



Research article

Configurational analysis on the causes of academic knowledge innovation in the social media environment

Yu Sheng^{a,b}, Hong Li^{a,*}^a School of Management, Shanghai University, Shanghai, 200444, China^b School of Artificial Intelligence and Law, Shanghai University of Political Science and Law, Shanghai, 201701, China

ARTICLE INFO

Keywords:

Social media
 Academic knowledge innovation
 Mixed methods research
 Fs-QCA
 Causal process tracing

ABSTRACT

Many scholars have benefited a lot from the social media environment. However, due to the privacy and environmental complexity of academic knowledge innovation under the new media environment, reasons for the successful innovation are still difficult to be figured out and copied, which results in potential losses in the promotion of its academic value. The results show that the progressive and radical academic knowledge innovation in the social media environment take fragmented knowledge accumulation and innovation incentive as the main route respectively, and the ways to realize innovation include encounter complementary type, creative accumulation type, content dependent type, leader following type, self-published type and functional excitation type. These research results greatly promote the development of knowledge innovation theory in social media environment, and is of great reference significance for academic individuals and social media platforms to make decisions.

1. Introduction

Social media is a series of online media, whose main characteristics are participation, openness, dialogue, community and connectivity (Mayfield, 2008). Its types include social network, network bookmarks, blogs, microblogs, video sharing, photo sharing, message board, Wiki, virtual reality, social games, etc (Glasier, 2011). Nowadays, people gradually begin to focus on the practical value (Yuan et al., 2020), learning and academic cooperation in social media environment (Bullinger et al., 2010; Crawford, 2011) have an impact on individual knowledge management (Barhoumi, 2015). Knowledge innovation is the ultimate goal of knowledge management. Academic knowledge innovation is the new scientific argumentation on objective things and their laws which is proposed by scientific researchers during the science research process and their achievements are made public and applied in practice after peer review (Ji, 2015a,2015b). Although social media brings benefits, some studies still believe that people do not fully understand how to effectively use it as a tool of promoting innovation (Bosua et al., 2013), and it is more suitable for entertainment than practicality (Fei et al., 2015), it has little impact on the improvement of work performance (Meesala et al., 2013). On the other hand, due to different degrees of innovation, there may also be differences in

innovation effects. Previous studies have shown that for progressive innovation, social media can reduce uncertainty and have a positive impact on performance by obtaining more external information, while for radical innovation, the contribution of social media is very weak, because getting more new information would not reduce the uncertainty of such innovation type, it may even increase confusion and uncertainty (Roberts et al., 2016). The complexity and ambiguity reduce users confidence and affect the comprehensive use of the new media. In order to enable more researchers to benefit from the new media environment, and to make the new media platforms better serve academic research, it's necessary to clarify the causes how individuals realize academic knowledge innovation in the social media environment.

Nowadays, the use of social media in enterprises is focused on in most of the relevant researches (Patroni et al., 2016; Roberts et al., 2016). There are few studies exploring academic knowledge innovation, and most of studies are based on the knowledge-based view, namely, new media provides external "knowledge support" for innovation (Li, 2015). The "emotional support" is only mentioned in a few studies, in which it is believed that new media can promote the formation of innovation atmosphere, bring pleasure and simultaneously promote the formation of innovation (Chen, 2016). There are also some new theoretical perspectives, including the knowledge grafting theory from the new

* Corresponding author.

E-mail address: lihong@shu.edu.cn (H. Li).

constructivism that emphasizes the “writing innovation” route (Wang, 2012), however, there is a lack of in-depth empirical research. At present, theoretical perspectives involved mainly include knowledge-based theory (Papa et al., 2018), social capital theory (Li, 2015), social exchange theory (Chen, 2016), communication visualization theory, motivation theory (Ding, 2019), organizational atmosphere theory (Chen, 2016), etc. Commonly mentioned influencing factors consist of structural capital (centrality, strength of the interactive relationship), cognitive capital (personal professional knowledge, consistency of values, shared language, as well as common vision), relationship capital (community recognition, familiarity, trust, reciprocity, and collectivism) (Tang, 2015), network structure and communication mode of social media bring diversified and heterogeneous knowledge (Cunha et al., 2013; Liao et al., 2010), workplace support (Chen, 2016), income cognition, as well as commitment from the community (Shi et al., 2017). In addition, the strategic ability of social media (Nguyen et al., 2015), the complementary and balanced ability of traditional information sources and new media (Roberts et al., 2016), individual media and information literacy (Wang et al., 2019), information encounter (Wan and Liu, 2021), communication visualization factors (Ding, 2019), as well as organizational culture (Patroni et al., 2016) may all result in the realization of innovation in the new media environment. In brief, there are few studies focusing on academic knowledge innovation at present. Although previous multi perspective research results are of certain reference value for this paper, there is a lack of an overall theoretical framework to summarize them. The effect of knowledge innovation in the social media environment is also controversial. Particularly, there is room for further discussion on the differentiation of dual innovation. Therefore, reasons and ways of academic knowledge innovation under the social media environment are still unknown, so it is necessary to summarize the successful causes through private and complex phenomenon. According to the above analysis, this paper aims to solve the following problems: (1) What are reasons for the realization of academic knowledge innovation in the social media environment? Is there any difference between progressive and radical academic knowledge innovation? (2) What are specific ways to realize academic knowledge innovation in the social media environment?

Through the combination strategy of sequential inquiry and explanation in the mixed methods research, the research is carried out through the methodological framework of “explore reasons for the realization through interview (qualitative explore), Fuzzy-Set Qualitative Comparative Analysis (Fs-QCA) explore specific ways of realization (combination of qualitative and quantitative), causal process tracing method restore the realization scenario (qualitative interpretation)”. Main reasons for adopting this combination strategy are (1) Firstly, because of the lack of targeted mature theoretical support and early research., so the qualitative method, the interviews are adopted to cultivate valuable element information, figure out decisive influencing factors and main route of dual academic knowledge innovation, and finally incorporate them into an overall framework of influencing mechanism. (2) Secondly, the influencing factor configuration is adopted to explore ways of realizing innovation. Since the results are unknown in advance, it is very useful to adopt the interpretive design strategy. Under such circumstance, the qualitative data collection in the later stage can explain the unexpected results after the configuration in a more detailed way. (3) Thirdly, the causal process tracing method is adopted to collect data, then the configuration results are explained and scenarios are restored by combining the case data with the existing theories, and finally reasons and ways of academic knowledge innovation in the social media environment are clarified.

2. Theoretical perspective

Dual Innovation Theory. Dual innovation refers to progressive innovation and radical innovation, which is divided into by the innovation

degree. Progressive innovation has a small improvement and expansion of the existing dtechnology or products, and has the characteristics of imitation, progressiveness and accumulation (Nelson and Winter, 1982), so it is an innovation model with previous experience as the necessary resource reserve (Lin et al., 2020). Radical innovation has a radical on new technologies and new products, and has characteristics of creation, explore, variation and adventure (Jiang and Lin, 2020), so it is the “completely new” innovation model (Wang, 2014). Progressive academic knowledge innovation is to supplement and improve the existing knowledge system in the field, or to expand the its application (Long et al., 2012). Radical academic knowledge innovation is to build a new knowledge system for academic research in the field, or to make fundamental theoretical contribution for the development of existing knowledge (Jiang and Lin, 2020). Without division in the degree of innovation will affect the accuracy of research (Shalley, 2004; He, 2004). This paper holds that the causes of dual academic knowledge innovation may be different and asymmetric, so it is necessary to study respectively.

Progressive innovation is based on the evolution of existing knowledge, technology and science (Tushman and Anderson, 1986; Abernathy and Clark, 1985; Cardinal, 2001), so knowledge accumulation is important for this innovation (Hansen, 1999; Zhou, 2005; Zhang, 2012). It has been proven in business practices (Barney, 1986; Penrose, 1959; Dierickx and Cool, 1989; Marshall, 1920; Zhang and Xu, 2004). But for radical innovation, the knowledge accumulation no longer occupies the primary position, instead, it even has a negative impact on it (Zhou, 2013). Radical innovation has the characteristics such as high risk, high investment, uncertainty and “possibly push all over again”, which need more innovation willingness and invest more time (Chandy et al., 2003). According to the self-determination theory, it is more critical to engage in something out of inner willingness, although certain external pressure is also important. Chandy et al. (2003) pointed out that willingness had a positive impact on radical innovation, individuals must have innovation willingness and spirit, so that radical innovation can be conducted (Yue and Lv, 2015; Qin, 2012).

According to the dual innovation theory, there are different degrees of innovation. These two innovation models are different in essence, previous studies concluded that social media has different effects on the two types of innovation (Roberts et al., 2016). The differential study of the dual model makes the conclusion more accurate and targeted (Shalley, 2004; He, 2004).

3. Methodology

In this paper, the mixed methods research is adopted as the overall method framework, subsequently, combining the sequential exploration strategy with the sequential interpretation strategy, and the research is carried out through the idea of “explore reasons for the realization through interview (qualitative explore), Fs-QCA explore specific ways of realization (combination of qualitative and quantitative), causal process tracing method restore the realization scenario (qualitative interpretation)”, specific implementation process is as follows:

Firstly, reasons for the realization of academic knowledge innovation in the social media environment is explored. Although the dual innovation theory perspective was adopted in this paper previously, its theoretical perspective only gives a general entry point and cannot provide specific influencing factors under the two modes. Furthermore, there are few previous studies on this topic. To understand reasons for innovation, we must first explore decisive influencing factors and their relationships through interviews. Moreover, there are limitations in previous research results, and richer content and perspectives can be obtained through interviews. Thirdly, the existing theoretical perspectives are independent of each other, and it is difficult to explore the internal relationship between different factors, especially after the dual innovation is distinguished. Therefore, in the first step of this paper, the interview method is used to analyze main influencing factors and establish the relationship

between these factors. The overall conceptual model of the impact mechanism of academic knowledge innovation in the social media environment is constructed. Simultaneously, interviews also provide the basis for the subsequent modification of scale and interpretation of configuration.

In the second step, to figure out the ways to realize academic knowledge innovation, Fs-QCA was used to analyze influencing factors configuration. First of all, the scale of influencing factors was designed according to the interview results, and a large sample was obtained through questionnaire survey. Subsequently, the configuration analysis was carried out through the Fs-QCA method, in which it is believed that the collection of factors rather than the single factor itself that plays a role in the results (Fiss, 2011), which is fully consistent with the objective demand of this study to explore the joint action of multiple factors to form academic knowledge innovation. Moreover, this method can accurately identify the sufficiency and necessity of the condition variables and the primary and secondary relationships of different condition variables. Through the core condition identification, a variety of genetic patterns of this topic can be concluded.

When it comes to the third step, causes and ways of academic knowledge innovation are explained, and the causal process tracing method is adopted to restore the scenario. By adopting qualitative data such as interviews, news reports, oral history and archives, the CPT method can effectively capture key phenomena of evolving events, observe the interaction of variables in quantitative analysis and clarify how things happen. So the method can better reflect the events in the real world (Kay and Baker, 2015). In this paper, CPT is adopted to restore the configuration results to the actual situation, and combining the previous research results, the configuration of influencing factors is transformed into a specific way that can reflect the individual experience, so that the successful innovation experience becomes concrete, visible, replicable and easily operated.

Each of the above steps is taken as a chapter, respectively. Each chapter consists of three part: data acquisition, analysis and conclusion. From the discovery of the reasons for the realization of innovation to the specific implementation path, the research theme of this paper is revealed gradually.

4. Reasons for the realization of academic knowledge innovation in the social media environment

4.1. Data acquisition

Taking WeChat Public Account as an example, the interview method is used to understand the main causes of dual academic knowledge innovation in the new media environment, The interview questionnaire is shown in appendix 1. WeChat Public Account Platform (referred to as Public Account) is a function newly added to basic platform of WeChat in 2012. Organizations and individuals can build their own Public Accounts, thereby realizing the full-scale communication and interaction with specific groups in the forms of words, pictures and voice. At present, 20 million accounts are set up in the platform. Compared with traditional media, the platform has a huge user bases, comprehensive We Media information, instant interaction and precise information push service. Moreover, it can create an academic circle, which brings new opportunities for academic innovation. This paper takes 20 college teachers and graduate students, who have academic experience in public account. Based on Wang and Liu(2017) scale, individuals are divided into the progressive group and the radical group, with 8 individuals in the radical group and 12 individuals in the progressive group. Moreover, face to face and telephone interviews are carried out with the title of "Factors affecting academic knowledge innovation in Public Account environment". This study was reviewed and approved by Ethics Committee of Shanghai University (ECSHU, 2022-158).

4.2. Analysis

Three-level coding is used to organize the data, the causes of realizing academic knowledge innovation in social media environment can be summarized into three prefactors and two intermediate process factors. Prefactors include individual factors, media factors and external environmental factors. (1) Individual factors mean that man produces motivation because of interest, academic relevance, efficiency, use cost and worship etc. Individual factors are shared by all dual academic innovators. (2) The media factors. The causes of progressive academic knowledge innovation include We Media identity, peer recommendation and SM-UGC quality, and the causes of radical innovation include We Media identity, peer recommendation and fragmented services. (3) External environmental factors. Progressive innovation is complementary resource environment, and radical innovation is social and technical environment. The social media environment is an informal learning environment and its content has features of Pan-Entertainment. Therefore, respondents said that " the impact of Public Account environment is imperceptible, rather than immediately and directly ". The influencing factors of realizing innovation are shown in Table 1. The definitions of the main concepts are given in Table 2.

4.3. Conclusion of the interview

Main routes of dual academic knowledge innovation under the social media environment are different. For the progressive group, the significance of social media is mainly to provide rich external knowledge, which is consistent with the previous research conclusion (Li, 2015). Individuals pay more attention to the acquisition of the new media academic knowledge, to better use new knowledge, it is necessary to cultivate our media creation and academic social ability. As there are still problems such as fragmentation, pan-entertainment and lack of authority in the social media content, it is particularly important to "complement" with traditional resources and environment. Only by organically "grafting" new media and replaceable resources to form fragmented knowledge accumulation can the goal be finally achieved. For the radical innovation group, the significance of social media lies on providing innovation incentives, which is mainly reflected in the unique services provided for "fragmentation", such as information push, likes and rewards, online and offline linkage, etc. Innovators can learn seamlessly, show their academic ability through the new media, attract collaborators and get public recognition, which greatly motivates these researchers, the more positive support that the follow-up social and technological environment gives the more it can strengthen researchers' identification to the new media, and then transform it into a strong innovation intention, and finally achieve the goal of making radical academic knowledge innovation. The Influential mechanism model of academic knowledge innovation in social media environment is shown in Figure 1.

5. Configuration analysis of academic knowledge innovation in social media environment

5.1. Data and measurement

By choosing a professional platform what is named 'Wenjuanxing' for data collection questionnaire survey, the study objects are academic users who have master's degrees or above and use Public Account for study in the past half a year. This study was reviewed and approved by Ethics Committee of Shanghai University (ECSHU, 2022-158). The questionnaire mainly includes three parts, which are the basic information, the causes of academic knowledge innovation under Public Account and the dual academic knowledge innovation mode. The variable items in the questionnaire are partly from the improved items of the mature questionnaire, and the measurement items use Likert 5°. The reference

Table 1. Causes of realizing academic knowledge innovation in Public Account environment.

Core category	Relational category	Category	Concept
Individual factors	Use motivation (UM)	Interest	interest, love, and attractive articles
		Academic relevance	the original knowledge framework, research related, consistent direction
		Efficiency	save workload, save retrieval time, fragmented reading, improve reading efficiency
		Worship	creator's personal style, pay attention to idols, Public Account of famous scholars
		Use cost	economic cost, time cost
Social media factors	Fragmented service (FS)	Rules and services	active push, share and interaction, information retrieval functions, online and offline linkage mechanism
		SM-UGC quality (UGC)	Academic nature
	SM-UGC quality (UGC)	Details and concentration	summary, full details, concentrated academic themes
		Originality	original article, original content
		language type of academic information	localization of public account, foreign academic resources
	We Media identity (WMI)	Academic innovation in Public Account environment	personal release, be invited to create, Public Account editing
	Peer recommendation (PR)	Peer forwarding	recommended by tutors and peer
Recommended by others		display in WeChat Circles, forwarded by others	
External environment factors	Social and technical environment (SE)	Social and technical environment	unbalanced educational resources, COVID-19, social environment adaptability, and technical characteristics of mobile network
	Complementary resource environment (CRE)	Complementary resource environment	replaceable resource is sufficient and easy to obtain
Intermedia-te process factors	Fragmented knowledge accumulation (FKA)	Academic resource reserve	news and new policies, hot information, lots of information, data source, practical data, research cases, and resource supplement
		Inspire academic ideas	understand new concepts, dig innovation points, construct ideas, inspire research directions, deepen others' research, increase breadth and diversity of knowledge
		Provide reference for study methods	learn research methods, learn thinking patterns, learn how to look at problem
		Comparresults of study	compared to others' study results and test our results
		Boost confidence in research	more confident in our own research
	Emergent use intention (EUI)	Innovation intention	passion for innovation and determination to solve difficulties
		Use intention	continuous attention, utilize spare time

Table 2. Definition of the concept of influencing factors.

Concept	Definition
Use motivation	It is the dynamic factor that can stimulate and keep academic users to use public account. It is also the psychological state that encourages them to use Public Account under the combined effect of interest, academic relevance, efficiency, use cost and worship.
We Media identity	Academic users build their identities according to the membership of Public Account and obtain their self-concept through the social category or group relationship in public account. We Media identity here refers to both the creator and user identity of public account.
Peer recommendation	Connection with academic peers is established by spreading academic information in Public Account in various ways such as mutual recommendation, forwarding and sharing in friend circle.
SM-UGC quality	The social media user-generated content (SM-UGC) includes various academic resources published by ordinary users, specialized users and professional users in public account. And the quality of SM-UGC mainly reflects in the academy, detail and concentration level, originality, academic information language type, etc.
Fragmented service	Academic users assess fragmented service of Public Account through whether it supports fragmented knowledge, learning and thinking. The evaluation of fragmented service level includes academic information retrieval, information push, academic interaction, information format presentation and online-offline interaction.
Complementary resource environment	It refers to academic institutions and academic innovation ecological park such as libraries and professional literature databases that are available for academic users, excluding public account.
Social and technical environment	It refers to the mobile Internet environment that Public Account rely on and the specific environment for its survival and development.
Fragmented knowledge accumulation	Before or during the research, academic users systematically and deeply summarize the previous research results in the environment of fragmentated knowledge, and prepare for the further research.
Emergent use intention	Emergent use means using existing technology to perform new tasks, and Emergent use intention refers to the willingness to use Public Account for academic knowledge innovation.

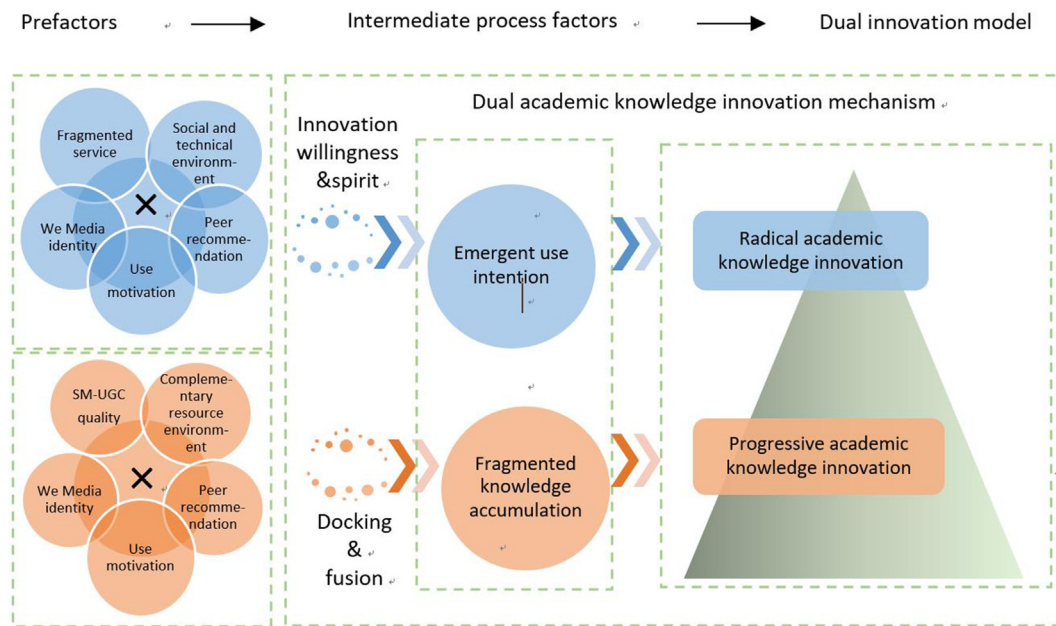


Figure 1. Influential mechanism model of academic knowledge innovation in social media environment.

Table 3. Source of the questionnaire items.

Variables	Item Number	Reference source
Use motivation (UM)	6	Wang (2010)
SM-UGC quality (UGC)	7	Wixom and Todd (2005); Zha et al.(2015); Zhang (2015)
Fragmentated service (FS)	6	Zha et al. (2015); Li and Sun(2008); Zhang (2015)
We Media identity (WMI)	4	Van den Hooff and de Ridder (2004)
Peer recommendation (PR)	7	McAllister et al. (2006)
Complementary resource environment (CRE)	5	Li and Sun(2008)
Social and technical environment (SE)	5	Qin and Ding (2006); Song et al. (2017)
Progressive academic knowledge innovation (PI)	5	Madjar et al. (2011); Guo (2016); Jansen et al. (2006)
Radical academic knowledge innovation (RI)	4	Madjar et al. (2011); Guo(2016); Jansen et al. (2006)

source of questionnaire items is shown in Table 3. Considering about the later deletion, each variable retains 4–7 items.

5.2. Analysis

The formal questionnaire shows in appendix 2. Before formally collecting data, 18 researchers were preliminary investigated and the questionnaire was modified according to the feedback. The formal collection involves two parts. The first part includes 207 questionnaires, which is used for exploratory factor analysis. The second part includes 418 questionnaires, which excludes some items based on exploratory factor analysis, 407 questionnaires were valid, 97.3% of the samples. The descriptive statistical result is shown in appendix 3. The Cronbach's α value, the combined confidence (CR) and the average variation AVE of the questionnaire, respectively exceed 0.7, 0.6 and 0.4, indicating that the reliability and aggregation validity are in the acceptable range (Fornell & Larcker, 1981). Meanwhile, the square root of AVE exceeds the correlation coefficient of other variables, indicating that the questionnaire has good discrimination validity. The reliability and validity results are shown in appendix 4.

Based on the results of theoretical analysis and interviews, We Media identity, peer recommendation, use motive, SM-UGC quality, as well as complementary resource environment are selected as the conditional variables, and progressive academic knowledge innovation is selected as the result variables; then We Media identity, peer recommendation, use

motivation, fragmented service and social technology environment are selected as the condition variables, and radical academic knowledge innovation is selected as the result variables. Before analysis, it is necessary to calibrate the preset factors. Three calibration points are set according to the 5-point Likert scale, of which "5" is the calibration point of complete membership, "1" is the calibration point of complete non membership, "3.001" is the intersection point, and the intersection point of "We Media identity" is adjusted to the mean value of 2.9, it means while meets the mean value, the individual has We Media identity. According to the necessity test, all conditions are not necessary. The configuration results are shown in Table 4.

5.3. Configuration results

When the result is progressive innovation, four configurations are produced. The overall solution consistency and coverage are respectively 0.987 and 0.706, indicating that these four configurations are reliable. Core factors of M1 configuration are complementary resource environment and no use motivation; The core factors of M2 configuration are We Media identity and low evaluation of UGC content quality; The core factor of M3 configuration is the lack of replaceable resources; The core factor of M4 configuration is peer recommendation.

When the result is radical academic knowledge innovation, two configurations are produced. The overall solution consistency and coverage are respectively 0.895 and 0.775, indicating that these two

Table 4. Configurations of academic knowledge innovation in social media environment.

Progressive academic knowledge innovation					Radical academic knowledge innovation		
Configuration	M 1	M 2	M 3	M 4	Configuration	E1	E2
We Media identity	⊗	●			We Media identity	●	●
Peer recommendation	⊗			●	Peer recommendation	●	●
Use motivation	⊗	●	●	●	Use motivation	.	.
SM-UGC quality	⊗	⊗	●		Fragmentated service		●
Complementary resource environment	●	●	⊗	●	Social and technical environment	.	.
Raw Coverage	0.238	0.351	0.335	0.626	Raw Coverage	0.704	0.754
Unique Coverage	0.010	0.016	0.040	0.240	Unique Coverage	0.021	0.071
Consistency	1.000	0.997	0.996	0.988	Consistency	0.919	0.902
Overall Solution Coverage	0.706				Overall Solution Coverage		0.775
Overall Solution Consistency	0.987				Overall Solution Consistency		0.895

Note: ● and ● indicate that the condition exists; ⊗ and ⊗ indicate that the condition does not exist; the blank indicate that the condition can exist or not; ● and ⊗ are the core conditions, ● and ⊗ are the auxiliary conditions.

configurations are reliable. For both configurations, core factors include We Media identity and peer recommendation, and the core factors of E2 configuration also include fragmentation services.

Since the configuration result of FS-QCA is unpredictable in advance, it is necessary to reorganize the data to restore and explain the path of academic knowledge innovation in social media environment.

6. Scenario explanation of the realization of academic knowledge innovation under the social media environment

6.1. Data acquisition

To recreate the original seven configurations, we use causal process tracing (CPT) method. This paper uses previous theoretical data, interviews and add some We Media articles (from public accounts of well-known scholars). We Media articles often have personal insights, which are deeper insight than interview, so they are used to support and explain the configuration results. The supplementary data can be publicly obtained from social media and publications, so it does not involve in the ethical issue of data acquisition.

6.2. Analysis of causal process tracing

There are certain subjective opinions by using the interview and official account data in the cause tracing. In order to strengthen the explanation, the previous research results are combined to explain the way of innovation realization, and six types of configuration are restored to six scenarios. The case description and theoretical results are as shown in Table 5:

6.3. Result of causal process tracing

The ways of realizing academic knowledge innovation in Public Account environment can be divided as follows:

- (1) Encounter complementary type. According to previous studies, information encountering can shorten the knowledge gap, increase users' knowledge reserves, and help achieve academic knowledge innovation (Wan and Liu, 2021). In this paper, M1 configuration is taken as a representative, individuals are used to using traditional academic resources, have low evaluation on the content of official account, without clear motivation for academic use, and do not have the ability to develop related academic resources. It is a common accumulation way of this mode to browse official account occasionally, encounter useful academic

information, and further cultivate through complementary academic resources.

- (2) Creative accumulation type. New constructivism regards We Media creation (usually in the form of We Media writing) as an important means to realize innovation. We Media creation can make individual thinking clear and systematic, and realize "zero saving and lump sum acquisition" of knowledge through three stages of integrable writing, personalized rewriting, as well as innovative reconstruction (Wang, 2012). Taking the M2 configuration as the representative, this paper is characterized by the fact that individuals took the official account as a platform for integrating their academic knowledge, reflecting and sorting out the research through We Media writing, and the innovation approach is mainly through integrable writing, personalized rewriting, as well as creative reconstruction (Wang, 2012), so as to realize accumulation and innovation.
- (3) Content-dependent type. Currently, most studies are based on the knowledge-based view, and social media is regarded as a way to obtain external knowledge, it is believed that social media can provide massive and heterogeneous knowledge and is the foundation of knowledge innovation. Many researches believe that new media content can support knowledge innovation (Moe & Schweidel, 2017; Long, 2017). Taking M3 configuration as a representative, a type of configuration with scarce available academic resource environment, and individuals have to find replaceable resources. At this time, the academic content of official account provides resources for individual creation. Therefore, individuals have strong use motivation and rely on acquiring academic knowledge from official account. After effective integration, gradual academic knowledge innovation is formed. This configuration is especially obvious when the resources under the Covid-19 epidemic are blocked.
- (4) Leaders following type. According to previous researches on enterprise social media (ESM), behaviors and actions of senior managers are often indicators of organizational behavior. When the senior executives understand, use and encourage others to use social media, they can encourage employees to use new media for innovation (Patroni, 2016). However, for academic researches, the role of senior executives is replaced by mentors or the leaders of opinions. Taking M4 configuration as the representative, academic social interaction is the main reason for this configuration, namely, after being recommended by tutors or academic authorities, individuals have the motivation to use it. Academic peers therefore just like the role of "supervisor" and "filter". Individuals are easy to be influenced by the "opinion leaders" in the academic field. Due to the accuracy of recommendations, it is easy for

Table 5. Configuration scenarios explained by causal process tracing method.

Configuration	Analysis examples	Background of these materials	Previous researches
M1 Encounter complementary type	<ul style="list-style-type: none"> > Whether there is We Media creation: no > Whether the Public Account is used for academic interaction: no > Use motivation: I don't use the Public Account frequently, I only read the academic content occasionally. Sometimes I open the pushed information and see the content that fits me, I haven't deliberately looked for these academic contents. > MS-UGC quality: the Public Account is not a special professional thing, and mistakes are inevitable, and its correctness or authority should be further considered. The Public Account is not as standard and uniform in quality as the academic resources on CNKI. Some articles talk in general, and you feel that they are all right, but in fact there is no original content at all. > Complementary resources environment: if I find flashing points in the Public Account and want to know more about it, I may check relevant contents on the Internet, or even find relevant academic papers in the database. > Fragmented knowledge accumulation: you can test your own research. For instance, once upon a time, my research results contradicted my research assumptions, and I never understood them. Subsequently, I saw a practical data in Wechat and found the real reason//sometimes my research is relatively new, and I may not see similar research in journals, and sometimes I feel confused and do not know whether my topic selection is right, At this time, I saw an article similar to myself on the official account, I had more confidence. 	<ul style="list-style-type: none"> > Interview > Lecturer on computer 	<p>Wan and Liu(2021)</p>
M2 Creative accumulation type	<ul style="list-style-type: none"> > Whether there is media creation: Yes (please refer to the background) > Use motivation: the Public Account adheres to the correct values of “embracing all rivers in the mainstream of Chinese culture and constantly striving for self-improvement”, conveys a true and rational voice, and enables our country to change a little bit in a better direction. > Complementary resource environment: because a lot of data are queried in the middle (from other resources), sometimes I wanted to make clear of a sentence or a definition, the data should be searched for several hours from other resources, so as to provide correct information as much as possible. Although there is limited knowledge level, but I had tried a lot. > MS-UGC quality: through observation, the author has been writing on the Public Account for a long time. The acquisition and utilization of academic resources are not mentioned on the Public Account. Therefore, it is believed that he only relies on We Media writing for accumulation. > Fragmented knowledge accumulation: a total of 89 articles were published in this official account last year, and it takes several days to write each article. Sometimes, an article is written all day long on Saturdays and Sundays. Starting from the morning to 11:00 pm, the process lasts for more than 10 h. Some articles have even been written for several months. 	<ul style="list-style-type: none"> > Source: article of the Public Account > Author: Ning Nanshan 	<p>Wang(2012)</p>
M3 Content-dependent type	<ul style="list-style-type: none"> > Use motivation: over the previous three years, I have been practicing in the front line of official account media, and I have been constantly enhancing my recognition from the perspective of observers. > MS-UGC quality: in terms of the content, the media content and forms of plane, video and Internet are integrated. For instance, the science and technology giant account " Science and Technology Daily Push "includes comics, videos, as well as graphics. A technology development tool will be released every week. > Fragmented knowledge accumulation: I find that with the Public Account, it is not necessary to search academic information through search engines. There are also rich academic resources in the Public Account. 	<ul style="list-style-type: none"> > Source: article of the Public Account > Author: Lao Huang 	<p>Moe and Schweidel(2017); Long(2017)</p>
M4 Leaders following type	<ul style="list-style-type: none"> > Peer recommendation: my Public Account is recommended by my peers, such as my doctoral classmates, students from higher grades, as well as colleagues. Sometimes I find a very good Public Account useful to me in meetings, I will pay attention to it. > Use motivation: I am engaged in the research of criminal law. Our articles generally find out problems from practice and then solve them. For instance, the controversial points of cases are all our concern, there are a large number of such cases on the Public Account. > Complementary resources environment: I obtain the latest cases or controversial hot spots in the society from the Public Account, but when analyzing these cases, I still downloaded many documents from the database. > Fragmented knowledge accumulation: a large amount of information can be obtained. For instance, new laws can be pushed in a very fast way. Once important laws appear, they will appear in these APPs.In addition, there are a lot of very controversial cases being discussed. Many scholars will express their opinions, which are all experts' opinions, they won't seem too shallow//The Public Account is helpful for the application of the project. Of course, it is also helpful to write articles, which can give you inspirations. 	<ul style="list-style-type: none"> > Interview > Lecturer of law 	<p>Patroni(2016)</p>
E1 Self-published type	<ul style="list-style-type: none"> > Whether there is media creation: Yes (please refer to the background) > Peer recommendation: I found visitors, students, interviewees, experimental subjects, as well as cooperators on Public Account. > Use motivation: When I want to do something, I just need to write down my ideas, I can always find people who are willing to do it with me. Moreover, I do not need any Additional conditions:no title, no qualification, no submission of materials, or even no cost. > Social and technical environment: in this era, I can have such a good position: writing comfortably, being engaged in consulting, leading students, obtaining good income without doing things I'm not good at, as long as I want to make my own voice, it can be heard by people far away or even by strangers. I'm really grateful for such an era. 	<ul style="list-style-type: none"> > Source: article of the Public Account > Author: Li Songwei (Famous Chinese scholar) 	<p>Shi(2017)</p>

(continued on next page)

Table 5 (continued)

Configuration	Analysis examples	Background of these materials	Previous researches
	<ul style="list-style-type: none"> > Emergent use intention: the Public Account is a new place, which is broader and has no threshold. Furthermore, it clearly proves that you do not need to wait until you become “somebody” to realize your wish., you can realize it now//Being engaged in Public Account is not my goal, but the means to achieve my goal. I need a shortcut to do things, therefore, I have this Public Account, and there may be more paths in the future, which are all rooms that respond my opinions, as far as the most important thing is that I will always have such demand. 		
E2 Functional excitation type	<ul style="list-style-type: none"> > Whether there is media creation: Yes, the reading notes will be written on the Public Account. > Peer recommendation: my tutor has a special academic public account. We also have a reading meeting every week. After the meeting, we will send the discussion content to the Public Account. > fragmented services: some functions of the Public Account are really helpful to me. For instance, it will specially recruit people, organize and summarize many good academic documents and provide them for free. Subsequently, it can subscribe, push one or two of the most valuable topics to you every day, and provide some free gadgets, which I believe is also very useful. > Social technology environment: it has become a very mature system to use social media for academic activities. I have participated in some academic associations. They will establish communication for American scientists and Chinese scientists through Wechat, including holding video conferences. Because American scholars know that China now uses Wechat, they should also adapt to local conditions. > Emergent use intention: more and more people use the Public Account, therefore, I am willing to use it for academic activities//I like some free gadgets in it//When operating our group's own Public Account, we wrote and played, which was not only a supervision, but also an improvement to our own learning. 	<ul style="list-style-type: none"> > Interview > Major: Medical doctor 	Patroni(2016); Ding,(2019)

individuals to obtain effective academic accumulation, integrate with complementary academic resources, and finally form progressive academic knowledge innovation.

(5) Self-published type. According to previous studies, it is believed that when individuals experience “The pleasure of discovering new knowledge” in the process of actively collecting data, writing or participating in discussions, their cognition of “knowledge innovation behavior has benefits” will be strengthened and their continuous knowledge innovation behavior will be stimulated (Shi, 2017). Taking the E1 configuration as the representative, core elements show that peer referral and We Media creation are the main causes. Because it takes a long time to achieve radical academic knowledge innovation and great risks are involved, creators may not officially publish their achievements for a considerable period of time. Social media provides a platform for independent publication of articles. Fans' praise, comments and rewards can greatly enhance the innovation confidence and willingness of individuals, which strengthened their willingness to media use and innovation. This configuration breaks the dilemma of radical academic knowledge innovation in the traditional environment, promotes innovation willingness and radical academic knowledge innovation.

(6) Functional excitation type. According to previous studies, ESM is an important collaboration facilitator, because it allows sharing and editing documents, holding video conferences, and publishing ideas and comments in the ESM community. The technical support brought by social media can relieve the workload and time pressure, while social support and technical support can promote knowledge innovation (Patroni, 2016; Ding, 2019). Taking the E2 configuration as the representative, in addition to having the same characteristics as E1, core elements of E2 show that the availability of fragmented services is also the main factor to stimulate radical innovation. Functional demand is the functional satisfaction that users experience after using social media (Xiang & Yang, 2017). Workplace support obtained through social media can not only stimulate individual innovative ideas, but can also help individuals overcome obstacles in the process of innovation implementation, improve innovation self-efficacy, and effectively promote the performance of innovation (Chen, 2016). The

availability of academic services, including the intensive reading and induction services, as well as free measurement tools provided by the Public Account, is very popular, which encourages individuals to media use and innovate, and promotes radical academic knowledge innovation.

7. Discussion

In this paper, mixed methods research is adopted to study how individuals realize academic knowledge innovation in the social media environment from the perspective of dual innovation. According to the research results, dual academic knowledge innovation in the social media environment is realized through two different main routes: for progressive academic knowledge innovation, the significance of social media mainly lies in providing rich external knowledge to form fragmented knowledge accumulation, while for radical academic knowledge innovation, the significance of social media lies in providing incentives. This conclusion is different from that of previous researches. In the enterprise research based on the knowledge-based view, it is found that the social media environment has a positive impact on progressive innovation, while it has little impact on radical innovation and even results in negative effects (Roberts et al., 2016). We believed that this is mainly because the previous research on dual innovation only takes the “knowledge support” function of the new media environment into consideration while ignoring other functions, through theoretical analysis and interviews, we confirmed that the radical academic knowledge innovation in the new media environment mainly benefits from “emotional support”, namely, obtaining innovation incentives, which enriches and develops the research results of knowledge innovation in the new media environment.

Focusing on two main routes, factors affecting the realization of academic knowledge innovation in the new media environment is further reflected, and the overall framework of the influential mechanism is constructed. Specifically, factors affecting the realization of progressive academic knowledge innovation include We Media identity, peer recommendation, use motivation, SM-UGC quality, as well as complementary resource environment, all of which interact with each other, forming an effective integration of knowledge and promoting the formation of progressive academic knowledge innovation; Factors

influencing radical academic knowledge innovation include We Media identity, peer recommendation, use motivation, fragmented service, as well as social and technology environment, all of which form Emergent use intention through innovation incentive, promoting the radical academic knowledge innovation. Under such circumstance, the overall framework of the influential mechanism of academic knowledge innovation under the social media is constructed. The framework uncovered the “black box” of academic innovation under the new media environment, enabling us to understand the internal mechanism of innovation, and also providing a systematic theoretical framework for related research.

In reality, factors influencing the realization of academic knowledge innovation in the social media environment do not appear alone or in all, but in the form of logical combination. Therefore, based on the above framework, Fs-QCA method is adopted to analyze the configuration of the influencing factors, so as to find out the matching rules of the influencing factors that help the realization of innovation, and identify the primary and secondary relationships and core factors among the influencing factors. Combining the causal process tracing method, we have concluded that the causes of progressive academic knowledge innovation in the social media environment consist of four types: encounter complementary type, creative accumulation type, content dependent type and leader following type, while the radical one includes two types: Self-published type and functional excitation type. We also find that multiple perspectives of previous result are involved in these six ways, and our research develop some of them. For instance, for information encounter, many scholars thought that this kind of easy and passive learning might produce abundant and diversified learning benefits than active learning, because users are more likely to accept the information they are exposed to, thus barriers to learning can be reduced (Bode, 2016). However, some scholars hold different opinions, believing that if there is no desire to process information, individuals can change the content at any time, and the learning effect would be less ideal (Shehata, 2013). According to the factor configuration explanation in this paper, academic individuals have realized the possible deficiencies, adopted complementary information resources to complement each other, and implanted the micro inspiration obtained by chance into traditional academic resources, thus achieving fragmented knowledge accumulation and simultaneously improving the possibility of innovation. For another example, although the new constructivism theory proposes that We Media writing can help realize knowledge innovation, there is a lack of relevant empirical research, and it is only discussed from the perspective of knowledge accumulation. Through the configuration, it is found in this paper that We Media creation factors can not only integrate knowledge to help realize progressive academic innovation, but also stimulate innovative mood, enhance emergent use intention, and help realize radical academic innovation. Moreover, although it has been mentioned in previous studies that the

leader following type, Self-published type, as well as functional excitation type can bring knowledge innovation, there is still lack of empirical research. Through our configuration analysis, the role of these causes on academic knowledge innovation has been clarified. The discovery of the cause makes the experience of realizing academic knowledge innovation in the social media environment visible, reproducible and operable, and is of great help for comprehensive promotion of successful innovation experience.

8. Conclusions

The forming mechanism of academic knowledge innovation under the new media environment is realistic importance and should be solved quickly. With the deepening use of social media, the forming mechanism may develop constantly, more empirical research is needed to understand the evolution of the timeline. In addition, the study can be further detailed, such as distinguishing research according to different disciplines or choosing more social media platforms. Despite the limitations, this study is still meaningful and provides a theoretical basis and practical case for future research.

Declarations

Author contribution statement

Yu Sheng: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Hong Li: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for profit sectors.

Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

Appendix 1. Interview outline

Dear sir/Madam,

Thank you for participating in our interview. There is no right or wrong answer to all questions in the interview. Just answer according to your real situation. In order to sort out the data later, this interview will be recorded by telephone. We promise that all the contents of the conversation are limited to academic use and strictly confidential. This interview has no commercial purpose.

The purpose of this interview is to investigate the impact mechanism of academic knowledge innovation in the social media environment and understand how social media affects and promotes academic knowledge innovation.

Personal background

1. Age:
2. Education level:
3. Major:
4. Current occupation:

Formal questions

1. Please introduce your academic background or your occupation, your academic expertise, academic achievements, and your recent research.
2. please talk about the gains and experiences of using WeChat official account in academic. Do you still use other academic resources? What are the advantages and disadvantages of them?
3. How can WeChat official account help you in your academic knowledge innovation? Can you give me some example?
4. Which factors affect your willingness or reluctance to use academic resources of WeChat official account?
5. Provide some academic resources which are useful for you and tell us why they are useful.

Appendix 2. Survey questionnaire

Questionnaire on factors influencing academic knowledge innovation in Wechat Official Account environment.

Dear madam/sir,

In order to understand the factors influencing academic knowledge innovation in the official account environment, we conducted the survey to enhance the effectiveness of using official account to carry out academic innovation. Please complete this questionnaire in your busy schedule. This survey is in the form of anonymous questionnaire. The survey results are only used for academic research. We will keep the survey data strictly confidential. There is no right or wrong answer. Your real idea is the best answer.

The meaning of the options in each part may be different. Please read the prompts carefully before answering each part. After completing the questionnaire, please confirm that you have answered each question in each part. Your answer is very important to our research. Thank you for your support and cooperation!

Part I Basic Information

Here are some personal information. (please select the appropriate option)

1. Gender: male female
2. Age: 18–30 31–50 >50
3. Education: Bachelor degree or below (investigation terminated) Master (including study) Doctor (including study)
4. Your major: Science engineering medical economy and management humanities and Social Science others
5. Your occupation: student scientific researcher teacher government departments, enterprises and institutions, The Party and government institution and leader of public organization staff business man tertiary industry
6. In the past six months, have you used official account for academic research? Yes No
7. The time spending on the Wechat Official Account : <30 min 30 min–1 h 1–2 h >2 h

Part II influencing factors

The following sentences describe the influencing factors of academic knowledge innovation in the social media environment. Please compare your actual situation with the following description. Select your approval or disapproval of the description.

1 Use motivation

No.	Item
UM1	The official account is consistent with my academic research.
UM2	The official account has improved my academic research efficiency.
UM3	The official account can help me learn a lot in academic field.

2 We Media identity

No.	Item
WMI 1	I will publish my academic content on the official account.
WMI 2	I will publish my academic information in official account by pictures.
WMI 3	I will publish my academic information in official account by recording and broadcasting.
WMI 4	I will publish my academic information in official account through live broadcast.

3 Peer recommendation

No.	Item
PR 1	Tutors often recommend official account to me.
PR 2	Forwarding official account helps to maintain my interpersonal relationship.
PR 3	Reading official account forward by others helps maintain interpersonal relationship.

4 SM-UGC quality

No.	Item
UGC 1	The official account is in the forefront of academic research.
UGC 2	The academic information content in the official account is deep.
UGC 3	The academic information content in the official account is original and strong.
UGC 4	Details of academic information in official account number

5 Fragmentated service

No.	Item
FS 1	In academic research, the official account information retrieval function has satisfied me.
FS 2	In academic research, academic interaction on the official account is satisfying.
FS 3	When I encounter difficulties in official account, I can get the help from the system.

6 Social and technical environment

No.	Item
SE 1	The official account has been widely used in society.
SE 2	COVID-19 gives me more opportunities to use official account.
SE 3	The current social environment is suitable for official account development.
SE 4	Mobile networks are reliable.
SE 5	Easy access to mobile networks.

7 Complementary resource environment

No.	Item
CRE 1	Besides official account, I can easily acquire academic resources.
CRE 2	Besides the official account, I can get the academic resources in time.
CRE 3	There are many academic sources that I can choose besides the official account number.

8 Fragmented knowledge accumulation

No.	Item
FKA 1	I can get academic resources from official account.
FKA 2	I can get new academic ideas from the official account.
FKA 3	I can get new research methods from the official account.

9 Emergent use intention

No.	Item
EUI 1	I intend to use official account to conduct my own academic research.
EUI 2	After using the official account, I want to conduct academic research.
EUI 3	I will frequently use official account In my academic research in the future.

Part III innovation mode

The following sentences describe the influencing factors of academic knowledge innovation in the social media environment. Please compare your actual situation with the following description. Select your approval or disapproval of the description.

1 Progressive academic knowledge innovation

No.	Item
PI 1	I can make minor adjustments to the original academic ideas.
PI 2	I can improve the original research methods.
PI 3	I can combine the original research methods with the new data research.

2 Radical academic knowledge innovation

No.	Item
RI 1	I can produce new academic ideas.
RI 2	I can propose a new research method.
RI 3	My academic achievements overtake the existing research in the same field.

Appendix 3. Descriptive statistical results of questionnaire.

Variables	Property	Number of people	Percentage %
Gender	Male	164	40.3
	Female	243	59.7
Age	18–30	276	67.8
	31–50	131	32.2
	>50	0	0
Using time	<for 30 min	96	23.6
	30 min-1 h	204	50.1
	1 h-2 h	82	20.1
	> 2 h.	25	6.1
Education background	Master (include Reading)	304	74.7
	Doctor (included Reading)	103	25.3
Profession	Science	91	22.4
	Engineering	98	24.1
	Medicine	36	8.8
	Economy and Management.	96	23.6
	Humanities and Social Sciences	77	18.9
	Others	9	2.2

Appendix 4. Reliability and Validity Test of questionnaire.

Variables	UGC	FS	UM	WMI	PR	CRE	SE	PI	RI	AVE	CR	Cronbach's α
UGC	0.641									0.4108	0.7360	0.871
FS	.426**	0.675								0.4550	0.7145	
UM	.428**	.321**	0.649							0.4207	0.6850	
WMI	.367**	.274**	.212**	0.749						0.5604	0.8355	
PR	.234**	.292**	.288**	.268**	0.747					0.5587	0.7900	
CRE	-.021	.026	.036	-.062	-.035	0.767				0.5882	0.8107	
SE	.294**	.274**	.320**	.022	.235**	.107*	0.650			0.4229	0.7852	
PI	.111*	.152**	.153**	.094	.192**	.001	.235**	0.669		0.4473	0.7080	0.755
RI	.256**	.259**	.161**	.489**	.322**	.040	-.005	.161**	0.689	0.4741	0.7294	

Notes: *p < 0.05 **p < 0.01 ***p < 0.001, UGC- SM-UGC quality FS- Fragmentated service quality UM- Use motivation WMI- We Media identity PR- Peer recommendation CRE-Complementary resource environment SE-Social and technical environment PI-Progressive academic knowledge innovation RI-Radical academic knowledge innovation.

References

Abernathy, W.J., Clark, K.B., 1985. Innovation: mapping the winds of creative destruction. *Res. Pol.* 14 (1), 3–22.

Barhoumi, C., 2015. The effectiveness of WhatsApp mobile learning activities guided by activity theory on students' knowledge management. *Contemp. Educ. Technol.* 6 (3), 221–238.

Barney, J.B., 1986. Strategic factor markets: expectations, luck, and business strategy. *Manag. Sci.* 32 (10), 1231–1241.

Bode, L., 2016. Political news in the news feed: Learning politics from social media. *Mass Communication & Society* 19, 24–48.

Bosua, R., Evans, N., Sawyer, J., 2013. Social networks, social media and absorptive capacity in regional small and medium enterprises (SMES) in Australia[J]. *Aust. Int. J. Rural Educ.* 23 (1), 117–134.

Bullinger, A.C., Hallerstede, S., Renken, U., Soeldner, J.-H., Moeslein, K.M., 2010. Towards Research Collaboration-A Taxonomy of Social Research Network Sites. Paper presented at the 16th America's Conference on Information Systems, Lima, Peru.

Cardinal, L.B., 2001. Technological innovation in the pharmaceutical industry: the use of organizational control in managing research and development. *Organ. Sci.* 12 (1), 19–36.

Chandy, R.K., Prabhu, J.C., Antia, K.D., 2003. What will the future bring? Technology expectations, dominance, and radical product innovation. *J. Market.* 67 (3), 1–18.

Chen, Q., 2016. The Influence of Social Media Use on Innovative Performance of Government Employees. Unpublished doctoral dissertation, Huazhong University of Science & Technology, Wuhan, China.

Crawford, M., 2011. Biologists using social-networking sites to boost collaboration. *Bioscience* 61 (9), 736.

Cunha, F.J.A.P., Ribeiro, N.M., Pereira, H.B.d.B., 2013. Records management: a basis for organizational learning and innovation. *Transinformação* 25 (2), 159–165.

Dierckx, I., Cool, K., 1989. Asset stock accumulation and sustainability of competitive advantage. *Manag. Sci.* 35 (12), 1504–1511.

Ding, G.Q., 2019. Enterprise Social Media, Knowledge Sharing and Employee Creativity. Unpublished doctoral dissertation, University of Science and Technology of China, Hefei, China.

Fei, J., Hu, T., Chen, J.L., 2015. Mental accounts, user habits and new media use: reflections based on social psychology. *Jianghai Acad. J.* 2, 215–220.

Fiss, P.C., 2011. Building better causal theories: a Fuzzy set approach to typologies in organization research[J]. *Acad. Manag. J.* 54 (2), 393–420.

Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *J. Market. Res.* 18 (1), 39–50.

- Glazier, K., 2011. An Introduction to Social media. Retrieved from. http://www.slide share.net/tactica_inc/the-conversation-an-introduction-to-social-media-presentation. (Accessed 19 August 2021). Accessed.
- Guo, W., 2016. Learning from Mistakes: A Comparative Study Based on Different Error Sources. Unpublished doctoral dissertation, Zhejiang University, Hangzhou, China.
- Hansen, M.T., 1999. The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits. *Adm. Sci. Q.* 44 (1), 82–111.
- He, Z.-L., Wong, P.-K., 2004. Exploration vs. exploitation: an empirical test of the Ambidexterity Hypothesis. *Organ. Sci.* 15 (4), 481–494.
- Jansen, J.J.P., Van Den Bosch, F.A.J., Volberda, H.W., 2006. Exploratory innovation, exploitative innovation, and performance: effects of organizational antecedents and environmental moderators. *Manag. Sci.* 52 (11), 1661–1674.
- Ji, Q., 2015. Management study on the present state and the development of the postgraduate's academic innovation ability. Hebei University, Baoding, China. Unpublished Master Dissertation.
- Ji, Q.Y., 2015. Study on the Present State and the Development of the Postgraduate's Academic Innovation Ability —An Investigation. Hebei University, Hebei University. Baoding, China. Unpublished master dissertation.
- Jiang, L., Lin, S., 2020. The influence of network structure embedded dual learning on enterprise's radical innovation. *J. Comm. Econ.* 13, 116–119.
- Kay, A., Baker, P., 2015. What can causal process tracing offer to policy studies? A review of the literature. *Pol. Stud. J.* 43 (1), 1–21.
- Li B.Q., Sun J.J., 2008. The influence of computer self-efficacy and task technology adaptation on the utilization of network academic information resources. *Information Science* 26, 1567–1571.
- Li J.T., 2015. Research on virtual community knowledge sharing and knowledge innovation based on social capital theory. Central North University.
- Liao, S.H., Wu, C.C., Hu, D.C., Tsui, K.A., 2010. Relationships between knowledge acquisition, absorptive capacity and innovation capability: an empirical study on Taiwan's financial and manufacturing industries. *J. Inf. Sci.* 36 (1), 19–35.
- Lin, Y., Cong, C., Hua, L., Wang, J., 2020. Research on the relationship of entrepreneurs previous experience and incremental innovation: the intermediary role of entrepreneurial bricolage. *Sci. Technol. Prog. Policy* 37 (21), 10–17.
- Long, X., 2017. Research on the influencing factors of knowledge innovation behavior of academic community. Southwest University of Science and Technology, Mianyang, China. Unpublished Master Dissertation.
- Long, L., Wang, H., Zhu, Y., 2012. The taxonomy of performance appraisal and its effect on innovation of scientific research in research-oriented universities. *Res. High. Educ. Eng.* 1, 145–150. CNKI:SUN:GDGJ.0.2012-01-026.
- Madjar, N., Greenberg, E., Chen, Z., 2011. Factors for radical creativity, incremental creativity, and routine, noncreative performance. *J. Appl. Psychol.* 96 (4), 730–743.
- Marshall, A., 1920. Principles of Economics, eighth ed. Macmillan, London.
- Mayfield, A., 2008. What Is Social media. iCrossing.
- McAllister, D.J., Lewicki, R.J., Chaturvedi, S., 2006. Trust in developing relationships: from theory to measurement. *Acad. Manag. Proc.* 2006 (1), G1–G6.
- Meesala, A., Rao, R., 2013. Is social networking detrimental to individual performance and organizational citizenship behavior[J]. *Interdiscipl. J. Contemp. Res. Bus.* 5 (1), 816–833.
- Moe, W.W., Schweidel, D.A., 2017. Opportunities for innovation in social media analytics [J]. *J. Prod. Innovat. Manag.* 34 (5), 697–702.
- Nelson, R.R., Winter, S.G., 1982. An Evolutionary Theory of Economic Change. The Belknap Press of Harvard University Press.
- Nguyen, B., Yu, X., Melewar, T.C., et al., 2015. Brand innovation and social media: knowledge acquisition from social media, market orientation, and the moderating role of social media strategic capability[J]. *Ind. Market. Manag.* 51 (nov), 11–25.
- Papa, A., Santoro, G., Tirabeni, L., Monge, F., 2018. Social media as tool for facilitating knowledge creation and innovation in small and medium enterprises. *Baltic J. Manag.* 13 (3), 329–344.
- Patroni, J., Von Briel, F., Recker, J., 2016. How enterprise social media can facilitate innovation[J]. *It Professional* 18 (6), 34–41.
- Penrose, E.T., 1959. The Theory of the Growth of the Firm. Basil Blackwell, Oxford.
- Qin, J., 2012. Radical innovation: foreign theoretical study development and empirical research review. *Technol. Econ.* 11, 21–30. CNKI:SUN:JSJL.0.2012-11-003.
- Qin, R., Ding, S., 2006. Analysis of environmental factors affecting the release of Postgraduates' innovation potential. *China Higher Educ. Res.* 2, 48–50.
- Roberts, D.L., Piller, F.T., Lüttgens, D., 2016. Mapping the impact of social media for innovation: the role of social media in explaining innovation performance in the PDMA comparative performance assessment study. *J. Prod. Innovat. Manag.* 33 (S1), 117–135.
- Shalley, C.E., Zhou, J., Oldham, G.R., 2004. The effects of personal and contextual characteristics on creativity: where should we go from here? *J. Manag.* 30 (6), 933–958.
- Shehata, A., 2013. Active or passive learning from television? Political information opportunities and knowledge gaps during election campaigns. *Journal of Elections, Public Opinion, and Parties* 23(2), 200–222.
- Shi, T., Jiang, Y.K., Chen, Q., 2017. The influencing factors of users' knowledge creation behavior in social Q & A community: A research based on grounded theory. *Docum. Inform. Knowl.* 5, 120–129.
- Song, X., Zhao, Y., Zhang, X., 2017. Research on the construction of user loss anxiety disorder (fomo) scale in mobile social media environment. *Lib. Inform. Work* 11, 96–105.
- Tang, J.J., 2015. Study on the Relationship between Social Capital, Knowledge Sharing and Individual Innovative Behavior in mobile Social Network. Unpublished master dissertation, Beijing University of Posts and Telecommunications, Beijing, China.
- Tushman, M.L., Anderson, P., 1986. Technological discontinuities and organizational environments. *Adm. Sci. Q.* 31 (3), 439–465.
- Van den Hooff, B., de Ridder, J.A., 2004. Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing. *J. Knowl. Manag.* 8 (6), 117–130.
- Wan, X.A., Liu, C., 2021. A differential study of the effects of weibo and WeChat use on citizens' knowledge gap: the moderating effects of political interest and casual contact. *Shanghai J. Rev.* 1, 68–79.
- Wang, J., 2010. *Motivation and Behavior of Microblog users*. Jinan, China: Unpublished Master Dissertation. Shandong University.
- Wang, Z., 2012. New constructivism and knowledge innovation. *J. Distance Educ.* 30 (2), 36–43.
- Wang, T., 2014. Effects of Purpose Orientation of Performance Appraisal on Innovation Behaviors: the Mediation. Unpublished master dissertation, Central China Normal University, Wuhan, China.
- Wang, Z.J., Liu, L.D., 2017. Can performance appraisal promote radical innovative behavior of the faculty—an empirical study based on self-determination theory. *J. High. Educ.* 38 (4), 52–60.
- Wang, H., Zou, C., Ma, H., 2019. Research on the sustaining path of knowledge innovation for enterprises based on the media and information literacy. *Lib. Inform. Serv.* 63 (4), 39–46.
- Wixom, B.H., Todd, P.A., 2005. A theoretical integration of user satisfaction and technology acceptance. *Inf. Syst. Res.* 16 (1), 85–102.
- Xiang, C.J., Yang, Z.H., 2017. Knowledge evolution mechanism of innovation teams in mobile social media. *Forum Sci. Technol. China* 5, 166–173.
- Yuan, Q., Zhu, Z., Zhang, Y., 2020. 20 Important Theories and Applications of Information System Empirical Research. China Machine Press, Beijing, China.
- Yue, C.J., Lv, Y., 2015. An empirical study on innovation spirit of graduate students. *Fudan Education Forum* 6, 20–25.
- Zha, X.J., Zhang, J.C., Yan, Y.L., et al., 2015. Does affinity matter? Slow effects of e-quality on information seeking in virtual communities. *Library and Information Science Research* 37, 68–76.
- Zha, X., Zhang, J., Yan, Y., Xiao, Z., 2015. Does affinity matter? Slow effects of e-quality on information seeking in virtual communities. *Libr. Inf. Sci. Res.* 37 (1), 68–76.
- Zhang, J., 2012. On Evolutionary Laws of a Firm's Innovation Capabilities Based on Knowledge Accumulation. Unpublished doctoral dissertation, Zhejiang University, Zhejiang.
- Zhang, J., 2015. Study on Impacting Law of Social media Users' Academic Information Seeking Behavior Given the Moderating Effect of Information Need. Unpublished doctoral dissertation, Wuhan University, Wuhan, China.
- Zhang, J., Xu, Q., 2004. Knowledge accumulation, innovation capability and enterprises' growth. *Sci. Sci. Manag. S. & T.* 8, 86–95. CNKI:SUN:KXXG.0.2014-08-010.
- Zhou, B., 2005. Research on enterprise Spiral Knowledge Innovation Mode. Unpublished doctoral dissertation, Fudan University, Shanghai, China.
- Zhou, S., 2013. Research on Network Community Knowledge Innovation Model Based on Knowledge Sharing. Nanchang, China. Unpublished master dissertation, Jiangxi University of Finance and Economics.