# *Knowledge Sharing in Virtual Academic Communities and Impact on Technological and Economic Development*

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*Abstract:* As information technology develops rapidly and the Internet becomes more popular, virtual academic communities are gradually becoming an important part of the academic world. The traditional academic publishing model faces problems of information asymmetry and high access barriers, while the knowledge sharing of virtual academic communities enables academic research results to be more widely shared and utilized. It reduces the threshold for obtaining academic information and improves the efficiency of academic exchange. The virtual academic community provides an open and convenient platform for scholars worldwide to freely share and exchange their research results. This helps to promote cooperation and innovation in the academic community, accelerate the accumulation and dissemination of scientific knowledge. The average research cost of knowledge sharing is 90300 yuan less than the average research cost of knowledge unsharing. Studying the effect of knowledge sharing in virtual academic communities on the development of technology and economy can help deepen the understanding of the role of information technology in promoting academic change and collaborative innovation, and provide reference and reference for the development of technology and economy.

## 1. Introduction

With the rapid development of the Internet, virtual academic communities have become an important platform for information sharing and knowledge exchange in today's society. Among them, virtual academic communities have also become an important knowledge sharing platform, relying on information technology. Compared to traditional knowledge exchange, their biggest advantage lies in openness, convenience, and unrestricted. Knowledge sharing is an important community activity in virtual academic communities, and sustainable knowledge sharing among users has become the key to supporting the existence and development of virtual academic communities. Therefore, it is necessary and urgent to explore the factors that affect sustainable knowledge sharing in virtual academic communities.

The study of knowledge sharing in virtual academic communities and its impact on technological and economic development involves multiple disciplinary fields. The purpose of Allameh Sayyed

Mohsen is to propose and test a comprehensive model that focuses on the impact of the structure, relationships, and cognitive dimensions of social capital on knowledge sharing. The results showed that knowledge sharing has a positive impact on the three components of intellectual capital (human capital, structural capital, and relational capital), as well as the dimensions of intellectual capital. This in turn would lead to technological innovation [1]. Agasisti Tommaso uses the concept of efficiency to measure whether there is a connection between knowledge sharing and the economic development of the region. In order to solve the endogeneity problem of knowledge sharing and economic development, he adopted the system generalized moment method and instrumental variable method. The research results indicate that the existence of knowledge sharing promotes the development of the local economy, and the results are robust to different estimation strategies [2]. Ode Egena empirically examined the relationship between knowledge sharing practices and enterprise innovation, taking service enterprises in developing countries as the background. He also examined the mediating role of knowledge sharing between knowledge management practices and enterprise innovation, using structural equation models to analyze the data. The research results indicate that knowledge sharing practices have a direct and indirect promoting effect on enterprise innovation [3]. The knowledge sharing of virtual academic communities helps to better understand the role of virtual academic communities in promoting technological innovation and economic development.

Knowledge sharing in virtual academic communities has a vital role to play in the development of techno-economics. Through the platform of virtual academic communities, researchers can better share and disseminate knowledge resources. Mardani Amirhosein explored the quantitative relationship between knowledge sharing, innovation, and performance, elucidating the impact of knowledge sharing activities on enterprise innovation and performance. The results indicate a positive correlation between knowledge sharing and corporate performance, and innovation in turn contributes to corporate performance. The impact of innovation quality, knowledge creation, and knowledge integration on performance is more significant, achieving higher innovation, effectiveness, efficiency, and profitability [4]. Big data analysis ensures that data can be analyzed and classified as useful information for enterprises, but there is little investigation into the knowledge sharing management generated by big data analysis and its integration with enterprise knowledge. Ferraris Alberto used a structural equation model to empirically analyze data from 88 Italian small and medium-sized enterprises, examining the positive impact of performance management capabilities on corporate performance, as well as the mediating role of knowledge sharing in this relationship [5]. Tchamyou Vanessa S examined the role of knowledge sharing in regulating the impact of economic channels on income inequality, represented by private and public credit agencies. The research results indicate that according to the types of economic development dynamics, knowledge sharing plays a role in reducing financing constraints, ultimately reducing inequality and promoting economic development [6]. Virtual academic communities are a knowledge sharing platform that provides an opportunity for global researchers to communicate and collaborate. Through virtual academic communities, people can share research results, discuss academic issues, and find partners globally, which promotes technological and economic development.

## 2. Virtual Academic Community

The rapidly developing Internet provides a great market and platform for web applications, and virtual academic communities, as a network platform, have emerged with the Internet and become the most important platform for information sharing and knowledge exchange in today's era [7-8]. It not only has a profound impact on people's lives, learning, and cognitive styles, but also provides a

faster and smoother channel for information exchange and dissemination.

The types of virtual academic communities are diverse, and virtual academic communities are an important one, playing a significant role in the field of academic exchange. Its main purpose is to gather research scholars, teachers and students from higher education institutions, and individuals with similar research interests, enabling them to carry out research exchange, knowledge sharing, and information sharing in the community [9-10]. In recent years, virtual academic communities have flourished in China, and comprehensive virtual academic communities such as Xiaomuchong and ScienceNet forums have formed a certain scale and influence in China.

With the continuous improvement of popularity, the participation of netizens in virtual academic communities is also increasing, gradually gaining unanimous recognition from the public [11]. For example, the Dingxiangyuan Forum, which has many professionals in life sciences, medicine, and pharmacy participating in trials, is currently the largest virtual academic community in the fields of medicine and life sciences in China. The community is designed with forums as the main body, and the site also has a rich functional structure. While providing the required services for the majority of community users, it also brings profound network benefits. From this perspective, virtual academic communities are not only an emerging product of the current era, but also a necessary network operation method for the future era. The characteristics of a virtual academic community are shown in Figure 1:
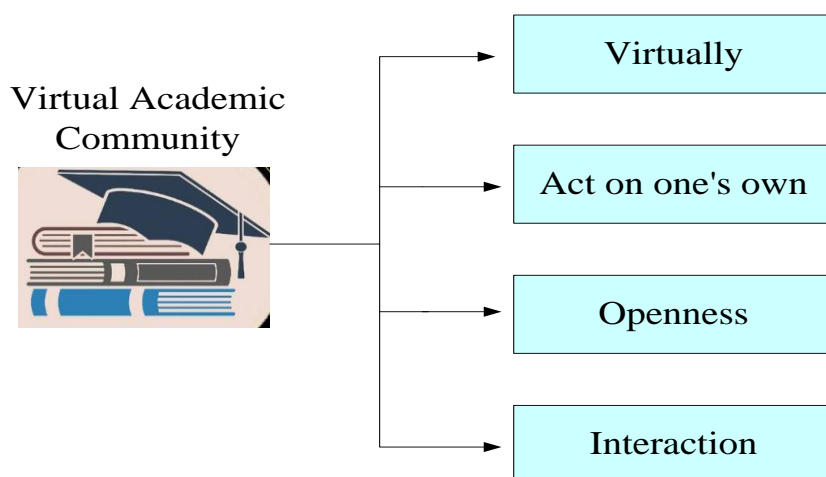


Figure 1: Characteristics of Virtual Academic Community

As shown in Figure 1: Generally speaking, virtual academic communities have characteristics such as virtuality, autonomy, openness, and interaction. Virtual academic communities not only possess the characteristics of virtual academic communities, but also have certain specificity in terms of knowledge coverage and user usage due to their unique professional academic exchange nature.

Virtual academic communities are free and open platforms for information exchange and sharing. Once information is shared among members, contributors would lose the value of their exclusive knowledge [12-13]. Because the shared knowledge base of virtual academic communities would automatically save the information and knowledge shared by members in the form of text or images, becoming a public wealth in academic virtualization, which facilitates those who can obtain knowledge without any effort. The "reaching out party" refers to a group of online delinquents who only know how to obtain the knowledge and information of others, but are unwilling to share their own knowledge and information with others. If this delinquent group becomes rampant, the knowledge sharing behavior within the virtual academic community would be greatly affected, thereby affecting the development of the community.

## 3. Knowledge Sharing

Knowledge sharing is a process of accumulating overall organizational knowledge through knowledge exchange, which can be achieved through direct communication between individuals, online communication, and learning through knowledge bases [14-15]. In recent years, the rise of knowledge management theory has driven the development of knowledge sharing research

Knowledge sharing is the transfer and connection of knowledge between people at different levels and scales. Knowledge can be transmitted between members of an organization, and achieving effective transmission and sharing of knowledge between organizations is a crucial aspect of organizational learning. The knowledge sharing behavior is shown in Figure 2:
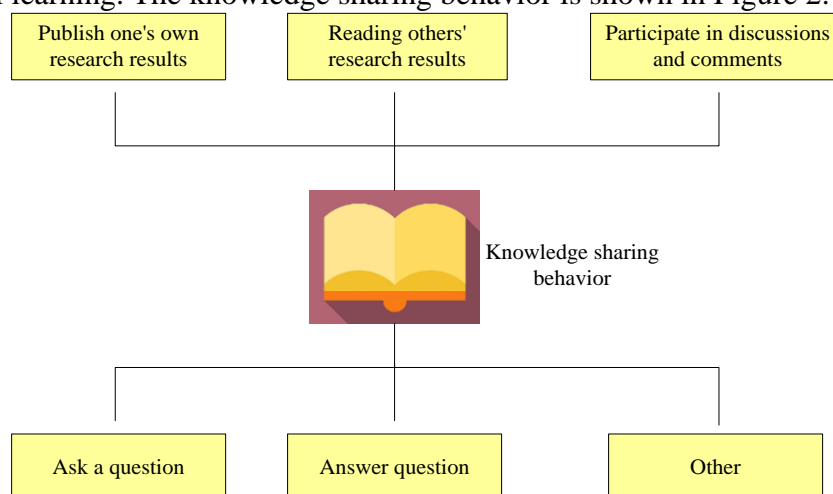


Figure 2: Knowledge sharing behavior

As shown in Figure 2, knowledge sharing behavior includes publishing one's own research results, reading others' research results, participating in discussions and comments, asking questions, answering questions, and others.

Sustainable knowledge sharing is an inherent way and means for researchers in the internet community to continuously engage in knowledge sharing with the same interests and goals. It includes both continuous behavioral processes and methods and means of managing and promoting continuous knowledge sharing. Sustainable knowledge sharing can build a trusted and efficient environment, reduce the cost of information communication and exchange, promote community members to share knowledge with others more sustainably and proactively, and ensure the free exchange and flow of knowledge in virtual academic communities.

## 4. Impact of Knowledge Sharing in Academic Communities on Technological and Economic Development

Virtual academic community is a knowledge sharing platform established through the Internet, through which users can share knowledge, exchange experiences, collaborate on research, explore cutting-edge science, and more. With the development of modern technology, knowledge sharing in virtual academic communities has become an important driving force, which has had a profound impact on the development of technology and economy. This article would introduce the impact of knowledge sharing in virtual academic communities on technological and economic development from aspects such as promoting innovation capabilities, optimizing resource allocation, and improving industrial ecology [16].

## 4.1 Promoting the Improvement of Innovation Ability

Innovation is an important force driving the sustainable development of the technological economy. The knowledge sharing of virtual academic communities can promote the improvement of innovation capabilities and inject new vitality into technological and economic development. Virtual academic communities can allow scientists with similar research interests to collide and communicate. The collision of different ideas often leads to the emergence of innovative ideas. Therefore, in these academic communities, people can share their research results, inspire each other, collaborate on research, and thus explore new fields and solve new problems.

The efficiency of knowledge non sharing and knowledge sharing innovation in virtual academic communities is shown in Table 1:

Table 1: Knowledge Dissharing and Innovation Efficiency of Knowledge Sharing in Virtual Academic Community (Days)

| Product quantity and average | Knowledge is not shared | Knowledge sharing | Difference in numerical value |
|---|---|---|---|
| 10 | 11.40 | 9.20 | 2.2 |
| 20 | 14.22 | 7.55 | 6.67 |
| 30 | 10.35 | 8.00 | 2.35 |
| 40 | 15.34 | 5.53 | 9.81 |
| 50 | 13.12 | 7.64 | 5.48 |
| 60 | 10.65 | 9.51 | 1.14 |
| Average | 12.51 | 7.91 | 4.6 |

From Table 1, it can be found that in the case of knowledge sharing, the average innovation efficiency of each innovative product is 12.51 days. In the case of knowledge sharing, the average innovation efficiency of each innovative product is 7.91 days. In the case of knowledge sharing, the average innovation efficiency of each innovative product is 4.6 days more than in the case of knowledge sharing.

The virtual academic community provides a platform for researchers and experts to widely share research results and knowledge. This helps to reduce duplicate research, improve innovation efficiency, and accelerate the development and application of technology.

Virtual academic communities can help scientists stay up-to-date with the latest technological information. Technology is changing rapidly, and timely access to the latest technological information is a prerequisite for innovation. Virtual academic communities can provide scientists with timely technological information, allowing them to understand the latest research progress, technological trends, and innovative ideas in the industry. This not only benefits the development of technology and economy, but also enhances the competitiveness of scientists.

In addition to not being limited by time and geographical scope, the knowledge exchange in virtual academic communities has also overcome the limitations brought about by the limited scope of personal interaction. Users of virtual academic communities can quickly share their academic achievements and thoughts online, and receive timely feedback and communication from other members, thereby enriching the academic perspectives of community members. It broadens the breadth of knowledge exchange, greatly promotes the efficiency of user sharing knowledge, and realizes the transformation and innovation of knowledge.

In summary, virtual academic communities can help scientists engage in broader communication, obtain more timely scientific and technological information, provide more convenient ways of cooperation, and promote the improvement of innovation capabilities, injecting new impetus into the development of technology and economy.

## 4.2 Increase Knowledge Sharing Behavior

Due to the rapid development of the Internet, it has completely solved the constraints of time and place that previously restricted communication and exchange of knowledge between researchers or scholars. Users of virtual academic communities can provide or receive various types of services. This has greatly expanded the breadth and dimensions of knowledge sharing, effectively supplemented and developed traditional communication models, and has become an important means of academic exchange at present.

Knowledge sharing behavior includes publishing one's own research results, reading others' research results, participating in discussions and comments, asking questions, answering questions, and others. This article selects 505 users who engage in knowledge sharing behavior in virtual academic communities for investigation, and the knowledge sharing behavior conducted is shown in Table 2:

Table 2: Knowledge sharing behavior (multiple choices)

| Type | Number of people | Percentage |
|---|---|---|
| Publish one's own research results | 338 | 66.93% |
| Reading Others' Research Results | 385 | 76.24% |
| Participate in discussions and comments | 397 | 78.61% |
| Ask a question | 385 | 76.24% |
| Answer question | 327 | 64.75% |
| Other | 315 | 62.38% |

As shown in Table 2, the largest number of people engaged in knowledge sharing activities were those who participated in discussions and comments, with 397 participants, accounting for 78.61%.

The virtual academic community provides opportunities for researchers worldwide to exchange and collaborate, promoting cross international and interdisciplinary cooperation. This helps to solve global problems and improve the global competitiveness of technology.

In communication, community members can improve their knowledge level, academic ability, and research level. It can be said that the purpose of virtual academic communities is to exchange and share academic knowledge, and promote the improvement of members' academic abilities. Virtual academic communities can stimulate members' interest in knowledge sharing, thereby stimulating their emotional value and making them willing to participate; The virtual academic community can communicate and interact anytime and anywhere, thereby promoting the social value of its members and making them willing to continue knowledge sharing; Virtual academic communities can stimulate the altruistic value of members, making each member more willing to help others acquire knowledge while gaining knowledge on their own.

The characteristics of virtual academic community members are professional, academic, and highly educated, mainly composed of researchers, scholars, enterprise R&D departments, and members with strong professional interests. In a virtual academic community, the purpose of community members is strong, mainly for exploring and exchanging professional knowledge. The academic, cutting-edge, and guiding nature of knowledge within the community are all prominent. It is precisely because virtual academic communities have unique characteristics that they differ from other virtual academic communities, that community norms in virtual academic communities also need to be matched in order to better manage community users, build community organizations, and improve the operational level of virtual academic communities.

## 4.3 Reducing Costs

The virtual academic community provides a large number of free literature and research papers, making it easier for researchers to obtain references and reducing the cost of purchasing expensive journals and books. Many virtual academic communities encourage researchers to share their datasets and research results. This reduces the cost of data collection and processing, while also improving the repeatability of research data. There are numerous open source research tools and software available in the virtual academic community for researchers to use for free. These tools not only provide efficient research methods, but also reduce the cost of developing and purchasing proprietary tools. The average research cost of knowledge non sharing and knowledge sharing under different quantities of products is shown in Figure 3:
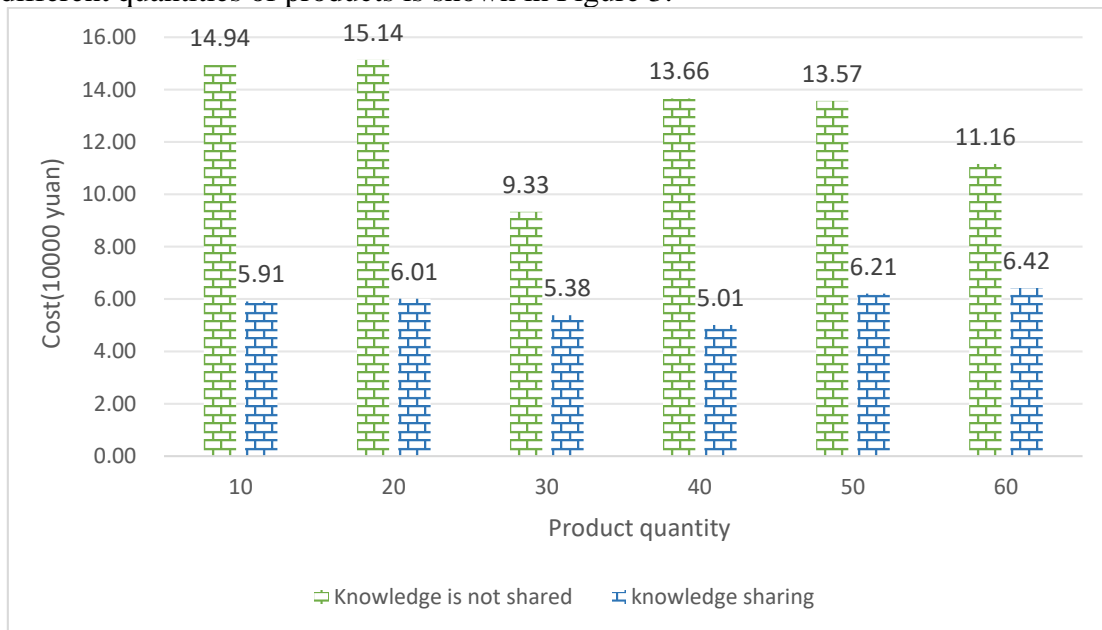


Figure 3: Average research cost of knowledge unsharing and knowledge sharing under different quantities of products

In Figure 3, it can be obtained that when the number of products is 10, the average research cost of knowledge unsharing is 149400 yuan, and the average research cost of knowledge sharing is 59100 yuan. The average research cost of knowledge unsharing is 90300 yuan more than the average research cost of knowledge sharing.

The knowledge sharing of virtual academic communities has reduced research costs and promoted scientific research and technological innovation. This impact has had a positive impact on the development of the technology economy, promoting the rapid development of technology, reducing research and development costs, promoting innovation in technology enterprises, and also promoting talent cultivation and technology education. These effects contribute to the sustainable growth of the technological economy and bring more benefits to society and the economy.

## 5. Conclusions

Virtual academic communities are an important component of today's research and academia, providing a convenient platform for researchers to access resources such as literature, data, and research tools more easily. This development is not only beneficial to the individual researcher, but also has a positive influence on the development of the technical economy. It accelerates innovation, reduces costs, promotes international cooperation, promotes technology transformation, and helps

improve economic competitiveness and sustainable development. This has a positive promoting effect on the development of technological economy, promoting technological innovation and economic growth.

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