational users. Relationships between personal capability and type of use are not clear, though business users in this study scored highest on this variable at both sites. Internet experience has a significant impact at both locations. As could be expected from our literature review, instrumental users in the study had more years of Internet experience than both recreational and communication users. As regards occupation, there are significant differences in type of use in Dar es Salaam. Most clearly, government employees in the

Table 6 Types of use compared between sites.

No.	Type of use	Yogyakarta		Dar es Salaam	
		N	%	n	%
1	Recreational	33	12.4	61	37.9
2	Communication	54	20.3	33	20.5
3	Instrumental	173	65.0	59	36.6
4	Business	6	2.3	8	5.0

Table 7 Means comparison across types of use at both sites.

Variable	R	C	I	B	F	Post-hoc tests [†]
Yogyakarta						
Age	20.38	22.59	25.46	23.50	9.65***	I > C > R
Education	11.55	12.21	13.35	14.00	6.66***	I > R; I > C; B > R; B > C
Personal capability	8.15	7.72	8.43	9.33	1.30	
Internet experience	5.38	5.13	6.18	5.67	4.63***	I > R; I > C
Financial capacity	29.72	41.72	73.87	39.53	3.32**	I > C > R
Media exposure	9.80	8.61	10.04	11.42	1.61	
Access flexibility	1.09	1.37	1.47	1.83	5.00***	B > C > R; I > R
Usage frequency	23.48	28.56	30.46	90.83	3.94***	B > R; B > C; B > I
Dar es Salaam						
Age	26.52	25.93	28.63	36.50	3.11**	B > R; B > C; B > I
Education	10.95	10.91	12.47	12.12	2.52*	I > R; I > C
Personal capability	7.80	10.42	8.69	10.50	3.09**	C > R; C > I
Internet experience	4.03	4.31	5.86	5.00	3.31**	I > R; I > C
Financial capacity	223.65	215.73	260.69	226.19	0.57	
Media exposure	8.34	7.39	9.16	9.06	0.82	
Access flexibility	1.08	1.21	1.27	1.12	1.17	
Usage frequency	21.08	17.14	35.17	50.56	2.39*	B > R; B > C

R = recreational, C = communication, I = instrumental, B = business.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

[†]Post-hoc test is conducted using least significant difference (LSD) method.

study used the Internet less for recreational purposes than did those in the other groups. Among government employees, only 3.4% report priority for recreational use while the comparable figure for self-employed was 22.0%. This supplements our previous findings and indicates that government employees in Tanzania in the study partly use Internet cafés as their workplaces.

Table 7 also depicts a significantly higher financial capacity among instrumental users in Yogyakarta compared with recreational and communication users. Also in Dar es Salaam, the financial capacity was highest among the instrumental users. Media exposure had no significant correlation with type of use, though it can also be seen from Table 7 that instrumental and business users at both sites used other media more intensively. As regards access flexibility, relationships between this and type of use can be found only among users in Yogyakarta, where higher flexibility in accessing the Web is significantly associated with more serious use. Especially amongst the participants in Yogyakarta, more serious use of the Web was also clearly and significantly associated with higher usage frequency. Average monthly access time was 23.5 h among recreational users, 30.5 h among instrumental users, and as much as 91 h among the few business users. The same tendency can be found in Dar es Salaam, where instrumental users were connected 14 h more than recreational users per month. Business users were also by far the most frequent customers.

Generally for cybercafé customers in Yogyakarta, users of the Internet for instrumental and business purposes were 'superior' to the other users in the way that they are significantly older, more educated, have longer Internet experience, higher access flexibility, and higher financial capability. Likewise in Dar es Salaam, business users tend to be older and use the Internet more frequently than other customers. As can be seen from Table 7, there are also significant correlations between forms of use and users' education, personal capability, and Internet experience.

Conclusion

A main objective of this study was to trace reasons behind utility gaps in using the Internet from a sample of users of Internet cafés in poor countries. Efforts have been made to find out if Web access is mainly used for entertainment and individual amusement, or as a means for enhanced individual competence and social gains. Spending an average of more than half the per capita national product per year on Internet access, as in Dar es Salaam, societal usefulness matters. The average cybercafé customer in the Tanzanian sample actually spends USD144.2 annually on Internet access from these venues, which is 51.5% of the country's gross domestic product per capita.

From the empirical findings presented above, four main results have been identified in this study:

- (1) Theories and previous empirical findings on Internet usage are generally supported by our comparable data from Tanzania and Indonesia. For instance, males are dominant among Internet café customers and use the Internet more frequently than females. Usage frequency tends to increase with higher individual competency and

capacities. Type of use is correlated positively with age and gender, as well as with competence, capacity, and usage frequency.

- (2) Patterns of use are remarkably equal in the study participants at the two research sites. For instance, only small differences were found in the popularity indexes of various uses. E-mail, information seeking, and chatting were the most popular online activities at both sites.
- (3) A high percentage of users utilise their Web access for serious and non-recreational activities. The utility gap is not alarming but appears to be bigger in the Tanzanian than in the Indonesian context. In Yogyakarta, 67.3% of customers use their Web access seriously for instrumental and business activities, while the comparable figure is 41.6% in Dar es Salaam.
- (4) There is a clear tendency towards more instrumental and serious use, and thereby probably reduced utility gaps, with higher user age, education, Internet experience, and usage frequency. This is especially the case in Yogyakarta, where infrastructure is more developed, access is cheaper, and level of education generally higher than in Dar es Salaam.

A crucial question then, is what could be done to enhance the societal usefulness of public Internet access points in economically poor contexts. It is promising to see that gaining generally dominates over gaming, and that more serious activities take over after trivial with higher age and personal competence and capacities in this sample. The higher use of Internet cafés for serious and instrumental purposes in Yogyakarta than in Dar es Salaam seem to point towards education and Internet experience as catalysts for higher social profit of poor people's spending on Internet access. If additional research confirms these results, it would be appropriate to recommend that junior and senior high schools in poor countries be used for introducing young people to Internet use and promote its positive potentials. Students could be taught how individual spending on Internet access can give private benefits as well as social profits. Private entrepreneurs can also contribute to more serious and potentially more profitable use by offering training and Internet café facilities that will make most, if not all, segments of the population feel comfortable in their premises.

It should also be concluded in this paper that entertainment activities, such as playing online computer games and downloading music, could be instrumental for learning and thus regarded as personal investments to build confidence and skills for higher private and social gains from Internet access at a later stage. As mentioned, our assumption that learning effects and social gains are higher for instrumental than for recreation use is made *a priori*, and more research is needed to calculate the real values of externalities from Internet use in developing countries.

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Article 8

Investing in knowledge?

Information asymmetry and Indonesian schooling

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Investing in knowledge? Information asymmetry and Indonesian schooling

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Summary This paper reports from a survey of media exposure and level of knowledge among senior high school students at various locations in Indonesia. Government budgets for education have recently been dramatically reduced in Indonesia and increasing financial burdens are put on the households, like in many other poor countries. There is a tendency to increasing differences in quality of schooling among social layers and geographical areas. Main conclusions in this research are that information asymmetry exists as a problem in society and that type of school and location matter more than media exposure for students' knowledge level. Students in public schools generally score significantly higher than those in private institutions. Also, students' level of knowledge tends to fall with decreasing level of geographical centrality. Our policy recommendations include increased public investment in quality schooling for all.

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Introduction

People's access to information has been undervalued as an instrument for economic and political development in poor countries. Rightly, systems of public education were expanded in the new nations of Africa and Asia in the post-colonial era but were

often used to legitimize the new and authoritarian state powers and not as means for information flows and people's emancipation (Levinson, Foley, & Holland, 1996). Also, the media were censored in most new states with undemocratic regimes, and critical journalists, authors, and publishers were forced to silence (Wood, 2000; CPJ, 2006). Weak schooling systems, slow flows of information, and not least unequal access to knowledge and information have severely hampered economic and political development in many African and Asian countries recently.

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In Indonesia, the media certainly have long traditions of obedience and lack of openness and freedom. Under the ideology of 'development journalism', reporters mostly avoided critical coverage of government institutions and officials (Tesoro, 2004). The media developed in parallel with the interests of the authoritarian state (Lim, 2003). The schooling system was substantially extended in the 1970s and 1980s but also suffered from the primary function to legitimise the 'developmental state'. Today, the vast majority of Indonesia's 220 million people do not have the formal education, knowledge level, or access to information necessary to take up responsibilities in political or administrative governmental positions or as leaders in formal business. Even to be an elected member of district councils under the new, democratic regime requires a minimum of senior high school education. Less than one fourth of the population has accomplished this level of schooling (BPS, 2005). To obtain a management position in the bureaucracy normally requires a university degree and the same is the case in corporate business. Even for small-scale entrepreneurs, a certain level of knowledge and access to information are crucial for business start-up and success. Who suffers? Less than 10% of members in legislative bodies are women and they are equally underrepresented as business leaders. Access to formal education at high school level is highly skewed in disfavour of poor people, rural areas, and peripheral provinces. Very few politicians, bureaucrats or business leaders, for instance, come from the lower social layers of society.

The main objective of our study is to trace mechanisms behind the information asymmetry problem in Indonesia, while the relevance for developing countries in general is also emphasized. We define information as resources of knowledge and competence that can be used by individuals for enhancing their economic welfare, political power, or social status. The research focuses on channels of information flows especially for use in political participation and access to employment or business opportunities.

Formal schooling is an obvious factor behind unequal access to information and knowledge. People without education are losers in politics, business, and in the labour markets. However, our study investigates inequalities and reasons behind them at one certain level of education, among students in senior high schools. We shall see how differences in levels of knowledge are affected by family background, location and school type, personal capabilities, and media exposure.

The paper is organized as follows: a literature review; and theories and previous empirical findings to create a general basis for developing the research model: the Indonesian schooling system; a closer look at mass media and channels of information flows in the Indonesian society; methodology and study areas; empirical findings; including a discussion of a conclusion.

Information asymmetry and politico-economic participation

As theories of information asymmetry and imperfect information markets have been advanced (Stiglitz, 1989; Besley, 1994), increasing attention has been put on economic losses in developing regions caused by incomplete information and costly knowledge. Still, relatively few studies are made on information as a resource and information asymmetry as a problem for economic development in poor countries, compared for instance with access to capital. Also as regards preconditions for democratization in post-authoritarian regimes, little research has been made on impacts of information asymmetry on political participation and administrative transparency.

Certainly limited and uneven access to information in poor societies affects business opportunities (Kristiansen, Kimeme, Mbwambo, & Wahid, 2005) and political participation (Blair, 2000). Information asymmetry also increases social inequalities and thereby potentially strengthens tensions and conflicts among groups and regions (Dove & Kammen, 2001). According to UNDP (1999, p. 63, chapter 2), the modern society creates parallel communication systems: one for those with high income and education, giving plentiful information at low cost and high speed; the other for the poor, uneducated, and unconnected people, who are blocked by costs and uncertainties and left with outdated information. An information divide exists, understood as a gap between those with abundant and those with scarce access to information, between the information haves and information have-nots (Mariscal, 2005, p. 409).

The digital divide has received increasing attention recently as a source of information asymmetry. The digital divide is normally defined as the gap between individuals, households, businesses, and geographic areas with regard to access to information technologies and use of the Internet (Mariscal, 2005). Access to novel information through modern technologies (ICT) remains extremely unequally distributed across and within societies. According to Quibria, Ahmed, Tschang, and Reyes-Macasaquit

(2003, p. 811), "income, education, and infrastructure play a critical role in shaping the divide". Based on studies of ICT and development in rural India, Mathur and Ambani (2005) found that new technologies can bridge information gaps for the benefit of the rural poor. According to them, the Internet has brought down the costs of information dissemination substantially. Rural and unprivileged people's lack of awareness of potential gains from new information acquisition is probably now a bigger problem than technical or economic constraints.

Generally, the Internet offers a chance for a decentralized form of social mobilization (Agre, 1998) and expands individual freedom and ability to communicate. It gives individuals the capability to control the production, storage, and dissemination of information (Havick, 2000). Lack of ICT access and skills can lead to and reinforce disadvantages of individuals and firms and hinder access to local as well as national and global markets. The typical lack of infrastructure for mobility as well as the limited use of ICT in rural areas still deprive people of the means to access "places of opportunity" and thus limit people's awareness and innovativeness (Huggins & Izushi, 2002, p. 113). From Mexico, Mariscal (2005) found that the deployment of ICT has been socially and geographically very unequally distributed and that the digital divide is not narrowing. Also from Indonesia, Rose (2004) found that the government is not doing enough to provide information to ordinary citizens by modern means. The debate on universal access should not only concern technical issues, however, but should focus more on the demand side. To understand and develop people's social capital may be useful in the design and implementation of a universal ICT access policy, according to Mariscal (2005). Social capital is normally understood as an attribute of social networks that increases the strength and value of personal capabilities (Coleman, 1988; Woolcock, 1998). In the lives of young people, family members and friends normally constitute the main elements of their social capital.

Modern information technologies are still not the most important sources of information, at least not in poor countries. Information may more dominantly be obtained from various other sources, like schools, newspapers, books, radio and television, films, or social relations. In a study of general information seeking behaviour of Canadian university students, Given (2002) found that social capital is of importance for the efficiency of students' information seeking. Information seeking is a process whereby an individual fills a gap after

identifying insufficiencies in his or her previous knowledge (Dervin, 1992). Social class, defined in terms of education and occupation, affects practices of 'everyday life information seeking' significantly. According to Savolainen (1995, p. 290), 'individuals make choices in various situations but they always chose within the limits of competence, which is built on social and cultural factors'. Anwar and Supaat (1998) found that the most important purpose for seeking information among a rural population in Malaysia was simply the fulfillments of a need to know. Main sources of information were television and radio, and friends and neighbours. Based on a recent study of information seeking in the US, Jeffres, Atkin, Neuendorf, and Lin (2004) provided support for a relationship between patterns of media use and diversity of interests. More frequent use of the radio, newspapers, magazines, and films also tend to enhance interest diversity and widen perspectives in information seeking. There is a tendency that an excess of watching television, however, does not enhance the viewers' relative level of knowledge in a society (Putnam, 2000). At least in the US and Europe, poorer segments of society tend to spend more time watching television compared to the more wealthy. The Internet on the opposite, may possibly enhance information seeking and bring new focus on economic and political matters, because it is less based on entertainment and more on individual initiatives and actions (Havick, 2000).

The importance of education for continued information seeking and for social and political participation in a society has for long been recognised. Education creates awareness and enhances the preconditions for searching new information (Verba & Nie, 1972). In a more recent study from developing countries, Weinberger and Jütting (2001) found a statistically significant and positive association between the value given to education in families and their participation in civic organizations. A number of other studies support the argument that weak formal schooling at lower levels is at the core of the information asymmetry problem in poor countries (Kallaway, 2001; Kabeer, Nambissan, & Subrahmanian, 2003). Also, if a country aspires to exploit the opportunities offered by new ICT for economic and political progress, it probably needs to emphasise education, not least on secondary and tertiary levels (Quibria et al., 2003).

Based on the foregoing literature review, we present a model in Fig. 1, which will be used as the structural basis for analysing empirical findings in

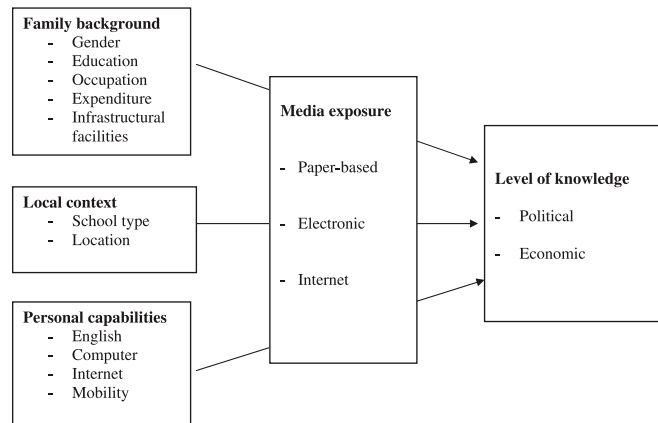


Figure 1 The research model.

the findings section below. The following propositions are made:

- (1) Family background may influence students' media exposure and level of knowledge.
- (2) Their local context may have an impact on students' media exposure and level of knowledge.
- (3) There might be positive associations between personal capabilities and media exposure, and likewise between personal capabilities and level of knowledge.
- (4) There might be positive associations between media exposure and level of knowledge.

The specific variables used in the analyses are operationalized in the methodology and study section. Firstly, however, we take a closer look at the Indonesian schooling system and other means of information flows.

The Indonesian schooling system

Public education was virtually non-existent in Dutch East-India until the colonial government established a system of village schools in 1906. At independence in 1949, only around 6% of the population were literate (Brojonegoro, 2001). Financial constraints still limited government efforts in developing the education sector, in spite of a constitution stating that every citizen has the right to education and that the government has the responsibility to provide one national education system. New schools were dominantly private and based on religious funding and teaching, mostly

Islamic in Sumatra and Java and Christian in the eastern parts of the country. The expansion of the 6-year public primary schooling firstly took off with increasing oil revenues and government budgets from 1973, and the number of primary schools and enrolled children doubled in the following 10 years. Nine-year compulsory education was officially introduced in 1994 but has not yet been fully implemented.

Government spending on the educational sector reached its heights in the mid-1980s with 17–18% of central government expenditures. The figure was reduced by the economic crisis since 1997 and again with decentralisation and privatisation policies since 2001. The share of education in central government budgets now stands around 5%. Increasing costs are put on lower administrative levels (districts) and especially on the households. In spite of the fact that primary and secondary school fees in the public sector were officially abolished in 1977 and 1994, respectively, children's education now makes up approximately 30% of total expenditures in households with school-aged children (Kristiansen & Pratikno, 2006).

Social and geographical differences in school participation rates are substantial. While the vast majority of children enrol in primary schools, only 80% complete primary education (SMERU, 2003). The average participation rate in junior high schools is around 70% (Jakarta Post, May 1, 2004). Before decentralisation, 55% of children from the poorest 20% of families were enrolled, while the comparable figure was 92% for the richest quintile of households (Lanjouw, Pradhan, Saadah, Sayed, & Sparrow, 2001). The average participation rate in senior high schools is around 50% (BPS, 2005;

Sparrow, 2004), but stands at meagre 25% among the poorest 20% of households (Lanjouw et al., 2001). Social, geographical and gender differences have increased recently. Participation rates at junior and senior high school levels are now significantly lower in the remote and rural districts, among households whose main income comes from agriculture, and among the poorest families and those where parents have low education. The male to female enrolment ratio in senior high schools is around 1.33. For each 100 male students, 75 females are enrolled (Kristiansen & Pratikno, 2006).

At the junior and senior high school levels, respectively, 40% and 50% of students are enrolled in private schools. Costs and quality differ widely among private institutions, but poor families often choose to send children to private low-priced schools owned and operated by Islamic organizations. Many of them are boarding schools, so-called *madrasah* or *pesantren*. The number of private elite schools has been small but now seems to be increasing. Public school graduates have generally gained much higher scores than those from private institutions (Serrato & Melnick, 1995).

Mass media in Indonesia

Major shares of Indonesians have regular access to radio and television, 50% and 85%, respectively (BPS, 2004). The current number of radio stations in the country is around 800. People generally use less time listening to radio than watching television (Yunus, 2003). On average, Indonesians spend almost 3 hours per day watching television (Menayang, 2004). There are currently 11 national TV stations that broadcast from the capital, Jakarta, and there are more than 20 additional local TV stations with limited broadcasting areas (Subramaniam, 2004; Anonymous, 2005). The first TV station in Indonesia, TVRI, was established by the government in 1962, and TV broadcasting was monopolised by the state until the late 1990s. In the Suharto era, the central Ministry of Information actually played a major role in the control of thinking and expression of ideas and to legitimise the authoritarian regime by the use of media networks (Lim, 2003). Only information that supported the incumbent regime was disseminated (Nugroho, 2000).

A remarkably much lower share of the population has regular access to newspapers and magazines, only 22%. Currently, close to 300 domestic newspapers, magazines and tabloid titles are available (Subramaniam, 2004). The reading culture in

Indonesia is actually very weak. Annually, only around 2000 book titles are published in the country of 220 million people while, for comparison, neighbouring Malaysia with a population of 21 million publishes 15 000 titles per year (Kompas, December 17, 2000). Libraries also have weak traditions in Indonesia, and very few good collections of books can be found outside higher institutions of learning in Indonesia today.

During the last few years, accessibility to films in CD and DVD formats has increased significantly. Illegal practices of pirate copying have brought prices down to 15 000 rupiah (USD 1.4) for the purchase of DVDs, and rental prices are around 2500 rupiah (USD 0.24) per film. Similar prices of pirate copies apply for various types of computer software.

The use of the Internet increases rapidly in Indonesia. The number of users actually raised by more than 1400% during five years, from 1.9 million in 2000 to 11.2 million in 2004 and reached 16 million in 2005 (APJII, 2005; Jakarta Post, January 27, 2006). A widespread public use of the Internet explains a much faster growth of Internet users than subscribers. Two-thirds of Internet users today gain their access through Internet cafés. These are concentrated in the larger cities, however, and in the whole population, the density of Internet users is still low, 7.0%. This figure is well below the average user density in the world, 14.6%, and in Asia, 8.9% (www.internetworldstats.com).

Methodology and study areas

Data for our study were collected from students in one public and one private senior high school in each of three districts at different levels of centrality in two provinces, namely Yogyakarta (Java) and Nusa Tenggara Barat (the island of Lombok). The included districts are the city of Yogyakarta, Bantul, Gunung Kidul, the city of Mataram, Lombok Barat, and Lombok Timur. In each district, we searched for the generally recognised best schools in each category, i.e. private and public. The private schools mostly belong to the Muhammadiyah organisation. Data were collected in the period from April to September 2005. The total number of respondents is 592, equally divided among the three districts in each of the two provinces.

A questionnaire was used as the main research instrument. Drafts of the questionnaire were tested on a number of students from different senior high schools and then revised according to feedback. The final questionnaire consisted of four parts:

firstly questions on respondents' family and household background; secondly on media exposure; thirdly on personal capabilities like computer and Internet skills and use; and finally on levels of knowledge on political and economic issues. As regards the questions on levels of knowledge, under each of the two knowledge categories students were given nine questions, like how many political parties participated in last national election, and what is the meaning of WTO. The validity of the knowledge data has been seriously considered and questions were continuously amended in the pre-tests to fit to the students' general ability to understand and answer. Questions were arranged from the international level through national to local, and also from easy through medium to difficult in each of the two sectors of knowledge. Questions related to local issues were adjusted to the various local contexts. The list of knowledge questions used in one of the districts is shown in Appendix A. The survey was based on the formal permission by the respective schools to distribute and collect the questionnaires from the school during a class. The students were guided in how to fill in the questionnaire, and they were controlled to ensure the reliability of the information provided. The respondents needed around 20 min to complete the questionnaire.

In the subsequent analyses, we mostly apply bivariate statistical methods, such as correlation analyses and means comparison. Stepwise regression analyses are also applied. The variables are grouped as depicted in Fig. 1 and operationalized as follows. *Family background* contains the following variables: gender; father's and mother's education measured as numbers of years in schooling; father's and mother's employment grouped into five categories (farmer, self-employed, civil servant, private company employee, and unemployed); respondents' individual and family expenditures; and infrastructural facilities measured as the number of technical equipments for access to information at home, like radio, television, telephone, and Internet access. *Local context* contains two main variables, which are school type (private or government), and location, which is measured by three levels of centrality within the two provinces). *Personal capabilities* contains the following four variables: English language proficiency, computer skills, and Internet knowledge (all measured on a scale from 1, beginner, to 5, advanced), and mobility measured as the number of travels out of one's province last year. *Media exposure* contains three main variables, all measured by the average number of hours spent per day. Paper-based media includes newspapers and study literature as well as other literature. Electronic media includes television

and radio as well as watching video or DVD. The last media exposure variable is the use of the Internet. *Level of knowledge* includes measures of students' scores on the nine questions in each of two main sectors, namely political and economic. The highest possible total knowledge score is 18.

Findings

Descriptive statistics are depicted in Table 1.

Analyzing the data, we firstly make the *bivariate analyses*. We investigate statistical associations between independent variables in each of the boxes in Fig. 1, namely family background, local context, and personal capability, and variables in each of the groups termed media exposure and level of knowledge.

Impacts of family background

Female students have a higher media exposure than male students, while males generally score higher on knowledge. Parents' education has a significant impact on media exposure as well as on knowledge level. Measuring father's and mother's average numbers of years in schooling, we find strong correlations with all kinds of media exposure. A similar strong and significant correlation is found between parents' education and students' knowledge level.

Similarly, both father's and mother's occupation have an impact on media exposure and economic and political knowledge. Parents employed in the government and private sectors generally seem to facilitate for a much stronger media exposure and higher knowledge level among their offspring as compared to farmers. Families' level of total expenditure is similarly strongly and significantly correlated with media exposure and knowledge level. Also, counting families' infrastructural facilities, clear statistical associations occur with media exposure and knowledge level. Results of the statistical tests are summarized in Tables 2 and 3.

Impacts of local context

A comparison between public and private schools reveals that students under government education have higher exposure to media, except for electronic media where no significant difference occurs. Also, public school students score significantly higher on both sectors of knowledge. In economics knowledge, for instance, public school students on average answer correctly on 5.7 out of 9 questions, while those in private schools score only 3.6.

Table 1 Descriptive statistics.

Variable	Mean (SD)	<i>n</i>	%
Study area			
Yogyakarta		298	50.3
Lombok		294	49.7
Gender			
Female		275	46.5
Male		316	53.5
Education of father (years)	12.27 (3.80)		
Education of mother (years)	11.16 (3.85)		
Father's employment			
Entrepreneur		138	24.0
Government employee		217	37.7
Private employee		44	7.6
Farmer		83	14.4
Other		94	16.3
Monthly family expenditure			
Rp < 250,000		47	8.2
Rp 250,000–500,000		151	26.4
Rp 500,000–1,000,000		202	35.3
Rp > 1,000,000		173	30.2
Infrastructural facilities	4.08 (1.65)		
School type			
Private		293	49.5
Government		299	50.5
Location			
Kota Yogyakarta		96	16.2
Bantul		102	17.2
Gunung Kidul		100	16.9
Kota Mataram		94	15.9
Lombok Barat		103	17.4
Lombok Timur		97	16.4
Personal capability			
English language proficiency	6.82 (2.50)		
Computer knowledge	2.50 (0.90)		
Internet knowledge	2.30 (1.02)		
Mobility	1.93 (1.03)		
Media exposure (hours/day)			
Paper-based	10.00 (4.64)		
Electronic	4.00 (3.13)		
Internet	5.79 (2.86)		
Level of knowledge			
Political knowledge	0.21 (0.47)		
Economic knowledge	11.16 (3.77)		

Especially in the more peripheral areas, differences are big between knowledge levels among students in public and private schools. For instance in Gunung Kidul, the knowledge level in public schools is more than twice as high as in the private institutions.

Students in the schools in the province of Yogyakarta are generally significantly more exposed to various media compared to their peers in Lombok. Also, the level of knowledge is significantly higher in the more centrally located Yogyakarta province with all its institutions of

Table 2 Means comparison of media exposure and level of knowledge between gender and father's occupation.

	Gender		t^{\dagger}	Father's occupation				F^{\ddagger}
	Male	Female		Entrepreneur	Government employee	Private employee	Farmer	
Media exposure								
Paper	3.73	4.22	-1.86*	3.62	4.52	4.48	3.44	3.24***
Electronic	5.73	5.84	-0.45	6.24	5.92	6.11	4.96	2.72**
Internet	0.23	0.19	0.92	0.21	0.24	0.40	0.007	3.22***
All	9.71	10.26	-1.44	10.07	10.68	10.99	8.48	4.26***
Level of knowledge								
Political	6.61	6.35	1.62	6.17	7.06	6.89	5.48	11.17***
Economic	4.89	4.55	1.82*	4.65	5.48	5.02	3.41	14.21***
All	17.41	16.40	2.21**	16.33	18.63	18.05	13.63	12.68***

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

[†]Independent-samples t -test is used in means comparison.

[‡]One-way ANOVA is used in means comparison.

Table 3 Correlations between family background variables and media exposure and level of knowledge.

	Father's education	Mother's education	Family's expenditure	Infrastructural facilities
Media exposure				
Paper-based	0.15***	0.18***	0.18***	0.14***
Electronic	0.11***	0.18***	0.14***	0.17***
Internet	0.24***	0.26***	0.23***	0.36***
All	0.20***	0.26***	0.78***	0.23***
Level of knowledge				
Political	0.36***	0.33***	0.17***	0.29***
Economic	0.36***	0.36***	0.09**	0.42***
All	0.40***	0.40***	0.14***	0.42***

Notes: ** $p < 0.05$, *** $p < 0.01$.

higher learning. Within the two provinces, we also find significant differences in media exposure and knowledge levels among the districts. In the city of Yogyakarta (Kota Yogya), for instance, students score an average of 7.4 on the political questions, while the students in the more remote and rural Gunung Kidul score 5.8. Combining the two sectors of knowledge (18 questions), there is a difference of 5.5 points between the average students' scores in schools in the city of Yogyakarta (13.1) compared with schools in the more remote district of Lombok Barat (8.6). Results of these statistical tests are summarised in Table 4.

Impacts of personal capabilities

There are clear inter-correlations between measurements of family background and personal capability. Still, we check statistical associations between capability variables (English proficiency,

computer and Internet skills, and mobility) and media exposure and knowledge level (see Table 5). English language proficiency is correlated with paper-based media exposure and Internet use, and also with general knowledge level in the two sectors. Computer skills are significantly associated with Internet use and knowledge levels. Internet knowledge is only correlated with Internet use, while not with paper-based and electronic media exposure. Internet knowledge is significantly correlated with knowledge level in both sectors. Mobility has a correlation with Internet use and electronic media exposure and is significantly associated with knowledge level in both sectors.

Impacts of media exposure

Table 6 shows the statistical associations between media exposure and knowledge variables. We see that both paper-based media and Internet use are

Table 4 Correlations between local context variables and media exposure and level of knowledge.

	School type			Location						
	Private	Public	<i>t</i>	Yogyakarta			Lombok			<i>F</i>
				Kota	Yogya	Bantul	Gunung Kidul	Mataram	Barat	
Media exposure										
Paper	3.38	4.60	-4.82**	3.98	5.91	3.84	3.52	3.21	3.47	10.81**
Electronic	5.76	5.82	-0.27	6.58	6.13	5.95	5.50	5.44	5.14	3.38**
Internet	0.17	0.26	-2.31*	0.46	0.22	0.13	0.30	0.08	0.10	9.83**
All media	9.31	10.68	-3.63**	11.02	12.27	9.92	9.32	8.73	8.71	9.96**
Level of knowledge										
Political	5.85	7.07	-8.17**	7.44	7.20	5.82	6.77	5.25	6.36	22.28**
Economic	3.64	5.73	-12.53**	5.67	5.31	4.16	5.35	3.52	4.26	15.42**
All	14.40	19.26	-11.78**	20.22	18.59	14.7	17.93	13.72	16.8	23.31**

Notes: * $p < 0.05$, ** $p < 0.01$.

Table 5 Correlation between personal capabilities and media exposure and level of knowledge.

	English proficiency	Computer skills	Internet skills	Personal capability*	Mobility
Media exposure					
Paper-based	0.13***	0.05	0.06	0.08	0.05
Electronic	-0.001	0.06	0.08	0.50	0.13***
Internet	0.24***	0.31***	0.37***	0.37***	0.20***
All	0.11***	0.10**	0.14***	0.13***	0.13***
Level of knowledge					
Political	0.22***	0.31***	0.35***	0.39***	0.11**
Economic	0.29***	0.31***	0.35***	0.39***	0.11**
All	0.29***	0.29***	0.35***	0.36***	0.12***

Notes: ** $p < 0.05$, *** $p < 0.01$.

*Personal capability scores is composed from scores of English proficiency, computer and Internet skills.

significantly correlated with knowledge. Correlations are not strong, however. The use of electronic media has no significant impact on students' levels of knowledge.

Multivariate analyses

Using students' total knowledge score as the dependent variable, we apply stepwise multiple regression analyses with various selections of independent variables. Family background variables included are student's gender, parents' education, father's occupation, monthly family expenditure, and infrastructural facilities. Local context variables are school type and location. Personal capability includes English language proficiency and computer and Internet knowledge as one variable, and secondly mobility. For media

Table 6 Correlations between media exposure and level of knowledge.

Media exposure	Level of knowledge		
	Political	Economic	All knowledge
Paper-based	0.17**	0.09*	0.14**
Electronic	n.s.	n.s.	n.s.
Internet	0.18**	0.20**	0.21**
All media	0.13**	0.11**	0.12**

Notes: * $p < 0.05$; ** $p < 0.01$; n.s. = not significant.

exposure, both all media and only Internet exposure are tried as variables in the analyses.

We find that the following set of independent variables can best explain the total variance in knowledge level: school type, personal capability, location, infrastructural facilities, and gender.

Remarkably, the media exposure variables are not being included in the regression analyses. The explanatory values of the variables are shown in Table 7. The five independent variables together explain 34% of the total variance in students' level of knowledge.

Searching for additional explanations

We also asked the students what they regard as their main sources of information on political and economic issues. Television and radio, magazines and newspapers, family and friends, and schools, all rank high and in that order (see Table 8). There is little difference in stated values of information sources between the political and economic fields. The students generally spend much time on electronic media; the average number of hours spent per day is as high as 7.0. Our findings have revealed that additional watching of television and films or listening to radio does not influence the level of knowledge. The fact that electronic media have no explanatory value on the variance of knowledge levels is probably caused by a threshold level, which seems to be reached for most of the students in the use of this media. Only 2.3% of the students report that they do not use any time watching television or listening to radio. Mean-

while, more than one fourth (27.5%) report that they do not read any newspapers or magazines at all. As much as 56% report that they never use the Internet.

The percentage of students reporting that they use the various sources of media mainly for entertainment is high, 84.4%. Those who usually access various media channels to search for information on politics and economic issues represent only 18.6% and 15.3%, respectively.

Conclusion

Huge differences exist in Indonesia, as in most developing countries, between those with easy access to modern information and those without. Information asymmetry represents a general problem for political and economic development in society. The main objective of this study has been to trace mechanisms behind unequal access to information of relevance for political participation and employment or business opportunities. Due to methodological reasons, we have selected only people with reasonably good access to information for our comparative analyses. The sample of respondents is made among senior high school students in private and public schools in six

Table 7 Regression analyses.

Independent variable	β	t
School type	0.33	7.56**
Personal capability	0.21	4.20**
Location	0.19	4.12**
Infrastructural facilities	0.12	2.22*
Gender	0.10	2.45*
Model summary	Adj $R^2 = 0.34$; $F(5, 406) = 42.55^{**}$	

Notes: Regression uses stepwise method and only significant variables are shown.
* $p < 0.05$; ** $p < 0.01$

Table 8 Sources of knowledge.

Sources of knowledge	Rank for all knowledge	Political knowledge		Economic knowledge	
		%	Rank	%	Rank
TV/radio	1	79.73	1	73.99	1
Magazine/newspaper	2	77.53	2	68.92	2
Friends/family/relatives	3	57.43	3	49.49	4
School	4	55.07	4	54.39	3
Internet	5	18.89	5	13.85	5
Government offices	6	5.91	6	7.09	6
Exhibition	7	3.38	7	4.05	7

Note: Total percentage exceeds 100 since multiple answers are allowed.

different districts in two provinces of Indonesia. The main dependent variable in the empirical study is students' level of knowledge in political and economic fields, and we have checked statistical associations between knowledge and family background, local context, personal capabilities, and media exposure. We have also analysed how different background variables influence media exposure.

Generally, male students have a significantly higher level of knowledge compared to females. Other family background variables influence students' media exposure and level of knowledge in several ways. Parents' education has a significant impact on media exposure as well as on knowledge level. Similarly, both father's and mother's occupation have an impact on media exposure and economic and political knowledge. Parents employed in the government and private sectors generally seem to facilitate for a much stronger media exposure and higher knowledge level among their offspring as compared to farmers. The knowledge level is almost 40% higher among students whose fathers are government employees compared to farmers. Families' total expenditures are also strongly and significantly correlated with students' media exposure and knowledge. Clear statistical associations similarly occur between families' infrastructural facilities and media exposure and knowledge level.

Students' local contexts also matter. Students in government schools generally have higher media exposure and levels of knowledge compared to students in private schools. Knowledge level is actually 33% higher in public than in private schools. Media exposure and knowledge levels are generally higher in centrally located areas as compared to rural and peripheral districts. In the city of Yogyakarta, for instance, knowledge level is almost 50% higher than in the more remote Lombok Barat. Students' personal capabilities are also clearly correlated with their level of knowledge. Meanwhile, our analyses reveal relatively low explanatory values of media variables on students' knowledge. There are actually no significant associations between students' use of electronic media and their level of knowledge. A threshold level of electronic media use is probably reached for most of the students and additional watching of television or listening to radio does not influence their level of knowledge.

Family background variables dominate in explaining students' level of knowledge, as well as the likelihood of obtaining higher levels of education. With an objective to equalise people's access to information and thereby to political influence

and economic participation, it is therefore important to look for policy measures to counterweight family determinism. Meanwhile, a process of devolution is going on in Indonesia, whereby increased responsibilities for children's education are put on local administrative levels and on the households. This easily creates enhanced differences in access to information among geographical areas and social layers. The political role of institutions providing formal education and access to information has not yet been fully recognized by ordinary citizens. Observing the huge differences in knowledge, even among senior high school students as in this study, we believe that people's access to knowledge and information should become a politically charged arena. Information should be more highly valued as a resource for development, and relations of power and influence subsequently need to be reassessed and reworked. There is a need for more central government intervention and control in securing the quality of schooling, not least in the private sector of education and in peripheral areas.

Appendix A. Knowledge questions in the research instrument (for schools in Yogyakarta)¹

Politics and government

- (1) Who is the President of the United State of America?
- (2) Who is the General Secretary of the United Nations (UN)?
- (3) What is the name of (or acronym for) UN's organization for education?
- (4) Who was the president of Indonesian before Susilo Bambang Yudoyono?
- (5) How many political parties participated in the last Indonesian election?
- (6) Who is the head of the Indonesian House of Representative (*DPR*)?
- (7) Who is the governor of Daerah Istimewa Yogyakarta?
- (8) How many *kabupaten* (districts) does the province of Daerah Istimewa Yogyakarta consist of?
- (9) Who is the incumbent *walikota* (mayor) in the city of Yogyakarta?

¹Questions 7-9 in each of the two categories were adapted to the various local contexts.

Economics and business

- (1) What is currency of the Philippines?
- (2) In which country is the car Peugeot produced?
- (3) What does WTO stand for?
- (4) What is the main product of Pertamina?
- (5) What is the biggest national airline in Indonesia?
- (6) Who is the Indonesian Coordinating Minister for Economy, Finance, and Industry?
- (7) What is the main product from Kasongan area?
- (8) Which *dinas* (government offices) is responsible for administering workforce and job opportunities?
- (9) What does KADIN stand for?

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Article 9

***Implementation of IT in Africa:
Understanding and explaining the results of ten years of
implementation effort in a Tanzanian organisation***

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Implementation of Information Technology in Africa: Understanding and Explaining the Results of Ten Years of Implementation Effort in a Tanzanian Organization

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ABSTRACT

This study traces attempts to introduce information technology into a management college in Africa, over a 10-year period from 1991 to 2001. The study uses an interpretative approach and is informed by information technology (IT) implementation literature. The case shows little progress over the 10-year period studied and the authors identify several explanations for this. The findings related to implementation, or the lack thereof, tie in well with the general IT implementation literature, suggesting that some of the key elements in the literature are of a fairly general and universal nature. The general nature of the literature does not provide the background for a deeper understanding of the issues and underlying levels of explanations. For this, more contextual factors need to be taken into account. The authors have been able to point to some of these sociocultural factors. However, this is an area where further research is needed. © 2006 Wiley Periodicals, Inc.

Keywords: information technology strategy; information technology implementation; cultural barriers; Tanzania

1. INTRODUCTION

Implementation of information technology (IT) has been a core theme in information systems (IS) research at least since the early 1980s, and there is a large body of accumulated knowledge related to this. However, comparatively little is known about the special challenges of implementation and adoption of IT in third world countries in general and in East Africa in particular. We trace attempts to introduce information technology into a management college in Tanzania over a 10-year period from 1991 to 2001. The background for the article is our experience achieved during two periods of IS strategy work at

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the institution at 10-year intervals. When working out the second strategy, in 2000–2001 (Furuholt, Nesland, & Ørvik, 2001), we wondered that it became surprisingly similar to the 1991 electronic data processing (EDP) strategy (Kimeme, Ørvik, & Nesland, 1992). The terminology had changed a little, EDP was now named IT or ICT (information and communications technology) and some technology issues were no longer in focus, like the concept of “IBM compatible” personal computers (PCs). But our recommendations about what to do and which priority decisions to make were more or less identical. The 1991 strategy with detailed action plans had only initiated marginal IS implementation and use. Why was it like this? In our world, in the use of IT and information systems in organizations and society a lot had happened during the same period. And our experiences have been that strategy and plans lead to action and organizational changes. We realized that there had to be other mechanisms influencing the development and use of IT in this context, or maybe the same mechanisms “in different clothes.”

The study aims at assessing the results achieved in implementing the 1991 EDP strategy (Kimeme, Ørvik, & Nesland, 1992) and explaining and interpreting those findings in light of established implementation theory and additional contextual factors. The study partially provides an indication of the validity of the established implementation theory in a Tanzanian context and partially provides a deeper, contextually situated understanding of the complexities of the implementation process as it is played out over a number of years in this particular setting. Our main objective was to use the implementation project as a lens to achieve a better understanding of use of IT in Africa in general.

The article is organized as follows. After the Introduction, we present the theoretical basis for our work, mainly IT implementation research, followed by the description of data collection and methodology used. In section 4, we describe the main implementation results achieved during the 10-year period and give our explanations and interpretations in section five. Section 6 is an analysis of the current situation at the institution, while our conclusions, study limitations, and prospects for further research bring the article to a close in section 7.

2. IMPLEMENTATION RESEARCH AND LITERATURE

There is a large body of literature addressing IT implementation issues and a number of well-established models and theories, e.g., the theory of planned behavior by Ajzen (1991), the technology acceptance model (TAM) from Davis (1989), and Roger’s diffusion of innovations (DOI) model (Rogers, 1983). There are also a number of studies that review and synthesize implementation research (Kwon & Zmud, 1987; Lai & Mahapatra, 1997; Marble, 2000; Munkvold, 1998; Swanson, 1987). Munkvold (1998) classifies implementation theory according to whether the central constructs relate to the individual (e.g., perceived ease of use and perceived usefulness from TAM), the technology itself (e.g., task technology fit and technology complexity), the organization (e.g., absorptive capacity, organizational learning), the environment (e.g., competitive pressures), or the implementation project (e.g., top management support, active champion). Recently, Venkatesh, Morris, Davis, and Davis (2003) presented an updated model of user acceptance of IT, unifying a lot of the previous work in this area (called the Unified Theory of Acceptance and Use of Technology—the UTAUT).

The technology transition model (TTM; Briggs et al., 1998; Briggs, de Vreede, & Nunamaker, 2003) is another model built on TAM and aiming to explain events for which

TAM do not account. The technology transition model is extending the TAM by adding details to seek to explain the existence of self-sustaining and growing communities of users for technologies. Although originally developed in the context of groupware technology, the theory offers causal explanations about the motivations that individuals may have to influence their behavioral intention to use a particular system.

The implementation of IS and IT is, however, more than putting the technology to use. It can be understood as encompassing the whole diffusion process. This is developed further by Kwon and Zmud (1987), who present six stages of implementation: initiation, decision, adaptation, acceptance, routinization, and infusion, thus recognizing that implementation is a process that will evolve and materialize gradually over time. Such a process view raises the question about when the process can be said to have been completed and implementation has occurred. Clearly, the implementation issue cannot be understood from a point in time perspective. We need to understand implementation-related phenomena as they unfold over time. In addition to the time issue there is also a problem related to quantity when we are assessing the implementation process. Looking at different indicators of implementation in progress there will usually be matters of degree. Are projects fully or just partially funded? Is all the planned functionality available for use or just some of it? If technology is put to use, how much use is there? Looking at different indicators, there might also be a qualitative aspect. If technology is available for use, how good is that technology and the information it provides? If use of the technology is evident, how effective is that use? And finally, when assessing outcomes, what are the extents of those outcomes and how well do they conform to desired outcomes?

Information technology is only part of an IT plan. Although the plan usually defines new information technology that the organization should put to use, it also concerns the diffusion of that technology into the organization. Leonard-Barton (1988) addresses this aspect in her analysis of implementation characteristics by distinguishing between the adoption decision (related to IT) and the innovation response (by the organization and its members). The response is manifesting itself over time.

From the discussion above, it follows that implementation is not a simple construct. We have identified time, and matters of degree related to quantity and quality as main issues in the implementation assessment process.

Most of the implementation literature address individual IT and IS projects. A few studies have tried empirically to identify dimensions in the planning or strategy development process that are critical to implementation (e.g., Earl, 1993; Gottschalk, 1998; Lederer & Sethi, 1996). Some present barriers to, or problems with IS strategy implementation and indicate that plans are often not implemented (Earl, 1993; Galliers, 1994). Others present factors that positively influence implementation (Bryson & Bromiley, 1993; Gottschalk, 1998; Lederer & Salmela, 1996; Premkumar & King, 1994). Information systems strategies or plans can be viewed as consisting of different parts, with different levels of detail, different planning horizons, and different foci. Such parts might well have very different implementation characteristics, and we believe identifying and studying different generic parts of the strategy is necessary in understanding problems in implementation.

Little work has been done to validate IS implementation theories and models in African cultures. Straub, Keil, and Brenner (1997) raise the issue of the validity of TAM in different cultural settings, but this does not involve any African countries. There are, however, a number of works that points to general IT and Internet challenges in these countries (e.g., Mwesige, 2004; Ngwaimbi, 2000; Oyelaran-Oyeyinka & Adeya, 2004; Qureshi, 1999; Tanzania eSecretariat, 2002; Useem, 1999).

A substantial part of the implementation literature is based on variance theory and a positivistic approach identifying factors influencing implementation. Others point to the complex nature of implementation and suggest a different type of theory base, for example adaptive structuration theory (De Sanctis & Poole, 1994). Walsham and Waema (1994) have studied IS implementation using an interpretative approach. Although seemingly very different in background and nature, the different approaches referred to above all serve to provide a better understanding of implementation issues and are thus relevant as a background for a deeper understanding of the present case.

A number of contextual and interpretative IT studies from the perspective of developing countries, some of them in Africa, are presented in Avgerou and Walsham (2000). There are also case studies describing various implementation efforts (De Vreede, Jones, & Mgaya, 1998; Maddy, 2000) and in recent years, three papers have provided interesting observations from specific IS implementations in East-African countries (Higgo, 2003 [Sudan]; Macome, 2003 [Mozambique]; deVreede, Rabson, Mgaya, & Quereshi, 1998 [Tanzania/South-Africa]). Some literature covers other aspects of information technology in African countries, than implementation issues. Soriyan, Mursu, Akinde, and Korpela (2001) discuss the methodology for systems development in Nigerian software companies, while others (e.g., van Ryckeghem, 1995; Heeks, 2002) deal with general use of IT in African contexts. All these point to the importance of taking local context and cultural environments into account when implementing information systems in developing countries, but they give little advice regarding which local considerations should be addressed.

Many interesting concrete implementation issues from developing countries in Africa and Asia have been described through the Health Information System Program (HISP), established in 1996 as a collaboration between three universities in southern Africa and University of Oslo, Norway (Stoops, Williamson, & Braa, 2003). The objective of HISP has been to develop and implement decentralized district health information systems. Stoops, Williamson, and Braa (2003) state that achievements in IS implementation and use were realized primarily in development of the human and organizational component, rather than technical products and underscore training as a cornerstone in the successful implementation of health information systems in their projects in South Africa. Braa and Nermunkh (2000) describe implementation of health information systems in Mongolia as a difficult process of change and found that the concept of (health) information systems as being social systems is in general not recognized by the actors in such processes. Due to the contextual constraints, they acknowledge that the social system perspective is even more critical in the Third World than in the First World. In a recently published article (published after our article was first written), Chilundu and Aanestad (2005) examine the notion of rationality and multiple rationalities and use these concepts as theoretical tools to discuss the process of implementing health information systems. They found these concepts helpful in understanding the multiplicity and heterogeneity of the interests, actors, structures, tasks, and systems involved in the processes.

Another recently published work on IS implementation contexts with relevant input for our work is a book edited by Avgerou, Ciborra, and Land (2004). We will in particular point to an article by Avgerou and Madon (2004), proposing an approach to studying context that is capable of accounting for the diverse social settings of IS innovation. They describe various stakeholders of the implementation processes and show how each of these groups are driven by their own "rationality" or logic, and point out that "the rationality of the apparently irrational behaviour needs to be uncovered" (p. 171).

3. DATA COLLECTION AND METHODOLOGY

The history of the institution in this case can be traced back to 1953, when the Centre for Local Government Training was launched. In 1972 the Government of Tanzania transformed the Centre into an institution of higher learning, in the areas of public and business management and administration. In December 2001, the Parliament of the United Republic of Tanzania passed an act that established the institution as a university. During the period 1991–2001, the number of students at any given time has been around 1,000–1,500.

A formal collaboration between the institution and Agder University College (AUC) in Norway dates back to 1988. The main objective of the collaboration is to stimulate activities related to research and consultancy at the two institutions, improve the competence of the academic staff, and build the necessary supporting infrastructure for research by collaborating in the fields of library services and IT. The collaboration is financed by The Norwegian Agency for Development Co-operation (NORAD). One of the first joint projects was to work out an IT plan for the institution. The plan was published in 1991–1992 (Kimeme, Ørvik, & Nesland, 1992). In September 2000, the institution felt the need for refocusing its efforts to invest in ICT and initiated work to develop a new ICT plan. AUC was asked for assistance to carry out the planning work and the new plan was published in February 2001 (Furuholt, Nesland, & Ørvik, 2001). One of us was involved in the first planning project and both of us were involved in the second. We have been involved in the cooperation in different capacities over most of the 10-year period; we've also conducted a number of visits at the institution and hosted numerous visits from the institution at AUC.

We believe that an interpretative case study approach is necessary to provide deeper insight into a situation for which validated theory is not available. The study approach used here is hence an in-depth, longitudinal, 10-year case study. The methodology used is basically following the recommendations suggested by Walsham (1995) who presents “the nature and method” of interpretative case studies in IS research and Klein and Myers (1999) who present “a set of principles” for interpretative field studies. As participants in the IS strategy process of the institution, we had, in particular, to be aware of “The Principle of Interaction between the Researchers and the Subjects,” but also put emphasis on “The Principle of Multiple Interpretations” and “The Principle of Suspicion.”

Data gathering was based partially on formal interviews conducted as part of both the first and second planning process and partially on observations and more informal interviews with a number of stakeholders. For the second plan, 37 persons from the institution were interviewed, of whom 15 were key academic staff, 6 were key administrative staff, and 11 were students. In addition to this, we also interviewed the IT managers at two other Tanzanian universities and personnel from Tanzania Telecoms Company Ltd (TTCL). The TTCL staff gave us useful information about their plans for upgrading the telecommunications infrastructure between Dar-es-Salaam and the institution. Being part of the planning process, these interviews focused on future needs and how to succeed with IT in the institution. Results obtained over the last 10 years were not the main focus, but were nevertheless addressed to obtain background information for deciding on future actions. After the internal interviews we had a rich background for assessing the results obtained and explanations for what had or had not been achieved. After the planning interviews a further round of interviews were conducted addressing specifically the reasons and explanations behind the (lack of) results achieved. Five people were interviewed in this round. All interviews were written and transcribed without using any tools or coding. The last five interviews were discussed with the interviewees after transcription. The subsequent

analysis and interpretations were informed and structured by traditional IT implementation literature, supplemented by relevant literature addressing mediating contextual and cultural factors.

4. ACHIEVEMENTS AFTER TEN YEARS

The 1991 planning was initiated by a senior academic staff member and supported by top management of the institution. The planning project was staffed with one person from the institution and two from AUC. At the time there was a great deal of internal enthusiasm related to IT, and the strategic importance of IT was clearly pointed to in the Terms of Reference for the plan: “To retain its position as the major management training institution, our institution must also take the lead in the teaching in business and administrative applications of computers” (Kimeme, Ørvik, & Nesland, 1992, p. 2).

The 1991 plan was organized as follows:

- IT for students
- IT for academic use
- IT for administrative and consulting use
- Organization of the IT resources
- Hardware and software acquisition (infrastructure)

The project group identified training of students as the most important of the five areas of interest. To facilitate this, acquisition of additional equipment would be necessary. This was spelled out in the plan as a detailed acquisition program. Among the interviewees there was a strong focus on this and the plan was regarded as an important instrument for soliciting funds from donor organizations.

Comparing the recommendations and the situation at the institution within the main areas identified in the plan, we found that very little had happened during the 10-year period. In the interviews for the 2001 plan, training of students was still considered the most important issue. The rest of the recommendations were more or less identical to those in 1991. In addition, upgrading of the ICT infrastructure (local area network [LAN], Internet connection, and students’ lab facilities) was explicitly pointed to.

4.1 Information Technology for Students

In 1991 there were no working PC labs for general student use. One small lab, donated by the United Nations Population Fund (UNFPA) was reserved for use in demography and population studies only.

In 2001, two small PC labs (20–30 operating PCs) for students were working. The same computers were occasionally reserved for short courses and training activities for outside customers. In 1991, students did not receive any formally defined practical computer training. Two courses, on Management Information Systems and Systems Analysis were included in some of the study programs, for a limited number of students. Both courses were basically taught on a purely theoretical basis, at the end of diploma and master’s programs. The 1991 plan recommended that the training of students should include practical computer skills through an introductory EDP (IT) course for all students during their first study year. In addition, relevant integration of EDP into existing courses was recommended. By 2001,

the study programs had very little progress. The same IT-related courses were taught within the same study programs based mainly on the same literature as in 1991. The students received hardly any practical computer training. The numbers of courses exposing students to computers, as an integral part of the course, were still marginal. This confirmed the main impression that general computer skills were virtually nonexistent among the majority of students. However, starting in 1998–1999 a short extracurricular introductory course to IT was made available on a pay basis, with preference for students in their last year of graduate school. Traces of IT impacts could thus be seen in this area. The quantity and quality of implementation were marginal however, partially due to the lack of IT expenditure in the first place and partially due to a poor implementation process.

4.2 Information Technology for Academic Use

According to the 1991 plan, EDP had been available since 1987. A considerable amount of time and resources had been spent to train academic staff. At that time, text processing was the only facility that was utilized to any extent, and then usually through secretarial help. The level of integration of EDP in the professional work of the academic staff was low. During the 1991–2001 period, some courses in the basic use of IT tools were arranged for academic staff, but in 2001, still only a small number of staff were regular users of IT tools. Faculty members had limited access to computer equipment at work, and very few had a PC at home.

Again, we saw some limited traces of IT impacts, especially related to text processing. The available IT, however, did not seem to be fully utilized. But at the same time there were also indications that the available IT was not sufficient, neither in quality nor quantity.

4.3 Information Technology for Administrative Use

In 1991, text processing constituted almost all EDP use for administrative purposes, the exception being a small application for administration of pensions. Most of the text processing was done by secretaries typing manuscripts for administrative and academic staff and for students (master's theses and semester cases). Lack of trained operators was a problem, not more than 10% of the 50 secretaries were using text-processing systems. Thus, one of the main challenges pointed to in 1991 was to solve the "text-processing bottleneck." In 2001, the use of IT for administrative purposes was still very limited. Word processing was however widely used, still mainly by secretaries. In addition, spreadsheets were used to some extent for accountancy, and e-mail was used for occasional external communication.

Traditional administrative systems or packages were not in use. In a short-term perspective the 2001 plan did not recommend computerizing these areas (one exception to this was marketing and communications). The main reason for this was the vulnerability, caused by the unstable electricity supply and by the lack of personnel, experience, and routines, related to operation and maintenance of business critical systems. The manual administrative systems worked fairly well, and from an economic perspective there was very little to save by computerizing such routines. In this area we saw IT impacts related to text processing. Otherwise, the implementation process had not proceeded past the planning stage.

4.4 Organization of Information Technology Resources

The 1991 plan recommended establishing the Computer Centre as a separate budget unit and developing a budget for 1993. In addition, it pointed to the need for a review of the organization of the Computer Centre and computer usage. In 1991, the Computer Centre was placed under the Department of Research & Technical Services, with very little autonomy. This meant that finding funds to carry out necessary repairs and service was very difficult, and equipment was often out of service for extended periods or just left inoperable. According to one interviewee (a senior lecturer and member of the IT service staff): “The head of department who manages the IT service resources is not an IT literate, and not even the previous head. When in the management meetings, they could not talk on behalf of the computer needs, etc.” Another quotation (the computer manager): “Today, there is no budget at all for the Computer Centre, it should have its own budget. You can’t even call a technician when a computer is broken down, it has to go through the Head of Department.”

In 1991, three persons were linked to the Computer Centre, with technical duties and IT teaching obligations. In 2001, the number had increased by 1–2 persons. During the whole period, the “IT staff” had their full load of teaching obligations within their primary field (e.g., statistics, business management, or materials management). No fulltime technical staff was hired to take care of the daily IT operations such as hardware or software implementations and services, network operations, help-desk functions, etc.

In this area very few impacts can be identified. Few assets in the form of properly trained and organized manpower are in place. The expenditures are mainly restricted to some staff training. Some of this was carried out by sending IT staffs for extended stays in Japan.

4.5 Information Technology Infrastructure

The total number of PCs (not privately owned) had increased from 33 to about 90 during the 10-year period. In 2001 there were around 35 computers in the student labs (23 functioning), 5 in the library, 20 mainly for administrative use, 25 PCs used by academic staff and their secretaries, and 5 uninstalled. During the period, a limited, vulnerable LAN was built, without a plan, contract, or documentation. 50% of the buildings and 70% of the computers were networked. The LAN was not working properly, as told by the Chief Planning Officer: “We should prioritise to up-grade the LAN, to cover the entire campus and be able to reach everybody by e-mail. Now, we have to walk around to gather information.”

A very limited and poor Internet connection was established in early 2000. The LAN did not provide sufficient Internet access, thus only 15 computers were connected to the Internet through the LAN.

In 1998, a container-load of used PCs were donated from AUC. All had been overhauled and were in good working condition. This equipment was never installed. Being used, the equipment had apparently not been regarded as very desirable, and we were told that some were in storage and some were used in people’s homes.

Although there were many apparent shortcomings of the equipment available, there was also a pronounced gap between acquisition and actual deployment of that equipment (referred to in the literature as an *assimilation gap*; Fichman & Kemerer, 1993). In general there seemed to be more concern related to having the right and modern technology than related to utilizing this technology in a meaningful way.

5. PERCEIVED EXPLANATIONS AND INTERPRETATIONS

Based on the interviews and our own observations and interpretations we tried to identify the main reasons for the limited development of IT usage and implementation.

5.1 Lack of Top Management Engagement

One main explanation expressed was “Top management has not given this enough priority!” It pervaded most of our interviews with academic staff. According to the computer manager:

The management during this time has not been a driving force. The Director of Studies (DS) in 1991–1994 was a major block. The next DS has tried, but not pushing hard enough. The present DS (since 2000) is pushing as well, we get support from him, but he is not a user himself. In 1991, there really was a block there, resistance and lack of management support. It was very difficult and things went wrong!

It is interesting to compare the situation at a neighboring academic institution, about 20 kilometers away, which has an obvious lead when comparing the level of IT implementation. One of the explanations could be (as stated by their computer director): “It took a long time for top management to understand the importance of IT use. But after developing a corporate strategic plan for the whole institution, with an IT plan as a part of it, management was involved, and they have to be supportive.”

Even at the national level, poor top management engagement is pointed to as one main obstacle for use of ICT in Tanzania: “Awareness of the potential of ICT within government to improve productivity is low, and implementation capacity is limited” (Miller, Esselaar & Associates, 2001, p. 37). The Tanzania eSecretariat (2002, p. 8) states “Tanzania lacks leadership and has no focal point for ICT, and as a result the country is missing opportunities and remaining fully exposed to vulnerabilities induced by rapid globalisation and emergent technologies.”

5.2 Knowledge Barriers and Staff Resistance

A common view at the institution seemed to be that younger people are generally more interested in IT, motivated to work with IT tools and to use them in the teaching. Many of the younger staff has been exposed to IT while obtaining their degrees. For many of the older ones IT is completely new and requires a major effort to learn. A professor at another university added: “The biggest problem is old, very senior staff—too old to learn. For them whiteboard is modern technology!” At “our” institution, we found the same attitude (quoting a lecturer):

Look at the members of staff and divide by age. Younger people are generally more interested in IT, they *want* to work with IT tools, and use them in the teaching. Older (+45) are not so interested. They have fear of having to learn, to spend time and effort to learn something new.

Interviewees pointed to the need for training to overcome the knowledge barrier. The desire for training might however be based not only on a desire to learn. People would generally expect to get compensated for attending training sessions. One lecturer, who

recently had been working abroad, explained “There is a cultural problem; people will expect to be paid to sit down and train.” If such compensation is provided the attendance would usually be good. The results might however be doubtful. The former DS said: “There were courses for regular staff, with many participants (Miller Esselaar and Associates, 2001). After that, they didn’t use it because of lack of possibilities and lack of following up.”

There was also a lack of pressure from the environment, expressed by the chief librarian: “They didn’t *have* to use it, they were not exposed to situations where they were really forced (they could, for example go to the secretary). There was a lack of pressure, they could get away without.

For many, the job-related benefits were thus too small compared to the significant effort that was required to learn the new technology.

The PCs available to staff were situated either in a staff lab or in shared offices. Many of the interviewees in 1991 suggested that the lab was an environment where those that did not fully master the technology easily felt that they were exposing their inadequacy. The need for individual PCs on people’s desktops was hence strongly emphasized.

5.3 Lack of Utilitarian Value and Other Personal Incentives

As mentioned before there was a lot of enthusiasm for IT expressed during the planning process in 1991 but at that time there was relatively little job-performance utility to be gained from IT use for the individual staff member. One exception is the clerical staff that experienced improvement in text production. From the 2001 interviews, however, this seems to be changing. Several among the staff expressed strong expectations about the potential benefits of a proper Internet connection. One obvious benefit from use of IT today is communication with the outside world, information retrieval through the Internet, and e-mail. The neighboring institution connected to the Internet in 1998. According to their computer director, “Before that, people were not interested in computers in their office—after Internet, all want to have computers!”

Initially the potential value of IT was more for the students and the institution as such and not so much for the individual staff member. Those in charge of the various programs experienced the student pressure for IT and clearly understood this. A department head said “The master’s programs in Public Administration include MIS [management information systems] as a subject, but cover only *theory* on IT, because of lack of computers. IT as a subject is highly demanded. Students *pay* to get computer knowledge.”

The MBA curriculum has no MIS teaching today. It was taken out because it was only theoretical and outdated. Today the students have to go for computer training privately. The head of business studies was convinced that “Undoubtedly, we need to train the students. I don’t know how this can be done without seriously changing the curriculum. Students’ pressure will be a driving force for the staff to raise their skills. The students, again, are driven by the market.”

The students we interviewed were also all very clear on the students’ attitudes to IT: “All students want to use computers; they are motivated to take computer courses. There is no computing in the programs and few students have tried computers. They expect to get better jobs when they know computers.”

The demand and pressure for IT was coming from others and the benefits going to others than those who would have to put in considerable effort to upgrade their skills to train the

students. Thus, there was little incentive to put in the considerable effort necessary when it comes to real-life practical use of IT tools. Doing consultancy work was a very important source of extra income for some of the more ambitious staff. For them client perceptions and the ability to land contracts with clients was an important motivator related to IT. One of them (a young, female lecturer) said: “Clients [at the Directorate of Short Courses and Consultancy] expect more professional outlook, like use of PowerPoint, etc. We lose customers because we don’t have right [modern] equipment.” This was reaffirmed by the head of the Local Government Centre, “The Local Government Centre is involved in lot of training activities and consultancy in the Tanzanian local government. We are competing with other companies and consultants and to be able to compete, we need to be connected to the Internet.”

5.4 The Symbolic Value of Information Technology

In some earlier models for IT adoption prediction, image was included as an important predictor (Moore & Benbasat, 1991). It seems likely that the power of IT as an image-enhancer is closely related to the newness of IT. In the Western world where IT is ubiquitous, it has probably lost its significance as an image-enhancer and thus also its significance as a predictor of adoption. In Tanzania in the early 1990s this might well have been different. Tanzania is also a country where the symbolic meaning of acts and artifacts can be significant (Mshana, 2002). The prestige value is however realized more by having the technology than actually utilizing it. This ties in well with one interviewee’s (a lecturer and PhD student) observation of top management having computers but not using them: “All top management are *older* guys. It is prestige to have computers. Although they have computers in their office, they don’t touch them. They use the secretaries.” This also ties in with the focus on technology acquisition combined with the lack of use that we could observe.

It also appears that the first IT-plan was considered more as a goal in itself, a finalized, static product rather than an active tool for running an implementation process. At the time the plan was developed, it was probably perceived by management more as a means to solicit funds for equipment from NORAD than as a plan to be followed. It was not fully appreciated that there needs to be a connection between plans and action and that subsequent activities would require resources. One of the IT lecturers explained: “The IT plan in 1991 was a different project, outside the institutions life. It was not considered a formal plan in the way that management or IT people had to work from it.”

5.5 Poor Organization

The ICT centre has been manned by personnel found among academic staff belonging to several subject panels, and all ICT staff has retained their full academic workload in addition to the ICT work. There have been too few IT people, poorly organized, with no recruitment plan and no planned development for their careers and competence. According to the computer manager, “You’re not managing IT; you’re managing problems all the time!” Appointing academic staff to IT (service) positions has been difficult, even as computer manager or director. It seems that such positions are regarded less prestigious than academic positions. People are then afraid of leaving their academic positions (or even reducing the teaching obligations) for IT service tasks. There have not been enough

personnel resources or technical resources to take on all the tasks and projects that have been desirable or demanded. Virus and technical problems are prevalent but not dealt with.

The Computer Centre has been organized as a service group without its own operations budget, which meant that there was no planned funding for maintenance, consumer goods, etc. All costs had to be applied for and decisions were treated in a cumbersome, bureaucratic, and inefficient way. The heads of department above the computer manager have not been IT literate, which meant that they could not effectively advocate IT needs.

All this poor organization has caused problems for staff when they want to use the IT facilities. Several expressed concern such as “When is the Computer Centre open?” “Who should be allowed to be inside?” “Are the PCs working and are they connected?” One of the young, IT-literate lecturers complained: “The main problem is the access to computers for the regular staff. There are lots of restrictions, even to equipment that’s there and is idle.” When the availability is unreliable, people choose not to use IT. The Computer Centre environment itself becomes detrimental to learning. Failures and problems often dominate the initial phases of learning to use software.

5.6 Poor Infrastructure

According to the management, the two main constraints for increased use of IT for students in their study programs and for staff have been the facilities and the IT staff. Before 1999 there was only one students’ lab; it had 13 PCs, which was insufficient for training needs. Because of lack of equipment, they did not focus on hiring or developing IT specialists. There are, however, different explanations to the question of lack of equipment and facilities. Management refers to insufficient funds, while others mean that funding of new equipment is not the problem, but rather lack of ICT knowledge and awareness, weak management, and missing decisions.

Before 1999 there were very limited facilities for the institution to communicate with the outside world. If they wanted network connection, they had to build it themselves, either by very expensive lines or by unreliable wireless connections. One of the senior professors, responsible for a master’s program described it as “terrible situation—we don’t have IT, only computers. We need to connect to the outside world!” Even telephone lines were a problem during a long period in the mid-1990s, when the (copper) line from the nearby town to campus (20 km) was stolen, and (according to rumors) sold in Kenya.

5.7 Other Contextual and Culture-Based Reasons

In addition to these, fairly obvious obstacles (as noted in the above sections), there were more contextual and culture-based reasons, that were more or less invisible to outsiders like us. Some of these could be related to individuals having their own agendas not readily apparent to us. One example of prioritizing, based on a hidden agenda, was the unanimous focus on the need for distance-learning facilities, which would allow staff living in the nearby town to receive TV signals from the campus satellite antenna system. This was lost when they opted to move from campus to town. Another example was the manager in charge of appropriating funds for repairing printers and copying machines who, for an extended period of time, failed to find the funds to effect necessary repairs. At the same

time, he was in charge of running a private printing and copying service on campus thriving on the added business from the college while they waited for their own equipment to be fixed.

Salaries for the academic staff were low, especially early in the period. One respondent estimated that the salary covered only 10 to 20% of his income need. The rest was covered by various industrious undertakings. This left little room for taking time out for learning new skills, an investment with an insecure payoff sometime in the future.

In Tanzania, the concept of time is very different from that in the developed countries. Time is not linear, mechanical, and uniform to all. Rather it is individual and organic, formed by the events that are important to the individual. The level of activity determines the time that passes. The higher the level of activity, the more time-shaping events occur and thus the more time is used. Waiting makes time go slowly, while hurrying for something makes time go fast. Resting conserves time. Time is shaped in the present. The most important aspect of life is to realize the moment. The value of the present is much larger and the future is much smaller. The idea that hard work now to reap benefits in the future runs contrary to this. This concept of time and the future generally lead to a short time perspective on daily undertakings. This is an indication that long-term planning and thinking ahead might not be prevalent in this culture. An indication of this came from one respondent responsible for a budget unit: "I have to spend the money fast. Budgeted funds are diverted to other activities. When I have not used all money by the start of the period, they (management) used the money for other purposes."

6. WHAT'S NEW TODAY?

6.1 Outside Pressure

Some of the study programs are subject to approval from national boards. For example, the candidates from a 3-year diploma program in certified accountancy are eligible to be registered by The National Board of Auditing and Accounting as approved accountants. Because of the lack of computer training in the program, this approval could be revoked, which certainly would create severe problems for the institution.

NORAD has been supporting the institution with considerable funding for a long period. Since 2000, they have offered additional funding, earmarked for ICT infrastructure, under the condition that the investments are based on a comprehensive IT Plan. There is an increased pressure from NORAD to see results from their investments in the infrastructure.

The institution's reputation depends on the quality of its study programs and how this quality is perceived by both potential students and employers. As the proportion of students with private or nongovernment sponsorship is increasing, the threat of competition from other education-providers is on the rise. There is also a general expectation among the public that a modern management education should provide students with knowledge about computers and how to use them in management-type work. The institution is at present not living up to such expectations. This may severely influence its reputation and its ability to compete for the better students. As more students have computer experience in high school, and they use PCs and the Internet for both study work and recreation, they will select higher educational institutions where they find IT integrated into their study programs and an available computer infrastructure.

6.2 Obvious Personal Benefits

Early in the 1990s, few staff would care about IT issues. The only use of computers was for text processing, which was regarded as a secretarial task. The academics were not exposed to situations where they had to use IT; they could get away without it. However, with the passing of time, more faculty members have gained experience with Internet based services. Today the Internet is an important driving force, which provides valuable information for teaching and research purposes and includes mail services for communication with the outside world. Increased access to academic material is especially important considering the poor library facilities and the prohibitive cost of books and periodicals. Combined with new teaching technology, for highly improved presentations, this is an important increase of possible benefits for academic staff.

6.3 Awakening Management

Management has finally started to take an interest in ICT and understand the strategic importance of the issues. This became evident in interviews with management and was also expressed by the ICT staff:

The priority of an IT infrastructure has been gaining momentum as time passes. Management prioritized information technology in 2000. For the first time there was a considerable budget for IT. Several PCs were purchased from the budget. Similarly, an ICT plan was prepared based on a "Terms of Reference," initiated by management. We can say that it was prioritization that was central to the pace of implementation. Several other institutions of higher learning such as our neighbors had more investments in ICT. This prompted the management to start seeing the investment in IT as a competitive edge; hence, the prioritization of IT as described.

7. THEORETICAL IMPLICATIONS

The findings related to implementation or to the lack thereof, tie in well with the general factors-related IT implementation literature, suggesting that key elements in that literature are of a fairly general and universal nature. One conspicuous difference was however, the seeming invalidity of the TAM constructs as indicators of future success. In TAM (Davis, 1989) and the more recent UTAUT (Venkatesh et al., 2003), perceived usefulness and performance expectancy are basically related to job performance. In this case, we saw a much more complex set of perceptions by the individuals about what constituted value and how this influenced people's behavior. There was a lot of enthusiasm for IT at the institution expressed during the planning process in 1991. Based on the perceptions of usefulness and ease of use expressed at the time one could have expected a high degree of adoption. That this was not the case could be interpreted as an indication that TAM might not be valid in this type of setting. However, the perceptions were expressed at a very early stage of adoption and to a large extent not based on any real experience.

The technology transition model (Briggs et al., 1998) builds on TAM, and extends it by adding more details. Some of these are useful for explaining our findings. The TTM's division of "perceived magnitude of net value" along a number of dimensions is one of these. For instance will the component of "access load" under the "cognitive dimension" have a link to issues under "poor organizing" detailed in subsection 5.5 and the economic dimension explains the issue of consultancy income noted in subsection 5.3. The TTM

has also introduced two new concepts: “certainty,” which is linked to our concept of time and poor planning (subsections 5.4 and 5.7) and “perceived net value of transition,” which corresponds with the demand for training of staff (subsection 5.2). This indicates that TTM takes us some steps further but still some issues remain, characterized by areas where “Western” norms differ from local norms in the developing world, i.e., in East-Africa as the focus for our research. For instance, different considerations exist of personal prestige (subsection 5.5) and the concept of corruption is also viewed differently (subsection 5.7).

Some of the literature introduced in section 2 deals with interesting individual examples of cultural issues. De Vreede et al. (2003) present a model describing factors influencing group support systems (GSS) acceptance in Tanzania, and introduce “referent power” (people holding positions based on their contacts, not on their skills) as one of these factors. In her study of IT in Kenya, van Ryckeghem (1995) explains why juniors are keener about learning IT than seniors, which is in line with our findings (subsection 5.2), and she discusses the African ideas of time in a way similar to us (subsection 5.7). Avgerou and Madon (2004) in their study of IS innovation processes in India describe a variety of factors related to hierarchy, status, and local culture of the key actors when they tried to uncover the organizational setting within which the systems were embedded, as we discuss in subsections 5.2 and 5.4. They also found examples of active (and passive) obstructions, somewhat parallel to our descriptions of top management and staff resistance presented in subsections 5.1 and 5.2.

8. CONCLUSIONS

There has been very little implementation progress over the 10-year period studied. The institution is still facing a number of challenges that need to be dealt with to succeed. A crucial question for the future is if the perceived benefits will be enough to overcome those challenges.

We have underscored the need to understand the different agendas that might be at play during an implementation process in this type of setting. As we have shown, the general nature of the implementation literature does not provide sufficient background for a deeper understanding of the issues and underlying levels of explanations (e.g., why the weak management support?). For this, more contextual factors need to be taken into account as pointed out in subsection 5.7. The political, organizational, personal, cultural, and power-related factors play out in ways unique to the situation. Some of these we have outlined. Some might well have been poorly understood by us, and some of them have probably not even been clear to the key players involved. One of the most interesting findings so far and a main issue in our future research, is the different understanding of time in various cultures and the time concept impact on IS development, implementation, and use.

The main limitation of this study is related to the scarcity of relevant literature related to contextual and cultural aspects of IS implementation. In addition, the work has a somewhat narrow perspective, with only one organization in focus. Further research should broaden this perspective by following “our” institution during the next period of time (the next 5 years) and looking at implementation issues in a wider selection of organizations in Tanzania and, if possible, in other African countries. More recent literature (e.g., on TTM: Briggs et al., 2003; de Vreede et al., 2003; Heeks, 2002; on UTAUT: Venkatesh et al., 2003; Avgerou & Madon, 2004) will also provide a valuable foundation for our next research effort.

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Article 10

***E-government Challenges and
The Role of Political Leadership in Indonesia:
The Case of Sragen***

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E-government Challenges and the Role of Political Leadership in Indonesia: the Case of Sragen

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Abstract

In general, developing countries are lagging behind in e-government adoption compared to developed countries. Within Indonesia, there is a huge disparity in e-government implementation between districts. This study presents e-government challenges and the role of political leadership in the rural district of Sragen, one of the leading districts in implementing e-government in the country. The study focuses on the supply-side of e-government, and categorises the challenges in three main areas; management, infrastructure, and human factors. Initiatives taken to deal with these challenges are presented and strong political leadership is found to play an important role.

1. Introduction

During the last 10-15 years, governments from all over the world have tried to take advantage of information technology (IT) in general and the Internet in particular to improve governmental administration and communication with their citizens. IT offers the opportunity for the government to better deliver its information and services and to interact with all its citizens, businesses, and other government partners in a more effective manner [5]. E-government offers the potential to bring citizens closer to their governments, and regardless of the type of political system in the country, the public benefits from interactive features that facilitate communication between citizens and governments [34].

Adoption of e-government has increased in most countries but at the same time the rate of adoption varies from country to country. Generally, developing countries, including Indonesia, are lagging behind in e-government adoption compared to developed countries. Based on a global e-government survey conducted in 2006, Indonesia was 183rd out of the 208 surveyed countries [34]. The

United Nations' Global e-Government Readiness Report put Indonesia on 97th place among the 191 surveyed countries. The readiness incorporates Web measure, telecommunications infrastructure, and human capital indices [31]. However, the disparity in e-government implementation between districts in Indonesia is huge due to a number of reasons, including management, infrastructure, and human factors that vary across this large and heterogeneous country.

Various sources point to strong political leadership as one important determinant of e-government success (i.e. [28]). In a society with a culture of great power distance, like Indonesia, where inequality in power distribution is accepted and, in some cases, expected by less powerful people, leaders play a very important role in deciding "to go" or "not to go" [14]. Strong leadership can ensure a long-term commitment of resources and unify different fractions so that they collaborate and support e-government initiatives.

The research questions addressed in this paper are: (a) what are the challenges of e-government implementation in a developing country, and (b) how are political leaders meeting these challenges. Sragen, one of the leading districts in e-government implementation in Indonesia, is our research site for this study.

The remainder of this paper is organized as follows. Section 2 describes the study's context, followed by a literature review presented in section 3. Our research methodology is described in section 4, while section 5 discusses the research findings. Section 6 brings this paper to a conclusion by discussing implications of our findings.

2. The study context

Indonesia is still recovering from a severe economic and political crisis and was hit hard by the biggest natural disaster in recorded human history in 2004. At the same time Indonesia is undergoing major changes to a

decentralized system of governance, and weak public institutions have resulted in significant governance challenges.

The Corruption Perception Index from Transparency International ranking Indonesia as number 130 out of 163 countries, shows that the country has severe problems regarding corruption and transparency of public services and information [30]. E-government was introduced by Presidential Instruction No. 3/2003 in July 2003, with the objectives of supporting the government's change towards democratic governance practice, to facilitate communication between central and local governments, to improve transparency, as well as to control and ensure accountability towards implementation of good corporate governance, and to enable a transformation towards the information society era [9, 15].

The Presidential Instruction contains a national policy and strategy pertaining to e-government development in Indonesia. Before the introduction of this instruction local governments had taken initiatives to develop e-government without any guidelines from the central authority. Development of national e-government solutions in Indonesia is managed by the Ministry of Communication and Informatics. The Ministry has reported that the adoption of e-government by local governments has been slow. The data shows that local governments, which include province governments and district/city (kabupaten/kota) governments, account for 49.9% of the total number of e-government solutions. At the central/state government level, 90% of the institutions have implemented e-government for a variety of functions [2].

The use of the Internet is increasing rapidly in Indonesia. The number of users rose by more than 1400% during five years, from 1.9 million in 2000 to 11.2 million in 2004 and reached 16 million in 2005 [3, Jakarta Post, Jan 27, 2006]. Widespread public use of the Internet explains the much faster growth of Internet users than number of subscribers. Today two thirds of Internet users gain their access through Internet cafés. These are concentrated in the larger cities, however, and in the whole population, the density of Internet users is still as low as 7.0%, which is well below the average user density in the world, 14.6%, and in Asia, 8.9% [16].

The district of Sragen is one of 440 districts/cities in Indonesia. It is located in Central Java and has a population of 850,000. The economy of Sragen mostly relies on agriculture and 8,105 registered small and medium-sized enterprises (SMEs). The use of information technology (IT) in the public sector in Sragen started in 1998, but the adoption rate is still low due to a general lack of competence. To cope with this problem,

regular training courses have been conducted since 2002, with the aim of improving the staff's IT skills. E-government implementation in Sragen is managed by the *Bagian Penelitian, Pengembangan, dan Data Elektronik* (Litbang dan DE, Section for Research, Development, and Electronic Data).

In October 2002, Sragen opened a so-called *Kantor Pelayanan Terpadu* (KPT, One-Stop Services) to provide the public with a simpler process to get certain permits and licences. In the beginning, the KPT had authority to issue 17 types of licences, such as building permits, restaurant licences, etc. When issuing the permits, the KPT coordinated their work with other governmental offices, and thus simplified the bureaucratic process considerably. During the last five years, their authority has been extended to 52 types of licences, where 16 of them are delegated to sub-district offices, and nine to village offices. Until 2005, the KPT had issued a total of 12,601 permits, most of them related to economic activities. Sinombor and Taslim [27] show that the introduction of the KPT has had an obvious impact on the number of investments in the district. From 2002 to 2005 the value of investments increased by 61.3%, from IDR 592 billion (USD 65 million) to IDR 955 billion (USD 105 million).

In 2006, 52 offices were connected to the computer network and the Internet, including, 21 working units at district level, 20 sub-districts (*kecamatan*), and 11 offices (*dinas*). The LAN (local area network) is used to connect all the offices. During the next three years, starting from 2007, a further 208 village offices will be connected to the Internet. Even if the Sragen district has been leading in e-government implementation, the public can still not access the provided services directly through the Internet. The citizens have to physically visit the service points set up at the sub-district offices; an adjustment to fit the local context. Heeks (2002) termed this kind of adaptation as local improvisations.

3. Literature review

3.1. What is e-government?

According to Kumar and Best [18], e-government can be defined broadly as the use of information and communication technologies in the public sector to improve its operations and delivery of services. Although e-government encompasses a wide range of activities and actors, three distinct sectors can be identified. These include government-to-government (G2G), government-to-business (G2B), and government-to-citizen (G2C). Some observers also identify a fourth sector, government-

to-employee (G2E). Since G2E operations tend to focus on internal, administrative activities, they can be considered a subset of the G2G sector [26].

In many respects, the G2G sector represents the backbone of e-government. It refers to the standard processes that different government agencies use in order to communicate with each other and streamline processes, and some observers suggest that governments at all levels must enhance and update their own internal systems and procedures before electronic transactions with citizens and businesses can be successful. G2B initiatives receive much enthusiasm from the private sector because of the potential for reducing costs through improved procurement practices, increased competition, and streamlined regulatory processes. G2C initiatives are designed to facilitate citizen interaction with government, which is what some observers perceive to be *the primary goal of e-government* [26].

The literature offers a number of models presenting the development of e-government. Some of these (e.g. [7, 8, 19, 20, and 24]) describe e-government as an evolutionary phenomenon, starting with presence on the web, providing the public with relevant, basic information. The development is then described in a number (typically 4) of levels, from (1) *web-presence* through (2) *interaction* and (3) *transaction* levels, to the (4) *transformation or horizontal integration* level, where all government information systems are integrated across departments. This highest level is usually a long-term objective where e-government is offered as "seamless" on the "one-stop-shop" principle. The stages are explained in terms of measurements of costs, time, complexity, levels of integration and constituency value.

Kunstelj and Vintar [19:133] have found that most countries reach the second level of development. This level is relatively easy to achieve, as supplying information, application forms and e-mail addresses online involves no great effort or any change in existing operations. The development of the real transaction services (or vertical integration), enabling all phases of back-office processes to function electronically, however, requires intervention also in back-office systems. At this level development starts to significantly slow down, even in the developed world, where only 10 percent of websites surveyed in the EU countries had at least one level-3 service.

3.2. E-government in developing countries

According to Heeks [10], e-Governance lies at the heart of two global shifts: the information revolution and the governance revolution. Both shifts are changing the

way society works and the way that society is governed. But it is the few who have access to ICTs, to digital information and knowledge, who benefits from reforms in governance. We can thus talk of an 'e-Governance Divide' that is increasingly separating developed and developing countries, and elites and ordinary citizens within developing countries. This growing divide must be addressed if the poor in developing countries are not to fall even further behind.

There are, however, a great number of e-government projects in developing countries to address this divide. Many of these projects are supported by international organizations, such as the UN, the OECD, and aid agencies from developed countries, or by national and regional development funds. We find a variety of both academic and practitioner oriented literature covering such projects. Grönlund et al. [8] gives a broad overview of literature sources covering e-government projects and research in developing countries in general.

Some literature has dealt with the opportunities and challenges of e-government in developing countries. The main opportunities for e-government in general, like cost reductions, improved efficiency, and quality of services, will also apply to projects in developing countries, but some motivation seems a stronger and more important factor for transitional democracies and developing economies. For example, mature democracies, which generally have their legitimacy well established with internal and external constituencies, may be driven more by an interest in enhancing internal efficiencies and instituting marketization practices. In contrast, transitional democracies with newer governments may perceive a need to improve openness and citizen opportunities to solidify their legitimacy, and may thus emphasize reforms such as transparency, increased citizen participation and attracting economic development [26].

The Asia Foundation [28] reports that, in Asia, there is growing recognition that e-government has the potential to improve government transparency dramatically by increasing accountability and reducing opportunities for corruption. Based on their studies from India, Kumar and Best [18] state that e-government is increasingly being seen as the answer to a plethora of problems that the governments or public agencies in general face in serving their constituencies effectively. These include a means to save costs, improve quality, reduce response times, and allow access to services, and as a tool to increase transparency in administration, reduce corruption, and increase political participation.

To be effective, e-government projects, like information systems in general, must focus on the social contexts into which IT is introduced. This is even more

important in developing countries, many of them African or Asian countries, with great cultural differences from the “western” world where the technology and systems normally are designed and developed. Heeks [12:5] put it in this way: ‘New Delhi is not New York, and Lusaka is not London. So there is often a large design-reality gap when you try to introduce in a developing/transitional country an e-government system designed in and for an industrialised nation’.

A common theme, however, in most literature dealing with e-government in developing countries, is the focus on transparency and fighting corruption. It seems this is the main difference between developed and developing countries in this regard. Grönlund et al. [8] have studied a selection of handbooks for managing e-government projects in general, and for developing countries in particular, and found that, apart from a particular focus on corruption in the developing countries, these handbooks are strikingly similar.

3.3. E-government – success or failure?

Despite benefits and some initial success, e-government has yet to prove successful in, or even affect the vast majority of governments in developing countries. E-government initiatives face serious challenges which are described in a number of articles (e.g. [4, 7, 8, 12, 18, 21, 26]). Broadly speaking, these challenges seem to fall into three categories: *management*, *infrastructure*, and *human factors*. While the first category is solely linked to the supply side, the infrastructure and human factors belong to both the supply and demand side, i.e. citizen issues.

Few projects meet these challenges, and the failure rate is high. According to Gartner [7], more than 60 percent of all e-government initiatives either fail or fall short of expected outcomes. Heeks [12] has analyzed more than 40 e-government-for-development projects in developing/transitional countries and estimates that 35% of these were total failures, while 50% partially failed, and only 15% were successes. These figures indicate that the failure rate is even higher in developing countries. Heeks states that partial or total failures are the frequent result when you try to introduce an e-government system designed elsewhere in a developing country.

Central to e-government success and failure is the degree of change needed to take us from 'where we are now' to 'where the e-government project wants to get us'. 'Where we are now' means the current realities of the situation. 'Where the e-government project wants to get us' means the model or conceptions and assumptions built into the project's design. E-government success and failure

therefore depend on the size of the gap that exists between 'current realities' and 'design of the e-government project' [12].

A number of success and failure criteria have been described in literature. In line with the challenges (above), the success and failure criteria can be grouped into the same three main categories: *management*, *infrastructure*, and *human factors*. The *management* category deals with strategic issues, change management, political leadership, institutionalizing, and continuous monitoring and evaluation of the projects. *Infrastructure* is ICT infrastructure, legislation and financial resources, while *human factors* include competence and skills, training, and trust.

In most cases, the greatest constraints to e-government are non-technical, in the *management* category, such as political opposition, deeply ingrained policies and practices, and internal employee resistance [28]. To overcome these constraints, governments require effective, knowledgeable leaders who can help spur bureaucratic action, and implement strategies that promote sustainable change [28]. A critical pre-condition in successful e-governance for development, thus, is political leadership, or a champion role with the vision to put e-government onto the agenda and make it happen. Conversely, all the operational e-readiness in the world is of limited value if there is no vision and leadership to give direction to e-governance [10]. In addition to this, in UN reports on ICT and e-government projects, institutional weakness and shortage of qualified personnel and training have been identified as core failure factors in developing countries [24].

3.4. Are e-government solutions sustainable?

While some research has been carried out on success and failure of information systems in developing countries, little work has been carried out on sustainability. In other words, how information system projects can be sustained over long periods with appropriate resources, including money and people [33]. In his article on failure and success of information systems in developing countries, Heeks [11] uses his model of design-reality gaps and explains that sustainability failures frequently occur when design and actuality spring apart. Typical examples occur when donor funds are withdrawn, when key IS staff quit and when senior-level champions move on.

Even fewer studies focus on the long-term sustainability of e-government initiatives. Some analysts have noted that e-government projects, like IS projects in general, often fail either totally or partially in achieving

their objectives despite initial successes. Kumar and Best [18] have studied an e-government project in rural India, licensing birth certificates and processing applications for old age pensions. After over one year of successful operation, however, the e-government program was not able to maintain the necessary level of local political and administrative support to remain institutionally viable. As government officers moved from the region, or grew to find the program a threat, the e-government services faltered. They argue that this failure was due to a variety of Critical Failure Factors, and they end with a sustainability failure model with five principal modes of sustainability failures: financial/economic, cultural/social, technological, political/institutional, and environmental sustainability failures. Many e-government projects in developing countries are financially dependent on international organizations, such as the UN, the OECD, and aid agencies from developed countries [8]. This makes them particularly vulnerable when the outside funding ends and even more exposed to financial sustainability failure than project in the developed world.

3.5. E-government in Indonesia

The literature we have described so far covers developing countries in general or regional Asian issues. There is a fairly broad selection of works covering e-government cases in some Asian countries, like India. There are, however, only a very limited number of articles dealing with e-government implementations and their challenges in Indonesia. Indonesia's present offer of content and services by the Government via the web is still poor and the country's ranking in terms of governmental Web presence is lower than for most other Asian countries except for Bhutan, Bangladesh and Sri Lanka. This low ranking does not make sense for a national government serving a large country that has a unified language and high rates of literacy and education [29].

Abhiseka [1] reports that, as of March 2003, 369 government offices had opened their own websites, but about 24 percent of the websites failed to maintain their running times. Less than one year later, only 85 (or 23 percent) were still operating with their complete options.

Heeks [13] describes a G2B case, where an online information system was introduced by the Department of Settlement and Regional Infrastructure in Indonesia, to support the process of tendering. It aimed to improve transparency, efficiency and costs of tendering and procurement procedures. He concludes, however, that increased transparency, "at present, (is) more a potential than a reality", and that the system falls in the category of

partial success/partial failure overall and is largely unsuccessful so far in addressing corruption, due to staff resistance and a lack of legal infrastructure and broader support. Rose [25] explains the difficulties of implementing e-government in Indonesian regional governments with the following reasons: financing problems, few qualified people, lack of supporting infrastructures, and low attention from regional government offices. The political will, laws and regional regulations are fundamental criteria for successful implementation of e-government.

What is important to achieve sustainable e-government in Indonesia? Heeks [13] points to political support as the critical success factor for sustainability of the described tendering system and Rose [25:224] explains lack of sustainability by the fact that "Governments do not cover routine costs in their budgets for operating and maintaining e-government", and it is also a matter of political leadership. This main issue of political leadership is summed up by Parks [22:8]: "Almost invariably, successful IT projects have been championed by a strong, committed leader, whose vision and ability to build support within government, secure the necessary funding, and manage the project from beginning to end has ensured the success of the initiative."

An important objective of some e-government initiatives is the decentralization of decision-making and service provision to sub national levels of government. According to Seifert and Bonham [26], this is more likely to be a goal in countries covering a large geographic area with a heterogeneous population where one-size-fits-all solutions may be less useful [26]. This characteristic applies fully to Indonesia, and together with the country's severe corruption problems, two main objectives of introducing e-government solutions would be decentralisation of governance and increased transparency. According to Haryono and Widiwardono [9], e-government in Indonesia is needed to support the government change towards a democratic governance practice, to support the application of authority balances, to facilitate communication between central and local governments, and to gain openness. A government spokesperson promises that, in the future, the public will have access to look up any government policy with one click of the mouse, signalling a higher standard of government transparency [1]. While this is a noble and ambitious goal, several challenges exist in attaining it. It is to examine these challenges that we conducted this study.

4. Methodology

The district of Sragen was chosen as the research site due to its achievement of winning The Indonesian E-Government Award in 2006. This exploratory study pays attention to the supply-side of e-government, and not to the demand-side. In our study, e-government is seen from the viewpoint of e-government actors and policy makers. Data collection was conducted using semi structured face-to-face interviews and informal focus group discussions with the actors who play important roles in implementing the e-government solutions. Data collection was made in mid October 2006.

The interviews were carried out with the Head of the District (Bupati) and the District Secretary. The focus group discussions were made with the Head of the Section of research, development, and electronic data processing and his staff, with the Head and staff of the KPT, the Head and officers of a Sub-district, and the Head of a Village office with his staff.

The interviews and focus group discussions focused on the participants' experiences with e-government implementation and their opinion about the development of e-government in the region and in Indonesia in general. By interviewing the e-government actors at different levels of governmental offices, we aimed to ensure validity of the information obtained.

As well as these key players, we also interviewed one Head of a Commission in the local parliament, dealing with governmental issues, to obtain his opinion on what the local parliament and the political opposition think about the e-government initiatives taken by the Bupati. This politician was the opposing candidate to the sitting Bupati during the last election. Each interview and discussion session lasted between 60 to 90 minutes.

In addition to the interviews and the focus group discussions, we carried out some field observations from district to sub-district to village levels, to learn about the daily activities and the available infrastructure. Documents such as the grand design of e-government, IT infrastructure architecture design, profile of the KPT, and customer satisfaction report were also analysed. Some of the services at the KPT were also demonstrated to us.

All the interviews and the focus group discussions were recorded and transcribed. The transcripts were then analysed using the content analysis method. Content analysis is "a research technique for making replicable and valid references from data to their contexts" [16]. Based on the theoretical background, and our three groups of e-government challenges, management, infrastructure, and

human factors, we developed a pre-defined set of categories. This method is also known as deductive category application [21], and the pre-defined categories were chosen to focus on specific themes. As this is a preliminary research, we coded for existence instead of frequency [6]. A closer investigation will be made in future work, involving quantitative data collection.

5. Findings and discussion

In the following section, the impacts of the Sragen e-government initiative are discussed in the light of the three e-government challenges mentioned above, i.e. management, infrastructure and human factors.

5.1 The management factor

Political leadership with a clear vision is essential to ensure successful implementation of e-government and efficient change management. Solving organizational and cultural inertia can only be implemented by a strong leadership. The organizational and cultural changes are often more difficult to execute than the technological challenges. The Bupati claimed that:

Change management is necessary to make e-government implementation successful.

In his meetings with the staff, the Bupati often stresses that:

Those who are against (the e-government processes) should quit their job.

This strong political leadership performed by the Bupati has given noticeable results, manifested as support from all levels of the governmental offices and even from his political rivals in the local parliament. The Bupati's background as a successful businessman in gas exploration may have a strong influence on his managerial style. In Sragen, he has experienced that managing civil servants is easier than managing private sector staff.

Loyalty and commitment of the civil servants are better than those in the private companies. Hence, it is easier to encourage them. In Sragen, being a civil servant is still a high status position,

the Bupati asserted.

The Head of the KPT, when asked about the reason behind the establishment of the KPT answered that:

The KPT establishment was triggered by complains on quality of public services, often emerged when the Bupati met the public. Especially those complaints related to the process of getting permits that takes a long time, with no guarantee in terms of time limit, no

transparency as regards service cost, and complicated bureaucracy. ... The Bupati has a good sensitivity to this problem. Fortunately, our Bupati is also a businessman. He understands that the problem is in the bureaucracy.

The e-government initiative in Sragen has received full support from the local parliament. The Head of a Commission in the local parliament asserted:

We, in the local parliament, gave full support to what the government did. We have seen a lot of advantages. Communications among all levels, from district to villages, are made possible by this initiative.

In 2003, a local government regulation was issued to strengthen the existence of the KPT politically and to ensure its sustainability. This is an important policy in the context of a highly volatile government with high volatility, like in Indonesia, where decisions made by one incumbent are overturned by the next, which may lead to projects being derailed or blocked.

5.2. The human factor

Sragen's vision when implementing e-government is to improve public services. The Bupati pays serious attention to changing the mind-set of the civil servants to being more service-oriented. Clearly, this is not an easy task to undertake. He stated that:

I spent the first six months when I was in the position to do brain washing of the civil servants. The objective is to increase their awareness in improving public service quality.

To improve the public service quality, best practices from private sector are brought in.

We want to make a new paradigm, new working culture, and new norms,

the Head of the KPT declared. During the establishment in 2002, the KPT staff had to participate in several development programs, including service quality training, given by invited professionals. All initiatives were aimed to show a more friendly service atmosphere to the public, and the public service quality is evaluated regularly. The Head of the KPT told us:

In the first semester of 2006, we could process 65% of all requested services in a shorter time, as expected.

During our field observation, we found that the awareness to give a better service to the public is also apparent in sub-district and village levels.

The strong leadership is also apparent when working with the lack of IT literacy among the staff. Regular IT training is set-up by the local government to improve the

IT literacy especially for young public servants and key personnel. Kumar and Best [18] indicate that lack of adequately trained personnel is one of the main critical failure factors of e-government implementation.

Young staff and key persons should be able to operate a computer,

stated the Bupati. To further strengthen the competence, the local government also hires professionals to fill in IT-related positions to speed up the e-government implementation. This initiative is in line with Rose's [25: 226] suggestions: "One means of support from the private sector would be providing human resources. Since few local government staffs are experts in digital information technology, the local government could have a joint operation with the private sector."

Now, The Asian Development Bank recommends the KPT as a model for other districts [27], and in addition to serving the internal market in Sragen, the Section for Research, Development, and Electronic Data now also employs their experience to offer consultant services to other districts in Indonesia to implement e-government solutions. This is an answer to the entrepreneurial challenge set up by the Bupati for all the offices. The Bupati asserted:

I challenge all Heads of Office to be able to be consultants for other districts when they have implemented an e-government program in Sragen.

The service fee they charge for this contributes to increase the Pendapatan Asli Daerah (PAD, Real Regional Income) and also gives a small, legal, income to the Sragen staff.

5.3 The infrastructure factor

Despite limited infrastructure and financial support, several e-government initiatives have been taken in Sragen. The Internet bandwidth used is, however, only 128 kbps, to serve all 52 offices. The limited bandwidth is the reasons that they do not offer the e-government services online via Internet, but from service points at the sub-district offices. Head of the section of research, development, and electronic data processing asserted:

Our infrastructure is limited. Our budget is limited. But, we believe that it does not mean that we can not cope with the limitation. We will be always trying to optimize utilization of the available infrastructure.

In order to be able to provide a cost-effective IT infrastructure, the Sragen government have established *Badan Usaha Milik Daerah* (BUMD, a local government owned enterprise). An important additional initiative is

collaboration with private sector. For instance, running the e-government application for processing ID-cards is provided by a private partner using a "profit-sharing" principle. Head of the section of research, development, and electronic data processing argued that:

By doing this, there is no need for us to allocate a lot of money to acquire the (information) systems.

So far, we have studied the e-government in Sragen from the government's side (i.e. the supply side). From 2007 they have planned to connect all 208 village offices in Sragen to the Internet, which is a good starting point for supplying the public with access to the Internet and to study the demand side of the e-government solutions more closely.

6. Conclusions

In this study, we have looked at e-government challenges in developing countries, and found that they can be grouped into three categories, management, infrastructure and human factors. In the light of this, we have analysed a successful e-government initiative in the rural district of Sragen, Indonesia. Literature analysis shows that strong political leadership is one of the most important success criteria for e-government projects in general and in developing countries in particular, even pointed to as the most important criteria by some [e.g. 13, 22]. This has been an obvious finding in Sragen, confirmed by statements we got from both politicians and administrative staff. Strong leadership is important to be able to manage the e-government implementations with the limited resources available, and to generate progress over a period of time. Taking similarities and differences in other district governments into account, we believe that this lesson from Sragen may be adopted both by other district governments in Indonesia and even in other developing countries with similar context.

Other important lessons to learn from the Sragen case are involvement of all stakeholders from the beginning, exhaustive training and motivating of the human resources and partnership with external parties. To ensure that the e-government implementation meets the expectation, regular evaluations should be performed, to provide necessary feedback for improvement.

Despite the positive picture we found in Sragen, some areas for improvement were also identified. Two important challenges have to do with the G2C aspect. The first one is a combination of an infrastructure and a management challenge. So far, service provision is not fully online and accessible through the Internet. The electronic communication ends at the sub-district level,

where the offices serve as service points. In the future, they should expand this further, not only to the village level, but make the services accessible through the Internet, anytime and anywhere. To make this possible, the IT infrastructure has to be improved, for example by involving external investors, to overcome financial constraints. Another G2C issue, which is entirely a management challenge, is to develop and implement routines for taking better care of the direct communication with the citizens. There is a need for procedures to track and respond to suggestions, critique, and complaints, to encourage the citizens and to increase the degree of participation in policy making and development.

Another managerial issue is to improve the G2G aspect by ensuring data integration and integrity vertically and horizontally between government agencies. Better data quality will in turn improve the quality of decision making.

The e-government initiative in Sragen is to a high degree based on external competence. The solution will remain vulnerable if the internal human resources are not strengthened, either by competence transfer to permanent employees or by recruiting civil servants with necessary IT skills.

Though considerable attention has been focused on how e-government can help public agencies improve their services, there are relatively few studies so far, that focus on the impacts of these services on users themselves (citizens and businesses), in particular in developing countries [8,12,18]. In other words, historically, focus has been placed on the supply-side of the e-government, both from the governments themselves, and from the research community. The demand side is almost neglected. Our next step will be to study the existing and potential users and their external pressure as a drive for increased efforts from the government.

In the context of Indonesia, Internet cafes may be used to support the demand-side of e-government. In Indonesia, two-third of users accesses the Internet through Internet cafes [32]. Along with other initiatives, like setting up public community telecentres or connecting schools to the Internet, this is expected to maintain a demand-side sustainability of e-government. This is an interesting direction for future research. Of Kumar and Best's [18] five types of sustainability, the first four relate to supply-side, while the last one is mainly a demand-side issue. Our next research will focus on the demand-side, and we suggest introducing a sixth type: demand sustainability.

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