

Knowledge Management Driving Innovation: International Research Perspective and Local Practice Postprint

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Abstract

[Purpose/Significance] Amidst global economic downturn, research on knowledge management holds practical significance. [Method/Process] This study conducts a comprehensive investigation of knowledge management theories and practices both domestically and internationally, consisting of three main components: First, employing the visualization software CiteSpace to perform thematic analysis on over 5,000 foreign literature pieces related to knowledge management, attempting to identify research correlations and hotspots in various knowledge management activities. Second, administering questionnaire surveys to 559 enterprises in China to understand the current state of knowledge management in Chinese enterprises. Survey results indicate that interpersonal networks constitute the primary source of knowledge acquisition; most enterprises remain in the preparation stage regarding knowledge management practices; practices with high knowledge intensity are relatively scarce. Third, utilizing structural equation modeling to conduct statistical analysis on the aforementioned questionnaire data, attempting to identify the impact of knowledge management on exploratory innovation, exploitative innovation, and enterprise performance. [Results/Conclusions] The results reveal a positive correlation among these three elements; the study also finds that enterprises primarily focus on knowledge depth while placing insufficient emphasis on knowledge connections and knowledge breadth. Based on these findings, countermeasures and recommendations are proposed for knowledge management and innovation in Chinese enterprises.

Full Text

Knowledge Management and Innovation: An International Research Perspective and Local Practice

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Abstract

[Purpose/Significance] Knowledge management research holds practical significance amid global economic downturn. **[Method/Process]** This study provides a comprehensive investigation of knowledge management theory and practice, consisting of three parts: First, we employ CiteSpace to analyze over 5,000 knowledge management-related international publications, aiming to identify research associations and hotspots across various knowledge management activities. Second, we conduct a questionnaire survey of 559 Chinese enterprises to understand the current state of knowledge management in China. Findings reveal that interpersonal networks constitute the primary source of knowledge acquisition; most enterprises remain in the preparation phase of knowledge management practice; and knowledge-intensive practices are relatively scarce. Third, we apply structural equation modeling to statistically analyze the survey data, seeking to uncover the impacts of knowledge management on exploratory innovation, exploitative innovation, and firm performance. **[Result/Conclusion]** Results demonstrate positive correlations among these three elements. Additionally, the study finds that enterprises predominantly focus on knowledge depth while paying insufficient attention to knowledge linkage and knowledge breadth. Based on these findings, we propose strategies and recommendations for Chinese enterprises regarding knowledge management and innovation.

Keywords: knowledge management; exploratory innovation; exploitative innovation; organizational ambidexterity; knowledge capital; knowledge capability

1. Introduction

Knowledge management emerged as a new field in the 1990s and has since garnered widespread attention from both academia and practice. In 1939, R. S. Lynd published *Knowledge for What: The Place of Social Science in American Culture*¹, proposing that organizations should restructure to enable free knowledge flow and create opportunities and solve problems in the process. In 1967,

Peter Drucker introduced the concept of knowledge workers in *The Effective Executive*², noting that all work is related to knowledge. In 1995, Ikujiro Nonaka published *The Knowledge-Creating Company*³, highlighting the importance of tacit knowledge in innovation and developing a knowledge creation model based on the conversion between tacit and explicit knowledge through extensive case studies. Today, organizational knowledge is not only increasingly integrated into product production and service processes but also influences people's daily operations and work styles. Organizations that can effectively cultivate, acquire, and share knowledge resources will gain strategic competitive advantages in the global marketplace.

The knowledge management discipline features different epistemological perspectives on the nature of knowledge. D. Hislop⁴ offers a representative view in his knowledge management textbook, categorizing knowledge management epistemology into two types: objective perspective and practice perspective, also referred to by some scholars as content (entity) perspective and relational perspective. The objective/content perspective treats knowledge as an objective object, with knowledge management practices focusing on codifying and collecting knowledge, creating mechanisms to facilitate knowledge search and retrieval, such as establishing searchable databases and encouraging employees to encode and store knowledge. The practice/relational perspective emphasizes the dynamic and fluid nature of knowledge, which is implicit in interpersonal relationships, thus focusing knowledge management practices on promoting knowledge exchange and sharing through various forms of interaction and communication.

From a strategic perspective, one of managers' core responsibilities is to accumulate and protect valuable knowledge and capabilities. Organizational knowledge and capabilities primarily manifest as the transformation of input resources into valuable knowledge and specialized skills, and through organizational mechanism design, improving knowledge renewal and optimization efficiency while expanding knowledge dissemination and usage scope. In this process, the core of knowledge management is not only utilizing and protecting existing knowledge but more importantly, continuously developing new knowledge. From a tactical perspective, organizations must employ technological and institutional design methods to increase the speed of internal knowledge exchange. When the speed of knowledge sharing, flow, and creation within an organization exceeds that of the external environment, competitive advantages gradually emerge. To accelerate knowledge sharing and flow, organizations need to eliminate barriers hindering knowledge exchange and transfer, such as cultural controls and hierarchical organizational structures.

This study comprises three main components: First, we use information visualization software to conduct a status survey and analysis of theme distribution and national differences in 5,000 international knowledge management research articles, forming a panoramic perspective on global knowledge management development. Second, we employ questionnaire surveys to investigate and comparatively analyze the current state of knowledge management and in-

novation in domestic enterprises. Third, we use structural equation modeling to analyze data from 559 enterprises, seeking to identify the relevant impacts of knowledge management and innovation on firm performance. The research aims to obtain a panoramic understanding of international knowledge management achievements and the current state of Chinese enterprise knowledge management, thereby providing fundamental facts and insights to promote future development of knowledge management theory and practice.

2. International Perspectives on Knowledge Management Research

To understand the global state of knowledge management research, we used the information visualization software CiteSpace to conduct co-word and cluster analyses on the top 5,000 most frequently cited English-language documents from 17,596 publications in the ISI Web of Science Core Collection database. We mapped knowledge graphs of research hotspots and country-keyword overlays to interpret the development status and research hotspots in knowledge management. Search themes included “knowledge organization,” “knowledge integration,” “knowledge reuse,” “knowledge transfer,” “knowledge protect,” “knowledge absorption/absorptive capacity,” “knowledge flow,” “knowledge acquisition,” “knowledge sharing,” and “knowledge creation.” After deduplication, we used CiteSpace to conduct temporal distribution analysis of high-frequency keywords in knowledge process research, yielding preliminary findings as follows.

2.1 Temporal Distribution of Knowledge Management Research Themes

From a temporal development sequence, the distribution of knowledge management research literature basically reflects the main activities in the knowledge management process, covering the entire cycle of knowledge acquisition, knowledge sharing, knowledge creation, knowledge flow, knowledge absorption, knowledge integration, and knowledge reuse—consistent with the inherent logical relationships of knowledge management activities (see [Figure 1: see original paper]). Among these activities, “innovation” is the most frequently cited term, indicating that numerous knowledge management activities—including knowledge acquisition, knowledge sharing, knowledge creation, knowledge flow, knowledge absorption, knowledge integration, and knowledge reuse—are most closely related to organizational innovation, with the ultimate goal of achieving innovation. Knowledge acquisition is associated with information systems, as information technology and machine learning technologies can greatly improve the efficiency of knowledge retrieval and acquisition. Knowledge sharing, knowledge transfer, knowledge flow, and knowledge absorption represent key themes in the dynamic flow of knowledge, focusing on how to integrate acquired knowledge with organizational business and practice processes, and relating to organizational learning, networks, multinational corporations, strategic alliances, resources, and dynamic capabilities. Knowledge integration and knowledge reuse reflect how

to create value based on knowledge formation and accumulation, thus relating to knowledge spillover and value creation, while knowledge systematization affects the formation of semantic networks and the stability of cognitive systems.

2.2 Evolution of Knowledge Management Research Themes Over Time

Building on these findings, we further investigated changes in these ten research themes over the past 25 years, seeking to discover their development evolution. As shown in [Figure 2: see original paper], although all ten themes emerged in the early 1990s, research on knowledge processes other than knowledge acquisition only gradually developed after entering the 21st century. In 1988, literature on knowledge acquisition surged dramatically, marking a breakthrough point for this research direction, after which annual publications remained stable at over 100 articles with fluctuating increases, suggesting future development will likely plateau. After entering the 21st century, knowledge transfer developed fastest, followed by knowledge absorption, while knowledge protection and knowledge reuse did not experience significant development.

Current trends in knowledge process research suggest that knowledge transfer and knowledge absorption hold clear development advantages, with publication volumes continuing to increase rapidly. In recent years, annual publications on knowledge acquisition and knowledge sharing have remained at 300 articles, with future development expected to stabilize. Knowledge innovation developed slowly before 2010, but publication volume increased rapidly after 2010, indicating that knowledge innovation has gradually gained experts' attention and will receive full development. Research on knowledge integration, knowledge flow, and knowledge organization has progressed slowly, with stable annual publication volumes, suggesting these three knowledge processes have a stable research community but have not gained widespread attention. Since research began, literature on knowledge protection and knowledge reuse has been minimal, indicating these two knowledge processes remain underdeveloped and await in-depth scholarly investigation. From a novelty perspective, knowledge protection emerged latest, but its novelty is not particularly high. From a research popularity perspective, knowledge acquisition and knowledge transfer have significantly higher research frequency than other knowledge processes.

Additionally, several patterns emerge: First, knowledge processes that emerged earliest also have the highest research volume, such as knowledge absorption, knowledge acquisition, and knowledge transfer. Second, although research on knowledge organization began as early as 1979, publication volume remains low and has not received widespread attention from knowledge management scholars. Third, research on knowledge sharing started relatively late but has generated substantial publications, forming a sharp contrast with knowledge reuse and knowledge flow that emerged around the same time. Fourth, knowledge protection, the latest emerging theme, has minimal research volume, indicating it has not been fully developed. These same results are also validated in .

2.3 National Differences in Research Themes on the Knowledge Map

Using CiteSpace's overlay clustering method, we overlaid countries with keywords to examine the spatial development of each knowledge process, with results shown in [Figure 3: see original paper]. The findings indicate that the United States and Canada focus on knowledge innovation, knowledge transfer, absorptive capacity, performance, product development, and industrial environment—highly correlated with the large number of multinational corporations and emphasis on innovation in these countries. Germany emphasizes organizational knowledge, algorithms, machine learning, and knowledge management influencing factors, reflecting its strong industrial foundation and emphasis on intelligent manufacturing. Switzerland focuses on R&D, knowledge spillover, networks, social capital, and manufacturing, related to its emphasis on expanding knowledge value within limited geographical space. The Netherlands emphasizes information systems, knowledge acquisition, and absorption. France focuses on knowledge flow, with research involving social networks, weak ties, social structure, and transformation. Italy emphasizes knowledge acquisition and knowledge reuse, with research content including system environments, ontologies, and decision support in computer science. Japan emphasizes leadership, artificial intelligence, and knowledge classification, related to its robotics industry and emphasis on leaders' tacit knowledge. China, the United Kingdom, and Spain cluster together, with research content involving markets, teams, organizational knowledge, and dynamic theory, indicating these countries' knowledge management focuses on organizational and market levels. These data demonstrate that knowledge management research priorities are closely related to national economic status and enterprise needs.

3. Local Practice of Knowledge Management in China

In 2015, our research team conducted a survey on knowledge management and innovation among 559 enterprises across various industries in China, including manufacturing, power and energy, and information technology. We surveyed key responsible persons such as knowledge management executives, CEOs, and department managers. Approximately 35% of the enterprises in the sample were existing or target customers of a well-known domestic knowledge management firm, and these enterprises had implemented or were preparing to adopt knowledge management-related technologies and systems to varying degrees. Additional questionnaire data came from MBA or EMBA students during our teaching at universities and enterprises.

The surveyed enterprises comprised 54% state-owned enterprises, 39% private and joint-stock enterprises, and 7% others (including joint ventures and wholly foreign-owned enterprises). By size, 74% were large enterprises with over 500 employees, while 26% were small and medium-sized enterprises (SMEs) with fewer than 500 employees. By establishment date, 30% were founded before 1978, 44% were established between 1978 and 2002, and 26% were founded after 2002. By industry distribution, 41% were in secondary industry, 44%

in tertiary industry, and 15% in other industries. Survey respondents included board chairs, senior executives, middle managers, and frontline staff. The survey yielded seven major findings with implications for how enterprises can leverage knowledge management to drive innovation.

3.1 Knowledge Acquisition Sources

The survey found that enterprises primarily acquire knowledge through interpersonal networks composed of customers, consumers, competitors, and suppliers (see [Figure 4: see original paper]). Interpersonal networks contain substantial knowledge, and enterprises mainly obtain knowledge through this approach. The survey revealed that 40% of enterprises recognized customers and consumers as information sources. However, acquiring knowledge from interpersonal networks is costly. Additionally, enterprises primarily acquire knowledge through technical standards and professional publications.

Knowledge acquisition faces two weak links: First, knowledge exchange and sharing between enterprises and government, universities, and research institutions is relatively limited, whereas collaborative innovation requires strengthened linkages among government, industry, academia, and research. Second, while 44% of enterprises typically search for information on the internet, only 11% are willing to purchase truly value-added professional paid databases and other knowledge from the information services industry (see [Figure 5: see original paper]). This indicates that knowledge circulation channels among industry, academia, research, and government are not smooth, information silos exist between them, the knowledge sharing system is not robust, and knowledge utilization is affected.

3.2 Most Enterprises Still in Preparation Phase

Only 28.79% of surveyed enterprises have concrete knowledge management practices, indicating a certain gap from international standards (see [Figure 6: see original paper]). Chinese enterprises perform well in establishing incentive mechanisms, creating knowledge maps, and measuring intellectual capital, exceeding average levels of European and American enterprises. However, they still show significant gaps in benchmarking current status, sharing best practices, formulating corporate strategy and norms, implementing knowledge management systems, and appointing Chief Knowledge Officers (CKOs) (see [Figure 7: see original paper]). This suggests that knowledge management practices receive considerable attention at the tactical level but insufficient emphasis at the strategic level, particularly in comparing knowledge management practices with leading external enterprises, and the degree of strategic integration remains weak.

3.3 Differences Between State-Owned and Private Enterprises

State-owned enterprises (SOEs) perform better in strategy formulation, system implementation, and policy standardization. Private enterprises demonstrate greater flexibility, with knowledge management tools more tightly integrated with business operations, including sharing best practices, developing “communities of practice,” creating knowledge maps, measuring knowledge capital, and appointing dedicated CKOs—these activities generate the most value in knowledge management (see [Figure 8: see original paper]).

3.4 Differences Across Enterprise Sizes

Knowledge management practices vary significantly across enterprises of different sizes. Our survey data reveal that SMEs excel at tactical-level knowledge management, such as knowledge management training, best practice sharing, and incentive mechanisms for knowledge workers. However, at the strategic level, large enterprises have more complete and standardized knowledge management systems, such as dedicated CKOs at the organizational level, greater emphasis on knowledge capital strategies, and more attention to knowledge management system audits and evaluations (see [Figure 9: see original paper]). Overall, 32.74% of SMEs have implemented knowledge management practices, compared to only 27.44% of large enterprises (see [Figure 10: see original paper]). For SMEs, knowledge is a scarce resource, and the cost of knowledge sharing is relatively low.

3.5 Status of Knowledge Management Technology Application

The survey found that networks have been well popularized as infrastructure for implementing knowledge management systems in Chinese enterprises. Systems for daily knowledge management operations, such as email, video conferencing, content management, and workflow management, have been implemented. Knowledge management analysis technologies and tools, such as data mining, expert systems, and business intelligence, are gradually gaining enterprise attention. In contrast, social knowledge management technologies and tools, such as social networks, collaborative wiki technologies, and social customer relationship management, have not yet been recognized or deployed by Chinese enterprises. Enterprises still use traditional knowledge management methods most frequently, while knowledge-intensive knowledge management practices are scarce (see [Figure 11: see original paper]). Compared with KPMG global data, Chinese enterprises still lag behind international levels in using data mining, decision support, business intelligence, and group decision tools. Currently, enterprises use relatively easy-to-implement technologies, and future knowledge management requires deeper development to reveal organizational tacit knowledge, discover new knowledge through big data analytics, and increase organizational intelligence to gain differentiated understanding of markets, technologies, and consumers, thereby enhancing competitive advantages.

3.6 Efficiency of Knowledge Management Technology and Systems

The strength of enterprise knowledge management applications lies in daily knowledge management, with document management being the most mature area. Collaborative management is a weak area, particularly community building centered on innovation. From the perspective of difficulty and value, many enterprises engage in knowledge management activities that are low in difficulty and small in value, while activities that are high in difficulty and truly create value for enterprises are insufficient. Huawei performs outstandingly in this regard, having developed many knowledge harvesting methodologies that connect knowledge management with business improvement and employee capability enhancement, truly transforming experience into organizational capability.

3.7 Value Contribution of Knowledge Management to Enterprises

The study found that knowledge management primarily contributes to the enhancement of strategic value for enterprises—this strategic performance is implicit, long-term, and difficult to evaluate, including employee development, product innovation, and competitive advantage enhancement. However, knowledge management does not demonstrate significant effectiveness in mergers and acquisitions, investment, and revenue growth—areas of greatest concern to managers—meaning its contribution to corporate financial value is limited (see [Figure 12: see original paper]). This suggests that current enterprise M&A activities may involve more capital flow than knowledge flow, whereas M&A should essentially be about knowledge transfer, knowledge integration, and collaborative knowledge creation. In terms of investment, project selection and subsequent operations are knowledge-intensive activities that require building knowledge-based teams to create leverage effects from capital while tightly integrating business and investment teams to avoid repeated mistakes and rapidly share best practices.

4. Knowledge Capital and Knowledge Management Capabilities of Chinese Enterprises

Enterprise knowledge capital is measured through three indicators: knowledge breadth, knowledge linkage, and knowledge depth. Knowledge breadth describes the degree to which an enterprise's knowledge base covers multiple fields, serving as an indicator of horizontal knowledge stock and diversity. Organizations with knowledge breadth typically have diverse customer bases, multiple market segments, and employees with educational backgrounds covering multiple professional fields⁶. Knowledge linkage measures the extent to which an organization can leverage key knowledge from external partners, research institutions, and universities for innovation activities. This paper measures it through organizational accumulation of industry knowledge, comprehensive industry expertise, industry experience, and familiarity with the industry⁶. Knowledge depth measures the extent to which an organization masters and is familiar with

specialized knowledge in a particular industry or field, serving as an indicator of vertical knowledge stock and knowledge uniqueness, complexity, and specific content⁷. Enterprises with knowledge depth possess profound understanding and rich experience of industries and core technologies⁵.

The survey measured these constructs using a seven-point Likert scale and found that enterprises focus most on knowledge depth—accumulation of industry knowledge—with an average score of 5.63, while paying insufficient attention to knowledge linkage and knowledge breadth, with average scores of 4.81 and 4.93 respectively (see [Figure 13: see original paper]). In stable industries, increasing knowledge depth can continuously strengthen existing advantages and enhance core competitiveness. However, in China's rapidly changing high-turbulence market environment, excessive focus on existing knowledge depth may create path dependence and inertia, increase transformation costs, emphasize internal optimization while ignoring external environmental, technological, and customer transformation changes, and miss opportunities to enter new technologies and markets. Research shows that knowledge breadth and knowledge linkage play important roles in exploratory innovation. For traditional Chinese enterprises to achieve "Internet Plus" transformation, they must rely on knowledge breadth and knowledge linkage. Regarding the three aspects of knowledge breadth, Chinese enterprises grasp multi-faceted customer portfolio information well but lack mastery of multi-disciplinary knowledge and market segmentation knowledge. Enterprise knowledge linkage mainly concentrates on suppliers and customers—direct stakeholders—while connections with universities are significantly low. Additionally, most enterprises are very familiar with their industries but lack comprehensive understanding of industry knowledge, which is unfavorable for strategy formulation.

Enterprise knowledge capital varies by size and type. From the size perspective, large enterprises' knowledge capital is significantly better than SMEs because large enterprises have sufficient resources to invest in knowledge capital accumulation activities. However, both have unbalanced structures, focusing on industry-specific knowledge while lacking knowledge breadth and linkage. From the type perspective, SOEs' knowledge capital accumulation is better than private enterprises because SOEs have more solid management foundations and abundant resources. SOEs particularly excel in knowledge linkage, paying great attention to resources outside the enterprise, especially from government, universities, and research institutions. However, both private and state-owned enterprises are deficient in knowledge breadth and linkage (see [Figure 14: see original paper]).

Enterprise innovation also requires good knowledge capabilities, including slack capital capability, knowledge sensing capability, and knowledge transformation capability. Slack capital capability measures how many excess resources an enterprise has to fund new projects⁸. Knowledge investment requires sufficient resources for management to allocate to support new strategies. Knowledge sensing capability measures an enterprise's ability to sense the environment and

absorb knowledge related to new technology opportunities⁶. After perceiving environmental changes, enterprises need to transform acquired information into organizational capabilities. Knowledge transformation capability is a dynamic organizational capability measuring the degree to which enterprises are willing to abandon existing capabilities to develop new ones⁹.

Multinational corporations possess abundant knowledge capital, but their knowledge management often focuses on internal knowledge management with strong knowledge operation and utilization systems while being weak in external knowledge acquisition. The survey measured these capabilities using a seven-point Likert scale, finding that Chinese enterprises' knowledge sensing capability averaged 5, significantly better than slack capital capability (4) and knowledge transformation capability (4.09). Good knowledge sensing capability helps enterprises identify new technologies and monitor technological changes. Most surveyed Chinese enterprises lack sufficient slack capital, which constrains exploratory innovation. Meanwhile, knowledge transformation capability needs improvement—enterprises must strive to adopt new technologies to ensure continuous renewal and upgrading of knowledge capability sets. Only by transforming sensed information into knowledge capabilities and constantly breaking existing advantages with new ones can enterprises successfully build leading resources and gain competitive advantages through the synergistic effects of these three knowledge capabilities.

5. Impact of Knowledge Management on Innovation and Organizational Performance

This section examines how enterprises can comprehensively enhance innovation capabilities. Innovation capability includes exploratory innovation and exploitative innovation. Exploratory innovation refers to enterprises' ability to break away from existing technological or institutional trajectories and create new knowledge, typically associated with variance-increasing activities such as searching, experimenting, varying, and discovering. Exploitative innovation refers to enterprises' ability to optimize and consolidate existing knowledge along original technological or institutional trajectories, typically associated with variance-decreasing activities such as refining, selecting, implementing, and efficiency improvement¹⁰. The survey indicates that Chinese enterprises mainly focus on exploitative innovation without achieving dual-driven ambidexterity. Ambidextrous capability determines enterprise future. Building new capabilities involves certain risks and requires enterprises to change or break free from existing organizational paths and capability constraints; over-reliance on existing capabilities may cause enterprises to miss future development opportunities.

Measurement results show that private enterprises' innovation capabilities are better than SOEs, and large enterprises' innovation capabilities are better than SMEs. SMEs' innovation advantages mainly lie in introducing improved products and upgrading products according to customer needs, presenting future opportunities for enhancing their innovation capabilities.

The construct definitions and measurements for knowledge breadth, knowledge depth, knowledge linkage, knowledge sensing, and slack capital all come from established scales in existing literature. Knowledge breadth and knowledge depth are from literature⁵, knowledge linkage and knowledge sensing from literature⁶, slack capital from literature⁸, knowledge transformation from literature⁹, exploratory and exploitative innovation from literature¹⁰, and firm performance is derived from respondents' subjective judgments using a five-point Likert scale on knowledge management project ROI, market share growth, sales, return on assets, and profit margins.

Based on enterprise names and questionnaire respondent background information, we merged questionnaire data from the same enterprise using averaging methods. After eliminating unusable and missing data, we retained 228 analytical samples. We employed exploratory and confirmatory factor analysis frameworks to assess the reliability and validity of the measurement model, and used AMOS to analyze relationships among the three dimensions of knowledge capital—exploratory innovation, exploitative innovation, and firm performance—through structural equation modeling. Results are shown in [Figure 15: see original paper] and [Figure 16: see original paper].

The study found that knowledge breadth has significant positive effects on both exploratory and exploitative innovation. Knowledge linkage directly affects the space for exploratory innovation—that is, whether new fields can be discovered. Knowledge depth primarily determines new technological innovation. Both exploratory and exploitative innovation have significant positive impacts on firm performance, with exploratory innovation having a greater effect.

Additionally, we examined the effects of three knowledge capabilities on innovation and performance using the same approach. The study found that enterprises' capability to sense external knowledge positively influences both exploratory and exploitative innovation. Knowledge transformation capability has a large significant positive effect on both types of innovation. For enterprises with insufficient knowledge transformation, they should quickly build a bridge from sensing to transformation. Slack capital does not have a significant effect on innovation.

6. Recommendations for Enterprise Knowledge Management and Innovation

Based on these findings, we propose four strategic recommendations for Chinese enterprises regarding knowledge management and innovation:

First, regarding knowledge acquisition sources and channels, enterprises need to gradually form knowledge communities, strengthen knowledge sharing and transfer among government, enterprises, universities, and research institutions, and enhance government-industry-academia-research linkages to achieve collaborative innovation. While building knowledge communities, we must further advance research on supply and demand in the knowledge services industry.

Currently, enterprises show low willingness to purchase knowledge products and services, requiring deeper investigation into the reasons. Simultaneously, knowledge management practitioners must change their mindset and pay for high-quality value-added knowledge, shifting focus from browsing and collecting internet information to value creation through problem identification and resolution.

Second, focus on value creation through knowledge management. This survey reveals that Chinese enterprises are active in methodological and tactical-level knowledge management activities but lack sufficient strategic and organizational-level recognition of knowledge management importance. Strategically, they have not integrated knowledge management with business, performance, and future strategy; organizationally, they have not established dedicated positions to promote knowledge management. This issue requires two-pronged resolution: On one hand, enterprise knowledge management activities and practices must closely integrate with business and strategy. On the other hand, we must demonstrate the value and importance of knowledge management to senior executives through multiple channels. As Internet Plus and innovation entrepreneurship advance, knowledge assets are becoming increasingly important in enterprises, and knowledge management will ultimately advance simultaneously at strategic and tactical levels.

Third, actively adopt more complex and professional knowledge management tools. Currently, Chinese enterprises' application of knowledge management technologies and tools mainly concentrates on daily operations and communication. However, these tools struggle to create true differentiation for enterprise knowledge accumulation, sharing, and creation. When knowledge becomes a core enterprise asset, more specialized knowledge management systems are needed to form deep knowledge fusion and creation capabilities between interpersonal networks and knowledge networks. Such knowledge will become key resources and capabilities for enterprises in the future. Enterprises should adopt more professional knowledge management technologies to help them explore and develop multiple knowledge resources, particularly in collaborative work and creation, building virtual communities and communities of practice, and establishing knowledge management environments capable of handling complex work—not just optional knowledge management systems. This requires society to further develop and cultivate talent in knowledge management and introduce personnel innovation spirit into the field.

Fourth, further expand knowledge linkage and knowledge breadth. For enterprises in transition, expanding knowledge linkage and knowledge breadth helps break thinking inertia and path dependence. Knowledge breadth increases enterprises' understanding of new business thinking and technologies, discovering new growth spaces. In changing and uncertain environments, maintaining dynamic balance and coordination between knowledge breadth and knowledge depth is crucial. Knowledge breadth helps enterprises enhance market and external resource integration, while knowledge depth combines new ideas and resources

with existing capabilities and systems. Knowledge depth, in turn, helps enterprises judge which knowledge is lacking and valuable.

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Note: Figure translations are in progress. See original paper for figures.

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