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Platform Matters: How Can Virtual Knowledge Communities Achieve Value Co-Creation Among Users in the Sharing Economy?

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Abstract: Under the sharing economy model, how value is co-created has changed significantly, with users beginning to participate more actively and proactively in the value creation process of enterprises, gradually becoming the core driver of value creation. Virtual knowledge communities have developed rapidly among the application areas of the sharing economy. In the context of high-quality development, the flourishing development of virtual knowledge communities helps promote the entire flow of knowledge in society and better serves the national innovation-driven development strategy. At the same time, a series of problems have emerged in the rapid development of virtual knowledge communities, such as poor user experience, a single way of realization and uneven content in the communities. As an important channel and hub for users to exchange information and acquire knowledge, the core problem that virtual knowledge communities need to solve is attracting users and motivating them to share their expertise and actively participate in the value-creation process. Based on the Zhihu case, this paper aims to explore the value co-creation mechanism of users in virtual knowledge communities to optimize platform services, enhance user participation and promote the exchange and dissemination of knowledge.

Keywords: Virtual Knowledge Community; Value Co-creation; UGC Theory; Value Chain; Mechanism Research.

1. Introduction

With the rapid development of Internet technology, the widespread use of social media and the idleness of a large number of resources, various types of sharing service platforms have emerged, such as short-term rental sharing platforms, travel sharing platforms and sharing platforms for living resources. Some scholars have suggested that the essence of the sharing economy is value co-creation and that the sharing economy has reconfigured the role of value creators, not only allowing more users to participate in value co-creation but also giving them greater power and control, with companies reduced to being providers of platform facilities for users to co-creating value. The value creation mechanism in the context of the sharing economy is challenging to describe using traditional value creation theory, so this paper needs to examine it in depth.

At the same time, virtual knowledge communities are virtual knowledge-sharing platforms on the Internet. Users in virtual knowledge communities have the dual identities of knowledge beneficiaries and knowledge sharers. They can exchange knowledge and engage in continuous and efficient knowledge-sharing behaviour regardless of time and space, so it is feasible to use virtual knowledge communities as the research object of this paper. Zhihu is one of the outstanding platforms, and its success is based on the advanced value-creation mechanism and service-guiding ideology.

Existing research has not yet provided an adequate academic response to value co-creation in the sharing economy model. Firstly, value creation subjects and service levels in the context of the sharing economy need to be redefined to enrich and expand the study of value creation theory. Existing value creation research has mainly considered value creation between firms and customers. Although a small amount of literature has suggested that the main subjects of value creation are users and platforms, they do not involve changing the role and meaning of the main issues of value creation in the context of the sharing economy. Second, the value creation logic and value creation mechanism in the context of the sharing economy needs to be improved. The way of thinking throughout the service process is no longer a single dominant logic. The logic of value creation changes depending on the degree of user dominance of the value creation process in each service phase. For example, in the user connection and contact phases, the user is the dominant player and follows user-driven logic. In contrast, in the user separation phase, the platform incorporates this process into its control system and obeys a dominant supply-side logic accordingly.

Therefore, this paper attempts to explore the service logic and value creation process of virtual knowledge communities based on the Zhihu case, to build a user value creation mechanism under the sharing economy model, contribute to the study of value creation in virtual knowledge communities, and provide guidelines and suggestions for value co-creation activities in the sharing economy.

2. Literature Review

2.1. Value co-creation

2.1.1. Concept of value co-creation

The traditional view of value creation is based on the goods-dominant logic, which holds that companies are value creators and consumers are value destroyers. That value is created by companies and passed on to consumers for their use. With the emergence of value co-creation and the transformation of business models, the role of consumers in value creation gradually came to the fore, and academics continued to delve into the creation of value by consumers. At the beginning of the 21st century, scholars Prahalad and

Ramaswamy first put forward the connotation and elements of value co-creation, emphasising that enterprises and customers should be partners. That value is created jointly by both subjects [1]. In this paper, we refer to value co-creation, the process of users' participation in knowledge sharing and value creation in virtual knowledge communities.

2.1.2. Research on the factors influencing value co-creation

Many scholars have conducted studies at home and abroad regarding the motivations for participating in value co-creation. In the context of virtual communities, researchers have conducted in-depth studies on the grounds of consumers' value co-creation behaviour and classified the main driving factors influencing users' participation in value co-creation into various dimensions, such as hedonic needs, cognitive needs, economic interests, and personal and social integration needs, etc. [2]. Best et al. (2022), through a study of customer value co-creation motivations in the manufacturing industry, classified the influencing factors into four perspectives: economic, technological, environmental, and psychological [3]. Sun and Zhang (2021) argue that the drive for economic benefits and customers' curiosity to satisfy themselves are the primary motivations for customers to participate in value co-creation behaviour [4].

2.1.3. Research on the results of value co-creation

Scholars have conducted various studies on the impact of value co-creation, focusing on the changes in users' behavioural tendencies, brand equity, user loyalty and purchase intentions under the effect of value co-creation. Researchers combined their findings in a virtual community scenario to highlight that value co-creation contributes to users' hedonic and product usage values, continued usage intentions, and user loyalty. Based on a virtual brand community environment, Griffith et al. (2022) pointed out that users' value co-creation behaviours in the community can significantly enhance user's brand loyalty to the community [5]. In their study of the impact of value co-creation on brand value, user loyalty as a mediator and empirical tests proved that value co-creation positively impacts brand value and works through user loyalty. Besides, they pointed out in their study that the degree of action and transmission mechanism of firm-initiated value co-creation and user-initiated value co-creation behaviours on users' brand loyalty differed. Mai and Ketron (2022) pointed out in their study on the path of user experience enhancement in virtual communities that communities can effectively enhance the user experience by actively carrying out value co-creation activities and guiding users to participate in them [6].

2.2. Virtual knowledge community

2.2.1. Concept of virtual knowledge community

A virtual knowledge community is a sharing economy platform for sharing intangible intellectual resources such as knowledge, skills, experience and creativity. Virtual knowledge communities belong to a branch of virtual communities and are born based on virtual communities. Regarding the concept of "virtual knowledge community", there is currently no uniform definition in the academic community, and different scholars have different meanings of virtual knowledge communities. Many studies on virtual knowledge communities include community subjects and content, users' attitudes and behaviours, knowledge dissemination mechanisms and operational models.

2.2.2. Community subjects and content

With regard to community subjects and content, academic research has focused on how communities attract user groups and how content is presented. Bhatti et al. (2020) explored the factors and mechanisms influencing the quality of knowledge in virtual knowledge communities, and they proposed that completeness, specialization and specific textual expressions affect the high quality of expertise, so users should treat the knowledge information shared in the community with a rigorous and responsible attitude [7]. Based on the analysis and research of knowledge content, they propose that although virtual knowledge communities are virtual, they also have typical "small world" characteristics: the content in virtual knowledge communities reflects diverse elements, and the responses are also different. Some community members focus on knowledge acquisition and aspire to interact and social attributes.

2.2.3. Attitudes and behaviours

Concerning user attitudes and behaviours, relevant scholars have mainly studied user interaction motivations, user mental attitudes and final behaviours. Based on satisfaction theory, researchers found users' incentives for participation through interviews with Zhihu users. Then they classified their motivations into information-seeking, decision-making purposes, entertainment, interpersonal relationships and social effects. Based on social cognitive theory, they pointed out that environmental factors strongly influence users' usage behaviour, including the quality of knowledge and the value judgment of users who share knowledge [8]. Based on human dynamics theory, Zhou et al. (2021) found that Zhihu, as a knowledge-based Q&A community, differs from other pleasurable communities in that users engage in behaviours while working, suggesting that Zhihu not only has entertainment attributes but also has some work value [9].

2.2.4. Dissemination mechanism

About the dissemination mechanism, there is almost unanimous agreement among academics that knowledge communities are more efficient than portals or search engines due to their real-time interactive nature. In their study, Wang et al. (2021) point out that the dissemination process of expertise in virtual communities is more centred around opinion leaders, who constitute the small groups of knowledge dissemination and the social relations between groups [10]. They also take a question-and-answer type knowledge community as the research object. They believe that "opinion leaders" play an essential role in the community and are more likely to provide professional answers and be recognized by users to facilitate dissemination.

2.2.5. Operation mode

Concerning the operation mode, many scholars suggest that the difficulty of profitability of virtual knowledge communities can be improved by utilizing knowledge payment. Chou et al. (2021) point out in their study that the payment mechanism of virtual knowledge communities will impact users' interaction behaviour in the platform [11]. On the one hand, introducing the payment mechanism will reduce platform users' questions and concerns about paid knowledge content. On the other hand, the original creators of paid content will be more active in answering questions.

2.3. Review of literature

The co-creation of value by users in virtual knowledge communities is based on the interaction and experience

provided by the platform and the value created by users according to their needs. Through the above literature on virtual knowledge communities and value co-creation at home and abroad, it can be seen that there is a large body of literature on virtual communities and value co-creation. Still, there needs to be more research on the mechanism of user value co-creation in virtual knowledge communities. Most studies on user value co-creation in virtual communities have taken community characteristics as the starting point. Scholars have also explored customer value co-creation willingness from different perspectives, such as user knowledge-sharing behaviour and user experience. However, the value creation logic of virtual knowledge communities' changes depending on the degree of user dominance over the value creation process in each service stage, so the value creation subject and service level of virtual knowledge communities need to be redefined. For virtual knowledge communities, due to the virtual nature of the environment, there is a greater need to explore the mechanism of user value co-creation behaviour from both the platform and the users. Therefore, research on the value co-creation mechanism of users in virtual knowledge communities is necessary.

Besides, in the literature on virtual knowledge communities, more keywords are used about knowledge sharing but rarely value co-creation. The knowledge shared by users in the community has a certain value, as the platform and the users can use the knowledge to create value, so in fact, the users are involved in value co-creation. The concept of "value creation" is more reflective of the value attributes of knowledge than knowledge sharing, rather than just the dissemination of knowledge content. So how does the transmission mechanism of user value co-creation in virtual knowledge communities develop? Therefore, this paper will take Zhihu as an example and explore the user value co-creation transmission mechanism operation in virtual knowledge communities based on UGC and value chain theory.

3. Theoretical Foundation

3.1. UGC theory

The concept of UGC theory was introduced in 2005, initially for user-generated value. In its 2007 report, the Organisation for World Economic Co-operation and Development (OECD) described three characteristics of UGC: (1) premised on online publishing; (2) a degree of innovation in content; and (3) created by non-professionals or authoritative organisations [12].

In the Web 2.0 era, where each user has the potential to contribute valuable information and where people with access to the Internet are given the right to express themselves, UGC has been given a new meaning as a new way of using the Internet in the context of the Internet, where users present their original content or make it available to other users through the Internet platform. From this perspective, UGC can be understood as both a static online information resource created by users and a dynamic behavioural model of user-generated creation and can be interpreted as a kind of order from an ecological perspective, which is inextricably linked to user groups, social networks, distribution channels and online/virtual communities. The once-popular Renren and now Zhihu and Douban are all successful examples of UGC, and social networks and blogs are the primary forms of UGC application.

3.2. Value chain theory

In 1985 Michael Porter, a professor at Harvard Business School, argued that the creation of value in a business is constituted by a series of activities, each of which has a different degree of influence on the design of the value of the final product (service), and introduced the concept of a value chain, which he believed could be divided into two categories: basic activities that create value directly and auxiliary activities that make value indirectly. The primary activities include internal logistics, external logistics, services, marketing and sales, and production operations. In contrast, the ancillary activities include technology development, procurement, human resource management, other services and business infrastructure. The value chain is an integrated process aiming to achieve customer value.

The value chain theory has been brought back up to date by the advent of the Internet, and the theorists in the Harvard Business Review and Management Salon have developed the concept of the "virtual value chain". The new value chain is, in fact, a network of all virtual companies, which often changes shape depending on the environment. Following Porter's value chain model, some researchers proposed a value chain relationship between data, information and knowledge and built a knowledge value chain model consisting of a knowledge management foundation and knowledge process management [13]. Combining the characteristics of virtual knowledge communities, we construct a knowledge value chain model for virtual knowledge communities from four aspects: knowledge identification, knowledge acquisition, knowledge interaction and knowledge externalization.

4. Research Methodology and Subjects

Unlike empirical research, the primary purpose of case studies is not to test theories but to construct them and applies to research questions that are (1) not easily defined, (2) hidden in processes and challenging to observe, and (3) no longer applicable to existing theories.

In case studies, however, the single-case study approach is suitable for exploring the above issues and has clear advantages when investigating new phenomena and dynamic processes in depth. Considering that the value creation process is difficult to be described by traditional value creation theory, this paper adopts a single-case study approach to conduct an in-depth study of the value co-creation mechanism of virtual knowledge community users.

In this study, "Zhihu" was chosen as the case study as the single case can be extreme or unique and is more specific in suggesting that a paradigm mechanism, which is not representative of the majority of firms but leads to significant changes in the industry [14].

In terms of the above criteria, Zhihu is a typical paradigm case. Zhihu.com is a representative social Q&A website in China that launched in December 2010. As China's first interpersonal network-based Q&A platform, Zhihu.com is modelled on Quora's successful model and incorporates many mechanisms such as Facebook and Twitter's followers, Wikipedia's collaborative editing and Digg's user voting, innovatively combining the fragmented functions of these existing Web 2.0 products to create a social Q&A platform in China. Nowadays, Zhihu.com has become the most typical social Q&A community in China [15].

On the one hand, Zhihu is one of the largest Q&A

communities in China, with content covering different fields such as technology, culture, psychology and business, and has gathered more than 70 million users with a high level of popularity, so any functional changes to the platform may have a significant impact. On the other hand, at the user level, Zhihu allows users to discover and disseminate content from three areas: user-focused, question-focused and topic-focused. Users can keep track of what their followers are doing on their pages, including posting new content or commenting on other content, and invite their followers to respond when they start a further topic discussion, a mechanism that helps to co-create value for users.

In summary, Zhihu is a successful pioneer of virtual knowledge communities and an excellent model for studying user value co-creation in virtual knowledge communities in China.

5. The Mechanism of User Value Co-creation in Zhihu

The sharing economy has made the role of the participants in value creation diverse and dynamic. Customers can both enjoy and provide service resources. They are no longer service objects in the traditional sense. Meanwhile, companies have become the service context and are no longer always the dominant player in the service. Therefore, dividing the role of value creators by the provider and customer side is no longer suitable. This paper argues that in the context of the sharing economy, the participants in value creation are no longer the provider and the customer but the user and the platform, and thus the way of value creation should be the co-creation of value among users. In this paper, users with dual roles of provider and demander are described as *Provider Users*, and users with only demand roles in both levels of services are expressed as *Demand Users*.

5.1. Knowledge identification phase

The knowledge identification phase refers to initiating a search for relevant content in the search bar and conducting preliminary screening of information from the knowledge demand-side users. It is also the process of posting a specific question by the knowledge provider users based on their knowledge areas and professional level. There are two processes simultaneously in this stage: the information search process from the perspective of the demand side and the answer process mainly from the knowledge provider. At this stage, the D-users who need to search for knowledge and those willing to provide the answering service are matched with the supply and demand.

At this point, the platform plays a vital role in knowledge extraction and knowledge storage. It is an influential hub for leading and realizing knowledge exchange, building a preliminary exchange platform for knowledge demand users and knowledge provision users, attracting homogeneous users through values, methodology and mission vision, and identifying knowledge resources between the platform and users and between users and users, which constitutes the initial stage of value co-creation: *value consensus*.

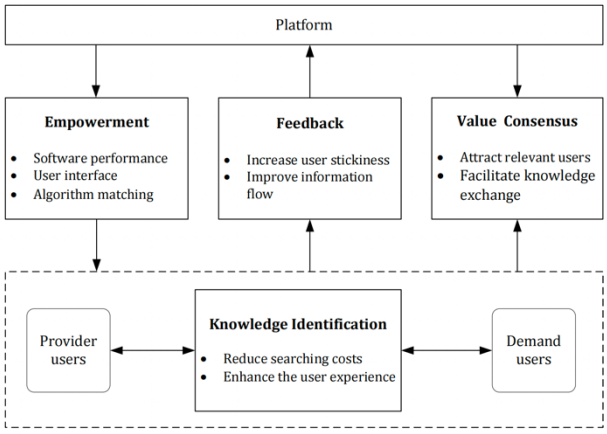

Figure 1. Knowledge identification phase

5.2. Knowledge acquisition phase

The knowledge acquisition phase refers to knowledge demanders purchasing the knowledge content they need through payment or private messaging. Zhihu has set up the payment process in a series of new business scenarios besides Q&A, including salt selection, e-books, Zhihu Live, etc., to cultivate users' payment habits implicitly. Knowledge providers target knowledge content based on the demand side's browsing record and propensity to buy. Zhihu insists on being content-oriented and gives creators more autonomy.

In the knowledge acquisition phase, users gain or export knowledge while gaining mental pleasure and enjoyment. Precise topic selection and rich content scenarios enable the overall click-through rate of content commercialization solutions to reach several times that of traditional advertising, facilitating problem-solving and the whole influx of knowledge elements across society. This process constitutes the second stage of value co-creation: *value sharing*.

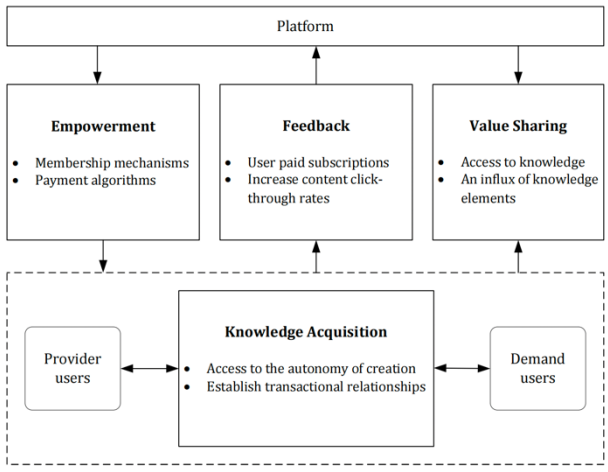

Figure 2. Knowledge acquisition phase

5.3. Knowledge interaction phase

The knowledge interaction phase refers to the different exchange and interaction of knowledge by the knowledge demand side through operations such as "liking", "collecting", and "commenting". After receiving feedback and recognition from the demand side, the knowledge provider replies in the comment section or specifically publishes a reply post, forming a benign knowledge sharing and interaction between P-users and D-users.

At this stage, P-users and D-users are no longer passive participants. Although the platform and the two types of users

still act as the main body of knowledge interaction simultaneously, the communication between users becomes closer, and the internalization of knowledge between users is realized. It promotes the platform to improve user experience and brand awareness, effectively utilising existing and new knowledge resources. It also constitutes the third stage of value co-creation: *value symbiosis*.

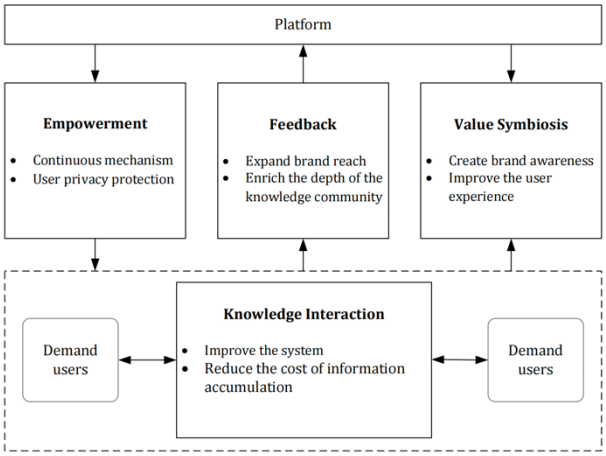

Figure 3. Knowledge interaction phase

5.4. Knowledge externalization phase

The knowledge externalization phase is mainly the process of feedback and output. When demand-side users get answers to questions and complete the process of internalizing knowledge, they will comment on and share the answers and even change their identity to become knowledge providers to extend the knowledge dissemination chain. They will become the "Big V" of the topics on the site.

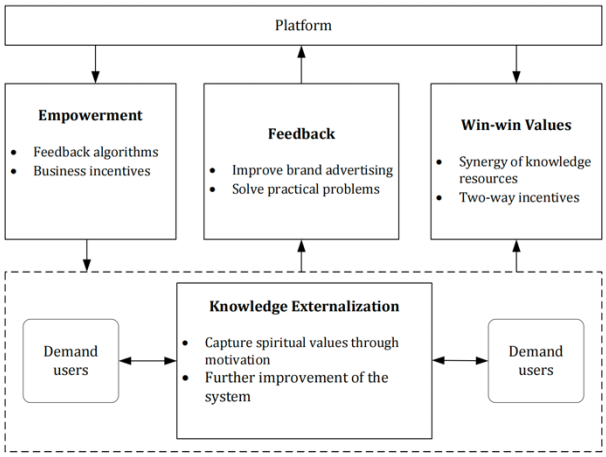

Figure 4. Knowledge externalization phase

At this stage, the platform achieves product innovation through the power of user interaction, effectively activating knowledge and other resources, reflecting the company's advertising strategy with quality content at its core, sharing commercialization revenue with content creators, expanding the platform's brand recognition value, creating a sympathetic knowledge environment and attracting more people to join the platform. After knowledge identification, acquisition and interaction, the virtual knowledge community, knowledge providers and demanders have achieved convergence and integration. The three become a mutual community of interest, with knowledge and other resources being effectively utilized and collaboratively transformed and fed back, constituting the final stage of value co-creation: *Win-win values*.

6. Conclusion and Discussion

6.1. Theoretical implications

First, the research in this paper enriches the current consequences research on value co-creation in virtual knowledge communities and expands its theoretical achievements. Most of the recent academic research on value co-creation is about value co-creation between enterprises and customers in the context of virtual communities. However, there is still relatively little research on value co-creation among users of virtual knowledge communities [16]. The value creation logic of virtual knowledge communities' changes depending on the degree of user dominance over the value creation process in each service stage, so the value creation subject and service level of virtual knowledge communities must be redefined.

Second, the research in this paper extends current research findings on the factors influencing value co-creation. The existing research on the factors influencing user value co-creation has mainly studied the factors influencing value co-creation from a single perspective, such as motivation, demand and platform factors. However, less research has been conducted on user-generated content (UGC) and the value chain. Therefore, based on these two theories, this paper explores user value co-creation behavior mechanisms from both the platform and user perspectives.

6.2. Practical implications

First, the marketing logic of enterprises in the context of the sharing economy should shift from a supply-led and user-led logic to a comprehensive value-creation logic. Although the number of users in virtual knowledge communities is significant, fewer users contribute knowledge in virtual knowledge communities. Nielsen found that in most virtual proposed communities, 90% of users never contribute content, 9% contribute content occasionally, and 1% contribute the most content [17]. The virtual knowledge community's knowledge contributors gradually lose interest in contributing knowledge, and it is difficult to maintain existing users and encourage sustainable knowledge contributions. How to facilitate user knowledge contributions, encourage user experience and improve the quality of user-generated content is the key to promoting the sustainable development of virtual knowledge communities and influencing the co-creation of user value.

Second, value co-creation among users is a pivotal means of value creation in the sharing economy. The marketing logic of enterprises should shift from supply-side and user-led logic to an integrated value-creation logic [18]. At different stages of value creation, enterprises should consider the other user behaviours and needs and provide a good value co-creation support environment for bilateral users. Users perceive the benefits of their value co-creation behaviours. Hence, community managers should understand user needs and ideas and are thus more motivated to improve the normality, entertainment and professionalism of the community experience to maintain good relationships between users and virtual knowledge communities.

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