Postprint of Exploratory Factor Analysis of Enterprise Matching Degree in Technology Opportunity Identification

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Abstract

[Purpose/Significance] Technology opportunity identification is one of the key factors influencing enterprise production innovation. In the process of technology opportunity identification, the matching degree between enterprises and technology opportunities affects whether technology opportunities can progress from the cognition stage to the utilization stage. Analysis of the influencing factors of enterprise matching degree facilitates the realization of technology opportunity identification and transformation. [Method/Process] Using literature analysis and team focus interview methods, we designed and compiled measurement scales and questionnaires for enterprise matching degree in technology opportunity identification, and applied SPSS 21.0 software to conduct quantitative analysis of the collected data. [Results/Conclusion] The research results show that enterprise matching degree in the technology opportunity identification process can be measured from two dimensions: enterprise innovation capability and enterprise knowledge sharing capability. After principal component analysis, four first-order variables were identified under the enterprise innovation capability dimension, and three first-order variables under the enterprise knowledge sharing capability dimension. The factor structure of matching degree in technology opportunity identification was comprehensively obtained.

Full Text

Analysis of Exploratory Factors of Enterprise Fitness in Technology Opportunity Recognition

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Abstract

[**Purpose/Significance**] Technology opportunity recognition is one of the key factors influencing enterprise production and innovation. In the process of technology opportunity identification, the fitness between enterprise and technological opportunity affects whether the opportunity can progress from the cognitive stage to the utilization stage. Analyzing the influencing factors of enterprise fitness helps enterprises achieve the transformation of technology opportunity recognition. [**Method/Process**] This study employed literature analysis and team focus interviews to design and develop a measurement scale and questionnaire for enterprise fitness in technology opportunity identification, and used SPSS 21.0 software to conduct quantitative analysis of the collected data. [**Result/Conclusion**] The results show that enterprise fitness in the technology opportunity recognition process can be measured from two dimensions: enterprise innovation capability and enterprise knowledge sharing capability. After principal component analysis, four first-order variables were identified under the enterprise innovation capability dimension, and three first-order variables under the enterprise knowledge sharing capability dimension. The factor structure of fitness in technology opportunity recognition was thus obtained.

Keywords: technology opportunity recognition; enterprise fitness; exploratory factor analysis

2 Conceptual Analysis of Enterprise Fitness

Domestic and foreign scholars' research on fit theory has primarily focused on four areas: management fit theory, cognitive fit theory, fit theory in information systems, and enterprise capability fit theory. These four domains each have distinct research characteristics while also intersecting and integrating with one another. J. A. Timmons et al. [2] proposed that the opportunity recognition system is a process of mutual fit and balance among three driving factors: opportunity, resources, and entrepreneurial team, and that enterprises must continuously maintain balance among these elements to achieve efficient operation. Zhang Yi and Fan Yun et al. [3] first proposed and demonstrated that the necessary condition for person-organization fit is consistency between individual and organizational values and goals, while the sufficient condition involves fit among three factors: consistency of values and goals, match between job requirements and individual capabilities, and alignment between individual needs and organizational supplies. Zhou Zhiying and Meng Weidong [4] extended the traditional value chain model to derive a dynamic Porter value chain model, from which key enterprise capabilities were identified, including resource allocation and coordination capability, comprehensive learning and innovation capability, performance management capability, strategic positioning capability, production

support capability, and marketing capability—all of which are interrelated and mutually influential. Chen Yongxing et al. [5] constructed a nine-grid matrix to study the matching relationship between technological innovation capability and technological innovation mode, concluding that enterprises can only achieve optimal positioning for technological innovation when these two elements exhibit a coordinated fit relationship. He Wenzhang [6] defined enterprise fit as a series of specific activity-related resources, information, knowledge, and capabilities that an enterprise possesses, along with their organizational regulation and coordination. Huang Shengzhong [7] proposed matching strategies for technological opportunities at different technological stages. Yao Mingming [8] studied the influence mechanism of the fit between business model design and technological innovation strategy on technology catch-up in latecomer enterprises. Liu Yixin et al. [9] employed a bilateral matching approach to construct a dynamic matching model for enterprise technology strategy based on the structural characteristics of technological niches. Synthesizing the above perspectives, this paper argues that the fitness between enterprise resources and technological opportunities is essentially the degree of alignment between the resource conditions and coordination capabilities that an enterprise possesses and its innovation activities and technological opportunities. Specifically, it refers to the matching degree between the enterprise's own capabilities and the technological innovation activities it needs to undertake, which determines whether the enterprise can effectively utilize technological opportunities.

3 Theoretical Model Structure Analysis and Validation of Enterprise Fitness in Technology Opportunity Recognition

3.1 Research Model Based on Capability-Fit Theory

From the perspective of capability-fit theory, in the stage from cognition to utilization, enterprises adjust various resources and capabilities to maintain appropriate fit relationships with external environmental factors and technological factors themselves. For the enterprise itself, whether technology can be truly utilized in technology opportunity identification depends more fundamentally on the dynamic matching of enterprise technological resources and capabilities. The formation of fit relationships requires, on one hand, that enterprises adjust internal and external resources in the face of mismatched conditions, and on the other hand, that they adjust their organizational capabilities to pursue breakthroughs from various obstacles and constraints to achieve a state of fit. Particularly crucial are the adjustments to enterprise innovation capability, knowledge management capability, and knowledge sharing capability related to technological opportunities. The dynamic matching relationship between innovation elements and enterprise capabilities can make the technology opportunity identification process simpler, clearer, and easier to realize. Whether this matching relationship is coordinated not only reflects the synergy among internal enterprise elements but also generally indicates whether the enterprise has a good overall synergistic state internally and externally. The better the overall fitness

of an enterprise, the more effectively it can form competitive advantages and obtain better returns—only then does a technological opportunity truly emerge [10]. If an enterprise exhibits only partial element matching or weak overall fitness, its relative technological advantages cannot be demonstrated, and for that enterprise, the technology cannot become a technological opportunity.

Capability-fit theory suggests that while the external environment and technological opportunities are objectively present, enterprise capability matching is not generated by objective factors but rather results from proactive selection and adjustment by the enterprise organization. Regarding enterprise technology development behavior, first, such behavior is highly goal-oriented, representing actions determined by the enterprise according to its development objectives. Second, this behavior is continuously adaptive, with the integration and adjustment of internal and external resources and capabilities being proactive enterprise actions. In the technology development process, enterprises will adopt comprehensive technological innovation behaviors including continuous independent investment, technological innovation, and even changing the external environment.

3.3 Model Structure and Validation Based on Team Focus Interviews

The authors conducted focus interviews to preliminarily investigate the influencing factors of fitness in enterprise technology opportunity identification and to initially validate the above theoretical model structure based on the interview results. The interview subjects were enterprises cultivated by the Hubei Industrial Technology Innovation and Incubation Center of the Chinese Academy of Sciences, which is the CAS's institution for technology transfer, transformation, and cultivation in Hubei Province. The center has established several industrial technology R&D platforms and formed a technology transfer and transformation network radiating throughout Hubei Province, having cultivated more than 30 industrial innovation technology and high-tech enterprises. Two group focus interviews were conducted using a complete group interview approach, each lasting between 40 minutes and one hour, with interview locations in Wuhan. Relevant enterprise leaders were invited to participate, with 8 and 11 attendees respectively. The interview content covered three aspects: enterprise cognition and technology opportunity identification, enterprise production innovation, and enterprise technological innovation management. Specific questions included: assessment of the connection between enterprise cognition and technology opportunity identification, description of enterprise cognitive capabilities in technology opportunity identification, the impact of fitness factors on enterprise technology opportunity identification, measurement of factors affecting fitness, key factors influencing enterprise technological innovation capability, how enterprises absorb, digest, transform, and apply new technologies, problems and difficulties encountered in the technological innovation process, and the impact of strategic decisions by senior management on enterprise technological innovation. Through the group focus interview research, this paper drew

three conclusions regarding enterprise technology opportunity identification and fitness:

(1) Enterprise fitness has a significant impact on the successful identification of technological opportunities. Most interview participants believed that technological opportunities are objectively present. Only when a technological opportunity is recognized and acknowledged by an enterprise, and simultaneously matches the enterprise's cognitive capabilities such as development strategy, technological strength, and market capability, can it be recognized and utilized by the enterprise.

(2) Enterprise identification capability in technology opportunity identification can be described by fitness. Interview participants generally stated that fitness is one of the important factors reflecting enterprise identification capability in technology opportunity identification. In the process of ultimately completing technology opportunity identification, enterprises need to assess their fitness with the technology—not all technological opportunities can be utilized by enterprises. This process essentially examines the degree of fit between the enterprise and the technology; enterprises with higher fitness possess greater capability to identify and utilize technology, making it easier to ultimately utilize technological opportunities and thereby realize their value.

(3) The fitness of enterprise technology opportunity identification capability can be measured from the following aspects: whether the resources an enterprise can invest match the technological opportunity, and whether the enterprise's existing knowledge management level matches the technological opportunity. Fitness is an important factor for completing the technology opportunity identification process, and the enterprise's own capabilities are the key to utilizing technological opportunities. Only when both enterprise innovation capability and knowledge organization are well-matched can the technology opportunity identification process proceed more smoothly, particularly since the utilization of technological opportunities depends more heavily on capability matching. When fitness was proposed as a key factor for enterprise identification capability to progress from recognition to application, most interview participants agreed that it could be measured from the two aspects of enterprise innovation capability and knowledge organization, although some individuals suggested that the fitness of the technology itself should also be considered. This paper focuses on the identification capability between enterprise and technological opportunity as the core research question; therefore, matching issues arising from technology-intrinsic conditions and social environment are not discussed.

4 Exploratory Factor Analysis of Enterprise Fitness in Technology Opportunity Recognition

4.1 Scale Development and Data Collection

After extensive literature review and empirical investigation, this paper summarized 34 measurement items across two dimensions for the enterprise technology opportunity identification fitness scale, as shown in Table 1 . Subsequently, data were collected through a questionnaire survey using a 5-point Likert scale, with 1-5 representing "strongly disagree" to "strongly agree." The survey targeted enterprises affiliated with the Chinese Academy of Sciences and its institutes, employing both online and email questionnaires to collect data. To improve the response rate and ensure data quality, the survey of CAS-affiliated enterprises was primarily distributed through the enterprise management departments at the CAS level. The basic information about the questionnaire survey is presented in Table 2 .

4.2.1 Sampling Adequacy Test and Bartlett's Test of Sphericity

Based on the data collected from the questionnaire, this paper conducted factor analysis on two reflective variables affecting enterprise technology opportunity identification fitness: enterprise innovation capability and knowledge sharing capability. To determine whether the second-order fitness measurement items were suitable for factor analysis, sampling adequacy tests (KMO) and Bartlett's tests of sphericity were first performed on the two factors of enterprise cognitive fitness. Initial factor analysis was conducted separately on the 20 variables under the second-order variable of enterprise innovation capability and the 14 variables under enterprise knowledge sharing capability. Bartlett's test results were significant, with KMO values of 0.816 and 0.774 respectively, chi-square test values of 1062.2 and 558.2, and degrees of freedom of 190 and 91, indicating that the scale was appropriate for factor analysis.

This paper selected factor loadings of 0.50 as the criterion and extracted factors with eigenvalues greater than 1. It was found that three measurement items under enterprise innovation capability (CA9, CA12, CA16) could not be assigned to any factor, either due to high loadings or certain overlap with other items. According to statistical theory, these three items were deleted to obtain the most reasonable scale. After removing CA9, CA12, and CA16, a second factor analysis was conducted on the remaining 17 measurement items under the enterprise innovation capability variable. Through varimax orthogonal rotation, four factors with eigenvalues exceeding 1 were extracted, with a cumulative explained variance contribution rate of 61.9%, indicating that these four factors essentially covered the measurement elements of enterprise innovation capability.

Using the same criterion of factor loadings of 0.50 and extracting factors with eigenvalues greater than 1, the analysis revealed that two measurement items under enterprise knowledge sharing capability (KS2, KS7) performed poorly, either with factor loadings below 0.30 or high loadings across multiple factors

that prevented their assignment to any single factor. According to statistical theory, these two items were deleted to obtain the most reasonable scale. After removing KS2 and KS7, a second factor analysis was conducted on the scale items under the enterprise knowledge sharing capability variable, yielding a KMO value of 0.800, a chi-square test value of 439.98, and degrees of freedom of 66, indicating that this part of the scale was suitable for factor analysis. Meanwhile, the cumulative explained variance contribution rate increased from 53.7% to 55.49%, also suggesting that the three factors extracted through factor analysis could adequately represent the enterprise knowledge sharing capability variable.

4.2.2 Principal Component Factor Extraction

To further analyze the internal factor structure of each reflective variable, this paper conducted principal component analysis on the independent variables of the two reflective variables, with results presented in Tables 3 and 4.

(1) Factor structure analysis of enterprise innovation capability. As shown in Table 3 , four higher-dimensional factors were formed under the enterprise innovation capability variable. The six measurement items CA1-CA6 all showed high loadings on Factor 1, ranging from 0.617 to 0.759; CA7-CA10 showed high loadings on Factor 4, ranging from 0.514 to 0.798; CA11-CA15 demonstrated high loadings on Factor 2; and CA17-CA20 were distributed on Factor 3. Based on analysis of the source literature and content of these 17 items, CA1-CA6 were used to measure the quantity, ratio, and growth trends of enterprise R&D investment, as well as the proportion of R&D personnel and the focus of R&D activities. Therefore, this factor was defined as the enterprise's "R&D Investment Capability." CA7-CA10 were used to measure the technical level, development cycle, and economic benefits of enterprise products, represented by the enterprise's "Innovation Output Capability." CA11-CA15 measured the formulation and evaluation of enterprise innovation strategy, coordination of innovation activities, allocation of innovation resources, and operation of innovation projects, defining the higher dimension of these five items as the enterprise's "Innovation Management Capability." CA17-CA20 examined enterprise product market research, sales channels, and after-sales service, defining this factor as the enterprise's "Innovation Marketing Capability." In summary, four higher dimensions were formed under the enterprise innovation capability variable: "R&D Investment Capability," "Innovation Output Capability," "Innovation Management Capability," and "Innovation Marketing Capability."

(2) Factor structure analysis of enterprise knowledge sharing capability. As shown in Table 4 , three higher-dimensional factors were formed under the enterprise knowledge sharing capability variable. After orthogonal rotation, KS1-KS14 showed high loadings across three factors. The three measurement items KS1-KS4 (with KS2 deleted) all demonstrated high

loadings on Factor 3, ranging from 0.474 to 0.811. These three items measured the enterprise's ability to establish project teams for sharing project experience, hold knowledge achievement exchange meetings, and promote employees' understanding of shared values; this factor was named "Knowledge Transfer" capability. KS5-KS9 (with KS7 deleted) showed high loadings on Factor 2, and these four items measured the enterprise's ability to communicate with competitors, learn from technical experts, communicate with suppliers, and encourage internal employee exchanges; this factor was named "Knowledge Learning" capability. KS10-KS14 showed the highest loadings on Factor 1, and these five items measured the enterprise's ability to compile manuals for products and services, establish databases, create knowledge repositories for managing data and collecting technical information, build user databases to integrate user information, and absorb and fuse employee suggestions for practical application. This factor was named "Knowledge Creation" capability. Thus, three higher dimensions—"Knowledge Transfer," "Knowledge Learning," and "Knowledge Creation"—were formed above the 12 measurement items under the enterprise knowledge sharing capability variable.

4.3 Reliability Test of the Scale

To further test the reliability of the scale measurements, this paper conducted reliability analysis on the research results. The analysis primarily employed calculation of the Corrected Item-Total Correlation (CITC) and Cronbach's alpha coefficient to verify the reliability of information quality constituent factors [23], analyzing the consistency or stability of measurement results. G. A. Churchill's [24] research indicates that CITC values should be greater than 0.5, with a minimum threshold of 0.3; items below 0.3 should be deleted. Different scholars have varying views on the threshold values for reliability coefficients, but generally consider 0.50-0.70 as minimally acceptable, 0.70-0.80 as fairly good, and 0.80-0.90 as very good. As shown in Table 5 , the Cronbach's alpha coefficients for all first-order factors of enterprise cognitive fitness in technology opportunity identification met the minimum standard, with four first-order factors falling within the fairly good to very good range, indicating good reliability for these factors. The first-order factors include innovation input capability (IP), innovation output capability (IO), innovation management capability (IM), and innovation marketing capability (MI), each comprising specific operational measurement items.

5.1 Research Findings

Based on the above analysis and the factor structure of enterprise fitness, the enterprise fitness variable constituting enterprise cognitive capability in the technology opportunity identification process has two second-order variables: enterprise innovation capability and enterprise knowledge sharing capability. These two second-order variables contain seven first-order variables: innovation in-

put capability, innovation output capability, innovation management capability, and innovation marketing capability collectively reflect enterprise innovation capability; while knowledge transfer, knowledge learning, and knowledge creation collectively reflect enterprise knowledge sharing capability. Therefore, this paper constructed a three-tier model of enterprise technology opportunity identification fitness, as shown in Figure 1 [Figure 1: see original paper].

5.2.1 Measurement of Enterprise Innovation Capability Fit

From a fitness perspective, enterprise innovation capability must align with enterprise technological innovation activities, focusing on the measurement of the enterprise's own resource coordination and organizational capabilities. These can be mapped through four types of innovation capabilities: input, output, management, and marketing.

(1) Innovation Input Capability. The R&D department is the most fundamental and core component for the formation and realization of enterprise technological innovation. From the emergence of innovative ideas to their productization, the R&D process generates technical knowledge that guides production management and other functions, ultimately achieving technological innovation benefits [25]. Therefore, enterprise R&D investment is the prerequisite and condition for promoting technological innovation and progress. In research on enterprise innovation input, some scholars have selected enterprise R&D investment as an indicator to measure innovation input capability. For instance, Wu Yanbing [26] constructed two different production function models using manufacturing enterprise data and found that R&D has a significant positive impact on productivity, with R&D investment amount showing strong correlation with the intensity, scale, and level of technological innovation. Li Wuxia [27] used R&D investment as the primary indicator, supplemented by non-R&D investment, to study enterprise innovation performance. Tao Yongming [28] expanded the definition of R&D investment to comprehensively include human, material, and financial resources in internal R&D, technology purchasing, and cooperative R&D activities, using this as the basis for empirical research on enterprise technological innovation capability. The R&D investment amount in the early stage of enterprise technological innovation activities has certain independence, and these investments, having undergone standardized statistics, offer good comparability and facilitate horizontal and vertical data comparisons, making them widely used to measure enterprise innovation capability. Representative indicators include the ratios of R&D funding and technical personnel investment. Therefore, the proportion of enterprise R&D expenditure to total sales revenue can be used to reflect the enterprise's willingness to invest funds in innovation activities, while the proportion of regular or full-time R&D technical personnel to total engineering and technical personnel can roughly measure the level of human resource investment in technological innovation and its fitness with

innovation activities.

(2) Innovation Output Capability. After conducting initial R&D investment activities, enterprises must transform the resulting outcomes into knowledge or products that support enterprise development. Enterprise innovation output capability can be measured from three aspects: enterprise technical level, new products, and comprehensive economic benefits. Zhao Dongxi and Fan Zhenrong [29] used new product sales revenue and its proportion to total sales revenue to measure enterprise innovation output capability. Liao Zhongju [30] employed comprehensive enterprise economic performance indicators when studying R&D input-output efficiency and verified that R&D investment is significantly positively correlated with enterprise economic performance. Tao Yongming [28] et al. used absorptive capacity to reflect the innovation output of technology investment when measuring enterprise innovation output capability. Wang Shuang and Ma Jingyi [31] used indicators such as intellectual property products and average new product development cycle to measure enterprise innovation output capability. In general, new products can ultimately embody innovation output capability, and indicators related to new products can reflect enterprise innovation output from different perspectives, including new product development cycle, innovative product technical level, and new product profit realization. New product profit realization and development cycle are practical for reflecting the economic benefits and speed of technological innovation, featuring statistical standardization and strong comparability. Additionally, enterprise innovation production capability can be used to indirectly reflect innovation output. Therefore, when measuring innovation output capability, relevant concepts such as technical level, new product development cycle, new product benefits, and enterprise innovation production capability can be employed.

(3) Innovation Management Capability. Innovation management capability is also a crucial component of enterprise innovation capability. Enterprise innovation management capability is manifested through organizational integration, construction, and reconfiguration of internal and external competitiveness. Enterprises with strong innovation management capability can adapt to rapidly changing market environments, make correct organizational arrangements and implementation plans for technological innovation activities, and timely adjust and share management experience across all management levels. Guo Donghai [32] studied enterprise innovation management capability using empirical cases, employing indicators from three dimensions: strategic management, support management, and management evaluation to examine innovation management capability in technology enterprises. Fang Xiaobo [33], approaching from the perspective of dynamic capability, proposed three components of enterprise innovation management capability: change capability, absorptive capacity, and integration capability. Du Yueping and Fang Yunran [34], through research on middle management, concluded that knowledge aware-

ness capability and work management capability in enterprise innovation management have the most significant positive effects on enterprise innovation capability, while innovation input capability and environmental perception capability have relatively large positive effects on technological innovation performance. In summary, enterprises can reflect their innovation capability through three aspects: strategic management capability for technological innovation, mechanism establishment and operation capability for technological innovation, and process management capability for technological innovation.

(4) Innovation Marketing Capability. Innovation marketing capability is the enterprise's ability to open markets for its innovative products, including correct judgment of market value direction, correct assessment of consumer acceptance of new products, accurate prediction of future markets, and the enterprise's influence on markets and consumers. Correct understanding and regulation of markets can enable enterprises to identify the right research directions and technological innovation value [35]. The research of Chen Xiaohong et al. [35] shows that enterprise marketing capability can significantly affect market performance through enterprise investment, particularly R&D investment. Tang Qing and Chen Haiyan [36] found that investment in technology marketing expenses can directly improve enterprise performance. Bai Ge [37] analyzed the relationship between marketing capability and innovation behavior, concluding that marketing capability is directly associated with innovation market performance and established a functional relationship describing the direct connection between marketing capability and technology industry and market performance. Innovation marketing capability includes enterprise investment in marketing, management strategies for new product marketing, and in-depth research on marketing mechanisms and their inherent laws. For technologically innovative products, the marketing objective is to enable potential users to gradually understand, recognize, and accept the enterprise's new products and technologies. Complete promotional programs, strong service and sales networks, and market feedback mechanisms are all concrete manifestations of enterprise innovation marketing capability. Therefore, enterprise technological innovation capability is not only about R&D capability but is also closely related to market development and marketing organization and management. The same type of technological innovation may yield completely different results in different enterprises—this is also a manifestation of capability fit. The higher the fitness of marketing capability, the more likely enterprise technological innovation achievements will be accepted and recognized by the market, generating more enterprise revenue.

5.2.2 Measurement of Enterprise Knowledge Sharing Capability Fit

Furthermore, effective knowledge management can increase the value of knowledge capital and strengthen enterprise core competitiveness. This paper reflects enterprise knowledge sharing capability from three aspects: knowledge transfer, knowledge learning, and knowledge creation.

(1) Knowledge Transfer Capability. Knowledge transfer refers to the process of transferring, disseminating, and sharing knowledge. It includes transfers between organization and individual, between individuals, and between organizations. Organization-related knowledge transfer is generally purposeful, planned, and cross-boundary. For enterprises, knowledge transfer is a crucial link in knowledge management, where organizational personnel absorb new knowledge during the transfer process and effectively reorganize and utilize it, discovering knowledge that contributes to enterprise development and applying it to achieve competitive advantage [38]. The transfer between tacit knowledge and explicit knowledge is the main component of the knowledge transfer process, which can help form an enterprise knowledge growth spiral. Knowledge transfer theory considers this transformation link as the foundation for achieving knowledge sharing. Enterprises can draw upon Japanese scholar I. Nonaka's [39] knowledge conversion spiral model to explore the entire knowledge transfer process. Throughout this process, individual employees combine various forms of external knowledge expression with practical experience to conduct creative research, thereby further innovating and developing knowledge. Through collaborative work among different departments within the enterprise and continuous practice, new tacit knowledge is constantly created.

(2) Knowledge Learning Capability. After an enterprise creates an environment for knowledge transfer, knowledge learning follows, permeating throughout enterprise technological innovation activities. Experiential learning theory posits that learning is a process of information acquisition and transformation, with these two aspects constituting learning: information acquisition methods refer to information source channels, while information transformation methods refer to how acquired information is analyzed and processed [40]. Due to differences in information acquisition and transformation methods, the identified technological opportunities also vary. Therefore, knowledge learning influences the opportunity identification process to some extent. The technological innovation process is essentially a knowledge learning process, requiring different forms of learning activities at different stages. Learning in the new technology idea generation stage: The inspiration and innovation for enterprise new technology originate from continuous learning of external knowledge. Only by continuously learning external knowledge to enhance the enterprise's internal knowledge stock can it optimize its

knowledge structure, generate new inspiration and creativity when exploring potential market opportunities, integrate them with other internal knowledge, and gradually be appropriately understood by organizational members. Under the influence of external learning, enterprises actively transform external knowledge into their own competitive advantages, transforming from passive recipients to active drivers of new technology development. Learning in R&D activities: Enterprises obtain their unique specialized knowledge through organizational learning in R&D activities, which represents an important core capability distinguishing them from competitors. Enterprises can acquire explicit knowledge through books, television, networks, and other carriers, and obtain tacit knowledge through observation, imitation, practice, and other means. At this stage, organizations should quickly absorb and internalize external knowledge, achieving integration of internal and external knowledge to ultimately form the enterprise's specialized knowledge. However, when new knowledge is highly complex, systematic, and specialized, this externally learned knowledge may conflict with the enterprise's own specialized knowledge, requiring the enterprise to make decisions on how to integrate new knowledge with existing core foundational knowledge. Learning in the production process: In new product production, only by making employees' tacit knowledge explicit can knowledge learning and utilization be improved, thereby perfecting production processes and enhancing production efficiency. Particularly, some employees' experience, skills, and insights as tacit knowledge are difficult to learn directly and explicitly, requiring enterprise members to use individual learning, team learning, and other methods to better share and utilize new knowledge, which can reduce the time and costs invested in technology development and improve technology development efficiency. Learning in the marketing stage: In the innovative product marketing stage, enterprises continuously exchange information and energy with the external world to achieve the integration of technological innovation knowledge. Learning at this stage focuses more on tacit knowledge such as finding new users, discovering new product uses, and re-segmenting markets, emphasizing extensive exposure to tacit knowledge related to customers, suppliers, and relevant markets. At this stage, during commercialization and industrialization, enterprises further absorb external tacit knowledge and conduct secondary innovation on innovation outcomes as knowledge reserves.

(3) Knowledge Creation Capability. After undergoing knowledge transfer and knowledge learning, enterprise knowledge accumulation reaches a certain level, and the enterprise enters the knowledge creation stage. In this stage, enterprises mobilize various elements to acquire information, integrate it to form new knowledge, and strive to achieve perfect matching between technological opportunities and the enterprise itself. The collaborative learning of enterprise employees during interactive communication is the

fundamental reason for creating new knowledge. The basic conditions for generating new knowledge include communication capability, absorptive capacity, and learning motivation. Communication capability means that enterprise employees need to continuously understand changes in technical knowledge to supplement external information and knowledge, learning others' ideas, knowledge, and skills while re-examining and rethinking old knowledge, thereby achieving knowledge creation based on the integration of old and new knowledge. Therefore, the formation of knowledge creation capability first requires the enterprise organization to create an organizational atmosphere conducive to knowledge and information exchange [40]. Absorptive capacity means that improving knowledge absorption capability requires employees' accumulation of past relevant knowledge and dependence on established paths [41]. Only with accumulated experience and knowledge from the past can employees more deeply understand and recognize new knowledge, achieving thorough comprehension and absorption of newly encountered information. Individual absorptive capacity is an important foundation for developing organizational absorptive capacity, which is gradually formed through continuous transcendence of individual knowledge sharing and achievement of knowledge diversification. Individuals with different knowledge structures view problems from different perspectives, and their communication plays an important role in enhancing organizational knowledge creation capability. Learning motivation: To generate learning motivation, employees need at least two conditions. On one hand, enterprise employees should recognize the value of information and knowledge; only by making employees aware of the value generated by their efforts will they be motivated to search for various types of information and knowledge inside and outside the enterprise and have the willingness to actively exchange and accept information and knowledge [42]. On the other hand, employees should be able to obtain sufficient incentives from the exchange of information and knowledge; employees are rational actors who will only truly generate learning motivation after receiving certain compensation for exchanging information and knowledge.

6 Research Conclusions

Through the analysis of influencing factors of enterprise technology opportunity identification fitness, it can be concluded that in the process from cognition to utilization of technology opportunities, enterprises must enhance their own innovation capabilities and create a favorable enterprise knowledge sharing atmosphere to promote synergy in technology opportunity utilization. Focusing on strengthening innovation input and output capabilities, optimizing innovation management capabilities, and enhancing innovation marketing capabilities helps enterprises maximize the benefits of technological innovation opportunity utilization. Creating an enterprise organizational environment that facilitates knowledge sharing is beneficial for enterprises to discover and absorb external

knowledge, reducing resistance in the technology opportunity utilization process. Only when innovation capabilities and knowledge sharing capabilities are matched with enterprise innovation activities can the identification and transformation of technological opportunities be achieved.

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Author Contributions

Jiang Hong: Designed the research framework, wrote Sections 1, 2, and 3, and guided the revision of the entire article
Zhang Xiaodan: Wrote Sections 4 and 5 and integrated the paper
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Note: Figure translations are in progress. See original paper for figures.