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Service Value Co-Creation in Digital Platform Business: A Case of Xianyu Idle Trading Platform

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Abstract: With the emerging digital platform economy, consumption activities are increasingly integrated in the production process of service platforms, and the development of e-commerce platforms shows a new realm for solving sustainability issues such as resource wasting and urban pollution. This paper investigates the service value co-creation processes in the digital platform context and recognizes the service value output categories under different stages among platform business, platform buyers, and sellers. Using an emergent and representative digital platform, the Xianyu idle trading platform, and adopting an embedded case study design and social media analysis approach, this paper illustrates the service value co-creation practices and value categories among users in each stage of purchase. We find that platform business not only facilitates value co-creations but is also an active participant. This study contributes to both value co-creation and platform business literature, and it sheds light on achieving sustainability in the platform economy and moving toward an environmentally friendly society.

Keywords: digital platform business; service value co-creation; service-dominant logic; sustainable development; service innovation

1. Introduction

Sustainable consumption and production (SCP) was identified as one of the sustainable development goals of the United Nations in 2015 [1]. SCP aims to improve resource and energy efficiency as well as provide a higher standard of living in a sustainable environment [2]. In reality, SCP has a significant impact on promoting global sustainability awareness, consumption patterns, and lifestyle choices [3], which are vital for the transformation of sustainable urban societies. Yet, the consumption upsurge in modern society has also brought about more and more idle resources and items to urban families. These idle items are thrown away without proper recycling or full utilization, resulting in a huge waste of resources. Statistics shows that 30 to 40 percent of our daily household waste can be recycled [4].

Meanwhile, technological advancements in these years stimulated the prosperity of digital platforms, which have not only reshaped both the virtual aspects (e.g., online shopping, movie) and physical aspects (e.g., education, household services) of daily life, but also open up new opportunities for sustainable consumption and production practices. Second-hand item trading platforms could enable sustainable consumption by creating more opportunities for the exchange of underutilized resources and enabling new interactive approaches and collaborative lifestyles. The popularization of app-based platforms has not only altered the way of providing and receiving products or services between firms

and consumers significantly, but also helps urban citizens to reconfigure resources, reshape their consumption patterns, and cultivate sustainable lifestyle.

While platform users take advantage of the benefits of digitalization, the growing platform economy brings new challenges to traditional market relationships. Content is increasingly generated and consumed by users, and consumers are more actively involved as knowledge and information can be easily shared between actors on the platform. However, mainstream marketing has been challenged for being static and incapable of capturing the market changes that have been induced by technological advancement and business model innovations [5,6]. Although the system-oriented thinking about value co-creation has been proposed for a decade [7], the interactions between consumers and firms are still seen as the central locus in services marketing research [8], and few present studies explore service value co-creation in practice [9]. A deeper understanding of the role of actors in service value co-creation and an integrative framework to analyze the different collaborative processes are needed [10].

To fill this gap in existing literature, this study investigates how service value is co-created among online platform actors (platform, sellers, and buyers), and elaborates the values created in the process. By focusing on each stage of purchase, we further identify the value co-creation practices in user interactions and the role of the platform business in the process. Xianyu, established in June 2014, is now one of the largest second-hand trading platforms in China, and it has accumulated more than 100 million authenticated users in the first two years of its establishment. Moreover, the transactions on Xianyu increased by 15.6-fold within approximately 15 months, and 170 million idle items have been traded under the platform service [11]. It has significantly contributed to environmental protection and sustainable development, facilitating the reduction of carbon emissions by 5848 tons since its establishment [4].

By conducting a case study on the Xianyu platform using a social media analysis approach, this paper illustrates the service value co-creation practices and value categories between users in each stage of purchase. We also find that platform business is actively involved in value co-creations. Platform users make contributions and capture value through interactions with other platform actors and in turn, users can facilitate the sustainable development of the service platform.

This research theoretically contributes to the service marketing literature by unfolding the value co-creation process under the platform context. First, we enrich the understanding of value co-creation practices through in-depth analysis of the service value co-creation process and the interactions among core stakeholders. Second, our findings respond to the gap and enrich the literature on service value co-creation and also promote the perspective of "A2A" (Actor-to-Actor) framework in the collective and dynamic value co-creation processes [12].

The rest of this paper is structured as follows. Section 2 provides a review on recent developments in literature on platform economy, value co-creation, and value categories. Section 3 describes the case study method and data collection process. Section 4 illustrates the framework of value co-creation process and lays out the value components in detail. Section 5 proposes the discussion of findings and managerial recommendations, as well as limitations and further research directions.

2. Theoretical Background

In this section, we review the recent marketing research on platform economy (Section 2.1), value co-creation (Section 2.2), and its connection with the created value categories (Section 2.3) in order to position this research in the relevant literature and to lay out the academic context for the case study.

2.1. Platform Economy and Business Model

Digital technologies have created new approaches of exchange, including information, services, and assets [13]. One business model that builds on digital technology is digital

platforms, where users can connect and interact with other users and obtain products, services, knowledge, or "resources" provided by users or the platform business [14]. Digital platforms allow businesses to leverage positive externalities from networks and to generate strategic benefits from the interactions between various stakeholders on the platforms [15]. Platforms represent a core foundation for implementing digital strategies because platforms can open up the traditionally closed value creation opportunities by providing low-cost interaction channels. Platforms move value creation activities from "place to space" and give support for the sharing of information and content between the various actors to innovatively integrate resources. Platform users are both producers and consumers, and they may switch roles in their interactions and practices [16].

Platforms can take different structures and functions while growing rapidly and altering modern lifestyles. Companies such as Google, Facebook, Amazon, and Uber have established platforms that can reach a wide range of consumers and producers and radically transform how people work, socialize, and create values. Under the digital economy context, companies are increasingly facing the challenges and opportunities brought by the growing platform economy, and they either need to transform to platform providers or to become incumbents of some existing platforms [17]. Thus, the platform economy can be seen as the collection of digitally enabled activities in business, politics, and social interaction [18]. Meanwhile, many digital platforms do not directly own or provide physical infrastructures or assets, instead supporting the connection and exchange of distributed resources through digital services and facilitating transactions between users while reducing accompanied costs [13].

The platform economy has also changed the previous producer–consumer relationship from simple cooperation to (potential) coopetition. Consumers' input could be critical in production processes [19] in the platform context because it can give users the abilities and opportunities to create, replicate, distribute, and commercialize resources. It requires enterprises to be more sensitive to the emerging trends of users' needs or even invite users to participate in the value creation process rather than regarding consumers as passive value accepters.

The perspective that confirms the active role of consumers in production process naturally links to the emerging term "prosumption". This term is used to explain the enhanced (sometimes leading) role that consumers play in the production field, which has been most critical in the platform context (e.g., consumer-generated and -distributed content) [19]. This is also in line with Seran and Izvercian's (2014) [20] definition that "prosumers" are the individuals who engage in and make contributions to the production processes for both their use or the use of others. As time goes on, prosumers are thought to be both the value creators and the altruistic value sharers. Existing studies have clearly shown that the phenomenon of prosumption is an evolutionary process and a conceptual shift from consumers to prosumers [21], and some researchers even suggest that "prosumer" will replace the notion of "consumer" [22].

Digital technology and online platforms accelerate the prosumer-to-prosumer value exchange, making it possible for prosumers to benefit from these collective production activities that often come from commercial transactions [23]. Moreover, prosumers undertake multiple roles that used to be served by firms such as communication, promotions, and quality control with the help of peer-to-peer sharing platforms [24]. Some related studies look into concepts such as do-it-yourself (DIY) [25], co-creation [26], service-dominant logic [27–29], and collaborative capitalism [30].

In short, the progression of digital technologies and platform have significantly altered the traditional consumer–producer relationship, and the changes of this relationship rely more on the lowered cost of value co-creation because technologies have empowered prosumers to create, collaborate, produce, and make significant contributions to commercialization of their knowledge or novel ideas [31].

Although there have been some initial investigations on prosumption in various contexts, extant literature needs a comprehensive analysis of the service value in digital

platforms from the prosumers' perspective and its value co-creation mechanism. Since value co-creation itself is a concept that is extensively studied in recent literature, we review some of its recent developments in the next section.

2.2. Value Co-Creation under Platform Economy

Existing marketing theories more or less agree that customer is a co-creator of value. Among them, service-dominant logic (SDL) is a visionary perspective that provides useful guidance to conceptualize and promote value co-creation, to drive digital transformation, to facilitate the development of digital strategies, and to take advantage of service innovations [16]. It puts forward that service is not a specific form but a general exchange form [32], and that all economies are service economies since service is the basis of all exchange activities. Enterprises and customers enhance the use-value collectively, but the enterprise is only delivering the value propositions [29]. As a result, it requires firms to collaborate with or to learn from consumers to adapt to the diversified individual needs [28].

When we put the service-dominant logic in the digital platform economy context, there are some important points. First, marketing researchers explicitly shift the focus from production to value creation. Second, the distinction between the consumers and producers are narrowed. Third, based on the service-dominant logic, service is inherently customer-oriented and associated, and the essence of value is seen as idiosyncratic, experiential, and contextual [29]. Fourth, value is uniquely determined by beneficiary according to individual needs and available resources [33]. To further understand how value is created, we now look at the value co-creation process.

Value co-creation is a novel business paradigm to explain how customers and end-users could take an active part in the design and development of personalized products, services, and experiences. Under SDL, the customer is always a participant in value creation, and thus, value is always co-created. "Co-creation" refers to the joint creation of offerings [34] or value [35], and the resource integration during the exchange processes and value emerges in interactions [36]. This represents a shift from a firm-centric view and suggests that both firms and customers are value creators. The previous studies demonstrate that customers can be conducive to enhance offerings and value outcomes at a wider service system level through customer engagement behaviors [36]. Overall, value co-creation involves multilateral stakeholders, and is enabled by the complementarities and synergies of customers' and producers' resources.

Putting value co-creation in the platform context, Seppä and Tanev (2011) [37] argue that value co-creation is based on the design and development of customer participation on platforms because it supports firms with the technological/intellectual/human resources to reap the benefits (e.g., the innovative ideas about products/services, new business chances). Value co-creation signifies that platform users with various backgrounds engage in the same issue together, gathering different opinions to generate novel ideas using the platform infrastructure. Consumers' value co-creation activities help firms enhance the products/services quality of firms, contributing to customer satisfaction and loyalty [38,39].

Existing marketing literature has focused on value co-creation, which includes influencing the facilitators that impact value co-creation, business models that are built on value co-creation concept, business and non-business dimensions of value co-creation, and values created as a result from the value co-creation process. For example, Lan et al. (2017) [31] focused on the facilitators of value co-creation in the sharing economy context, and found that self-efficacy, cognition of duty, and anticipated rewards are positively related to value co-creation behavior. Fehrer et al. (2017) [40] discuss the value creation business model in a platform context, and propose that values are co-created through shaping the institutional arrangements of the platform. Ma et al. (2019) [3] focus on value co-creation in SCP and analyzed the social, behavioral, economic, and infrastructural obstacles in realizing co-creation practices.

Another research theme of value co-creation is the value categories created by value co-creation when various stakeholders interact with each other in the service ecosystems. Value categories can serve as a cornerstone to explore the value co-creation within platforms. The next section is devoted to value co-creation and value categories, as well as how they evolve under the platform economy.

2.3. Value Co-Creation and Value Categories

Value co-creation under the service-dominant logic assumes that consumers always participate in value creation, and consumer activities play a crucial role in determining the values created. Recent trends in marketing literature also demonstrate that values are experienced instead of perceived, and thus shift from a provider perspective to a customer perspective. To analyze the value co-creation practice, previous studies have focused on the conceptualization of process classification as well as value categories. On the classification of value co-creation process, Gronroos et al. (2015) [41] distinguish the practices by whether the process is intentional induced by one party or not. The dichotomies between intentional and unaware together with the roles of provider and consumer give rise to four types of value co-creation processes, namely, customer-driven, provider-driven, intentional, and spontaneous processes. This classification is useful in advancing research of value co-creation practices.

Understanding the values created from the value co-creation process is also beneficial to understand the value co-creation process. Value dimensions are identified and categorized using different lenses and contexts. The theory of consumption value proposes five value categories, which are functional, social, emotional, epistemic, and conditional value [42]. Subsequent studies have adopted this theory in different contexts and some value categories (such as monetary and convenience) are added while some values (such as epistemic and conditional) are taken out as a result. Since the dimensions of value are context-dependent, the platform economy context as a context not yet fully studied raises a new challenge to appropriate value conceptualization.

With the changes in value co-creation and value experience induced by technology and service functions, Vargo et al. (2017) [43] support the system-oriented conceptualization of value under the service-dominant logic, which emphasizes the nature of value with four propositions: (1) value is phenomenological and that means different actors could experience it differently in various contexts; (2) value is always co-created among multiple actors through the integration processes and resource exchange; (3) value is multidimensional and may include individual, social, technological, and cultural components; and (4) value emerges from the interactions between different actors and the system.

On the other hand, existing research also investigates value co-created from consumer engagement. It distinguishes consumer direct engagement or buying the goods or service from indirect engagement such as reviewing or referring the product/service. From the customer engagement perspective, value co-creation practices can be categorized into purchasing behavior, influencing behavior, and knowledge behavior [44].

The dimensions of value with customer engagement and value categorization from the perspective of customers are further combined and constructed into a value framework of customer engagement. It focuses on the indirect engagement of customers as customer referral value, such as new customers referred by existing ones; customer influence value, such as the impact of word of mouth; and customer knowledge value, such as customer reviews of products or feedback.

Suseno et al. (2018) [45] analyze the value creation process and value categories between consumers and professional stakeholders and find that the value co-creation process is embedded in the interactions between these two roles and that the values created from such practices are merged in terms of categories. It proposes that value co-creation is a multidimensional practice. Although the case study contains platform business, it does not take the media platform provider into account. This paper advances this line of research by not only putting value co-creation in the platform context but also by including

platform business as a research object. The multilateral stakeholder interactions for value co-creation under digital platforms are worth further investigation.

3. Research Method

Digital platforms have become an indispensable part of our daily lives nowadays, yet few studies consider the service value co-creation under the platform context. Furthermore, our understandings of platform service value co-creation practices are still limited. Given that the qualitative methods rely on text and image data and could draw on different designs, this research responds to the limitations previously mentioned through a single case study of Xianyu with an embedded case study design and investigate "how" the service value emerges from the service value co-creation processes of the platform business [46].

We selected the case study approach for the following reasons. Siggelkow (2007) [47] advocates that cases could usually be an advantageous way to motivate a research question and also be persuasive to demonstrate an important phenomenon. Similarly, Baxter et al. (2008) [48] suggested that the scholars will choose the qualitative case study approach when they face complex situations, which would contribute to establishing the new academic theories in-depth, making an assessment of the programs, or pullulating interventions [48]. This research conforms to the above scenario, so we chose a heuristic single case study of the Xianyu idle platform with an embedded case study design to elaborate on the emerging phenomenon. An embedded case study examines different "units of analysis" within one organizational context, and treating platform users as the subunits of analysis allows for an in-depth exploration of the Xianyu platform (Yin, 2014).

Owned by the Alibaba group, Xianyu is the largest second-hand trading platform in China. Conducting a case study of the Xianyu platform from the service value co-creation perspective, we expect to unfold the service value co-creation processes by analyzing the practices of the users and platform business and constructing a staged conceptual framework.

3.1. Case Selection

Xianyu was created from the vision to realize sustainability. It offers many functions, including reselling of "bought items" from Taobao (a Chinese online shopping platform), taking and uploading photos and information of the second-hand idle items, donating items, searching products or services, as well as finishing online transactions. Using Xianyu, individual sellers can attain more exposure, a more efficient recycling channel, and better logistic prices. Moreover, Xianyu is seamlessly connected to Taobao's credit system, thus ensuring transaction security to the greatest extent.

Our rationale of choosing Xianyu as the case is as follows. First, Xianyu was nominated as the most noteworthy second-hand idle items trading platform by eNet Research Institute in 2017 [49]. The business model of Xianyu is relatively mature among the second-hand e-commerce platforms, which ensures its representativeness. Second, second-hand transactions on Xianyu are based on a rich category of items, efficient communication approaches, and a reliable credit system. Hence, Xianyu can provide us adequate and trustworthy data from user interactions. Third, although Xianyu provides users with services including both business and social attributes, the platform does not profit directly from any transaction. This distinct business model enables us to analyze the different practices and service value categories between core stakeholders.

3.2. Case Study Method

An exploratory case study design helps to unfold and explain novel or counterfactual phenomenon that existing theories and frameworks are unable to elaborate or analyze clearly [50,51]. To thoroughly exercise the potential of this case and enhance the credibility of this study, we obtained the data from multiple sources.

To better explore the multidimensional practices and various emergent service values from the interaction of the related stakeholders under various purchase stages, user-

generated content can be resourceful for us to conduct the case study. Through the on-line content created by the prosumers, we can objectively capture the information of the prosumers' interactions, opinions, concerns, experiences, and feelings. Following Suseno et al. (2018) [45], we adopted an interdisciplinary approach called the SMA (Social Media Analytics) method [45], which consists of three steps: (1) social media tracking, (2) data preparation, and (3) data analysis. This method allows scholars to combine, extend, and adapt methods for social media data analysis.

The SMA methodological framework was developed by Stieglitz et al. (2014) [52] and frequently used in information system research. Because of its interdisciplinary nature, it is also gradually adopted by researchers of digital innovation. Although Xianyu is not a social media platform per se, it allows extensive user interactions, such as commenting, posting, subscribing, and forming sub-communities, that resemble social media platforms such as Facebook, and it generates data similar to that of social media, thus making it suitable for the SMA approach. Using this method, we can capture the values and their related practices by directly coding from user testimonies, such as posts and comments.

3.3. Data Tracking

For the platform user domain, we divided the tracking part into two subsequent parts. First, we determined the actor-related approach [45], aiming to concentrate on the real and dynamic interactions of related stakeholders. We selected the representative "sellers" according to random recommendations made by the platform when we logged in. The representative "sellers", regardless of whether they are individual users or micro-enterprises, can be divided into the "four taxonomies": (1) digital/material, as the subjects traded include both physical and virtual items (e.g., e-books); (2) online/offline, as the trade can be finished both online (e.g., intellectual service: learning guidance) and offline (e.g., household service); (3) resell/processing, as the products/service can be either simply resold or redesigned (e.g., DIY products/training), repaired (e.g., computers), and re-offered/recycled by the "prosumers"; (4) mainstream/alternative, or whether the sellers are recommended by Xianyu or its related platform, as Xianyu posts also appear on Taobao. From individuals' homepages, which are open access to any platform users, we record their information including their main business (e.g., physical/digital products and intellectual or labor services), number of posts (product or service for sale), number of comments (buyer interaction and feedback), number of followers (platform attention), and duration as users (regular or new users who have been registered for less than 6 months). To ensure that our sample covered all four taxonomies and users of different activity level, thirteen representative users were selected. The detailed information is shown in Table 1.

For the platform business domain, we chose the keyword-related approach [45]. Specifically, we searched the keywords that have meanings of "celebration", "thanks", and "complaint" in users' posts, and attained 126 "celebration posts", of which 6 posts refer to the Xianyu platform; 1016 "thanks posts", of which 71 relate to Xianyu; and 160 "complaint posts", of which 15 posts refer to Xianyu.

For the data tracking, we tracked the prosumers' interactions (inquiries/comments) on the Xianyu platform from April 2020 to September 2021. These interactions are open access to registered users and can be found under the sellers' posts of the trading objects or on sellers' homepages. While many buyers choose to leave public comments under sellers' trading posts, some buyers will communicate to the sellers privately, and such messages are not trackable. Thus, the data we collected were openly available to all Xianyu users and do not pose privacy or security concerns.

Table 1. The detailed information of the chosen sellers and their products/services on Xianyu (by 16 September 2021).

Serial Number	Main Business	Location	Occupation	Total Number of Posts for Sale	Total Number of Comments	Total Number of Comments with Pictures	Total Number of Platform Interactions	Total Number of Followers
1	Switch Accessories	Shanghai	Entrepreneur	828	3940	118	1583	2221
2	Agricultural Products	HuBei	Entrepreneur	7	208	32	625	313
3	Geriatric Cellular Phone	Beijing	IT Staff	44	2774	211	480	1457
4	DIY Knitting Products	Shenzhen	Teacher	13	11	1	110	27
5	Personal Idle Items	ShanDong	Student	25	24	2	121	8
6	Personal Idle Items	Zhejiang	Entrepreneur	25	796	57	189	201
7	Jewelry Accessories	Shenzhen	Entrepreneur	7	52	6	105	31
8	Digital Planning Scheme	Guangxi	Student	24	69	0	388	29
9	Digital Learning Material	Inner Mongolia	Student	33	44	0	153	20
10	Computer Maintenance Service	Sichuan	Engineer	9	67	0	26	19
11	Housekeeping Service	Shanghai	Customer Service Staff	20	433	3	3	75
12	Instrument Tuning Service	Guangzhou	Instrument Trainer	11	35	2	88	23
13	Oral English Training Service	Liaoning	Teacher	66	226	2	169	665

3.4. Data Collection

The data collection was conducted from April 2020 to September 2021 and data on Xianyu from various sources were summarized. The main data sources include: (1) archival data, obtained from the official website news and public reports of the Xianyu platform or Alibaba; (2) social media reports, which are the news or reviews on social media and the comments from media commentators or users about Xianyu; (3) academic articles, such as articles from CNKI and Baidu Scholar; (4) user-generated contents, the most important data source of this research, which are the records of posts, inquiries, and comments from representative prosumers on Xianyu. The data sources and their encoding can be seen in Table 2.

Table 2. Data sources.

Data Category	Data Source	Coding
First-hand Data	Open inquiry messages of users	F1
	Open comments messages of product or service	F2
	Open "celebration posts" of users	F3
	Open "thanks posts" of users	F4
	Open "complaint posts" of users	F5
	Other related messages on sellers' homepages	F6
Second-hand Data	Official news and reports	S1
	Social media news and reviews	S2
	Comments from media commentators/users	S3
	Published academic articles	S4

3.5. Data Analysis

First, we triangulated across different data sources. In case there were inconsistencies between data sources, we further searched or collected new documents for verification. Duplicate, irrelevant, and false data and information were deleted to ensure the reliability and validity. Second, two research assistants registered on Xianyu and experienced selling and buying on the platform in order to gain a more accurate understanding of the prosumers' interaction data. We screened the text information on Xianyu with the two research assistants to reduce potential bias. Third, we chose thirteen prosumers to analyze the comments from the "buyers" and carried out the encoding procedures manually three times to refine the keywords. The messages included both the inquiries (if they have) and evaluations, and another two research assistants checked the coding results. Fourth, to establish a new conceptual framework based on the interaction and customers' experiences, we summarized the core ideas of these user-generated messages and coded them into diverse varieties between different purchase stages.

4. Case Analysis and Findings

4.1. User Interaction in Digital Platform Service System

We first briefly introduce the Xianyu platform. Established in 2018, it supports fifty-seven types of recyclables, including household items, digital devices, and so on. According to its annual report, in addition to C2C idle transactions, Xianyu recycled 1.222 million mobile phones and 508.5 thousand major home appliances in 2019 [53]. Moreover, Xianyu has helped 687 thousand farmers, who successfully sold 7.06 million agricultural products and earned nearly a billion RMB. Many farmers began to use Xianyu to present their surplus agricultural products on the platform. Reports showed that residents in Beijing and Shanghai are more enthusiastic about recycling, and they have a strong green awareness of environmental protection. Xianyu also has a "recycling factory" that transforms discarded clothes into backpacks, empty plastic bottles into raincoats, and other activities to promote

recycling and SCP. Moreover, Xianyu has also organized dozens of public welfare activities in 2019. About 30 thousand users donated more than 100 thousand clothing items to more than 20 projects in eight provinces across China and to poor children in Laos [53]. These activities present substantial contributions and potential benefits of the digital platform for the SCP and sustainable development.

We summarize three points of the digital platform economy based on the Xianyu platform. Firstly, with the popularization of mobile Internet technology, the regional development scope of platform economy gradually radiates from first-tier cities to second-tier and third-tier cities, as one can see that metropolitan users are more active; secondly, the platform economy penetrates various service industries, including the production service industry, life service industry, public service industry, as well as public welfare activities; thirdly, digital platform enterprises show tremendous potential for promoting and achieving sustainable development.

Service value co-creation processes are reciprocal and interdependent and these participants learn from each other, and the buyers are also value co-producers [54]. Xianyu as a platform business provides services to both sellers and buyers (prosumers). Based on the process of service transaction on the platform, we divided the stakeholder interactions into three phases: the user connection stage, which is the pre-purchase period when prosumers actively engage in searching; the user contact stage, or the purchasing period when users negotiate between each other; and the user separation stage, the post-purchase period where buyers receive the delivery of service and evaluate. Figure 1 describes the three stakeholders interaction mode in different stages. We next discuss the value co-creation process based on these three stages.
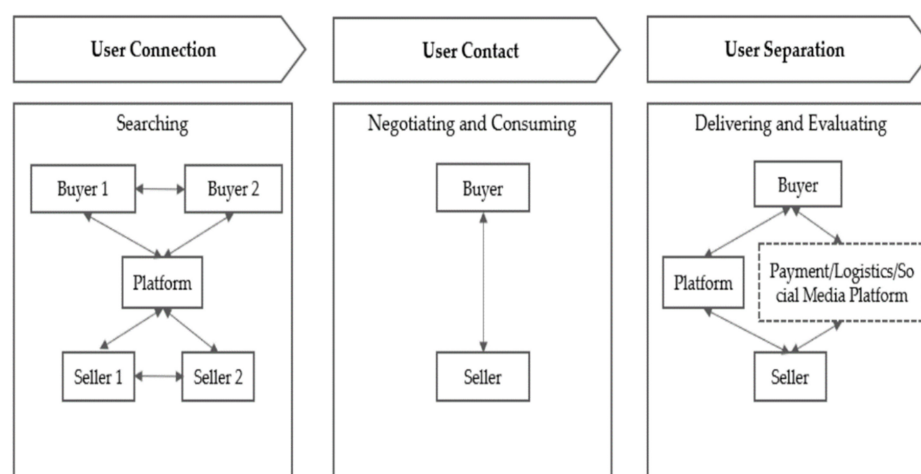

Figure 1. The three-stage model of the three stakeholders' interactions on the Xianyu platform.

In the user connection stage, sellers participate in prosumption activities by providing labor (e.g., work force), intellectual capital (e.g., creativity, ideas, knowledge, and expertise to realize customization/ personalization), physical capital, or activities that need to combine diverse types of input. It is convenient for buyers (prosumers) to find what they want through searching keywords or posting the pictures of intended objects on the platform. They can also choose to join various "Xianyu communities" according to their value proposition/interests/geographical location or the organizations they belong to in reality and they can ask for information from the community members.

In the user contact phase, the prosumers have the chance to engage in further communication on the platform. During the interaction processes, they take the time/energy/effort to reach agreements on an item's function, price, distribution methods, and so on. The platform service empowers users to create, replicate, distribute, and even commercialize their resources. Simultaneously, these prosumers provide innovative ideas/new business opportunities with plentiful user-generated content online when they take an active

part in service co-creation activities with other prosumers in design, manufacturing, and distribution [19].

At last, in the user separation stage, after the two parties come to a consensus, the buyers switch to the payment platform while seller may start to arrange the delivery and connect with third-party logistics services. After the buyer receives the items and finalizes the transaction, both parties can evaluate their transaction experience and write comments on platform for each other. At the same time, they can also share the process on social media platforms and express their opinions, leading to future interactions with other users in their social networks.

4.2. Platform Business as a Co-Provider, Co-Consumer, and Co-Regulator

In the previous section, we discuss the value co-creation process in general, but the platform context and what role Xianyu plays in the process is not yet discussed. In this section, we specifically focus on the role of platform business and investigate how it facilitates or even joins the value co-creation process. In short, we find that Xianyu takes different roles and acts as service co-provider, co-consumer, and co-regulator at the same time.

Xianyu act as a service co-provider with the seller in many ways. First, Xianyu offers a series of tutorials that guide sellers on how to make an attractive post of items for sale, how to modify their homepage to be more appealing, and even how to utilize platform functionalities to portray the seller as a vivid and warm person to gain a favorable impression among potential buyers. Second, for some types of items that are originally purchased from Taobao, Xianyu provides convenience for reselling such products by directly importing the item descriptions and promotion materials from Taobao, saving effort for sellers to input repetitive product information. Third, Xianyu also can stand similarly as an agent for the seller to sell the product with a commission fee. Although provided for a fee, this service requires the platform to authenticate the product and assume the duty of customer service and warranty, thereby relinquishing sellers from further interactions with buyers.

With these platform services, Xianyu has contributed to the maximization of seller value proposition. It identifies the fact that sellers on the platform are not necessarily aiming for profit maximization from the transaction. For platform users who possess idle resources and intend to resell them, those who are interested in selling at a maximum price will choose to customize their post and homepage to attract more buyers, those who wish to enjoy convenience will choose to import content from Taobao, and those who want minimal interaction with buyers can easily sell their items to Xianyu directly. Thus, the platform provides services not only to sellers but also to buyers, and it serves as a service co-provider from the sellers' point of view.

On the other hand, Xianyu also acts as a service co-consumer with the buyers. First, it maximizes value proposition by offering a way to obtain information at a minimal cost for buyers. Consumers can easily obtain the secondhand prices of a desired item with pictures and descriptions, and even a review of the product from the sellers. The search functionality provided by the platform is fast, accurate, and easy to use. Second, it provides help for buyers when they initiate communication with the seller. For example, when the chat window is open, it will pop up example inquires for buyers to choose and send to seller. The chat history can also be used as evidence when there is a dispute in the user separation stage. Third, it provides social media functionalities in that buyers can find other users with the same interests and share experiences and reflections on purchased items. Last, as previously discussed, Xianyu itself is also a buyer when it purchases a product from a seller who wishes to trade their idle product more conveniently. When it resells these goods to buyers, it offers quality assurance and warranty at the same time. In this way, it opens up an opportunity for value co-creation to buyers who are risk averse and afraid of low-quality secondhand goods.

With these platform services, Xianyu has also contributed to the maximization of buyer value proposition. It caters to the multidimensional value propositions of consumers, and buyers looking for information value, economic value, functional value, and emotional value are all supported by the platform's infrastructure and functionalities. At the same time, the platform is also an important consumer of user-generated content. If buyers or sellers post information related to any product, it provides information experiences for future transactions on identical goods categories. On the other hand, as the platform does not have an appropriation charge for transactions between users, it profits by posting ads from Taobao so consumers can see first-hand prices on the same webpage with second-hand posts. The accumulation of user-generated content can constantly attract new users to register and become a regular user, which benefits the financial performance of the platform.

Although Xianyu is actively involved in facilitating value co-creation for all platform users, it also takes a crucial role in defining the overall context for user experiences. Xianyu is devoted to establishing a socialized governance system with the community. First, it set basic knowledge requirements such as a code of conduct for all users on the platform. As platform users may take different roles, the rules are also in detail and contain separate versions for user interactions, making new posts, community governance, transaction dispute resolution, etc. Although a user can buy or sell items using the platform without forcibly going through these rules or being tested on them, they are nevertheless labelled as requisite knowledge and the platform assumes that users are informed of these rules in advance. Furthermore, it also makes announcements to broadcast new policies to inform users regarding to changes in allowed item categories or promotion strategies. All information is easily accessible on webpage or mobile phone applications as they are put in clear and noticeable positions.

Since it does not provide quality assurance for normal user transactions, when consumers are not satisfied with their purchase, they must negotiate with the sellers themselves to discuss returns or refund policies. However, fraud may occur when users do not trade in good faith by not fully disclosing the conditions of products or refusing to accept the return from the buyers. In this case, Xianyu does not interfere directly, but offers a mini court where 12 users are selected from the community and they can collectively vote on whether the transaction should be refunded or not based on the evidence submitted by both parties, including chat histories, unboxing videos, etc. As the juries of the mini court are from the community, the verdict of such a process reflects the shared value and judgement of the platform users. Thus, the platform business is not the sole regulator of the platform, and the platform is in fact governed by users, where Xianyu sets the basic rules and balances the rights between buyers and sellers.

Another crucial institution that Xianyu put in place is the user profile system. It not only contains crucial information such as user ratings from other users in previous transactions, but also shows user age and zodiac signs to present the buyer as a vivid person. Clearly, users who are highly rated by others will receive more attention and have more opportunities to interact with others. By actively inducing and encouraging users to evaluate each other after the transaction, Xianyu establishes a reputation system that puts users in check to conduct trade in good faith. This is another example of the platform not directly governing the community but co-regulating it by setting up effective institutions.

4.3. Service Value Co-Creation Practices and Value Categories Coding Results from Prosumer Interaction in Digital Platform Service System

Based on the analysis of value co-creation and roles of the platform in general, we now look at the value co-creation practices in detail by coding the posts and comments made by platform users. When we look through the whole process of the interactions, the related stakeholders can share the positive value output. For the user domain, 8679 user-generated comments about transactions were coded. We identified four practices are mainly connected to platform users' experiences: information experiences, communication experiences, receiving experiences, and user feedback. These practices are divided to four

categories of value, namely, functional value, economic value, emotional value, and social value. The coding results are exhibited in Table 3.

Table 3. Xianyu platform and users' value co-creation processes.

Roles and Potential Obstacles / Value Co-Creation Opportunities	User Purchase Process		
	Searching	Negotiating and Consuming	Delivering and Evaluating
Service receiver—Buyers	Receive the platform service to find a "want items" post; the seller service to gain the post information	Receive the platform service to inquire about the item, make comparisons and purchase decisions, make an agreement on the item's delivery mode	Receive wanted items and the evaluation from sellers
Service receiver—Sellers	Receive the platform service to upload a "idle items" post or "creator center" that facilitate/teach sellers make attracting posts	Receive the platform service to interact with buyers, make agreement on the item's delivery mode	Receive the buyers' feedback and evaluations
Service receiver—Platform	Receive user inputs data such as keywords for post and search	Receive user chat data such as common inquiry sentences	Receive the evaluations and suggestions from users that can improve the platform institutions
Service provider—Buyers	Provide search keywords and offer browsing	Communicate wants and needs regarding the item of interest to sellers	Provide evaluations or put up suggestions about the seller and platform, self-pick-up of items if needed
Service provider—Sellers	Provide items' related information	Provide reply and explain services to buyers, communicate with them, and further facilitate transactions	Provide the packing services and arrange the logistics
Service provider—platform	Provide related connecting services	Provide related contacting services	Provide the related transaction services
Potential obstacles of value co-creation	Difficulties to find a suitable item post or sell items	Difficulties in reaching an agreement on price/items delivery mode	Express service quality/possible items quality problem/conflict

In the user-connection (searching) stage, users mostly rely on the platform to act as the "bridge" to meet their demands, and the items' information exhibition is crucial for the prosumers to decide whether to take part in the next phase. In the user-contact (negotiating and consuming) stage, the users can contact each other under the platform service. The platform service not only contributes to stimulate user interaction but also lets buyers feel a sense of security and trust thanks to its dispute resolution assistance and mechanisms. In the user-separation (delivering and evaluating) stage, after the agreement of the item delivery, we found that the receiving experiences significantly influence users' transaction feelings. As previously mentioned, user evaluations are critical to enable the development

and operation of the Xianyu platform. Meanwhile, sharing purchase experiences on social media platforms and joining various sub-communities on Xianyu offer users opportunities to expand their networks and satisfy their emotional and social needs. The buyers' feedback is important for both sellers and platform business, as these suggestions help them to identify problems and further improve their products or services. For example, suggestions can be seen as an approach to learning about consumers' preferences and even lead to novel ideas and practices.

Prosumers take part in potential value co-creation processes, which may gradually turn into the redesign, remanufacturing, redistribution, reuse, or other critical processes when other platform users are also interested and would like to join in. Then, the prosumers would have dual roles and become intertwined in value co-creation under the platform services. Meanwhile, as discussed previously, prosumers always originate from consumers; thus, they are also buyers when engaging in transactions on the platform. Thus, we use the term "buyers" and "prosumers" interchangeably in the subsequent analysis, and mostly use "buyers" to represent this group of actors because of its natural dualism with "sellers".

The platform services for users can be categorized into three types. First, it integrates resources at various geographical scales and then finds the suitable match for users. Second, it provides detailed information or makes recommendations to prosumers and provides communication channels. Third, it establishes fundamental institutions and regulates user communities as well as solves disputes among them. Although some value co-creation processes of these services are not captured in users' posts, we found 1142 user-generated posts about the Xianyu platform that can reflect three practices: users' usage experience, users' feelings, and user feedback. We further classified them into five categories of value, namely, economic value, environmental value, social value, reputational value, and institutional value. The coding results are presented in Tables 4 and 5. We also constructed a conceptual framework of service value co-creation based on the above analysis, and it is shown in Figure 2.
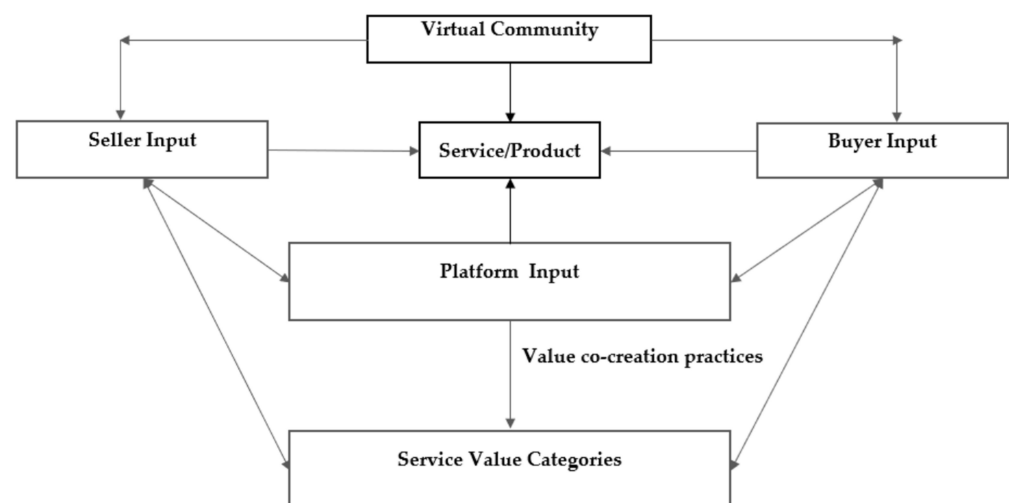

Figure 2. The conceptual framework of service value co-creation.

Table 4. User domain, value co-creating practices, value categories, and illustrative data examples (by 16 September 2021).

Domain	Value Co-Creating Practices	Description	Value Categories	Data Example
User domain	Information experiences	The items exhibiting information of product/service with the practical product/service	Functional value	1. "What an honest seller! The real object and the picture are exactly the same! The box is really useful and is almost as good as a new one, others can rest assured to buy it!" 2. "The service description matches the real service! I have to say that the housekeeping service is preeminent and the service staff is responsible!" 3. "The mask works well as the description and the skin is much better than before."
	Communication experiences	The buyer or seller response speed and attitudes, and overall feelings of communication	Emotional value	4. "The seller responded to the message very timely, and he is very patient, nice! This is a happy trade!" 5. "A really good seller! Although the transaction did not go through, the communication was really pleasant. I look forward to the next cooperation!" 6. "The previous game box of 'Piogiore no Banshou' was a little damaged, which made me sad for a long time. Finally, I found a new box to use and I am really happy!"
	Receiving experiences	The buyers' feelings of receiving service or products (including packaging and logistics)	Economic value	7. "I've bought it many times. The accessory is of good quality and much cheaper on Xianyu platform. By the way, the seller sent me small gifts and he deliver these items quickly!" 8. "It is a surprise to get so many peaches at this nice price. The express is quick and the package is perfect. Very good!" 9. "Although they were just small items, the seller packed them carefully. The fast logistics with the plentiful giveaways, it is really affordable!"
	User feedback	The buyer or seller feedback (suggestions or rating) of the transactions, and sustainability awareness	Social value	10. "I am happy to buy this second-hand bag with the most reasonable price and I contribute to the resource recycle! I hope the seller can upload more posts and everyone could try our best to make the idle items can be transferred." 11. "Hopefully this game box will have more color choices next time. And I hope the seller can offer more idle items, let's work together to maximize the use of idle items!"

Table 5. Platform domain, value co-creating practices, value categories, and illustrative data examples (by 16 September 2021).

Domain	Value Co-Creating Practices	Description	Value Categories	Data Example
Platform domain	Users' usage experience	Users' experience associated with using Xianyu	(1) Economic value (2) Environmental value (3) Social Value	1. (1)(2) "Xianyu platform supports environmental protection and recycling, and it is free to use, that's great! There are a lot of idle items in my house, I can sell idle items and realize environmental protection and recycling!" 2. (1)(3) "Thanks to Xianyu platform for giving us such a good opportunity to communicate with all the users and sell our products. This epidemic has made our factory feel great economic pressure. In order to better development, I would like to offer special sales here, and I can also provide you with special design and production. Thank you for your attention and many thanks to Xianyu platform!" 3. (3) "Thanks to Xianyu platform, the four stray cats in this post have been adopted by some kind-hearted people. I hope they will be happy in their new home. Thank you all!" 4. "Thanks to Xianyu platform, and it let more users in need can find some good and inexpensive items easier!"
	Users' feelings	Users' overall feelings and emotions about Xianyu	Reputational value	5. "Xianyu is a well-known sharing platform, and I have met many collector friends. We share the same hobbies and it is very happy to communicate with each other. Many thanks to Xianyu!" 6. "I won in the Xianyu small court, thanks to the fair handling of Xianyu!" 7. "Unconsciously, I sold something worth 100,000 RMB on Xianyu platform. Thanks for the support of my followers. I hope everyone can have a happy transaction! Also I hope Xianyu platform can improve its mechanism, becoming better and better!"
	User feedback	Users' suggestions, evaluation, and rating of Xianyu	Institutional value	8. "I think the appeal system of Xianyu should be improved. I was judged to be in violation of rules just because I gave suggestions to other people's products." 9. "Why buying a computer also violate rules? It's not clear whether it was an artificial intelligence error or a malicious tip-off?" 10. "Thank you to the judges in the 'small court', thank you for helping and believing in me!"

5. Discussion and Conclusions

5.1. Summary

From a marketing perspective, the essence of consumers has moved to a more dynamic role where consumers could be resource producers and value creators [55]. Consumers can make use of their resources, such as knowledge, skills, and competence and in turn take the role of prosumers [56]. As prosumers, their individual participation in abundant production activities leads to the word-of-mouth effect and brand recognition [57]. Meanwhile, digitalization exerts a critical influence on modern markets, which brings more resource access options for all actors, causes the blurring of actor roles, and makes the market malleable.

The digitalization of the market also substantially affected the value co-creation process, as it can no longer be seen just from a dyadic perspective. The analysis of such concept needs to consider it in expanded settings and requires a more complex and dynamic co-creation framework [58]. Edvardsson and Tronvoll (2013) [59] believe that figuring out actors' interactions with structures of service systems is vital to apprehend value co-creation and service innovation. Using a digital platform as the context, our research depicts a conceptual framework including the components of service input and value output with co-creation process under service system orientation. As our findings suggest, the platform is not only a context for value co-creation but is also actively involved in providing and consuming services and maintaining the user community.

The diverse ways in which resources are integrated and services are exchanged do not exist in a vacuum; instead, these are embedded in the platform context and could be influenced by user practices [60]. We found that platform business is also actively innovating in value co-creation and value capture practices to maintain the overall platform ecosystem. Institutions such as regulations and codes of conduct together with rating systems for all users have become important foundations for the success of platform business models, as the theories predict [40]. The case study improves our understanding of the role of the platform, service value co-creation practices, and resulting value categories. We find that the platform economy is an emerging business model that enables service value co-creation from multilateral stakeholders with diversified interests and objectives at a low cost. Digital technology and online platforms accelerate the consumer-to-consumer value exchange, and prosumers play a leading role in design, manufacturing, and distribution of customized goods or services.

In brief, the platform business participates in the processes of service value co-creation, and its infrastructure enables the service value co-creation of prosumers. In turn, service value co-creation of prosumers can generate more opportunities for value co-creation through platform services, and these new opportunities further promote users and platform business to create more value through goods, services, and interactions, thus forming the main characteristic of "sustainable". On the one hand, "sustainable" refers to the service value co-creation being continuable; on the other hand, "sustainable" could be a vision that can be spread to more people and have a profound impact on society, encouraging more people to be "prosumers" and engage into the service value co-creation processes, benefiting the economy and environment. This sustainable feature is also the main shift of service value co-creation when put under the platform economy.

5.2. Theoretical Contributions and Practical Implications

This research contributes to the existing literature in three aspects. First, the existing studies have only a limited focus on digitalized value co-creation, and this study is among the first to place value co-creation in the platform economy context. It enriches and expands the value co-creation theory by identifying the new roles of various stakeholders in the "actors-to-actors" perspective.

Second, this research elaborates the value co-creation practices from the interactions between platform users in different phases, which helps to identity the potential, opportunities, and challenges in releasing the concept from the dyadic restriction to incorporate other

stakeholders. It also sheds light on how we understand the formation of the market under SDL, since the platform market is not naturally established by buyers and sellers, and platform business plays a significant role in co-organizing and co-governing the platform with its users.

This research also leads to many managerial implications for both platform business and its clients, the platform users. First, as prosumers are an inherent part of the service process, encouraging and guiding prosumers' value co-creation engagement will contribute to a positive synergy effect that could have a wide socioeconomic impact. Thus, for the platform business, just as Edvardsson et al. (2005) [61] argued, it can encourage their customers to participate in the pre-purchase stage and utilize various service functions as well as engage in community governance. Furthermore, the platform could choose to organize some activities to encourage the engagement of prosumers, such as to give out coupons, provide different digital medals of titles to prosumers, or send them thank you notes.

For the platform users, in addition to following the rules of the platform, creating a vivid user profile is important in attracting user interactions to increase value co-creation opportunities. Furthermore, their active involvement in community governance is crucial for them to continue their value co-creation practices using the platform. Both the evaluation of users and comments on the platform are critically important for improving the platform's institutions. On the other hand, as the socialized governance may not be sufficient to keep the balance in the user ecosystem, the government and the relevant departments need to strengthen legislation and improve law enforcement capacity on digital platforms and ensure the reasonable operation of the platform to promote the development of the platform economy.

5.3. Limitations and Future Research Directions

Although this study attempts to discuss the value co-creation process in the platform context in depth, it suffers from several limitations. Firstly, value classification boundaries in existing literature are gradually blurring because value creation is multidimensional. We only use one set of value categories in this research, as some values are difficult to conceptualize when a platform enters the process. In future research, a deeper understanding of the market is needed to conceptualize value propositions of platform business with corresponding value categories.

Secondly, our research is a qualitative and explorative study based on the Xianyu platform, and the single case study is limited to some extent. However, there are some other small platforms that can recycle second-hand idle items, which also contribute to sustainable development. Although the Xianyu platform is suitable for preliminary exploration and theorization of this research issue, studies on smaller platforms are also valuable since they may face more difficulties in attracting users and maintaining user communities. In follow-up research, multiple-cases analysis and even comparisons can enhance our understanding of the platform and whether some conclusions still hold in a more generalized context.

Lastly, in the main analytical framework, we only consider the platforms and users dyads. However, the service platform brings changes to the entire service ecosystem. The ecosystem is critical for generating novel technologies or business ideas. The interaction between multilateral stakeholders facilitates the practices that promote the hybridization of service value. Subsequent research can focus on service ecosystem and value co-creation institutions that will help to encourage and realize sustainable development. Urban consumption patterns and lifestyles are becoming increasingly important for sustainability in the present and future, and these meaningful topics will contribute to enabling service value co-creation of sustainable development through digital platforms, accelerating the transition to sustainable consumption.

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