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Article

The Effect of Existing Knowledge Assets on Inbound/Outbound Disruptive Innovation

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Abstract: Innovation is an essential key factor in the technology development history. Past research on innovation focused more on the innovation behavior of technology, but seldom described knowledge assets which also influence innovation behavior greatly. The effect of knowledge assets attribute and result on disruptive innovation is therefore regarded as the research topic in this study, where disruptive innovation is divided into outbound and inbound to combine combination-embeddednessandmajor business specificityof knowledge assets as the research model. Manufacturing enterprises in China are proceeded the questionnaire survey, and 173 valid copies are collected. The empirical analysis shows that combination-embeddedness of knowledge assets presents significantly positive effects on major business specificity and outbound innovationof an enterprise but reveals remarkably negative effects on inbound innovation. Enterprises are suggested to constantly accumulate knowledge assets with low major business specificity before disruptive innovation in order to reduce ineffective inbound innovation.

Keywords: knowledge assets' combination-embeddedness; major business specificity of knowledge assets; outbound and inbound disruptive innovation

1. Introduction

Current enterprises are facing the pressure of constant innovation, especially the industries with short product life cycle. Such pressure appears particularly obvious in hi-tech industry and manufacturing industry. Continuous innovation could sustain competitive advantage and even become the source of competitive advantage. A company has to stress on the technology R&D and innovation, satisfy the needs of major customers, and observe competitors' movement in the industry as well as potential entrants and possible alternative new technology in order to continuously make profits. Christensen [1] proposed new innovation classification concepts of and disruptive innovation and sustaining innovation and. Sustaining innovation aims to improve existing product performance, while disruptive innovation intends to bring different value proposition into the market. Disruptive innovation is not emphasized by existing leading enterprises or accepted by the mainstream market because of the small size and performance not conforming to the mainstream market demand. By cultivating in emerging enterprises and developing in niche markets, disruptive innovation might be successful by being broadly accepted by the mainstream market eventually. For instance, Skype network call system destructed existing telephone call systems and Epson continuous printers destructed one-time printing systems at the time. Emerging companies could even replace existing enterprises which originally dominated the mainstream market.

To have enterprises effectively use such innovation strategic instrument, most researchers would discuss the genetic conditions and the factors of disruptive innovation from the aspect of organizations [2,3]. Reviewing literatures on disruptive innovation, most of them focused on the

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description of technology [4,5,6]. It is worth mentioning that knowledge assets show critical but unstressed position in the disruptive innovation process [1,7,8]. Knowledge assets, as the innovation development basis of enterprises and the specific knowledge independently owned by enterprises, roughly cover structural experiences, text of information, and unique opinions of experts [9,10], which are the critical factors in enterprises practicing or executing disruptive innovation. Past research also proved that existing resources, processes, and value of enterprises would restrain the activity of disruptive innovation [1]; or, enterprises being familiar with past businesses were adverse to the generation of disruptive innovation [2]. It therefore becomes the major objective in this study that how enterprises well utilize existing knowledge assets for creating new or larger value.

Knowledge-Based Theory of the Firm regards enterprises as the set of knowledge resources and considers that the feature attribute of such knowledge determines the survival and competition environment for enterprises, especially the specific innovation environment for enterprises. A lot of researchers regarded the feature attribute of knowledge assets as an antecedent or a moderator and introduced it to the research on organizational behaviors to discuss the effects on knowledge transfer [11,12,13], organizational structure [14], and innovation ability. Birkinshaw et al. [14] indicated that an effective organizational design had to take knowledge-based potential attributes into account. Similarly, it is considered in this study that an enterprise also needs to thoroughly take the feature attribute of existing knowledge assets into consideration of the activity of innovation. Specifically speaking, this study intends to discuss the complicated relationship between combination-embeddedness and major business specificity of knowledge assets and disruptive innovation as well as precede empirical analyses with the questionnaire survey data of manufacturing enterprises in China, expecting that the research conclusion could provide theoretical guidance and empirical reference for enterprises managing knowledge assets and developing innovation strategies.

2. Theory analysis and research hypothesis

2.1. Effects of combination-embeddedness on major business specificity of knowledge assets

Internal knowledge of an enterprise is often embedded in employees, instrument, practice, and the interactive network among them [11]. Embeddedness, as an important feature attribute to identify knowledge assets [15,16], is the function combination of knowledge embeddedness systems or environment and is composed of several interactive components, such as mutual dependence between individuals and teams working on relative activities, individual experiences, certain activities which could not be separated or modularized, and the specificity of activity sites [14]. Combination-embeddedness of knowledge assets, as an advanced form of knowledge embeddedness, refers to the complicated network formed by the interaction among employees, instrument, relationship, and practice in which corporate knowledge is embedded [15,17,18]. Major business specificity of knowledge assets, an primary concept referring to the degree of existing knowledge assets of an enterprise specifically serving the development of current major business [8,19,20,21], is an apparent but easily ignored feature attribute of existing knowledge assets of an enterprise. It is therefore considered in this study that the higher major business specificity of internal knowledge assets, the higher difficulty in the products and technologies correlated to the major business of an enterprise being imitated by competitors and therefore the core competitiveness will become stronger. Apparently, major business specificity of knowledge assets will be a critical indicator of the core competitiveness of an enterprise. Furthermore, the higher combination-embeddedness of knowledge assets presents the more diverse carriers that knowledge embedded in and higher difficulty in transferring and imitating knowledge between organizations [15,18,22] that the possibility of serving current major business in the organization to further reinforce the core competitiveness would be enhanced. The above studies led us to propose the following hypotheses.

Hypothesis 1. Combination-embeddedness of knowledge assets shows positive effects on major

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business specificity.

2.2. Effects of combination-embeddedness of knowledge assets on enterprise disruptive innovation

Disruptive innovation is an important kind of innovation. It refers to enterprises provide easier, more convenient, and cheaper products or services for new consumers or those who were not picky and attain a market foothold, then with the products' or services' performance emphasized by mainstream customers improved, enterprises will get more market space and erode the mainstream market [1,5,23,24]. New products introduced by enterprises with disruptive innovation might not attract mainstream customers because such products do not show favorably key performance stressed by mainstream customers. Although the product attribute of disruptive innovation is not as stable as original products, it presents specific attributes or combination of attributes emphasized by non-consumers or customers who are over-served by key attribute performance, e.g. price advantage [1,23,24]; they are therefore called disruptive products. Gilbert and Bower [25] indicated that the cognitive judgment of an enterprise would affect the attitudes towards and coping strategies with disruptive changes. For this reason, disruptive innovation is divided into "outbound" and "inbound", based on the aspect of enterprise cognition of disruptive changes, in this study. Outbound disruptive innovation focuses on enterprises introducing disruptive product from external markets to compete with non-consumers or products of other enterprises so as to develop a new market or erode the product market shares of other enterprises. Inbound disruptive innovation, on the other hand, stresses on enterprises introducing disruptive products to the market led by the current products to nibble, and even completely replace, current product market shares.

When enterprises depend more on external knowledge sources and the knowledge transfer between organizations exists in management challenge, the absorptive capacity of an enterprise becomes the key factor in the innovation activity and performance [26,27,28,29,30,31,32]. High-level absorptive capacity could have enterprises properly utilize new technology and knowledge of other enterprises to promote the development of innovation activities [27,29]. Nevertheless, the absorptive capacity of an enterprise relies on the prior knowledge bases; such knowledge-based properties and areas determine the field and type of enterprises identifying and acquiring external knowledge to further influence the innovation space and innovation efficiency [26,29,33]. The higher prior knowledge-based combination-embeddedness of an enterprise explains the deeper acquaintance with such knowledge to embed it in the organization with a complicated and changeable structure and to transform it to an available form according to organization needs and environmental changes in external markets [34] so as to create more new knowledge and new products. Nonetheless, the entire knowledge or product innovation process presents strong path dependence that it is difficult to create brand-new knowledge and products different from current knowledge-based ones. On the contrary, such new knowledge is correlated knowledge derived from current knowledge bases, and new products are the outcome of current knowledge-based innovation applied to different industries. Moreover, outbound disruptive innovation often originates from the new application of current technology to other markets, and knowledge and skills in inbound disruptive innovation often reveals larger differences or conflict from current unique capabilities of an enterprise. In this case, it is considered in this study that the higher combination-embeddedness of knowledge assets would generate the organizational inertia promoting an enterprise to focus on current knowledge-based reproduction and cross-industry application and effectively enhance the outbound disruptive innovation, but not inbound disruptive innovation. Therefore, we propose the following hypotheses:

Hypothesis 2. Combination-embeddedness of knowledge assets reveals significantly positive effects on outbound disruptive innovation.

Hypothesis 3. Combination-embeddedness of knowledge assets shows remarkably negative effects on inbound disruptive innovation are proposed in this study.

2.3. Effects of major business specificity of knowledge assets on disruptive innovation of an enterprise

Knowledge assets are intangible assets and present specificity [19]. Williamson [19] defined

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major business specificity of knowledge assets as a type of knowledge assets being able to be reallocated in other alternative businesses without sacrificing the productive value. It was essentially a locking effect [35], i.e. knowledge assets being constantly reinforced to lock the existing knowledge assets of an enterprise and developing along the direction related to the major business, once major business specificity of knowledge assets was confirmed. When an enterprise attempted to apply such knowledge assets to other business fields, it would be extremely difficult or the economic value would be reduced.

According to Path Dependence Theory, once economic, social, or technological systems enter certain path, they would be constantly reinforced under the habitual function and lock on the specific development path[36]. Locking effect of major business specificity of knowledge assets indeed is a kind of path dependence and would affect the innovation activity of an enterprise. Major business specificity of knowledge assets could assist enterprises in continuously acquiring exclusive advantage on the major business and such unique advantage would guide enterprises investing in more resources and energy to develop innovation activities related to the major business. Furthermore, knowledge assets applicability is a critical factor in enterprises developing innovation management strategies [37,38]. Major business specificity of knowledge assets enhances the applicability to the major business [39,40] and further promotes enterprises developing innovation activities related to the major business. Certainly, such innovation activities would promote the core technology of the major business being applied to different fields to further promote the outbound disruptive innovation. Nevertheless, the higher development degree of major business specificity of knowledge assets would reinforce the path dependence and possibly result in the core competence becoming rigid in the major business and being trapped by familiarity, maturity, and propinquity to ignore and even refuse the disruptive innovation opportunity of nibbling current major business market shares [20,41]. Based on the above literature, this study would like to test the following hypothesis.

Hypothesis 4. Major business specificity of knowledge assets appears positive effects on outbound disruptive innovation.

Hypothesis 5. Major business specificity of knowledge assets presents negative effects on inbound disruptive innovation are proposed in this study.

Based on the prior studies, this study would like to propose the conceptual model shown in Figure1.

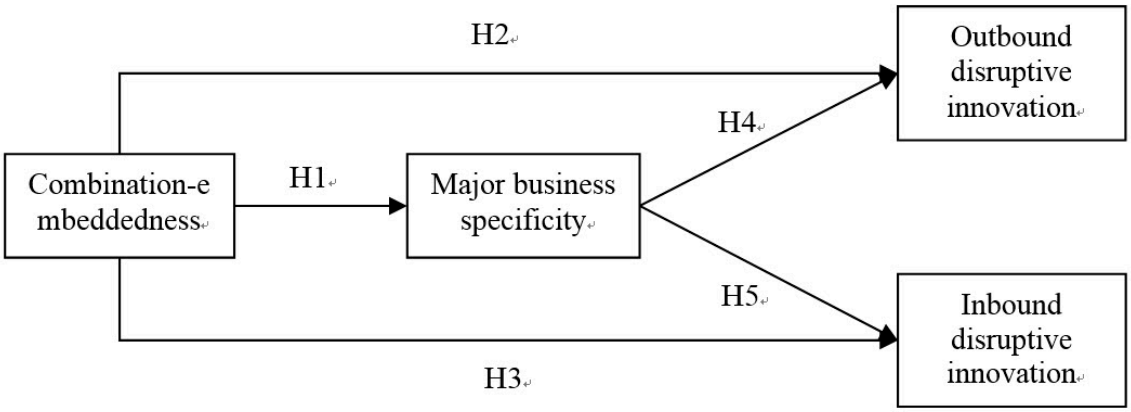

Figure 1. Research model.

3. Research design

3.1. Data collection and sample situation

Questionnaire survey is utilized in this study for collecting data. Technology supervisors and middle and high-level managers (vice presidents or general managers), who mainly engage in

product research and development, market monitoring, and product strategy development and are familiar with the product innovation of enterprises, of manufacturing enterprises in China are distributed the questionnaire. Total 360 copies of questionnaire are distributed, and 173 valid copies are proceeded Descriptive Statistics. It is found that the percentage of males (53.8%) is slightly higher than it of females (46.2%), and most of them are middle managers (67.6%), followed by high-level managers (28.9%). Most (126) surveyed enterprises (72.9%) are established below 10-15 years, 114 enterprises (65.9%) have more than 300 employees, and most (142) enterprises are private-owned (82.1%). Besides, such enterprises mainly distribute in specific and general equipment manufacturing industry (12.7%), computer, communication, and other electronic equipment manufacturing industry (19.1%), automobile manufacturing industry (12.1%), chemical material and chemical product manufacturing industry (9.2%), and electrical machinery and equipment manufacturing industry (15.6%), and other manufacturing industry appears less than 5%.

3.2. Measurement of variable and reliability and validity analysis

Combination-embeddedness of knowledge assets aims to measure the degree of knowledge rooting in internal human-instrument-task of an organization and the complexity of networks. Such an idea and the scale are revised based on Cummings [42] and combined with Chinese culture. Four questions like "Competitors could hardly acquire the technology skills of the company by field observation and learning" and "Competitors could hardly acquire the technology skills of the company by studying the production equipment" are covered; with Cronbach's α is 0.806. Major business specificity of knowledge assets intends to measure the degree of existing knowledge assets of an enterprise specifically service current major business. By referring to the idea proposed by Cable and DeRue [43] and "demand—supply" and "demand—capability", five questions are designed, e.g. "The major business of an enterprise provide large opportunities for the application of existing knowledge assets" and "The existing knowledge assets of an enterprise significantly contribute to the development of the major business", with Cronbach's α appears 0.772. The outbound and inbound disruptive innovation scales are referred to the research of Christensen [1], Markides [44], Govindarajan and Kopalle [45], and Schmidt [46]. Outbound disruptive innovation contains disruptive innovation aiming at new markets and competitors, with seven measurement questions, e.g. "Comapny often develops disruptive products aiming at brand-new markets" and "Comapny often introduces disruptive products aiming at competitor markets", with Cronbach's α reveals 0.856 and 0.711. Inbound disruptive innovation includes three measurement questions, e.g. "Developed disruptive products reduce the market shares of existing products of an enterprise" and "Developed disruptive products present alternation of existing products of an enterprise", with Cronbach's α 0.772.

For the accuracy and reliability, Exploratory Factor Analysis is applied to test the construct validity of the scales. The KMO value of the 19 measuring items shows 0.752 and Barlett test of sphericity Chi-Square appears 1378.183 (degree of freedom 171), achieving the significance that Factor Analyis is suitable as there are common factors between correlation matrices. Five factors are extracted with Factor Analysis, including new market targeted disruptive innovation, major business specificity of knowledge assets, combination-embeddedness of knowledge assets, inbound disruptive innovation, and competitor market targeted disruptive innovation. What is more, common method variance (CMV) of Harman's one-factor test data reveals 5 factors extracted with Principal Component Analysis and the total variance 66.03%. A factor shows 23.53%, not reaching a half of the total variance, presenting that one factor does not explain most variance. The common method variance of the research data is properly controlled.

4. Empirical result and analysis

4.1. Correlation Analysis

The mean, standard deviation, and correlation coefficient of variables in this study are listed in Table 1, from which combination-embeddedness of knowledge assets presents notably positive

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correlations with major business specificity (r=.188, p<.05) that H1 is supported, combination-embeddedness shows remarakbly positive correlations with outbound disruptive innovation (r=.182, p<.05) that H2 is supported, and major business specificity presents positive correlations with outbound disruptive innovation (r=.265, p<.01) but reveals negative correlations with inbound disruptive innovation (r=-.328, p<.01). Such results found the basis for successive research.

Table 1 Descriptive Statistics and Correlation Analysis

	M	SD.	1	2	3	4	5	6	7
1. Age of enterprise	3.000	.8694	1						
2. Size of enterprise	2.890	.7958	.462**	1					
3. Nature of enterprise	.179	.3846	.226**	.160*	1				
4. Combination-embeddedness	4.757	.9468	.065	.188*	-.008	1			
5. Major business specificity	5.755	.6165	.111	.068	-.064	.188*	1		
6. Outbound disruptive innovation	5.116	.9128	.030	.036	-.029	.182*	.265**	1	
7. Inbound disruptive innovation	4.121	1.1653	-.117	-.230**	-.122	-.064	-.328**	.224**	1

n=173; *p<.05, **p<.01

4.2. Structural Equation Modeling

The mean, standard deviation, and correlation coefficient of variables in this study are listed in Table 1, from which combination-embeddedness of knowledge assets presents notably positive correlations with major business specificity (r=.188, p<.05) that H1 is supported, combination-embeddedness shows remarakbly positive correlations with outbound disruptive innovation (r=.182, p<.05) that H2 is supported, and major business specificity presents positive correlations with outbound disruptive innovation (r=.265, p<.01) but reveals negative correlations with inbound disruptive innovation (r=-.328, p<.01). Such results found the basis for successive research.

Structural Equation Modeling is utilized in this study for testing the research hypotheses. In order to reinforce the stability of goodness of fit, the average of highest and lowest factor loadings is used for grouping and parceling the measurement questions of new market and competitor market targeted disruptive innovation, and the mean of the group scores is regarded as the measurement index of outbound disruptive innovation; 4 measurement questions are included. Chang et al. [47] stated that such a method presented satisfactory statistical characteristics. Using AMOS20.0 as the analysis tool and applying Maximum Likelihood to the preliminary estimation, the goodness of fit shows the chi-square (χ2)-degree of freedom (DF) ratio (χ2/DF=) 1.981, lower than 3, RMSE 0.076, lower than 0.08, and GFI and CFI 0.887 and 0.896, slightly "higher than 0.9". Simply revising the model, GFI and CFI achieve the ideal area 0.9, presenting the favorable goodness of fit of the revised model, better than the goodness of fit of sample data. The path coefficient could reasonably and effectively reflect the causal relationship between variables that it could be used for testing the hypotheses proposed in this study. The results are shown in Figure 2.

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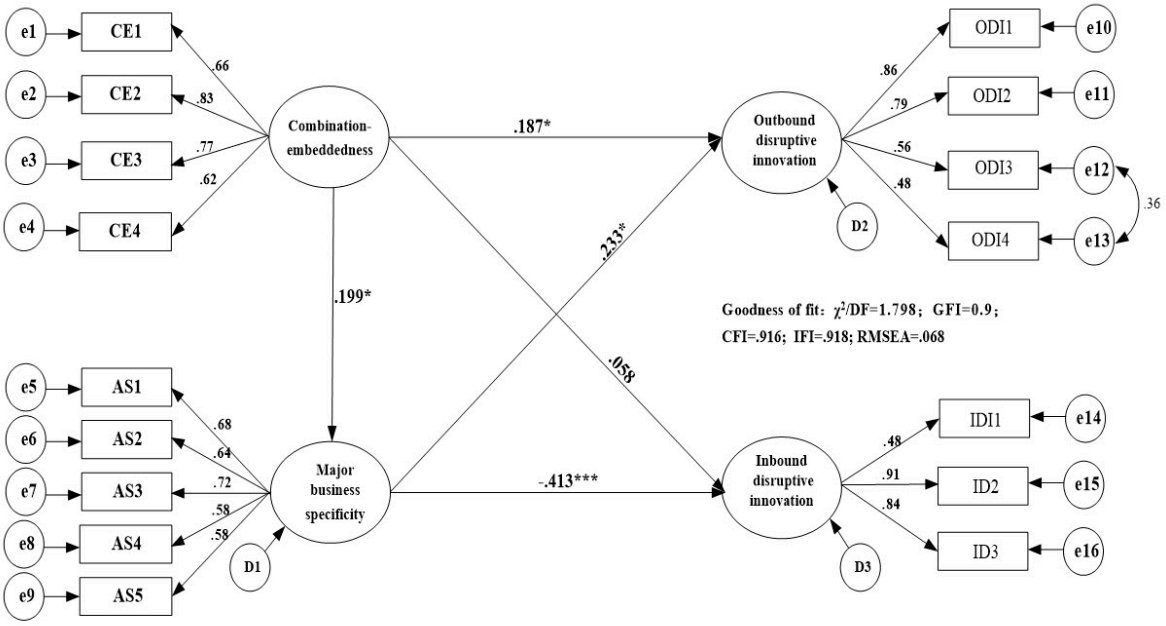

Figure 2. Path fit diagram.

From Figure 2, the standardized path coefficient between combination-embeddedness and major business specificity of knowledge assets appears 0.199, and P<0.05 achieves the significance, showing the directly positive effect of combination-embeddedness on major business specificity of existing knowledge assets of enterprises that H1 is supported. The standardized path coefficient between combination-embeddedness of knowledge assets and outbound disruptive innovation reveals 0.187, and P<0.05 reaches the significance, presenting the directly positive effect of combination-embeddedness of existing knowledge assets on outbound disruptive innovation of enterprises that H2 is supported. The standardized path coefficient between combination-embeddedness of knowledge assets and inbound disruptive innovation appears 0.058, not passing the significant test, that H3 is not supported. The standardized path coefficient between major business specificity of knowledge assets and outbound disruptive innovation is 0.233, and P<0.05 reaches the significance, revealing the directly positive effect of major business specificity of existing knowledge assets on outbound disruptive innovation of enterprises that H4 is supported. The standardized path coefficient between major business specificity of knowledge assets and inbound disruptive innovation reveals -0.413, and P<0.05 achieves the significance, showing the directly negative effect of major business specificity of existing knowledge assets on inbound disruptive innovation of enterprises that H5 is supported.

Structural Equation Modeling is utilized for analyzing the mediation effect of major business specificity. Compared with traditional mediation effects based on the test with Multiple Regression Analysis, Structural Equation Modeling allows all variables being tested at the same time, the goodness of fit of the model could be evaluated, and I-type errors could be reduced. As aforementioned, combination-embeddedness presents notably positive effects on major business specificity (with the standardized path coefficient 0.199*), and major business specificity also appears significant effects on outbound and inbound disruptive innovation (with the standardized path coefficients 0.233* and -0.413***). It explains the remarkable mediation effect of major business specificity on the effects of combination-embeddedness on outbound and inbound disruptive innovation of enterprises (with the mediation effect 0.046 and -0.082, respectively). Meanwhile, combination-embeddedness shows directly positive effects on outbound disruptive innovation, but the directly negative effect on inbound disruptive innovation is not notable that major business specificity appears partially mediation effects on the relationship between combination-embeddedness and outbound disruptive innovation, but full mediation effects on the relationship between combination-embeddedness and inbound disruptive innovation.

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5. Conclusion and Inspiration

The effects of the attribute and result of knowledge assets on disruptive innovation are regarded as the research topic in this study. Based on literature review and theories, combination-embeddedness of knowledge assets is the independent variable, major business specificity is the mediator, and outbound and inbound disruptive innovation is the dependent variable. Based on knowledge attributes, Structural Equation Modeling for the effect of knowledge assets of enterprises on disruptive innovation is constructed, and 173 valid copies of questionnaire on manufacturing enterprises in China are proceeded empirical analyses to present the relationship between combination-embeddedness and major business specificity of existing knowledge assets of an enterprise and the effects on disruptive innovation.

5.1. Result discussion

First, combination-embeddedness of knowledge assets presents significantly positive effects on major business specificity of enterprises, showing the higher complicated network formed by the interaction among employees, instrument, and practice, in which enterprises knowledge embeds, the stronger stickness to the major business, and the use area and the economic value would focus more on the major business. Such a conclusion offers a new thinking for the research of Mcevily et al. [12] and Reagans and Mcevily [13] on successful knowledge transfer between organizations. Major business specificity of knowledge assets might be the restraint on successful knowledge transfer between organizations, while combination-embeddedness of knowledge assets might reinforce major business specificity to further restrain the successful knowledge transfer between organizations.

Second, major business specificity of knowledge assets appears opposite functions on outbound and inbound disruptive innovation of enterprises. Major business specificity of knowledge assets shows remarkably and directly positive effects on outbound disruptive innovation of an enterprise, but notably and directly negative effects on inbound disruptive innovation. It reveals that an enterprise with higher major business specificity of knowledge assets could allocate more resources to the major business. It, on one hand, digs out the value space related to existing knowledge assets of the major business and develops more external market targeted disruptive product innovation activities, and on the other hand promotes the development of current knowledge assets around the major business to reinforce the innovation activities sticking to current knowledge, which is adverse to internal market targeted disruptive innovation. The research conclusion provides a possible explanation for understanding the different viewpoints of Christensen [1], Assink [2], and Lindsay and Hopkins [7] about the relationship between knowledge assets and disruptive innovation. It is not the simply positive or negative relationship between them, and major business specificity of knowledge assets and the cognition of disruptive innovation of an enterprise should be taken into account.

Third, combination-embeddedness of knowledge assets shows opposite functions on outbound and inbound disruptive innovation of enterprises. Combination-embeddedness of knowledge assets appears remarkably positive effects on the development of outbound disruptive innovation of an enterprise, including the directly positive effect and the indirectly positive mediation effect of major business specificity. Combination-embeddedness presents remarkably negative effects on inbound disruptive innovation, and such negative effects are indirect, with the mediation effect of major business specificity. It shows that an enterprise with higher combination-embeddedness of knowledge assets could better control the composition and application of such knowledge assets. On one hand, it could enhance enterprises, based on the use experiences and model of major business, constantly trying such knowledge assets in different business fields for disruptive application. On the other hand, it reinforces the dependence of enterprises on such knowledge assets and the major business, but could have them reject new items and new knowledge which might replace existing products or damaging the major business. The research conclusion, based on the aspect of knowledge assets, expands the research coverage on disruptive innovation and

suppliments the discussions of Christensen [1], Assink [2], and Lindsay and Hopkins[7] about the relationship between knowledge assets and disruptive innovation. Instead of classifying existing knowledge assets of an enterprise, according to the content and specific form, it is better analyzing knowledge asset attributes which could possibly affect disruptive innovation. Combination-embeddedness and major business specificity are two critical features attributes of existing knowledge assets influencing disruptive innovation of an enterprise.

5.2. Management inspiration

The research conclusion presents significant inspiration on enterprises practicing knowledge assets management and innovation management. First, existing knowledge assets are the bases of innovation development, but there is not an "apparent" positive relationship between them; the match between knowledge asset attributes and various types of innovation needs to be considered. For disruptive innovation, enterprises could promote outbound disruptive innovation with combination-embeddedness and major business specificity which show higher knowledge assets. Second, from the aspect of knowledge assets management, enterprises should establish knowledge asset evalaution systems or knowledge search practice [48] to dynamically track and evaluate combination-embeddedness and major business specificity of existing knowledge assets, to classify such knowledge assets, based on above two dimensions, and to guide them developing correspondent disruptive innovation with such information. On one hand, major business specificity of knowledge assets are utilized for promoting existing knowledge assets in the disruptive application to different business fields. On the other hand, the innovative knowledge assets management constantly accumulates low major business specificity of knowledge assets to offer novel knowledge for enterprises developing inbound disruptive innovation.

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Conflicts of Interest: The authors declare no conflict of interest

Appendix A

Table A1. Measures for Key Constructs.

Construct	Measurement Items
Outbound disruptive innovation	Disruptive products our company developed are mainly targeted at potential customers.
	Disruptive products our company developed focus on the future market demand.
	Disruptive products our company developed opened up a new market.
	Our company often develops disruptive products for new markets.
	Disruptive products our company developed reduce the competitors' market share.
	Disruptive products our company developed bring a threat to the competitors' market.
	Our company often introduce disruptive products to competitors' market.

Inbound disruptive innovation	Disruptive products our company developed have an alternative to firm's existing products. Disruptive products our company developed have brought down the market share of firm's existing product. Disruptive products our company developed have reduced the sales of firm's existing product.
Major business specificity of knowledge assets	Our company's existing knowledge assets have been widely used in the main business. Our company's existing knowledge assets provide value to the enterprise through the main business. With the development of the main business, the existing knowledge assets of our company are increasing. Our company's main business has a large number of application opportunities for existing knowledge assets. Our company's existing knowledge assets has made a significant contribution to the development of main business.
Knowledge assets' combination-embeddedness	It's hard to know how it works when it comes to our company's activities, tasks and procedures. Through on-site observation and learning, our company's know-how is hard to get by competitors. By studying the production equipment, our company's know-how is hard to get by competitors. By testing and using the product, our company's know-how is hard to get by competitors.

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