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An Extended Overview Study on Intellectual Property Capability and Its Maturity Modeling

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ABSTRACT: An enterprise intellectual property capability refers to an enterprise ability to integrate its resources, promote the creation, application, protection, management and service of intellectual property, enhance market competitiveness, and improve business efficiency, and the combination of elements of ability to exercise various rights. The intellectual property capability of an enterprise has the characteristics of the exclusivity of the object, the legality of the attribute, the multi-dimensionality of the process and economical value of the value, to create intellectual property management rules and regulations, to form an intelligent structure, to promote the creation, application and protection of intellectual property rights such as patents, trademarks and works, and to seek market advantages. The maturity model includes a systematic system and a scientific method, which can not only represent the process of a certain ability from weak to strong and achieve sustainable development, but also provides a set of practical observation indicators for enterprises to objectively locate their own management ability level and development and implementation of improvement measures indicated the direction. This paper uses the literature research method to summarize the research results of intellectual property capabilities in intellectual property management and its maturity model from many aspects, including capability set analysis and capability system management, concept determination, characteristics and structure analysis of intellectual property capabilities, capacity building, influencing factors, etc. , maturity model research, system engineering tools and technology application, etc. The research results are reviewed and possible future research topics are prospected.

Keywords:literature review, intellectual property management, intellectual property capability, capability maturity model, maturity evaluation

I. INTRODUCTION

On September 22, 2021 , the Central Committee of the Communist Party of China and the State Council issued the Outline for Building a Powerful Intellectual Property Country (2021-2035), proposing to promote the building of a powerful country with intellectual property rights and comprehensively improve the level of intellectual property creation, utilization, protection, management and service. The construction of national intellectual property capacity plays an important role in the national intellectual property service level and the international competitiveness of intellectual property. Enterprises play an important role in the national economy and are the main body of the country's implementation of intellectual property services. Improving the intellectual property capabilities of enterprises is an important way to implement the national intellectual property strategy and realize an innovative country. How to strengthen the intellectual property capacity building of enterprises is an important task for a country with strong intellectual property rights. Enterprises, in particular, should build their intellectual property capabilities in terms of serving their main business, internalizing the intellectual property system, forming a leading concept of intellectual property, sorting out and implementing the intellectual property management system, and building an intellectual property professional team.

The future competition in the world is the competition of intellectual property rights. The most important subject in the implementation of the national intellectual property strategy and the realization of an innovative country is the enterprise, and the most basic system is the intellectual property law. Enterprises are the main body of technological innovation. Only when the laws of intellectual property rights are implemented and effective can the laws of intellectual property rights be truly

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implemented and the legislative benefits are realized. It is an important way to implement the national intellectual property strategy and realize an innovative country to improve the intellectual property capabilities of enterprises and promote the management of intellectual property rights of enterprises. Therefore, it has important theoretical value and practical significance to discuss the intellectual property capabilities of enterprises and their construction, to promote the management of intellectual property rights of enterprises, and to improve the intellectual property rights of enterprises.

From 2000 to 2009, the understanding of intellectual property rights by governments, enterprises and public institutions at all levels in China was just in its infancy. At that time, many enterprises and even state-owned enterprises did not fully understand and pay enough attention to intellectual property rights, and the building of intellectual property rights of enterprises had not yet been put on the agenda. After more than ten years of development, Chinese enterprises have paid more and more attention to intellectual property rights, and their management experience in intellectual property rights has gradually improved. There is still room for improvement in the overall improvement of capabilities such as services and services. With the help of maturity theory and model, it has important theoretical significance and practical value to study the problem of enterprise intellectual property capacity building.

Since 2000, there have been few domestic and foreign studies on the themes of "IP Capability" and "Intellectual Property Capability Building". As of February 26, 2022, by searching CNKI for the subject heading of "Intellectual Property Capability ", there are 128 related literatures, including 11 master thesis and 3 doctoral dissertations. The tools for systematic analysis around the meaning of "Intellectual Property Capability" such as Interpretative Structure Modeling (ISM), Analytic Hierarchy Process and Network Analysis (AHP and ANP), Capability Maturity Model (CMM), Fuzzy Comprehensive Evaluation (FCE), Data Envelopment Analysis (DEA), System Dynamics (SD)), forecasting and decision technology (FDT) and other systematic research literatures are scarce. Therefore, the tools and technologies of these systematic analysis are used comprehensively, aiming at enterprises, governments and other intellectual property entities and specific intellectual property rights capacity dimensions, such as intellectual property financing ability, intellectual property creation ability, intellectual property application ability, etc. There is still a lot of room for more systematic research on the construction and evaluation of maturity models. Relevant research will have important theoretical significance and practical value to strengthen and enhance China's intellectual property capacity building.

Throughout the domestic and foreign researches on the theme of "Intellectual Property Capability", they mainly focus on the following aspects.

II. RESEARCH ON THE SUBJECT OF INTELLECTUAL PROPERTY RIGHTS AS INTANGIBLE RESOURCES OF ENTERPRISES

The resources owned by an enterprise are the basic research units of the resource-based theory, and analyzing the connotation of resources to classify them is the basic work for studying the relationship between various resources and competitive advantages. Enterprise resources are the source of enterprise's competitive advantage and the main reason for the difference in performance among enterprises (Penrose, 1959; Wernerfelt, 1984; Barney, 1991). There is no unified opinion on how to classify professional resources. According to different research starting points, scholars have different definitions of enterprise resources in the development process of enterprise resource theory (see Table 2.1).

Table 2.1 Scholars' main views on enterprise resources

Representative scholars	The main points
Wernerfelt (1984, 1989)	Enterprise resources can be divided into tangible and intangible categories.
Dierick, Cool (1989)	Enterprise resources can be divided into flow resources and stock resources.
Coyne (1986)	Divide organizational resources into "having" (having) capabilities and "using" (doing) capabilities.
Barney (1991)	Enterprise resources can be divided into physical capital resources, human capital resources and organizational capital resources.
Grant (1991)	Enterprise resources can be divided into financial resources,

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	material resources, human resources, technical resources, reputation and organizational resources.
Hall (1992, 1993)	Divide enterprise resources into tangible assets, intangible assets and capabilities. Divide intangible resources into two categories: resources that are not subordinate to people (Asset) and skills that are subordinate to people (Skill).
Amit, Shoemaker (1993)	Business resources include tradable know-how (such as patents and licenses), property orphysical assets (such as property rights, plant and equipment) and human capital.
Hitt,Ireland, Hosikisson(1995)	Divide enterprise resources into seven categories: financial resources, physical and chemical resources, technical resources, innovation resources, goodwill resources, human resources and organizational resources.
Miller, Shamsie (1996), Das, Teng (2000)	Divide enterprise resources into rights resources and knowledge resources. and according to resource characteristics In the next step, the rights resources and knowledge resources are explained in detail.
Fernandz (2000)	Divide intangible resources into human capital subordinate to people and organizations not subordinate to peoplecapital, technical capital, and relationship capital.
Carmeli, Tishler (2004)	22 kinds of resources into four categories according to whether they belong to people and the operation process of resources in the enterprise, including knowledge, ability elements, and organizational relations.
Luo Huidao , Xiang Baohua (2005)	Enterprise resources are classified according to the resource itself and the relationship between the resources and the enterprise's competitive advantage.

Through the combing of the above literature, we can see that there is no unified opinion on what is an enterprise resource, and how it should be classified. However, in general, enterprise resources can be divided into "tangible resources" and "intangible resources" without much difference. Like tangible resources, intangible resources are also scarce, including skills, culture, reputation and ability (Liu Zhibiao, Jiang Fuxiu 2003). Other scholars focus on analyzing the intangible resources of enterprises from the perspective of accounting, mainly to explain a common phenomenon, that is, there is a difference between the book value of enterprise assets and its market value. These scholars believe that intangible assets owned by enterprises that are difficult to measure and measure, and that are difficult to reflect on the books are important factors that cause the difference between book value and market value (Lev and Sougiannis, 1996; Chan 2001; David 2002). In the scope of civil rights in the spiritual field, intangible resources or intangible property rights (Intangible Property) have become another title of intellectual property rights. The world's first "Patent Law" was born in Venice in 1474, which can be regarded as the earliest origin of the concept of corporate intangible resources or intangible assets. The concept of "intangible property rights" was first proposed by German scholar Kola in 1875. In some other western countries, "intangible property rights" have been used to summarize the exclusive rights related to intellectual and creative achievements. Since the signing of the Convention on the Establishment of the World Intellectual Property Organization in 1967, the concept of intellectual property rights has been widely used internationally , but some Western scholars continue to use the term "intangible property rights". With the continuous development of society and economy, the connotation and extension of enterprise intangible resources have undergone great changes. Scholars have not formed a unified understanding of enterprise intangible resources. The main views of scholars are shown in Table 2.2. Hatfield (1927) mentioned in his publication "Accounting: Its Principles and Problems" that the meaning of corporate intangible resources refers to patent rights, copyrights, secret recipes and formulas, goodwill, trademarks, franchise rights and other similar property. Yang Rumei, a Chinese scholar in the United States , published the monograph "Intangible Assets" in 1929, and gave the definition of intangible assets: "The value of the so-called intangible assets is the expression of the extra earning power of a specific enterprise", "Intangible assets are certain

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types of The representative of the value, this value, according to the surplus of the enterprise's profit, the excess amount is converted into the value of the asset according to the corresponding interest rate." Paton (1963) defined the intangible resources of the enterprise as "attributable to an enterprise but any valuable consideration, factor or element that does not have a physical form and lasts for a long time ", this discussion shows that it believes that intangible resources are a kind of residual value, that is, the legal value of the enterprise as a whole. The value exceeds the difference between the total statutory values of various individual tangible properties. After that, Paton (1968) further divided the intangible resources of enterprises into three types in the No. 10 Accounting Papers of the American Institute of Certified Public Accountants, namely: those related to promotional activities Costs (advertising costs); costs related to production technology (admiration, industrial methods, patent rights, etc.); costs related to the formation and start-up of enterprises. Itami (1987) conducted a systematic analysis on the intangible assets of enterprises, and in his view, the intangible assets of enterprises mainly refer to the information resources of enterprises. In his theoretical system, the normal operation of an enterprise is inseparable from tangible resources. At the same time, the key for an enterprise to gain a competitive advantage and then succeed in the market is intangible assets. The competitiveness and adaptability of an enterprise are derived from intangible assets. Shi Xingji (2000) pointed out that an enterprise's intangible assets are resources that have no physical form but can serve the enterprise for a long time. Afterwards, Jin Jianguo (2001) and others made a further distinction between resources and assets, arguing that the concept of assets emphasizes the attribution of property rights and focuses on the distribution of asset income, while the concept of resources emphasizes the right to control resources. Mao Ning (2001) pointed out that the intangible resources of enterprises think that the so-called intangible resources are the source of value creation of non-material forms formed by the organization design of enterprise innovation activities and human resource practices, which are embodied in the enterprise's exploration ability, organizational capital and human resourcescapital etc. From the perspective of strategic management theory, Liu Zhibiao, Jiang Fuxiu (2003) and others pointed out that the sources of corporate competitive advantage are mainly divided into resource-based views and activity-based views. These two views have been isolated or opposed for a long time, but the theory can be bridged if intangible resources are included in the analytical framework. Therefore, when analyzing the competitive advantage of an enterprise, it is very necessary to include intangible resources into the analysis framework. Then, Yu Dong and Wang Yuandi (2004) analyzed the characteristics of intangible resources. They believed that intangible resources, as an indispensable resource for enterprise development, mainly have three attributes. The first is that they can be analyzed and shared; Assets are dependent; the third is concealment. Wang Weiping, Liu Xu (2005) and others pointed out through research that the definition of intangible assets can be divided into two perspectives: broad sense and narrow sense. The broad sense of intangible assets includes not only trademark rights, patent rights, non-patented technologies, trade secrets, licenses Management rights, corporate copyrights, etc.; in a narrow sense, it also includes corporate goodwill, relationship networks, information systems, corporate culture, strategic planning and policies, and corporate human resources. Hao Yunhong and Zhang Leilei (2006) believe that reputation is an important embodiment of the intangible resources of enterprises, which can create performance for enterprises, and reputation is also a strategic resource that promotes enterprises to obtain competitive advantages. Yang Jun, Zhang Yuli, etc. (2009) pointed out that the social relationship resources of enterprises are the most significant in improving the performance of new enterprises among the intangible resources of enterprises. Similar to their point of view, Zhang Zhangying and Chen Liping (2009) analyzed the impact of social relations as the intangible resources of enterprises on enterprise development from the perspective of embeddedness.

Table 2.2 Scholars' main views on the intangible resources of enterprises

Representative scholars	The main points
Hatfield (1927)	The meaning of intangible resources of enterprises refers to patent rights, copyrights, secret recipes and formulas, goodwill, trademarks, franchise rights and other similar properties
Yang Rumei (1929)	Intangible assets are the value converted from corporate earnings
Paton (1963) (1968)	Intangible resources are a kind of residual value, that is, the difference between the legal value of the enterprise as a whole exceeding the total legal value of various individual tangible

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	properties; intangible resources are divided into three types: costs related to promotional activities; costs related to production technology Costs; costs associated with forming and starting a business.
Itami (1987)	Intangible assets mainly refer to the information resources of the enterprise, such as the information resources of the enterprise, such as technology, customer trust, brand image, control of sales channels, corporate culture and management skills
History Interstellar (2000)	Intangible assets are assets that have no physical form but are used by the enterprise for a long time
Mao Ning (2001)	Intangible resources, as the source of non-material value creation formed by the organization design of enterprise innovation activities and human resource practice, are embodied in the enterprise's exploration ability, organizational capital and human capital.
Liu Zhibiao, Jiang Fuxiu (2003)	The resource-based concept of competitive advantage and the activity-based concept of competitive advantage have long been in a state of isolation or opposition, and the two can be organically combined in a new analytical framework based on intangible resource-based competitive advantage In other words, intangible resources are also an important source of a company's competitive advantage
Yu Dong, Wang Yuandi (2004)	The intangible resources of enterprises are divisible and shared, relatively dependent and concealed
Wang Weiping, Liu Xu (2005)	Intangible assets are divided into intangible resources in the broad sense and intangible assets in the narrow sense. Intangible assets in the broad sense include not only trademark rights, patent rights, non-patented technologies, trade secrets, franchise rights, corporate copyrights, etc. in the narrow sense, but also corporate goodwill, relationship network, information system, corporate culture, strategic planning and policy, and corporate human resources
Hao Yunhong, Zhang Leilei (2006)	Reputation is the main embodiment of an enterprise's intangible resources

Through combing the relevant literature, we found that intellectual property rights are an important part of the intangible assets of enterprises, and intangible assets are an indispensable part of enterprise resources. In addition, Wu Handong pointed out in his book "Research on Basic Issues of Intellectual Property Rights" that in the scope of civil rights in the spiritual field, intangible property rights (intangible assets) are another name for intellectual property rights. Enterprise resources are composed of effective assets and intangible assets, and intangible assets occupy an important position in the composition of enterprise resources because of their exclusivity and exclusivity stronger than tangible assets. It can be seen from this that the connotation and scope of enterprise resources are greater than intellectual property rights and include intellectual property rights, which means that intellectual property rights exist as enterprise resources for modern enterprises (as shown in Figure 2.1).

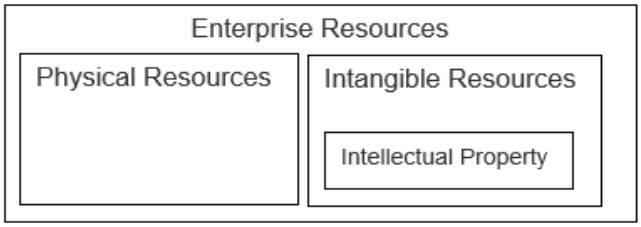

Figure 2.1 Intellectual property rights as intangible resources of enterprises

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III RESEARCH ON THE CONCEPT OF INTELLECTUAL PROPERTY AND ITS CHARACTERISTICS

As an important component of an enterprise's intangible assets, intellectual property rights have been affirmed by many scholars for its importance to enterprise development , and the main views of scholars on the concept of intellectual property rights are shown in Table 3.1. The so-called intellectual property rights refer to the exclusive rights to the fruits of intellectual labor created by human beings in social practice. The word "intellectual property" is translated from English "Intellectual Property" or "Intellectual Property Right", which originally means "knowledge (property) ownership" or "intellectual (property) ownership", also known as intellectual achievement rights. In my country's Hong Kong and Taiwan regions, it is translated as "intellectual property rights" or "intellectual property rights". It was the French scholar Kaptsov in the middle of the 17th century who first summarized all rights from the field of intellectual activities as "intellectual property", and later developed by Belgian scholar Picardy, who defined it as "all rights from intellectual activities". ", he also believes that intellectual property rights are a special category of rights, which are fundamentally different from ownership of things: "ownership" is in principle eternal, occurring and ending with the creation and destruction of things; but intellectual property rights are time-consuming limit. Research by Comish (1996) and Sherman and Bently (1999) shows that modern intellectual property law did not emerge as an independent legal department until around the 1850s. Compared with rights categories with a long history such as property rights and bonds, the concept of intellectual property rights has not been used for more than 150 years, and its international use was first seen in 1893. It was not until the signing of the "World Intellectual Property Organization Convention" in 1967 that the term was gradually used by the international community. In China, the "General Principles of Civil Law of the People's Republic of China" (1986) officially used the term "intellectual property rights" in legal form for the first time. After entering the 1990s , with the deepening of the information revolution and globalization, the role of technology has been increasingly valued by governments, enterprises and academic circles in various countries (regions), and intellectual property rights closely related to knowledge and technology have also been With unprecedented attention, many scholars have commented on intellectual property rights from different aspects. For the definition of intellectual property rights, there are mainly three methods: one is the "enumeration method"; the other is the "generalization method"; the other is the "mixed method". The "enumeration law" enumerates all the protected items systematically, that is, delimits the scope of the rights system to clarify the concept of intellectual property rights. The method of "summary law" is to give the definition of intellectual property rights through a general and abstract description of the object of protection and a brief explanation of the "genus plus species difference" of this right. The "mixed method" is a definition method that combines the two methods of "summarization" and "enumeration".

Table 3.1 Scholars' main views on the definition of intellectual property rights

Representative scholars	The main points
Kaptsov (mid 17th century)	All rights from the field of intellectual activity
WIPO (1967)	Intellectual property rights are defined as consisting of eight parts: 1. Rights to literary, artistic and scientific works; 2. Rights to performances, recordings and broadcasts by performing artists; 3. Invention rights; 4. Rights to scientific discoveries; 5. The right to the appearance of industrial products; 6. The right to trademark; 7. The right to stop unfair competition; 8. All other rights derived from intellectual activities in the fields of industry, science, literature or art.
Ricketson(1991)	Intellectual property is a description of the rights granted by law and some human intellectual activities
Toruo Fukuda (1993)	right system that protects the normal progress of technological development or creative management
Zhang Ping (1994)	The rights legally enjoyed by intellectual laborers and owners of intellectual achievements in intellectual

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	creation activities.
TRIPs (1995)	Intellectual property rights include copyright and related rights, trademarks, geographical indications, industrial designs , patents, integrated circuit designs, undisclosed information, control of anti-competitive practices in licensing agreements, etc.
Maskus (1998)	an exclusive right to the results of creative activity conferred by law
Liu Chuntian (1999)	rights that people enjoy according to the law based on the forms they create and use
Miller and Davis (2000)	The characteristics of intellectual property rights are usually vague, and it is a highly abstract concept of assets, including patents, trademarks and copyrights.
Winter (2000)	The concept of intellectual property is often used in a broad sense: in a narrow sense, intellectual property refers to the rights established and protected by patent law, copyright law, trademark law and trade secrets.
Borg (2001)	Intellectual property is a product of free and independent thought, not of institutionalized research and development
Zhang Yumin (2001)	Intellectual property rights are the rights enjoyed by civil subjects to control creative intellectual achievements, commercial logos and other commercially valuable information and exclude others from interfering
Zheng Chengsi (1993,2001)	Intellectual property rights are the exclusive rights that people enjoy in accordance with the law on the achievements of their intellectual creation
Bently and Sherman (2004)	Intellectual property is an intangible private right, recognized by law in the broadest sense as a collection of wisdom and information with protective value, mainly including patents, copyrights, databases, neighboring rights to copyrights, trademarks, designs and undisclosed information wait
Xie Mingyang (2004)	Intellectual property rights are the protection of the law for the creation of human beings using spiritual power, as well as the protection of the legitimate competition order of the industry
Tao Xinliang and Yuan Zhenfu (2005)	Intellectual property is the right to control specific intellectual achievements or commercial marks
Zhang Yumin (2005)	the exclusive rights that people have to control their own creative intellectual achievements and signs of commercial activities according to law, mainly including copyright, patent right, trademark right, exclusive right of integrated circuit layout design, plant variety right, neighboring right of copyright, etc.
Wu Handong et al. (2005)	Intellectual property rights are the rights that people enjoy in accordance with the law to the results created by their own intellectual activities and the marks and reputation in business management activities.
Spence (2007)	Intellectual property includes types of rights such as copyrights, patents, trademarks, and databases
Zhu Xiequn (2008)	Intellectual property is essentially an exclusive right with innovative intellectual achievements as the object

The "enumeration method" method is widely used in the formulation of international treaties on intellectual property rights and various related rules. In this way, WIPO (World Intellectual

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Property Organization, 1967) defines intellectual property rights as eight parts: （1） Rights on literary, artistic and scientific works; （2） Rights on performances, recordings and broadcasts by performing artists;（3） The right to invention; （4） The right to scientific discovery; （5） The right to the appearance of industrial products; （6） The right to trademark; （7） The right to stop unfair competition; All other rights derived from intellectual activity in the field of art. WTO defines intellectual property rights in TRIPs ("Agreement on Trade - related Aspects of Intellectual Property Rights") as including copyright and related rights, trademarks, geographical indications, industrial designs, patents, integrated circuit diagram designs, undisclosed information, and restrictions in licensing agreements A collection of rights composed of competing actions. The International Association for the Protection of Intellectual Property (AIPPI 1992) adopts the law of enumeration and believes that intellectual property rights can be divided into two categories: "rights to creative achievements" and "rights to distinctive marks". In the "Agreement on Trade-Related Aspects of Intellectual Property Rights" (TRIPs 1995), it is pointed out that intellectual property rights include copyright and related rights, trademarks, geographical indications, industrial designs , patents, integrated circuit designs, undisclosed information, restrictions on competition in licensing agreements control etc. Miller and Davis (2000), who are typical representatives of the "enumeration method", pointed out that the characteristics of intellectual property rights are usually vague, and they are an abstract concept of assets. Winter (2000) believes that the concept of intellectual property is often used in a broad sense: in a narrow sense, intellectual property refers to the rights determined and protected by patent law, copyright law, trademark law and trade secrets.

As a typical representative of "general law", Ricketson (1991) pointed out through analysis that the connotation of intellectual property rights is relatively broad, and it is used to describe the rights granted by law and caused by some human intellectual activities. Japanese scholar Fukuda Tetsuo (1993) gave the definition of intellectual property rights from the perspective of market competition, that is, a right system that protects the normal progress of technology development or creative management. Maskus's (1998) research pointed out that intellectual property is an asset, which is an exclusive right to the results of creative activities endowed by law. Borg (2001) pointed out from a historical perspective that intellectual property is not a product of institutionalized research and development but a product of free and independent thought. Later, Bently and Sherman (2004) also believed that intellectual property is an intangible private right, mainly including patents, copyrights, databases, neighboring rights of copyright, trademark rights, designs and undisclosed information. However, Chinese scholars tend to define the concept of intellectual property through "generalism". Among them, Zheng Chengsi (1993, 2001) pointed out that intellectual property is the exclusive right that people enjoy in accordance with the law on the fruits of their own intellectual creation, and then Zhang Ping (1994) also put forward a similar point of view. Liu Chuntian (1999) attributed intellectual property rights to formal property rights, which are rights that people enjoy according to the law based on the forms they create and use. Zhang Yumin (2001) pointed out that intellectual property rights are rights extended in the legal sense, which is manifested as the right of civil subjects to control their own creative intellectual achievements, commercial logos and other information with commercial value and to exclude others from interfering. Taiwanese scholar Xie Mingyang (2004) pointed out that intellectual property rights are the protection of the law for the creation of human beings using spiritual power, as well as the protection of the legitimate competition order of the industry. Tao Xinliang and Yuan Zhenfu (2005) pointed out on the basis of Zhang Yumin's research that intellectual property is the right to control specific intellectual achievements or commercial marks. According to the research of Wu Handong et al. (2005), intellectual property rights are the rights that people enjoy in accordance with the law to the achievements created by their own intellectual activities and the marks and reputation in business management activities. Intellectual property is a noun for various non-material properties, so it is advocated to subdivide intellectual property rights into creative achievement rights, operational mark rights and operational asset rights. Then Zhu Xiequn (2008) pointed out that the essence of intellectual property rights is the exclusive right with innovative intellectual achievements as the object.

Scholars who support the "mixed approach" combine the advantages of the "enumeration" and "summary" approaches to define intellectual property rights. The World Intellectual Property Organization (WIPO 1967) used the " mixed approach " to define intellectual property rights , which pointed out that intellectual property rights are the rights enjoyed by intellectual activities in the fields of industry, science, literature and art. , works of art and science, performances, recordings and broadcasts by performing artists, inventions, scientific discoveries,

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industrial designs, trademarks, trade names and signs, and the prohibition of unfair competition. However, Bently and Sherman (2004) believed that intellectual property rights in the broadest sense refer to the collection of wisdom and information considered by law to be of protection value, mainly including patents, copyrights, databases, neighboring rights of copyrights, trademarks, designs and unspecified intellectual property rights, disclosure of information, etc. Zhang Yumin (2005) pointed out that intellectual property is the exclusive right of people to control all their creative intellectual achievements and commercial activities in accordance with the law. Spence (2007) believes that intellectual property rights include copyright, patent, trademark and database rights, and its core meaning is: firstly, intellectual property rights are regarded as property; secondly, intellectual property rights control a specific scope of use; finally, intellectual property rights are a kind of Intangible assets with specific meanings.

Understanding the characteristics of intellectual property rights is a necessary process for further research on intellectual property rights. Although scholars have different definitions of the connotation of intellectual property rights based on different research starting points, intellectual property rights are different from property rights and creditor's rights in academic circles. Agreement was reached on the point of category of rights. This shows that intellectual property rights have different characteristics from property rights and creditor's rights. Generally speaking, scholars have the following views on the analysis of the characteristics of intellectual property rights, as shown in Table 3.2. Li Guoguang (1999) pointed out that intellectual property rights have dual attributes of property rights and personal rights; examination and confirmation according to law; exclusiveness or exclusivity; regionality; timeliness and other characteristics. And Wu Handong (2000), a well-known scholar in the field of intellectual property in China, believes that the object of intellectual property is knowledge products, and emphasizes that the immateriality of the object is an essential attribute of intellectual property. Chen Xiao (2001) believes that the characteristic of intellectual property is the intangibility of the object. Chen Guizhi and Liu Song (2001) believed that intellectual property rights are particularly protective, restrictive and time-sensitive. Zhang Yumin (2002) emphasized that the protection object of intellectual property rights is information, and intellectual property rights are the right to the world and the right to dominate. Intellectual property rights can be obtained by region, and the powers of intellectual property rights can be granted to multiple people to exercise. Liu Chuntian (2003) and others, based on the legal context of intellectual property rights, believe that intellectual property rights are a kind of property right, which includes two characteristics, namely time and diversity and multiplicity of rights content. Zheng Chengsi (2001, 2003) studied the characteristics of intellectual property rights from the perspective of property rights system changes. He believed that intellectual property rights are intangible, exclusive, regional, temporal and reproducible. Yang Ronghao (1995) and Wu Handong (2005) further defined exclusiveness, regionality and timeliness as the basic characteristics of intellectual property rights. Zhu Xiequn (2008) pointed out that the characteristics of intellectual property rights include exclusiveness, intangibility, statutory timeliness, territoriality, and legal creation.

To sum up, although different scholars have different definitions of the concept of intellectual property rights, they have reached a consensus on one point, that is, intellectual property rights are exclusive and exclusive. A characteristic is consistent. Intellectual property rights are closely related to the development of enterprises.

Table 3.2 Scholars' main views on the characteristics of intellectual property rights

Representative scholars	The main points
Li Guoguang (1999)	Intellectual property rights have dual attributes of property rights and personal rights; review and confirmation according to law ; exclusiveness or exclusivity; regionality; timeliness and other characteristics
Wu Handong (2000)	From the perspective that the object of intellectual property is the knowledge product, it emphasizes that the immateriality of the object is an essential attribute of intellectual property
Chen Xiao (2001)	The characteristic of intellectual property is the intangibility of the object
Chen Guizhi and Liu Song (2001)	Intellectual property rights are special protective, special restrictive and time-sensitive

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Zhang Yumin (2002)	Intellectual property rights are the right to the world and the right to control. Intellectual property rights can be obtained by region , and the powers of intellectual property rights can be granted to multiple people to exercise
Liu Chuntian (2003)	Intellectual property rights include two characteristics of time and diversity and multiplicity of rights content
Yang Ronghao (1995) and Wu Handong (2005)	The basic characteristics of intellectual property rights include exclusive, territorial and temporal boundaries
Zhu Xiequn (2008)	The characteristics of intellectual property rights include exclusiveness, intangibility, statutory timeliness, territoriality , and legal creation

IV RESEARCH ON THE RELATIONSHIP BETWEEN INTELLECTUAL PROPERTY RIGHTS AND ENTERPRISE DEVELOPMENT

With the continuous deepening of economic globalization and the development of knowledge economy, the role of intellectual property rights in the development of enterprises has been widely affirmed by the political and business circles. Scholars are also increasingly interested in the proposition of intellectual property and enterprise development. Through previous literature review, we can see that intellectual property rights are an important part of an enterprise's intangible assets and a resource of an enterprise. Based on this, many scholars try to explore the relationship between intellectual property rights and enterprise development and growth from the resource-based view.

4.1 Resource-Based View

The theoretical origin of the resource-based view can be traced back to Penrose's (1959) exposition in "The Theory of Enterprise Growth". She pointed out that management plays an important role in the process of enterprise growth, so the core of enterprise growth in her theoretical system is Motivation comes from within the enterprise. She believes that an enterprise is a collection of a group of resources embedded in a group of management structures, and that an enterprise can efficiently adjust its own resources and management functions to effectively promote the growth of the enterprise. The profit obtained is the ultimate goal of the enterprise, and in order to achieve this goal, the enterprise needs to continuously obtain external resources and combine them with its own resources to carry out activities such as production and sales. In the operation process of the enterprise, resources provide the basis for the operation of the enterprise, and its management structure completes the combination of these resources. In her growth theory, the source of enterprise growth comes from the services and products produced by enterprises using various resources. She believes that enterprise growth is driven by the unique strength of the enterprise itself, rather than determined by non-market equilibrium theory. On the whole, she believes that enterprise resources include material resources and human resources, and these resources are often not specific, but the products and services produced by enterprises from these resources are specific, which is an important driving force for enterprise growth. Following Penrose, Andrews (1971), Lippman and Rumelt (1982), Wernerfelt (1984), Barney (1986, 1991, 1997), Dierickx and Cool (1989), Castanias and Helfat (1991), Conner (1991), Peteraf (1993) , Amit and Schoemaker (1993), Makadok (2001), Helfat and Peteraf (2003), Mathews (2002, 2006) and other scholars have further improved the resource-based theory through more than 20 years of development, making it a An important school of strategic management theory. The core point of this theory is that: the enterprise itself is a collection of resource bundles, and the competitive advantage and growth momentum of the enterprise come from the resources owned by the enterprise, especially the heterogeneous resources. While external market institutions and market opportunities can have a certain impact on the competitive advantage and growth of enterprises, but they do not play a decisive role.

A famous professor at the Massachusetts Institute of Technology in the United States, based on the study of the relationship between enterprise resources and their profitability, pointed out that the so-called enterprise resources are tangible and competitive advantages or disadvantages that can be brought to enterprises in a given period of time including intangible assets. As the core question to be researched in enterprise strategic management, under what conditions can enterprise resources bring high returns to enterprises in a relatively long period of time? On the basis of the concept of "entry barrier", Professor Wernerfelt put forward the concept of "resource positioning barrier", and implemented the dynamic management of resources

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by establishing a resource-product matrix. It is believed that the effective dynamic management of resources is an important way for enterprises to obtain competitive advantages and seek development.

Then, Professor Barney (1986) proposed that the performance of enterprises depends on the cost of strategy implementation, not just on the choice of strategy. Professor Barney aimed at completing an effective analysis of the cost of implementing strategies, and he introduced the concept of strategic factor markets into his research. His point of view is that the strategic element market is not perfectly competitive, which is due to the differences in expectations of the future value of strategic resources among different enterprises. In this context, enterprises obtain higher performance benefits from obtaining and controlling strategic resources and related strategy implementation, that is to say, the unique skills and capabilities possessed by enterprises are the key to enterprises gaining competitive advantages. Barney (1991) pointed out through long-term research that Wernerfelt believes that the competitive advantage of enterprises comes from the heterogeneity and incomplete mobility of resources. He believes that this view is too vague and abstract, so Barney believes that sustainable competitive advantages of enterprises come from the scarcity, inimitability, irreplaceability and value of resources that can be mastered by enterprises, and these characteristics are difficult to obtain through direct "purchase" activities through market behavior. In his subsequent research, he further added organizational requirements, arguing that corporate imitation behaviors include copying and substitution behaviors (Barney, 1997, 2002). According to his point of view, when the resources controlled by the enterprise meet the value, scarcity, difficulty of imitation and difficulty of substitution, it can provide enterprises with sustainable competitive advantages. Inimitability plays a central role in this, and resources of imitability are not the basis for sustainable competitive advantage.

Since then, Peteraf (1993) has constructed his unique competitive advantage analysis framework through long-term accumulation and research. The core of this framework is the analysis method based on the resource-based view. When the four conditions of post-restriction, incomplete flow of resources and ex-ante restriction on competition are met, enterprises will have the opportunity to obtain sustainable competitive advantage. Moreover, among the above four factors, resource heterogeneity is the most basic, and it is also a condition generally recognized by scholars, but it is only a necessary condition for an enterprise to obtain a competitive advantage, but not a sufficient condition. Only when these conditions are combined can it play a role.

Through combing the classical literature of the resource-based view, we can see that this school tends to find out the factors that promote the enterprise to obtain sustainable competitive advantage and enterprise growth from within the enterprise, and tends to analyze the source of enterprise's competitive advantage from the perspective of resources. The emergence of this school summarizes the types and characteristics of resources that help companies obtain sustainable competitive advantages, forms a new research branch of corporate strategic management, and opens up a new research field. However, this school has made a breakthrough in paying attention to the role of knowledge in the form of special resources in obtaining sustainable competitive advantages for enterprises, which has important reference and enlightenment significance for future research.

4.2 Intellectual property research based on resource-based view

As science and technology and innovation play an increasingly significant role in promoting the development of enterprises, the knowledge assets or intellectual capital related to innovation are getting more and more attention from the academic circles. Some scholars started from exploring the internal logic between intellectual property and intellectual property, and explored the internal correlation mechanism and mechanism of action between intellectual property and competitive advantage. Their main research viewpoints are shown in Table 4.1. Borg (1996, 2001) and others systematically analyzed the value evolution of intellectual property from the perspective of the relationship between intellectual property, information and knowledge. Their point of view pointed out that at first scholars believed that intellectual property was not an institutionalized research and developmentproduct, but only a product of thought. However, with the continuous deepening of the knowledge economy, the role of intellectual property rights in the market has become more and more prominent, and it has been regarded as an important intangible resource for enterprises to maintain their competitive advantages. Therefore, intellectual property rights have begun to be regarded by scholars as an important resource for improving corporate performance. Since then, scholars such as Rivette and Kline (2000) have analyzed the competitiveness of many well-known enterprises (including IBM, Microsoft, Dell, etc.), and found that the competitiveness of current social enterprises is more derived from new ideas and innovations than traditional ones. The market and

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raw material control business model is gradually losing its advantages. Under this background, the importance of intellectual property rights to enterprises is increasing day by day. It has become the source of competitiveness of enterprises, and intellectual property management has also become an indispensable part of the process of enterprise value creation. An important link is missing. When a business manages intellectual property effectively, it can gain a competitive advantage that would otherwise be at a competitive disadvantage. The emergence of this situation shows that a new competitive environment has been produced along with the development of knowledge economy, and that intangible resources such as intellectual assets and the beginning to replace traditional assets have become the main source of enterprises' competitive advantages.

Different from foreign scholars, Chinese scholars proceeded from reality and analyzed the relationship between intellectual property rights and corporate competitive advantages and their mechanism of action in light of the Chinese context. Professor Xu Yusen from Dalian University of Technology (2003) analyzed the relationship between corporate intellectual property rights and core capabilities based on the actual situation in China. His research results revealed that intellectual property rights represented by patents are key indicators for evaluating core capabilities. The ultimate destination of corporate intellectual property and intellectual property strategy is the core competence of the enterprise, and intellectual property and its strategy are also the external representation of the core competence of the enterprise. From this we can see that the intellectual property strategy plays a vital role in the process of cultivating the core competence of the enterprise.

Xiao Hong (2004) first analyzed the internal relationship between patents as corporate intellectual property rights and corporate competitiveness. On this basis, he believed that the prerequisite for corporate sustainable competitiveness is patent information orientation; while knowledge property rights system is an incentive mechanism to protect the competitive advantages of enterprises, and laws related to intellectual property rights are important external guarantees. Professor Cheng Enfu of Shanghai University of Finance and Economics and others (2003) proceeded from the perspective of comparative advantage and value advantage, and believed that modern enterprises must adapt to the competitive environment under the background of globalization in order to obtain sustainable competitive advantages, and this requires enterprises to build intellectual property rights. Advantages, that is to say, enterprises should try to obtain competitive advantages based on independent intellectual property rights.

Table 4.1 Scholars' main views on the impact of intellectual property rights and enterprise development

Representative scholars	The main points
Borg (1996, 2001)	As a product of free and independent thought, rather than as a product of institutionalized research and development, intellectual property is seen as an important factor that can enhance the return on investment in innovation
Rivette and Kline (2000)	In a society where competitiveness increasingly benefits from new ideas and innovations rather than control of markets and raw materials, intellectual property is increasingly the competitiveness of successful companies
Xu Yusen (2003)	Intellectual property rights with patents as the core are very critical indicators in the evaluation indicators of the core capabilities of enterprises
Cheng Enfu and Ding Xiaoqin (2003)	In order to adapt to the needs of global competition, it is necessary for enterprises to build intellectual property advantages , that is, to highlight the economic advantages or competitive advantages centered on technology and brand by cultivating and developing the economic advantages of owning independent intellectual property rights
Xiao Hong (2004)	Patent information orientation is the prerequisite for enterprises to maintain competitiveness; the patent system is an incentive mechanism for enterprises to maintain competitiveness, and patent laws are an important legal guarantee for enterprises to maintain competitiveness

From the perspective of enterprise resources, different from rigid traditional material resources, intellectual assets such as intellectual property rights protected by law have the characteristics of flexible resources. According to Wang Yingluo (1998) and others, the competitive environment of modern enterprises is in a state of dynamic change, so enterprises can only effectively

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achieve their strategic goals if they actively adapt, utilize and manufacture changes. The behavior can be attributed to the implementation of flexible strategy, including resources, capabilities, organization, production and culture of the five aspects of flexibility. University of Electronic Science and Technology of China Professor Ni Debing (2006) and others conducted in-depth research on the strategic flexibility of enterprises. They certified that the so-called "flexibility" essentially reflects adaptability and responsiveness. These two characteristics can ensure the stability of enterprises and ensure that enterprises can actively Use various changes to achieve its own strategic goals; corporate decision-making should not be a passive adaptation to achieve corporate stability, but a proactive choice to maximize value. Intangible resources support the effectiveness of corporate strategic flexibility. Therefore, in the ever-changing external environment, the role of intellectual property rights as an important intangible resource for companies in the process of obtaining competitive advantages cannot be ignored. Therefore, the relationship between intellectual property rights and enterprise competition has also attracted the attention of many scholars. Xiao Yangao et al. (2006) analyzed the value of intellectual property rights to enterprises in the context of a dynamic market environment. Their point of view pointed out that intellectual property rights are different from traditional ones. Material resources themselves contain flexible characteristics; they believe that the flexible characteristics of intellectual property rights are reflected in three aspects: self-creation, dynamic utilization and the elimination of negative consequences brought about by uncertainty. Among them, self-creation means that the intellectual property rights of enterprises can be created by enterprises on human capital and the intellectual property rights previously owned; and the meaning of so-called dynamic utilization means that enterprises can freely and flexibly use intellectual property rights according to their own environmental conditions. Application, including determining the scope and degree of utilization; finally, eliminating the negative consequences of uncertainty reflects that enterprises can improve their responsiveness in an uncertain market environment through the layout of intellectual property rights, thereby reducing the risk of business operations, uncertainty. When the uncertainty faced in the business process is reduced, the enterprise can seize the opportunity to contain competitors and gain a competitive advantage. The flexibility of intellectual property rights determines that it can support the adaptability of enterprises in a dynamic competitive environment better than traditional material resources, so as to ensure that enterprises can obtain sustainable competitive advantages. The flexible characteristics of this kind of intellectual property rights are more prominent in emerging technology industries. Yinlu et al. (2004) pointed out that emerging technologies refer to emerging technologies that have not been around for a long time and are still in the stage of rapid development, and have great impact on economic and industrial development. High-end technology with big impact. Day and Schoemaker (2000) pointed out that the emergence of emerging technologies based on scientific innovation can often completely subvert the operation mode of traditional industries or create a new industry. The research results of Li Shiming and Xiao Lei et al. (2007) pointed out that there are uncertainties and ambiguities in the innovation process of emerging technologies , these uncertainties include technical uncertainty, demand uncertainty, competition uncertainty, among which Technical uncertainty refers to the uncertainty of subject foundation, application prospect, system structure, etc.; demand uncertainty refers to user demand uncertainty, application mode uncertainty, etc.; competition uncertainty refers to competition structure. And the uncertainty of the rules, the uncertainty of competitors and methods, etc. In Schumpeter's discussion of innovation, he believes that innovation has the characteristics of "creative destruction (Creative Destruction)". Innovation often creates destructive blows to old things while creating new products, and emerging technologies also have this characteristic. Specifically, the emergence of emerging technological innovations often creates new industries or subverts the operation mode of traditional industries, and changes the value chain structure of corresponding enterprises, changing their business scope and competition methods. Creativity destruction and uncertainty are ubiquitous in emerging technological innovations, and the existence of these characteristics means that the development of emerging technological innovations is doomed to face a turbulent market environment, and its development path will be full of thorns and difficulties. Enterprises with technological innovation need to adapt to the uncertainty of the external environment through dynamic capabilities. Dynamic capability is a capability that can continuously adjust an enterprise's coping strategy with changes in the external environment, which requires resource flexibility to guarantee (Li Shiming and Li Ping, 2005). From the previous discussion, we can see that the intangible resources of enterprises such as intellectual property rights have good flexibility characteristics, and such resources can

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meet the flexible needs of enterprises' dynamic capabilities for resources. Through the combing of the above literature, it can be known that scholars have analyzed the impact of intellectual property rights on enterprises from a resource-based perspective. It is believed that intellectual property rights as enterprise resources can promote enterprises to obtain competitive advantages and promote enterprise development. However, through the analysis of practical problems, it is not difficult to find that many first movers with intellectual property advantages, leading technologies and core patents may not be able to become the ultimate successors. This result is contrary to the conclusions of resource-based scholars. With the advancement of the enterprise capability theory, some scholars have tried to further explore the relationship between intellectual property rights and the acquisition of corporate competitive advantages and enterprise growth through the enterprise capability-based theory.

V RESEARCH ON THE THEORY OF ENTERPRISE CAPABILITY

From the 1980s to the 1990s, the theories related to enterprise capabilities developed and expanded rapidly. It has become the main research direction of strategic management theory. The enterprise capability theory combines economics and management theory, trying to explore the source of enterprise growth motivation and how to maintain healthy and effective growth. Today, the theory of enterprise capability has become an important part of the study of enterprise strategy theory. The theory of enterprise capability is based on the theory of enterprise growth. British scholar Penslow pointed out in the book "Enterprise Growth Theory" that an enterprise is "a collection of resources coordinated by an administrative framework and bounded by modern boundaries." Each resource of an enterprise has many different uses and produces different "productive services". The indivisibility of resources makes the "productive services" produced by different enterprises in their business activities necessarily unique. Other enterprises are inimitable. Therefore, the driving force for enterprise growth comes from the internal resources of the enterprise. Although Penslow did not explicitly put forward the concept of "corporate capability", her distinction between corporate "resources" and "services" has epoch-making significance. Her internalized corporate growth theory laid the foundation for the development of corporate growth theory. Base. Then, Selznick (1957) first used the unique competitive ability to indicate that the enterprise is better than its competitors in some aspects, but he did not clearly define the unique ability of the enterprise. Richardson (1972) made a clear definition and distinction of enterprise capabilities for the first time. He pointed out that enterprise capabilities reflect the accumulation of knowledge, experience and skills, and are the basis of enterprise activities. His research extended Penslow's theory of internal growth of the enterprise, arguing that the specialized ability of the enterprise comes from the process of continuous learning. Afterwards, the enterprise capability theory has gone through three stages of development. They are: the resource-based theory of Wernerfelt (1984) and Barney (1986); the core capability theory of Prahalad and Hamel (1990), Leonard Barton (1992) and Teece, Pisano and Shuen (1997)'s dynamic capability theory, and its evolution process is shown in Figure 5.1.

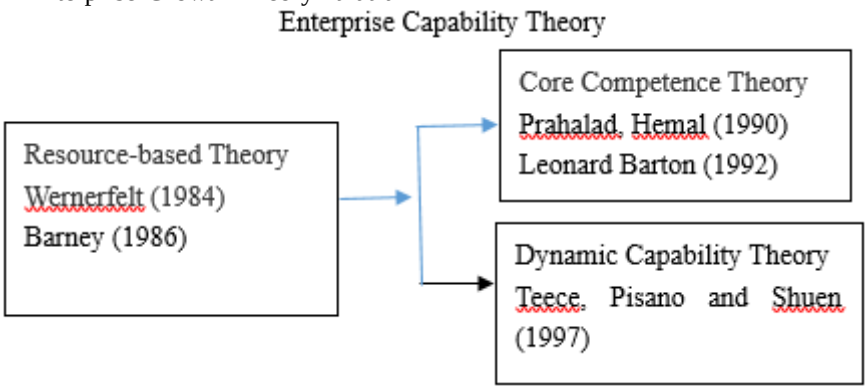

Figure 5.1The development path of enterprise capability theory

The starting point of the resource-based analysis concept comes from the understanding and induction of practical problems. The special capabilities of enterprises that cannot be imitated or copied are the root cause of the difference in efficiency among enterprises. Wernerfelt (1984) believed that an enterprise is a resource bundle composed of a series of resources and capabilities. Its

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long-term institutional advantages and development momentum come from the special resources owned and controlled by the enterprise that cannot be replicated and are difficult to trade, including material, human and organizational resources. Barney (1991) interpreted enterprise resources as all assets, organizational procedures, enterprise quality, information and knowledge controlled by the enterprise that can improve the operating efficiency of the enterprise. The unique resources of an advantageous enterprise can bring excess profits to the enterprise. Driven by economic interests, other enterprises will imitate the advantageous enterprise, and the excess profits will be weakened. Therefore, in order to avoid this situation, advantageous enterprises will form an isolation mechanism. In Wernerfelt, the concept of resource barriers was proposed to explain the isolation mechanism of dominant companies. First-mover companies first occupied resources due to time and economic advantages, preventing latecomers from competing for excess profits. Barney (1991,1997) demonstrated from two perspectives of first- mover advantage and barriers to movement, and proposed to analyze from four dimensions of Value, Rareness, Limitability and Organization. However, Priem and Butler (2001) pointed out that if static resources are effectively combined without human factors, can they form actual development momentum and competitive advantages, and then question the validity of the resource concept. Scholars such as Teece have conducted empirical research on internationally renowned multinational companies such as IBM, Texas Instruments, and Philips and found that a pure resource strategy cannot support a clear competitive advantage. Since then, some scholars have answered this question from the perspective of the enterprise's own soft power, and the theory of enterprise core competence came into being under such a background.

The perspective of enterprise core competence theory points out that pure enterprise resources are not the decisive factor of enterprise advantages, but the organic combination of various resources, technologies and skills of enterprises, which also shows that the degree to which material resources can develop and function depends entirely on the people who use it . Prahalad and Hamel (1990) put forward the theory of enterprise core competence on the basis of technology integration after conducting follow-up research on Canon, Ford and many other well-known diversified enterprises, and defined core competence as the cumulative knowledge of the organization, especially Knowledge of how to coordinate various production skills and technologies. The theories of the two of them define the core competence of enterprises from the technical point of view, emphasize the skills and technology integration view of core competence, and focus on the research of core competence from the perspective of technology and product innovation. Dorothy Leonard Barton (1992) believes that core competence is the knowledge system that makes the enterprise unique and brings competitive advantages to the enterprise, including knowledge base, technology system, management system, value system, management system, and value system dimensions, strong interaction. Meyer and Utterback (1993) believed that the core competence reflects the technological innovation ability of the enterprise, reflects the knowledge with enterprise characteristics created by the enterprise in the process of dealing with various practical problems, and the ability to acquire knowledge from the outside and solve new problems. The improvement of these abilities process is completed by the enterprise through the accumulation of organizational and personal experience and knowledge. After in-depth research on knowledge-intensive industries, Elfring and Baven (1996) found that the expansion and utilization of enterprise capabilities can be divided into several stages, including internal functional service stage, service stage for a few companies, and service stage for multiple companies. They also pointed out that when knowledge-intensive enterprises expand their business, they will face more opportunities for learning and practice, thereby promoting the overall improvement of the core capabilities of enterprises. Through research and analysis, Javidan (1998) and others have concluded that enterprise capabilities will evolve layer by layer with the development of enterprises, and divide the enterprise's capability levels into four layers: resource capabilities, resource utilization capabilities, competitive capabilities, and core capabilities. Although scholars have different understandings on the concept of resources, they agree that the special resources of an enterprise are the source of the enterprise's competitive advantage and growth momentum.

After the wave of knowledge economy hits and the development of enterprises enters the information age, the rapid changes in the market and technology have changed the overall industrial structure and operation mode, and the original competition rules have been broken. In this environment, enterprises rely on the competitive advantage obtained by the ability is difficult to maintain the growth and development of the enterprise for a long time. The way to long-term development success is not to try to maintain a long-term competitive advantage, but to obtain a series of

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temporary competitive advantages through continuous innovation, so that the company can always be ahead of its competitors. Teece, Pisano, and Shuen (1997) constructed the theory of enterprise dynamic capability after incorporating environmental factors into the enterprise capability system, pointing out that enterprise capability is gradually evolved under the adaption and influence of the enterprise to the outside world, which is dynamic, changing and presents have some path-dependent properties. They creatively combined the enterprise model of evolutionary economics with the view of enterprise capabilities, and put forward the framework of the strategic view of "dynamic capabilities". The ability to develop on the basis of internal and external unique capabilities. They defined dynamic capabilities as the internal and external capabilities of an enterprise to integrate, construct and reshape the enterprise to adapt to the changing external environment. Eisenhardt and Martin (2000) made a more in-depth and specific discussion on the issue of market dynamics and the concept of dynamic capabilities. On the basis of analyzing the dynamics of the market, they believe that the market can be divided into moderately dynamic market and highly dynamic market. In a highly dynamic market, the evolution of dynamic capabilities emphasizes the growth path of constant adjustment, and is the main means of capability evolution of the learning mechanism. Zollo and Winter (2002) believed that dynamic capability is the search procedure of the organization, that is, to improve and perfect the existing capability system of the enterprise by introducing various learning mechanisms. In the process of exploring the source of enterprise's competitive advantage and growth motivation, based on the view of enterprise resources, scholars' understanding has changed from specific resources to an enterprise that combines resource allocation, development and multiple skills and adapts to the dynamic environment ability.

Scholars who study the theory of enterprise capabilities explore the ways in which enterprises adapt to environmental variables, and explain how enterprises can achieve sustainable development and growth by gaining long-term competitive advantages. This theoretical system is a substitute for the "structure-behavior-performance" analysis framework of traditional enterprise theory and industrial organization theory. The industrial analysis model is used to supplement and improve the analytical methods in the field of strategic management. Although different schools of thought have different understandings of corporate capabilities, they all agree on one point. Corporate capabilities are an important driving force for corporate growth and development. All corporate capabilities are based on the effective use and organic combination of corporate resources.

VI RESEARCH ON THE DEFINITION OF THE CONCEPT OF INTELLECTUAL PROPERTY RIGHTS

As an important intangible resource of enterprises, intellectual property rights have been valued by governments, enterprises and scholars for their influence on enterprise development. The academic circle often discusses the logical relationship between intellectual property rights and enterprise development from two aspects. On the one hand, intellectual property rights, as an important intangible resource of modern enterprises, are essentially institutional factors that help enterprises gain competitive advantages; No sustainable competitive advantage can be obtained without the protection of the intellectual property system; on the other hand, from the perspective of resources, scholars believe that intellectual property, as an intangible resource, is an important source for enterprises to obtain sustainable competitive advantages in the market environment. Although there are differences in the understanding of the mechanism of intellectual property rights on enterprise development, no matter from which point of view, scholars generally believe that intellectual property rights have a positive impact on the growth and development of enterprises.

However, does it mean that the more intellectual property rights owned and the higher the quality, the stronger the competitiveness of the enterprise and the better its growth and development trend? Through the analysis of real cases, we found that the fact seems not to be the case, taking Kodak and Sony in the digital camera industry as examples. With the vision of "making photography as easy as writing with a pencil", the American George Eastman invented the photosensitive dry plate in 1880 , which avoided the need for bulky glass coating and The hassle of instant exposure and development; and the introduction of the first roll of Eastman film in 1885 , made photography a popular art and entertainment. In 1888, with the slogan "You just press the button, we do the rest", George Eastman brought the first simple camera to consumers and imitated the "click" sound of the shutter to the company He gave a simple and loud name - "Kodak", and since then established Eastman Kodak Company. Since then, Kodak has been in a leading position in this industry. In 1975, Kodak developed the world's first digital camera, and launched the world's first commercialized digital camera in 1989. In 1991, it cooperated with Nikon

company jointly launched the world's first digital SLR, the 1.3 million pixel DCS100. Kodak originally led the technological trend of digital cameras, and has mastered more than 1,000 patented technologies related to digital imaging. Unfortunately, due to the gradual conservative management of the management, this leading technology was not applied to business in a timely manner. Thirty years later, he almost ruined his own destiny. As its competitor, Sony, from the establishment of the Sony Group in 1946 to the end of the 1990s, its three generations of heads, Ibuka, Akio Morita, and Norio Oga, used their unique market insight and persistent pursuit of advanced technology. Turn Sony from an obscure electronic equipment manufacturer into a grand business empire. Since the launch of Sony's first digital camera Cyber-shot F1 in 1997, Sony has always attached great importance to the development of digital cameras. As a latecomer, its share in the digital camera market far exceeds that of Kodak, a technology leader. There are many other cases like this.

This reality has attracted the attention of many scholars, that is to say, the first mover who owns intellectual property rights substituted by patents may not be able to continuously gain competitive advantages in the market and become the final winner of the competition. Therefore, many scholars have analyzed the relationship between intellectual property rights and the acquisition of competitive advantages of enterprises starting from how enterprises create, apply, organize and protect intellectual property rights. Rivette and Kline (2000) took patents as representatives of intellectual property rights and analyzed the relationship between them and the competitive advantages of enterprises. They believed that the strategic management of patents and the effective use of patents can effectively promote the success of enterprises. Intellectual property rights such as patents play a role in the process of obtaining a company's competitive advantage through three main aspects. The first is to protect the company's own core technology and business operation model through patents to stimulate corporate R&D and brand creation, so as to realize the future. The prediction of market and technology development direction, thus establishing its own competitive advantage; the second is to improve the financial performance of the company through patent transactions and other means; the third is to prevent competitors from imitating or hinder competitors' R&D processes and plans , so as to reduce the business analysis of the enterprise mainly market and technical risks, and finally realize the improvement of the competitiveness of the enterprise in the dynamic environment. In addition, some scholars have pointed out through research that the patent licenses owned by enterprises can obtain innovation income for enterprises and promote the improvement of enterprises' competitive position. However, due to the large differences in intellectual property systems between different regions, different countries and enterprises, there are large differences in the competitive advantages obtained by enterprises under different scales through patent licensing (Gallini and Winter (1985), Antelo (2003), Sherry and Teece (2004), Kollmer and Dowling (2004), Sen (2005), Hausman and Leonard (2007), Motohashi (2008)). In addition, scholars also took the patent alliance as the starting point to analyze the environmental factors for the formation of the patent alliance, as well as the characteristics of the organizational characteristics and operating mechanism of the enterprise under the background of the difference in the structure of the alliance, and the strategy of maximizing profits is the common choice of enterprises in the patent alliance. ; In addition, the formation of patent alliances is also inseparable from the influence of certain external factors, and the "patent jungle" formed by patent competition among enterprises is one of the typical external factors. (Carlson (1999), Shapiro (2001), Lerner and Tirole et al. (2004), Li Yujian (2006), Liu Linqing et al. (2006), Lerner and Tirole et al. (2007), Aoki and Schiff (2008) etc.).

It can be seen from this that, as the core resource for enterprises to participate in competition in a dynamic competitive environment, intellectual property rights are a necessary but not a sufficient condition for enterprises to win innovation gains and gain competitive advantages. The role of intellectual property as the "source" of competitive advantage depends on the combination of resource characteristics such as "intangible" and "flexibility" of intellectual property, so that intellectual property can match the business strategy of the enterprise. In this context, some scholars began to put forward the intellectual property rights of enterprises based on the theory of enterprise capabilities.

The formation of the concept of intellectual property rights can be analyzed from two stages, the first stage is the concept formation of the non-theoretical stage, and the second stage is the stage of theoretical concept formation. In the first stage, many experts closely related to intellectual property put forward the concept of intellectual property capacity from a practical perspective.

Among the government agencies, the State Intellectual Property Office is the first to realize the necessity of intellectual property rights. In 2002, Wang Jingchuan, the former director of the State Intellectual Property Office, first proposed

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intellectual property rights in "Strengthening Intellectual Property Capacity Building, Cultivating and Developing Core Competitiveness". This concept (Wang Jingchuan, 2002). In addition, he believes that the cultivation, ownership, allocation and regulation of national intellectual resources are important manifestations of the country's core competitiveness, so the cultivation of intellectual property rights capabilities cannot be ignored (Wang Jingchuan, 2007). Then Tian Lipu, another director of the State Intellectual Property Office, put forward the concept of intellectual property capacity building in 2007. He believed that this is a brand-new concept, which mainly reflects the comprehensiveness of the creation, management, protection and utilization of intellectual property rights by business entities. Ability, his main point is that the construction of intellectual property rights should not only stop at the improvement of the protection system, but more importantly, enable business entities to obtain the relevant capabilities of intellectual property rights. In addition, intellectual property capacity building has also attracted the attention of enterprises. Huawei Technologies Co., Ltd., an important private manufacturer and seller of communication equipment in China, is also a Fortune 500 company. It took technological innovation as the soul of enterprise development at the beginning of its establishment. After entering the 21st century, in order to realize its internationalization strategy, enterprises attach great importance to the creation, application and protection of their own intellectual property rights. For this reason, they have also established a complete internal intellectual property organization system. Huawei's senior management believes that the future international market competition will be more intense, and the traditional price advantages and low labor cost advantages of Chinese companies will be gradually weakened. Enterprises must rely on innovation to occupy a place in the future market competition. Against this background, intellectual property rights can enhance corporate value from the following aspects, and then create sustainable competitive advantages for companies: first, intellectual property rights can protect corporate innovations; second, it can ensure market freedom; It can be used to pay high intellectual property licensing fees to other companies; it can also allow companies to obtain additional income from intellectual property technology licensing. Therefore, it is necessary to incorporate intellectual property strategy into the overall strategic design of the enterprise. In order to build Huawei into a "world-leading company with independent intellectual property rights", the management team of Huawei uses the concept of "intellectual property capabilities" in the company's internal strategy, and believes that intellectual property capabilities are an important ability for companies to ensure market competitiveness One, only by establishing a strong intellectual property capacity can enterprises win in various competitions (Fan Zhiyong, 2008).

In addition, scholars have also begun to pay attention to the concept of intellectual property rights, and began to try to analyze relevant business entities from various angles, abstracting the concept of intellectual property rights from reality into a theoretical model. Xiao Yangao et al. (2006) analyzed the sample data of 61 information technology (IT) companies located in Shenzhen to establish an intellectual property capability measurement model measured from four dimensions: creation, application, protection and organization. The knowledge of these companies in-depth analysis of the capabilities was carried out, pointing out that enterprises should strengthen the construction of independent intellectual property rights, learn to use diversified intellectual property tools, and complete the integration and utilization of social public resources, and try to reduce the cost of intellectual property protection and rights protection for enterprises. Li Ping and Li Rong (2006) conducted an empirical analysis on the relationship between intellectual property rights and industrial competitiveness with the goal of Shenzhen's industrial innovation dimension. They believed that with the improvement of intellectual property rights, the competitiveness of regions and industries will be improved. Significantly improved, but the efficiency of these improvements will be affected by institutional factors and the service environment. In addition, some scholars have used the number of patents, the number of patent applications, and the layout of enterprises in the technical field as the core indicators to measure the intellectual property rights of enterprises (Peng Xiaorui and Qu Bingyun (2008)). Xiao Yangao (2008) and others, after further analyzing the influence of intellectual property rights on industrial innovation, summarized the construction of regional intellectual property system. Targeted improvement of the intellectual property system can effectively promote the independent innovation capability of the industry. Li Rong et al. (2007) discussed the definition of intellectual property capability on the basis of enterprise research and literature analysis. Their view is that "intellectual property capability refers to the creation, use and protection of intellectual property rights of enterprises, and the combination of intellectual property resources and The ability to integrate other resources and participate in market competition,

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especially international market competition", and they also believe that intellectual property capabilities can also be divided by functional differences. According to this method, intellectual property capabilities can be divided into defensive, offensive, and dynamic integration capabilities; and If it is divided according to the different management processes, intellectual property capabilities are composed of creation and protection capabilities; in addition, according to the role and status of intellectual property rights in the process of enterprise value creation, intellectual property capabilities can be divided into negative value type and defensive type. , integration type and profit type. Since intellectual property itself is still a concept in the legal field, some scholars have attempted to define intellectual property capabilities from legal-related concepts. Guo Qiumei (2007) and others are typical representatives of such scholars. After Coe's theory, intellectual property rights are considered to be the ability of the organization to effectively control, protect, apply and integrate intellectual property rights. Afterwards, Xiao Yangao (2009) made a detailed definition of the concept of intellectual property capability based on the analysis of the relationship between intellectual property capability and corporate competitive advantage in his further research. To enhance the competitive advantage of enterprises in today's dynamic environment, the creation, utilization, protection and management of intellectual property rights are the manifestations of enterprise intellectual property rights capabilities. The creation, use, protection and management of intellectual property rights will be affected by factors such as the industrial environment in which the enterprise is located, market factors, and enterprise scale. Since then, Song Hefa (2013), a famous scholar in China, has proposed that intellectual property capacity consists of four parts: creation, utilization, protection and management, and has designed corresponding measurement methods. It can be seen that the current government, industry, and academic circles all believe that intellectual property rights are crucial, but no effective consensus has been reached on the concept of intellectual property rights. They have different views on this concept, but they agree on one point, that is, the collection of creation, application and organization capabilities constitutes the intellectual property capability.

In China, the concept of intellectual property capacity was first proposed in 2002 by Wang Jingchuan (2002), former director of the State Intellectual Property Office. General Secretary Hu Jintao emphasized at the thirty-first collective study meeting of the Political Bureau of the CPC Central Committee on May 26, 2006: "Strengthen the construction of China's intellectual property system and vigorously improve the ability to create, manage, protect and use intellectual property."The State Council's 2008" National Intellectual Property Strategy Outline " clearly stated: " In order to enhance China's ability to create , use , protect and manage intellectual property rights , build an innovative country, and achieve the goal of building a well-off society in an all-round way, this outline is formulated " and explained that " the implementation of the national Intellectual property strategy, vigorously enhance the ability to create , use , protect and manage intellectual property rights, which is conducive to enhancing China's independent innovation capabilities and building an innovative country; it is conducive to improving the socialist market economic system, standardizing market order and establishing an honest society; it is conducive to enhancing The market competitiveness of our country's enterprises and the improvement of the country's core competitiveness; it is conducive to expanding opening up to the outside world and achieving mutual benefit and win-win results . Intellectual property strategy must be regarded as an important national strategy, and intellectual property work must be effectively strengthened". The Central Committee of the Communist Party of China and the State Council issued the "Outline for Building an Intellectual Property Power (2021-2035)" on September 22, 2021, which clearly stated that " in order to coordinate and promote the construction of an intellectual property power, comprehensively improve the level of intellectual property creation, use, protection, management and service, and give full play to the The important role of the intellectual property system in the socialist modernization drive, formulate this outline. " The State Council issued the "14th Five-Year Plan" National Intellectual Property Protection and Utilization Plan on October 9, 2021 , Jiangsu Provincial People's Congress 2022 January 14 The " Regulations on the Promotion and Protection of Intellectual Property Rights of Jiangsu Province " adopted by Japan and Japan both regard the protection , promotion and utilization of intellectual property rights as an important task, which is essentially to strengthen the capacity building of intellectual property rights.

From the perspective of the evolution of the above concept, the so-called intellectual property capacity at the national level refers to the macro intellectual property capacity. From the perspective of national strategy and national interests, the process of multiple links consisting of intellectual property creation, utilization and protection is a variety of the collection of capabilities is of great significance to

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national development. National IP capabilities are not the same as government IP capabilities. National intellectual property capacity is the collection of national capacity to use legislative, judicial and administrative resources to promote the creation, use and protection of intellectual property rights through the formulation, application and implementation of intellectual property legal systems. Scholar Sun Yunde (2009) pointed out that the government's intellectual property capacity is an important part of the country's intellectual property capacity,property rights, and the ability to manage, protect and exercise them". Its " public power " should be limited to national administrative power, and its " development of intellectual property rights system " is based on the national intellectual property legal system, combined with China's national economy , science and technology development reality and cultural traditions, to formulate laws and regulations that can enhance the government's core competitiveness and promote intellectual property rights . Laws and policies on the development of property rights, focusing on the administrative implementation of the national intellectual property legal system and its policies. For this reason, the government's intellectual property capacity, as a collection of capabilities in the entire continuous process of intellectual property creation , use, and protection, should be based on the intellectual property system formulated by the country, conduct administrative enforcement of the intellectual property system, formulate and implement intellectual property policies, and promote intellectual property rights. The ability to create, use and protect intellectual property rights, where intellectual property management runs through the entire process and every link of intellectual property creation, use, and protection, and is a kind of macro-management; it emphasizes that relevant functional departments of intellectual property rights at all levels across the country actively perform macro-management functions, play an important functional role in intellectual property work. The further strengthening of national management of intellectual property rights is conducive to ensuring the effective play of the role of China's intellectual property system, which is the state and embodiment of the government's intellectual property rights capabilities . It can be seen that the government's intellectual property capacity is different from the legislation of the country's intellectual property capacity and the use of judicial resources. It focuses on the use of administrative resources, which belongs to the category of government management capacity.

In academia, Guo Qiumei (2007) pointed out that intellectual property capability refers to the ability of an organization to effectively control, protect, use and integrate intellectual achievements defined as intellectual property. Guo Qiumei's intellectual property capacity does not have a clear subject, but from the perspective of "owned by the organization and can bring benefits to the organization" and "The collection of knowledge, skills, and capital within the organization", it is limited to the enterprise's intellectual property capacity. Li Rong (2007) and Li Wei et al. (2010) directly studied the intellectual property rights of enterprises. The government's intellectual property capacity and the enterprise's intellectual property capacity are consistent in terms of using their respective resources to promote the creation , use and protection of intellectual property rights according to the intellectual property system, and there are obvious differences in many aspects: (1) the price of the two different . The resource base of the government's intellectual property capacity is administrative power and government resources, while the enterprise's intellectual property capacity needs to be limited to the scope of national intellectual property laws, including government intellectual property regulations and policies, and limited to management autonomy , enterprise-owned " knowledge , skills , and capital". Collection "; (2) the goals of the two are different. The goal of the government's intellectual property rights lies in social development, national interests, and people's well-being. Although the enterprise's intellectual property rights are closely related to the interests of society and the nation, it is more important to realize its own market competitiveness and economic benefits; (3) the content of the two focus is different. From the perspective of content, the government's intellectual property capacity promotes the creation and confirmation of intellectual property rights , the use and transfer , protection and protection of intellectual property rights through its administrative functions, focusing on the progress of science and technology , the prosperity of culture and art, and the sustainable development of the national economy. . "From the perspective of levels, it can be divided into three levels: the ability to build intellectual property legal norms, the ability to build a harmonious intellectual property system, and the ability to build intellectual property concepts". From the content point of view, the enterprise's intellectual property ability can promote the creation and confirmation of intellectual property rights , the use and operation , protection and development of intellectual property rights through its operation and management, and more importantly, it lies in technological innovation , improvement of operating efficiency and improvement of market competitiveness .

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Structurally speaking, it includes three aspects: the formation of intellectual property concepts, the establishment of management systems and the establishment of management institutions. At the same time, there are many differences between the two in terms of means and forms of realization.

Therefore, intellectual property capability refers to the set of capabilities that an organization uses its resources to promote the creation, use, and protection of intellectual propertycreation, utilization, protection and re-creation of intellectual property rights are more in line with the innovation process and logic. The creation of intellectual property is the source of intellectual property, the use of intellectual property is the fundamental purpose of establishing the intellectual property system, and the protection of intellectual property is the guarantee and continuation of the creation and use of intellectual property. Promoting the development of intellectual property is the initial and basic value of the intellectual property system, and the development of intellectual property is the eternal driving force for the creation and protection of intellectual property. Every organization's intellectual property management runs through all links and processes of intellectual property creation, utilization, and protection; each capability, each functio, and each link has its own focus. An enterprise's intellectual property capability is a set of capabilities that an enterprise integrates all its resources, promotes the creation, application, and protection of intellectual property, enhances market competitiveness, and improves operating efficiency.

Table 6.1 Main Views of Scholars and Experts on Intellectual Property Capacity

Representative scholars	The main points
Xiao Yangao , Liu Ju and Li Rong, etc. (2006)	Intellectual property capabilities can be measured from the dimensions of intellectual property creation, utilization, protection, and organization
Xiao Yangao and others (2006)	Correlation between intellectual property capability and regional industrial competitiveness. Intellectual property capability can enhance industrial competitiveness and regional competitiveness, but its correlation is affected by the intellectual property system environment and service system
Li Rong, Xiao Yangao and Wang Xiaoming (2007)	Intellectual property capability refers to the ability of enterprises to create, use and protect intellectual property rights, integrate intellectual property resources with other resources, and participate in market competition, especially international market competition.
Guo Qiumei (2007)	Intellectual property capability refers to the ability of an organization to effectively control, protect, use and integrate intellectual achievements defined as intellectual property , which is owned by the organization and can bring benefits to the organization
Tian Lipu (2007)	The concept of intellectual property capacity building is a new concept, which refers to the comprehensive capacity of intellectual property creation, management, protection and utilization
Wang Jingchuan (2007)	National core competitiveness is increasingly reflected in the cultivation , ownership, allocation and regulation of intellectual resources and intellectual achievements , especially in the ability to own and use intellectual property rights
Fan Zhiyong (2008)	one of the basic capabilities to establish and maintain a competitive position and market share in the international market
Peng Xiaorui and Qu Bingyun (2008)	Intellectual property capabilities can be measured by core indicators of intellectual property rights such as general patents, number of basic patent applications, and layout of technical fields
Xiao Yangao (2009)	Intellectual property capability refers to the ability of enterprises to create, use , protect and organize patents, trademarks, copyrights, trade secrets and other forms of intellectual property in order to seek competitive advantages
Song Hefa (2013)	Intellectual property capacity consists of four parts: creation, utilization, protection and management , and corresponding measurement methods are designed

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Although different scholars have different definitions and measurements of intellectual property capabilities, they all believe that intellectual property capabilities are a key factor for enterprises to play the role of intellectual property rights in enterprises. Intellectual property capability is the endogenous capability of an enterprise, which is the ability to effectively create, use and manage intellectual property rights and integrate them to participate in market competition. Therefore, intellectual property rights are the sustainable capabilities of enterprises, reflecting the integration and innovation capabilities, including intellectual property creation capabilities, application capabilities, and management capabilities. There are similarities and differences between intellectual property rights and the concept of intellectual property rights. Intellectual property rights are corporate resources, and capabilities are reflected in the process of resource creation, utilization, and management. Only by strengthening intellectual property rights activities and improving corresponding capabilities can corporate intellectual property rights increase. Competitiveness will increase.

VII RESEARCH ON THE CHARACTERISTICS AND STRUCTURAL ANALYSIS OF INTELLECTUAL PROPERTY CAPABILITIES

Guo Qiumei (2007) pointed out that intellectual property rights have the characteristics of intangible assets, value and uniqueness. Li Wei (2010) believes that the characteristics of intellectual property rights are value, dynamics, tacitness and openness. Chen Jiahong (2011) pointed out that the intellectual property rights of enterprises have the characteristics of the specificity of the object, the legality of the attribute, the multidimensionality of the process, and the economicalness of the value. It can be seen that the academic circles have explored the characteristics of intellectual property capabilities and achieved some results, but they have not yet converged.

Chen Jiahong (2011) analyzed the structure of the enterprise's intellectual property ability, and pointed out that the enterprise's intellectual property ability comes from the internalization theory of the patent system. First of all, the intellectual property capacity of enterprises is manifested in the structure of advanced intellectual property concepts, reasonable intellectual property management institutions and staffing, and sound and effective intellectual property management systems. The direct purpose of an enterprise's intellectual property capability is to seek market advantages; the acquisition path is the process of integrating intellectual property resources with other enterprise resources through learning and practicing the intellectual property system; the improvement and combination of the quantity and quality of intellectual property objects. The industrial technology background , market structure , enterprise scale , own technological development status and even the cultural and legal background of the enterprise affect the focus and method of enterprise intellectual property creation , application and protection, and also affect the enterprise's patent , trademark , Selection and promotion of different forms of intellectual property such as copyright and trade secrets . Secondly, the enterprise's intellectual property capability runs through the creation, application and protection of enterprise intellectual property. Among them, the creation and confirmation of intellectual property rights are the basis of the intellectual property rights of enterprises. If there is no creation, how to use them and do not need to be protected,its system is to promote the prosperity of human culture and art and the development of science and technology, and the enterprise's internal intellectual property system is to use the integration of intellectual property resources and other resources of the enterprise to enhance the company's market competitiveness; intellectual property protection is the key to the enterprise's intellectual property rights. Protection, rights and no longer exist. The creation and protection of intellectual property rights by enterprises is ultimately for the use of intellectual property rights. Through the commercialization of intellectual property rights, including self-use, transfer, licensing, etc., it can win innovation income for enterprises and enhance the value of enterprise products and services, thereby obtaining and maintain a competitive advantage.

VIII RESEARCH ON INTELLECTUAL PROPERTY CAPACITY BUILDING AND FUNCTIONAL MECHANISM

Chen Jiahong (2011) put forward some suggestions for building the intellectual property rights of enterprises from five aspects: serving the main business of enterprises is the prerequisite for building the intellectual property rights of enterprises; internalizing the intellectual property system is the core of building the intellectual property rights of enterprises; forming The leading concept of intellectual property is the forerunner of building an enterprise's intellectual property capacity; sorting out and implementing the intellectual property management system is the basis for building an enterprise's intellectual property capacity; building a professional intellectual property team is the key to building an enterprise's intellectual property capacity.

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Guo Qiumei (2007) analyzed the key influencing factors of enterprise intellectual property capacity building from the technical level , including the trajectory analysis of knowledge operation and value chain analysis , and put forward countermeasures and suggestions in five aspects, including strengthening the leading and guiding role of government departments , Strengthen the construction of comprehensive intellectual property rights; strengthen the construction of scientific and technological innovation platforms, improve the ability to create intellectual property; strengthen the construction of intellectual property systems , improve the management of intellectual property rights ; strengthen the construction of intellectual property defense systems , and improve the protection of intellectual property rights; Strengthen the implementation of intellectual property rights and improve the ability to use intellectual property rights . Here, scholars divide intellectual property capabilities into five dimensions. Zhou Zhaofeng et al. (2020) put forward some measures for intellectual property management to boost the high-quality development of state-owned enterprises from five aspects , including improving strategic awareness and leading enterprise development; avoiding intellectual property risks and strengthening intellectual property protection ; brand strategic management and strengthening brand image ; promote technological innovation and support high-quality development; standardize enterprise management and improve management efficiency. Li Xiangzhi (2020) discussed the path of intellectual property capacity building for technology-based small and micro enterprises from five aspects.

Through the review of the above literature, we can see that the intellectual property capability is the ability of an enterprise to obtain intellectual property through creation, utilization and management and transform it into the driving force of enterprise development. Scholars have further found through analysis based on a large number of real enterprise data that these behaviors of creating, using, and managing intellectual property rights of enterprises do not operate completely independently, but are restricted by a series of external factors. Scholars such as Hippel (1988) analyzed the external factors affecting the value of patents starting from the differences in the patent value of enterprises in different industriespatent value. Barton (1998) also believed that differences in the industries in which companies operate will affect the value of patents. They took the chemical and pharmaceutical industries as research objects. Their research results pointed out that these industries have specific uses because of the company's products. At the same time, the patents in this industry It has strong market power and monopoly effect, so the technology in this industry is a Discrete Technology with strong patent protection ; this kind of technology is difficult to open peripherally, so it is convenient to market, and its patent value is relatively high. The research of Hall and Ham-Ziedonis (2001) believes that unlike chemical and pharmaceutical companies, the patents of the communication electronics and semiconductor industries involve more fields, and their distribution is relatively scattered, which shows that new technologies in such industries are easy to infringe Intellectual property rights already owned by others. For this reason, intellectual property infringements in this industry are rarely actually prosecuted in court (and often can be just a bargaining chip between enterprises), so intellectual property rights in these industries are more important. Most of them exist as bargaining chips in the settlement of technical disputes between enterprises and in the licensing crossover. Grindley and Teece (1997) also have similar views. Ernst (1995) analyzed the relationship between patent measurement and enterprise performance in the field of mechanical engineering industry enterprises using the data of enterprises in various countries as a research sample. The research results showed that the more active the patent activity of the enterprise, the more significant the performance improvement of the enterprise. , patent utilization rate, etc. have a significant contribution to the economic performance of enterprises. In addition, the size and geographical differences of enterprises will also affect the value of intellectual property rights. Bessen (2008) et al. analyzed the differences in the value of patents between European and American enterprises, and their research results show that the value of patents granted to large companies Far greater than the value of patents granted to small patentees. Bouju (1991) conducted an empirical study on European companies and found that the cost of obtaining patents and litigation costs are high, which discourages companies from applying for patents, especially in foreign countries.

Based on the above, this paper draws a roadmap for intellectual property and intellectual property capacity development (as shown in Figure 8.1). It can be seen from this that the enterprise's intellectual property rights and its related capabilities will be affected by the environment in which the enterprise is located when they play a role. That is to say, there is not a simple linear correlation between intellectual property rights and related capabilities and enterprise growth, and many environmental factors will be affected in this process. Therefore, many scholars have discussed these environmental factors from different levels and perspectives.

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Through combing the existing literature, the author finds that these factors can be classified into two categories. Scholars such as Grindley believe that the role of intellectual property related capabilities on enterprises is affected by the industrial environment in which the enterprise is located, while scholars such as Hippel believe that the government-led policy environment is the main source of this impact.

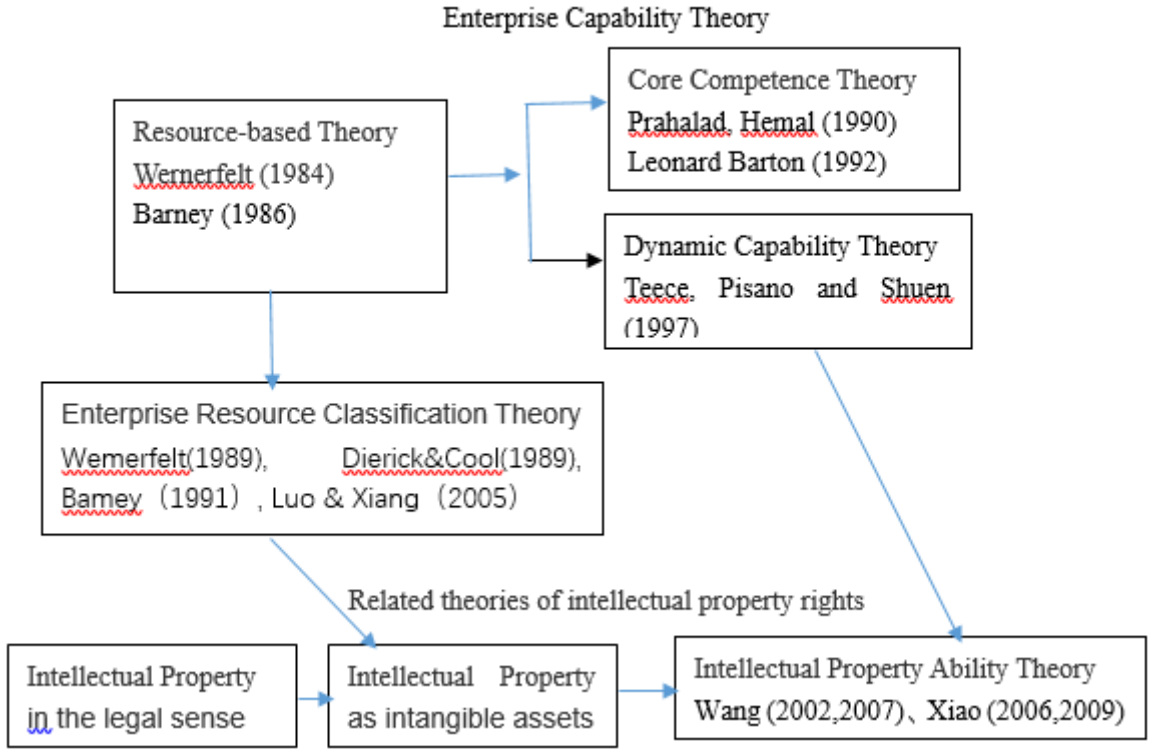

Figure 8.1 Roadmap for Intellectual Property and Intellectual Property Capacity Development

IX RESEARCH ON THE RELATIONSHIP BETWEEN INTELLECTUAL PROPERTY CAPACITY CULTIVATION AND EXTERNAL ENVIRONMENT

9.1 The development of theories related to the external environment of enterprises

The understanding of the relationship mechanism between enterprises and environmental factors has gone through a long evolution process. At first, people regarded enterprises as a mechanical, closed and highly structured organizational system. Influence has been ignored. The formation of this point of view is limited by the market environment and people's cognitive ability at that time. Since then, with the development of relevant theories, people's cognition of the relationship between the external environment and enterprises has also been continuously evolving. Theories related to the external environment of enterprises have gone through three stages: germination, development and maturity.

Phase 1: The Embryo Stage

The systematic elaboration of related studies on external environmental factors of enterprises and their impact on enterprises can be traced back to the French management master Henri Fayol (1916), the founder of classical organization management theory, in his masterpiece "Business Management and In General Management, he summarized the basic functions of enterprises, and further proposed five basic activities of enterprise management, including planning, organization, command, coordination and control. In Fayol's theoretical system, business management is a kind of planning activity about the enterprise, and it is the prospect of the enterprise for its future. Foreseeing and looking forward to the future is a basic factor of management. Any action plan of an enterprise is based on three elements. They are: First, the resources owned by the enterprise, including buildings, tools, personnel, sales channels, and public relations secondly, the nature of the company's current business operations; and finally, the unforeseeable future development trend of all

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activities of the company. In the process of elaborating the company's future prospect process, it has actually involved some important content in the external environment of the company, such as the market, technology, industrial structure, and prediction of future development trends. However, it only implicitly puts forward Theory of business environment. Then Chamberlain (1933) expounded the relationship between organizational environment and organizational development with keen insight. When he discussed the factors that affect the growth and decline of the organization, he took the internal resources and capabilities of the organization as the main consideration indicators. At the end of the 1930s, the western capitalist countries fell into the quagmire of the Great Depression one after another, and enterprises in various countries were struggling to survive. The production shifted to the strategy of adjusting the organization so that the organization could adapt to the environment of the Great Depression, and the problems between the organization and the environment began to emerge. In this context, Chester I. Barnard (1938) , the founder of systematic organization theory and the father of modern management theory , put forward the basic principles of organization theory in his masterpiece "The Functions of Managers". Thoughts, organization theory is based on the system concept, and the enterprise organization can be regarded as an open system, and then the organization is expressed as a system in which all members have pursued equilibrium (reached a stable state). The adjustment of various internal and external forces constantly keeps the entire system in balance. On this basis, Barnard believes that the focus of management organization work is to create organizational efficiency. In the process of this work, the organization must adapt to the environment. This view on the "matching" of the organization and the environment clearly puts forward the concept of corporate environment. However, during this period, scholars were still in a relatively preliminary stage of the external environment of enterprises, and had not conducted systematic research on it.

Phase 2: Development Stage

From the 1950s to the 1980s was another important period for the development of theories such as organization and environment. After the end of the Second Century War, there were no large-scale military conflicts in the world, so a relatively peaceful period was formed, which provided favorable external conditions for the social and economic development and wealth accumulation of all countries in the world. However, under this calm appearance, the world is facing unprecedented changes. The wave of the third industrial revolution led by emerging technologies such as atomic energy technology, space technology, information, communication technology, new material technology, and biotechnology has completely changed the world mode of operation of human society. During this period, with the strengthening of international economic ties and the development of the world market, the traditional enterprise structure has undergone tremendous changes, which are manifested in: the giantization and mixing of monopoly enterprises; the collaboration among enterprises of different sizes; the dispersion of shares characteristics of nationalization and nationalization (Guo Xiangang 1999). Due to the continuous changes of these factors, the external environment of the enterprise is in an increasingly turbulent situation. Therefore, during this period, the strategic research on enterprises began to form an upsurge, and the emergence of this trend also made the theory related to organization and external environment develop greatly during this period. Dill (1958) believed that external environmental factors are the key factors in managing an organization. Penrose's (1959) theory of company growth also guides people in the direction of research. She studies this issue from the internal and external factors that affect the company's growth. American management scientist Alfred ChandlerD. Chandler Jr 1962) in his book "Strategy and Structure" analyzed the interaction among enterprise environment, strategy and organizational structure in detail and comprehensively, and thus proposed: enterprise strategy should adapt to environmental changes to meet market demand. The organizational structure must adapt to the requirements and changes of the corporate strategy. His research is the beginning of the relationship between "external environment-enterprise strategy-enterprise structures". Since then, Kenneth R. Andrews, a well-known scholar at Harvard University (Kenneth R. Andrews 1969), defined corporate strategy in his book "Business Strategy: Content and Cases", and believed that strategy can be divided into four important components. Elements: market opportunity, company strength, personal value and desire, and social responsibility, among which market opportunity and social responsibility are the external environmental factors of the enterprise. In his theoretical system, the goal of enterprise strategy is to adapt the enterprise itself to external opportunities. He still emphasizes the relationship between the enterprise and the environment, and on this basis, divides the enterprise's business strategy into strategy formulation and implementationprocesses. His outstanding contribution is to put forward the SWTO

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analysis model, which is an important tool to determine the formulation of corporate strategy. Among them, the O in OT in the model is "Opportunities", which means the corporate opportunities that come with environmental changes; T means "Threats" that are accompanied by Threats from environmental changes; S means "Strengths" are the advantages of the company in operation; W means "Weaknesses" are the weaknesses of the company. Through the analysis of these factors, we can know the advantages and disadvantages of the company itself, and then enable the company to Foster strengths and circumvent weaknesses, constantly open up new opportunities along with environmental changes, and avoid threats brought by the environment to the enterprise. Therefore, the enterprise should design the enterprise development strategy on the basis of the SWOT analysis results, and the strategy should be flexible and creative. Emery and Trist (1965) conducted research on the causal relationship between organizations and the environment. They proposed the organizational environment theory of the concept of "turbulent environment", and achieved a breakthrough in social organization ecology. The famous American management scholar Igor Ansoff (Igor Ansoff 1965) proposed in his book "Corporate Strategy" that strategic construction should be a controlled and conscious formal planning process. He particularly emphasized strategic planning and discussed Feasibility issues for enterprises to plan for changes in the external environment. In 1979, Ansoff systematically expounded the strategic management model in his other book "Strategic Management". His main point is that the process by which an enterprise adjusts its internal structure to adapt to the external environment is the essence of corporate strategy. In essence, in the elements of the strategic management model proposed by it, the external environment is an important factor. Ansoff became the leader of the "Strategic Planning" school because he proposed the theory of corporate strategic management. Some scholars in this school also proposed the idea of strategic business area-unit (ie, Strategy Business Area-Unit, SBA-SBU). As a method of analyzing and researching a certain environmental factor of an enterprise, enterprise SBA is divided according to the principle of demand and technology cycle. They also pointed out that the enterprise environment is divided into different SBAs according to the characteristics of the enterprise itself, so as to conduct comprehensive comparative analysis. It is an important method for enterprises to survive and develop in a complex dynamic competitive environment.

The above corporate strategy theories and schools together constitute the classic strategic theory. These theories have put forward ideas about the external environment of the enterprise to a certain extent, and they have begun to realize that the external environment of the enterprise is constantly changingstrategic plan to adjust the internal organizational structure in response to this changing external environment. However, the shortcoming is that they pay more attention to the industry environment in which enterprises operate, and the analysis of more general environmental factors is not enough. At the same time, more emphasis is placed on enterprises to adapt to the environment passively, while the ability of enterprises as active subjects to actively respond to environmental changes is insufficiently understood. Therefore, in the 1980s, with the deepening of the understanding of the environment and the deepening of the research, the thoughts of some corporate strategy schools have further developed. The famous American scholar Michael Porter (Michael E Porter) is a typical representative of this period. Since the 1980s, he has published his famous competition trilogy: "Competitive Strategy" (1980), "Competitive Advantage" (1985) and "National Competitive Advantage" (1990), established its master status in management. It puts forward a comprehensive analysis framework in the book "Competitive Strategy", which helps enterprises to conduct an overall analysis of an industry, predict the evolution of the industry in the future, understand competitors and their own status, and make this analysis according to the specific situation of the enterprise itself. Analysis translated into competitive strategy. Based on this, the subsequent book "Competitive Advantage" aims to communicate strategy formulation and implementation, rather than separating the two like many works in this field. Then, he goes into a more in-depth analysis of the competition within the industry, and the acquisition of competitive advantages of enterprises, as well as applied issues such as offensive or defensive strategies. In connection with the research on the external environment of enterprises, Porter's relevant thoughts can be briefly summarized as follows: focusing on the research and analysis of the industry environment and economic environment in which the enterprise is located is helpful for business operators to take sudden actions against competitors and new developments in their own industries. Intruders and transformations of industrial structures have changed from passive responses to active predictions and preparations. Porter's industry analysis method has been effectively expanded on the basis of classic strategy theory. At the same time, James Brian

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Quinn, a master of knowledge management and a representative of the learning school in the strategic school, proposed in his book "Contingency Strategies: Logical Gradualism" (1980) that the corporate environment is complex and changeable. In addition, enterprises often lack the necessary information and knowledge to formulate strategies, which greatly increases the difficulty of strategy formulation, and sometimes even becomes an impossible task. Enterprises must continuously expand their own knowledge and information stock.This is precisely a learning process, so some scholars have proposed that strategy formulation is a learning process, that is, the learning school. The typical point of view of this school is: when the enterprise is in a very complex environment, the learning process is very important, and the essence of strategy formulation and implementation is a learning process.

Scholars in this period generally believed that the corporate environment included all factors outside the organization, and this definition seemed very broad. Through analysis, they pointed out that complexity, dynamics, diversity, and intentionality were the characteristics of the external environment of the organization. . They also point out that environment affects strategy by forcing organizations into specific

Phase3:The Maturity Stage

Since the end of the 1980s, the world pattern has undergone major changes. On the one hand, the "bipolar confrontation" pattern formed by the two major political blocs headed by the United States and the Soviet Union has gradually evolved into an American superpower with the disintegration of the Soviet Union. Dominant world pattern. Then, socialist countries such as the former Soviet Union and Eastern Europe began to evolve into capitalist political and economic systems. Under this international environment, countries around the world turned more attention to developing their own economies and enhancing their international competitive advantages. , thus accelerating the process of economic globalization. On the other hand, the advancement of science and technology is changing with each passing day, which has an increasing impact on human production and life, especially the changes brought about by the tremendous development of information technologymany things. In addition, the diversity of values is accompanied by the emergence of social diversity, and the integration of multiple cultures intensifies the dynamics of the corporate environment. Under this general environment, scholars have a new understanding of the corporate environment. During this period, Michael Hammer and James Champy, the fathers of enterprise reengineering, published their classic book "Enterprise Reengineering" in 1993, which laid the foundation of enterprise reengineering theory. They believe that the motivation of enterprise reengineering consists of four factors: market environment changes, technological development, unrealistic traditional management theory, information technology change and its general application. From this we can see that they believe that the root cause of enterprise reengineering is the change of the external environment of the enterprise. Enterprise reengineering is to "rethink fundamentally" and "completely redesign" business processes in response to changes in the competitive environment and customer needs, and recreate new business processes in order to improve performance in terms of speed, quality, cost, and service. Significant improvements have been made in the key indicators of a contemporary performance appraisal. Peter M. Senge, a scholar at the Massachusetts Institute of Technology, in his "The Fifth Discipline-The Art and Practice of a Learning Organization" (1993) attempts to establish a more ideal enterprise organization system based on system dynamics. His point of view points out that a learning organization can establish a highly flexible, flat, organic, and capable organization by cultivating a learning atmosphere within the organization. The organizational model of continuous development and the ability to learn are typical characteristics of such an organization. This type of enterprise can often achieve integrated performance in which the overall performance is higher than individual performance, that is, the effect of 1+1 is greater than 2. The impact of innovation drive on enterprise development.Role is becoming more and more important; the value of people has changed; the market competition is becoming increasingly fierce, and the traditional functional division of organization and management concepts need to be changed. These factors are the internal reasons for enterprises to try to establish a learning organization. However, this analysis is mainly about the impact of external factors on enterprise organization and the adjustment of enterprise organizational structure, therefore, in the course of his research, he focused on the factors that caused the organization to change, but the analysis of external environmental factors was still insufficient. The environmental stimulus the one-way response from "to organizational adjustment" is implicit in the idea of learning organization. Since then, Stephan H. Haeckcl has established the "adaptive enterprise" strategic thinking, and in his important book "Adaptive Enterprise: Creation and Leadership

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Consciousness-Response Organization" (1999), he has carried out basic research on the strategy, structure and leadership of enterprise organizations. A thorough and comprehensive rethinking , updating the concept of the company in the information age, outlining a new corporate management model that helps companies systematically cope with unpredictability —responsiveness, and proposing countermeasures to environmental changes from the corporate level. It can be seen from this that the dominant idea of its model is still aimed at responding to drastic changes in the external environment. For changes in the external environment, he focused more on changes in information technology development and customer needs, and deeply analyzed the deep-seated reasons for such drastic and discontinuous changes, thereby enabling enterprises to perceive in advance or realize in time this change and react quickly. This idea uses system theory to discuss the problem of establishing an adaptive system of an enterprise.

The theory of enterprise environment has undergone three stages of evolution: germination, development and maturity, and the theoretical system has been gradually perfected. Through the combing of the above literature, we can see that environmental factors are a link that cannot be ignored in the process of enterprise operation and growth. After entering the 21st century, the development of science and technology is changing with each passing day, and the process of globalization is advancing at an unprecedented speed. Under this background, the environmental uncertainty that enterprises must face is higher than any period in history. Therefore, the core goal of modern enterprise strategy is to enable enterprises to adapt to the constantly changing external environment. Since Teece and others put forward the theory of dynamic capabilities, the theory of enterprise capabilities has been effectively promoted, which also makes the theory of enterprise environment and enterprise strategy have an effective connection. Dynamic capabilities are the effective connection point between enterprise strategy and external environmental factors. Dynamic capabilities have a positive effect on the development of enterprises, and the external environment of enterprises has a mediating relationship with this relationship (Lin Ping, 2009; Zhang Zhijun, 2015). The main research object of this paper is intellectual property capability, which belongs to the category of dynamic capability, so dynamic capability is also regulated by environmental factors. The environmental factors regulating intellectual property rights and related capabilities can be divided into two categories. Scholars such as Grindley believe that the role of intellectual property-related capabilities on enterprises is affected by the industrial environment in which enterprises are located, while scholars such as Hippel believe that government dominant policy and institutional environment is the main source of this influence. Based on this, in order to smoothly promote the relevant research, it is necessary to further sort out the literature related to the policy and institutional environment and the industrial environment.

Table 7 Scholars' main views on the external environment of enterprises

stage	Representative scholars	The main points
The Embryo Stage	Fayol (1916)	It implicitly proposes that factors such as market, technology, industrial structure, and prediction of future development trends are the most important environmental factors affecting enterprises.
	Chamberlain (1933)	Organizational environment is an important audio-visual factor for organizational development
	Barnard (1938)	the concept of enterprise environment more clearly
The Developmen t Phase	Dill (1958)	The factors of the external environment are the key factors to manage the organization
	Penrose (1959)	External environmental factors are factors that cannot be ignored in the analysis of enterprise development
	Chandler (1962)	Enterprise strategy should adapt to environmental changes - to meet market demand, and the organizational structure must adapt to the requirements and changes of enterprise strategy
	Andrews (1969)	Market opportunities and social responsibilities are the external environmental factors of the enterprise, and corporate strategy is the adaptation of the enterprise itself to external opportunities.
	Emery and Trist (1965)	"turbulent environment"

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	Ansoff (1965) (1979)	Strategic behavior is the process of adapting to its environment and the resulting adjustment process of the internal structure changes of the enterprise.
	Porter (1980) (1985) (1990)	help business operators react to sudden actions by competitors, new intruders in their own industry, and transformation of industrial structure. react, and instead anticipate and prepare by proactively
	Quinn (1980)	The complex and changeable nature of the business environment, coupled with the fact that companies often lack the knowledge necessary to formulate strategy, makes controlled strategy and strategy formulation process strategy is almost impossible to exist, so strategy must be a learning process
The Maturity Staget	Hammer and Champy (1993)	The root cause of enterprise reengineering is the change of the external environment of the enterprise
	Senge (1993)	Changes in environmental factors are an important reason for enterprises to establish learning organizations
	Lin Ping, 2009; Zhang Zhijun, 2015	Dynamic capabilities have a positive effect on the development of enterprises, and the external environment of enterprises has a moderating relationship with this relationship.

9.2 Literature review on policy and institutional environment

Institutional context/environment is an important theoretical basis for exploring firm-related research (Clercq, Danis & Dakhli 2010). The institutional environment is shaped by various detailed rules and conditions. Organizations in this link must carry out business activities in accordance with these rules in order to obtain legal support from the government and develop well (Scott 1995). That is to say, in a certain country or region, relevant systems such as policies and laws are the institutional environment, and the institutional environment will directly affect the development of the region. An appropriate institutional environment will actively promote the development of the regional economy, while an inappropriate institutional environment will to the opposite. The analysis of the concept of the system is the premise of understanding the system environment, and there are too many studies and descriptions on the system, among which the research of Williamson and North is the most influential, and their research is the later field of new system economics. Related research has laid the foundation.For a long time, institution has been an important topic in social and economic research, and it is also one of the oldest concepts in human social thought. However, there are differences in its interpretation and cognition in different theoretical systems and researches. Williamson (1975, 1985, 2000), as one of the typical representatives of institutional economics theory, held that the system in human society includes two forms: enterprise organization and market behavior, so in essence, the system is a A social resource allocation system. The difference in the system means the difference in resource allocation cost, which also determines the quality of the system. The efficient trading system will eventually replace the inefficient system. His point of view emphasizes that organizations such as enterprises must consider environmental factors such as norms, traditions, property rights, and laws in the course of their operations. Williamson constructed a complete institutional research framework in his later research. His framework has four levels: the first level is the informal system, which is an embedded system; the second level is the formal system, which is the basic institutional environment. The third layer is the executive supervision system, that is, the governance mechanism; the fourth is the market economic system, that is, the short-term resource allocation system. Each of these systems focuses on relevant theoretical research fields. The research on the first system involves sociology and anthropology; the second involves property rights economics; the third system research involves transaction cost economics; it belongs to the scope of neoclassical economics. For the relatively comprehensive field of enterprise research, all these dimensions may be involved.

And sociologist North (1990) believes that institutions are the rules of the game in society, and they are artificial restrictions to restrict human social behavior, and reduce uncertainty by providing rules for human daily life. Institutions are composed of formal institutions and informal institutions. On the one hand, formal institutions refer to those written or formally accepted rules and regulations, which are implemented to form a country's economic and legal institutions. Denzau & North, 1994; North, 1990,

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propose that institutions are a set of political, economic, and contractual rules that govern individual behavior and shape interpersonal interactions; informal institutions, on the other hand, are those that are never intentionally designed, but Traditions, customs, social norms, shared thought patterns, unwritten codes of conduct and norms, etc. that are still observed by all (Sugden, 1986). Among them, the operation and establishment costs of the formal system are relatively high, and certain procedures and corresponding organizational structures need to be established. During this period, favoritism and rent-seeking activities will inevitably occur, which will consume certain social resources. Informal systems do not generate much social cost. They work mainly through people's voluntary, self-awareness, and public opinion. They do not require special institutions and personnel for implementation and supervision, and there is almost no direct consumption of social resources. In terms of structural framework, the system is divided into three aspects including political structure, property right structure and social structure. Political structures define the way people formulate and integrate political choices, property rights structures define formal economic incentives, and social structures, including norms and customs, define informal incentives in economic life (North 2005) . Similar to North's understanding of institutions, Chiles et al. (2007) also believe that a country's institutional environment, including formal and informal norms, rules, and values that constrain social and economic exchanges, has a huge impact on firm behavior in any society. Influence. Scott (1995) believes that institutions are not limited to laws, regulations, rules, norms, traditions, and customs, but also include moral systems, symbolic systems, and cognitive models that constitute the "meaningful framework" of human behavior (Hall & Taylor, 1996). He defined the system as: "The system is a social structure with high flexibility , composed of regulatory factors, normative factors and cognitive factors, affecting social activities and resource allocation, stabilizing social life, and providing meaning for social behavior, including Regulatory, normative and cognitive elements (Scoot, 1995)."Scott (1995) divided institutions into three dimensions: regulatory institutions, normative institutions, and cognitive institutions. Many scholars have conducted further research on institutions on this basis (Zimmerman, 2002; Kshetri, 2007), where regulatory institutions refer to the Laws, policies, rules, and standards formulated by formal authoritative organizations (such as countries, governments, industry associations, etc.) have mandatory or similar mandatory features; normative systems refer to the values and social norms shared by people in society , belonging to the moral level; the cognitive system refers to a collective or individual cognition and understanding of the external objective environment, which is a self-evident and natural psychological activity.

The relationship between institutional environment and economic organization has always been the focus of management and economics. The institutional environment is an extension of the concept of the system, which refers to a series of laws, regulations and customs related to politics, economy and culture used to regulate the basis of production, exchange and distribution (Davis & North, 1994). A large number of empirical studies have shown that different institutional environments will indeed lead to disparities in economic development performance among different regions, especially in terms of economic growth rate, market openness, per capita income gap, and productivity (Acemoglu et al, 2002; IMF, 2003). Kaufmann and Kraay (2002) proved that an effective system can promote the increase of income level, because a good institutional environment, including an effective property rights system, a high degree of economic freedom, and a good rule of law can effectively promote private and corporate investment and reduce Corruption leads to higher economic growth rates. Differences in the institutional environment affect the transnational and transregional operations of enterprises. Levchenko (2004) believes that institutional differences can be the source of trade comparative advantages, and multinational companies with institutional comparative advantages are more willing to invest in countries and regions with good institutional environments. Smarzynska and Wei (2000) pointed out that bad institutions such as corruption will bring additional costs to enterprises' local investment; Habib and Zurawicki (2002) believe that institutional differences (namely institutional distance) will produce "psychological distance" and thus increase Uncertainty and investment risk. In the research of domestic scholars, Deng Ming (2012) pointed out that countries or regions with a good institutional environment tend to have higher productivity and thus are more attractive to enterprises; Pan Zhen and Pan Chichun (2004) used A total of 17 years) of China's inter-provincial data conducted an empirical study on the institutional and policy factors that affect foreign direct investment in China. The study found that a higher degree of market economy development, an effective property rights protection system, higher government efficiency and frugality , which is conducive to attracting foreign direct investment; Zhang Hong and Wang Jian (2009) used the cross-sectional data of

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114 host countries to study the influence of host country location factors on China's OFDI flow, and found that the institutional quality and religious diversity of host countries have great influence on China's OFDI flow. OFDI flows have a significant effect. In view of the fact that a good institutional environment is a strong attraction to enterprises' transnational investment, Hu Chao (2011) proposed that developing countries may attract foreign-funded enterprises by improving the institutional environment, which may be more effective than providing other preferential measures or policies.

Table 9.1 Scholars' main views on the knowledge-institutional environment

Representative scholars	The main points
Williamson (1975, 1985, 2000)	Institutions in human society include two forms: enterprise organization and market behavior, so in essence, an institution is a social resource allocation system
North (1990)	Institutions are the rules of the game in society, and they are artificial restrictions to constrain human social behavior. They reduce uncertainty by providing rules for human daily life.
Denzau & North , 1994; North, 1990)	Institutions are sets of political, economic, and contractual rules that govern individual behavior and shape human interactions
Sugden (1986)	Informal institutions are those that were never intentionally designed
Davis & North,1994	Institutional environment is an extension of the concept of institution, which refers to a series of laws, regulations and customs related to politics, economy and culture used to regulate the basis of production , exchange and distribution
Scott (1995)	The institutional environment is shaped by various detailed rules and conditions. Individual organizations must abide by these rules and clauses in order to gain legitimacy and support, and to develop well
Smarzynska and Wei (2000)	Poor systems such as corruption will bring additional costs to companies investing locally
Kaufmann and Kraa (2002)	An effective system promotes the improvement of income levels, and the difference in the institutional environment affects the multinational and cross-regional operations of enterprises
Habib and Zurawicki (2002)	Institutional differences (i.e., institutional distance) will create a "psychological distance" that increases uncertainty and investment risk
Acemoglu et al, 2002; IMF, 2003	Different institutional environments will indeed lead to disparities in economic development performance among different regions, especially in terms of economic growth rate, market openness, per capita income gap, and productivity.
Levchenko (2004)	Institutional differences can be a source of trade comparative advantages, and multinational companies with institutional comparative advantages are more willing to invest in countries and regions with good institutional environments
Pan Zhen, Pan Chichun (2004)	High degree of market economy development, effective property rights protection system, high government efficiency and frugality are conducive to attracting foreign direct investment into
North 2005	Political structures define how people formulate and integrate political choices, property rights structures define formal economic incentives, and social structures, including norms and customs, define informal incentives in economic life
Chiles (2007)	A country's institutional environment, including the formal and informal norms, rules, and values that govern social and economic exchange, has a huge impact on firm behavior in any society
Zhang Hong, Wang Jian (2009)	A good institutional environment has a strong attraction for enterprises to invest across borders
Hu Chao (2011)	It may be more effective for developing countries to attract foreign-invested enterprises by improving the institutional environment than by providing other preferential measures or policies

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Deng Ming (2012)	Countries or regions with a good institutional environment tend to have higher productivity and thus are more attractive to companies

Through combing the existing literature, we can see that the institutional environment plays an important role in the development of the organization. The subject of this paper is the enterprise capability related to intellectual property rights. In order to study its effect on enterprise development, it is very effective to consider the external environment, and the institutional environment is an indispensable environmental factor. Therefore, in the analysis of the policy system, this paper mainly considers the role of formal and informal systems related to intellectual property rights.

9.3 Literature review on industrial environment

The industrial environment is the environmental impact factors faced by organizations in the same industry. Different from general environmental factors, industrial environment only affects enterprises in a certain industry. The regional industrial environment controls the scope of influence of this environment within a specific area. Therefore, to analyze the regional industrial environment, we must first proceed from the perspective of regional economic theory.

In the Encyclopedia Britannica, the concept of "region" is defined as: "A region with cohesive force, according to certain standards, the region itself has homogeneity, and is distinguished from adjacent regions and regions by the same standard." American economist Hoover (1970) believes that "a region is a region that is considered as an applied whole based on the purpose of description, analysis, management, planning or policy making." And the general term is the region". Gao Hongshen (2002) pointed out that regions are obtained by dividing the continuous and limited space in nature according to certain standards, and these regions often have homogeneity characteristics in some aspects. However, Xie Lixin (2003) expanded the concept of region from a narrow sense to a broad one. He pointed out that the scope of a region can be different due to differences in research purposes and tasks.

Regional differences are reflected in differences in natural resource endowment, culture, and systems, and these differences will affect the strategic system, production and management activities, and business performance of enterprises. This idea can be traced back to the theory of enterprise advantage. Adam Smith put forward the theory of absolute advantage in his discussion in "The Wealth of Nations" (1776), then David Ricardo (1817) put forward the theory of comparative advantage in his research, Heckscher and Ohlin (1933) put forward the theory of production factor endowment through the analysis of international trade and regional division of labor. Michael E Porter (1990) put forward his national competition theory system in his book "National Competitive Advantage". His research results believe that regional differences are one of the factors that can not be ignored for the differences in competitiveness among countries. The essence of this regional difference is the difference in the industrial environment.

Since the 1980s, scholars have begun to study industrial and corporate competitiveness through the industrial environment. This theory of corporate competitiveness that emphasizes environmental factors is called "environmental theory," and Michael E Porter is a representative of this school. He believes that the competitiveness of an enterprise is mainly determined by two factors, one is the long-term profit potential of the industry in which the enterprise is located; the other is the market position of the enterprise in the industry. According to Zahra and Covin (1993), the industrial environment has a significant moderating effect on the relationship between competition orientation and corporate performance. Shaanan and Feinberg (1995) pointed out in their research that the competitive behavior and targeted behavior among enterprises such as industrial structure, industrial concentration degree and enterprise competition behavior are the main components of the industrial environment. And Robinson (1998) pointed out through research that the growth performance of enterprises is significantly affected by industry characteristics and environment. Chinese scholar Wang Jici (2001) believes that under the background of economic globalization, the industrial environment can be divided into different levels, and the industrial environment can be divided into three types according to the region: the global environment, the national environment and the regional environment, which are different from the international, regional and local environments. Competition and cooperation among firms and industries. She also believes that in order to gain a competitive advantage in the context of globalization, it is necessary to optimize the development environment of local industries. Wu Jianhai et al. (2000) pointed out that regional industrial competitiveness can be measured from eight aspects: industrial association, openness, economic effect, scientific and technological contribution, concentration, market demand, industrial scale and development potential. Chen

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Honger and Chen Gang (2001) point out that industrial competitiveness consists of five indicators: industrial input; industrial output; industrial technology level; industrial market performance and industrial development sustainability. Wei Houkai and Wu Lixue (2002) believed that market influence, industrial growth, resource allocation, structural transformation and innovation are the main indicators of regional industrial competitiveness. Xu Biao et al. (2011) analyzed the regional factors that affect corporate performance on the basis of empirical research. His point of view pointed out that these regional factors include regional resource endowment, regional demand, industrial concentration, and regional soft environment factors. Shaanan and Feinberg (1995) and Ren Rong (2011) believe that inter-enterprise competition and targeted behavior, including industry concentration, industrial structure, and competitive enterprise behavior, are the main components of the industrial environment. Although scholars have differences in the definition and measurement of regional industries, they all agree that the industrial environment has an important impact on the development of regional economic enterprises.

Table 9.2 Scholars' main views on the industrial environment

Representative scholars	The main points
Porter (1990)	The market position of an enterprise in the industry is one of the main determinants of its competitiveness
Zahra and Covin (1993)	Industrial environment significantly moderates the relationship between competition orientation and firm performance
Feinberg (1995)	The main components of the industrial environment are the competitive behavior and targeted behavior among enterprises, including industrial concentration, industrial structure, and competitive enterprise behavior.
Robinson (1998)	The characteristics of the industry and changes in the industrial environment have a significant impact on the growth and performance of enterprises
Wu Haijian et al. (2000)	Evaluate regional industrial competitiveness from eight aspects: market development potential, industrial scale, market demand, degree of concentration, scientific and technological contribution, economic benefits, degree of opening to the outside world, and industrial association
Wang Jici (2001)	The industrial environment can be divided into different levels. According to the division of the region, the industrial environment can be divided into three categories: the global environment, the national environment and the regional environment.
Chen Honger and Chen Gang (2001)	To evaluate regional industrial competitiveness, we should start from five aspects that reflect industrial competitiveness : input; output; technical level; market performance; sustainable development
Wei Houkai, Wu Lixue (2002)	Regional industrial competitiveness is mainly determined by five factors: regional industrial market influence, industrial growth , resource allocation, structural transformation and industrial innovation
Xu Biao et al. (2011)	Factors such as regional resource endowment factors, regional demand factors, regional industry concentration, regional soft environment factors, and regional origin brands can affect corporate performance
Ren Rong et al. (2011); Shaanan and Feinberg (1995)	The main components of the industrial environment are the competitive behavior and targeted behavior among enterprises, including indicators such as industry concentration, industrial structure, and competitive enterprise behavior.

To sum up, the regional industrial environment is an important factor affecting the development of related industries in a certain region. Companies with similar capabilities may show large performance differences under different industrial environment backgrounds. Therefore, in the process of analyzing the relationship between enterprise capability and enterprise development and growth, it is very necessary to incorporate regional industrial environment factors into the research system.

The capability system owned by the enterprise is the source of the enterprise's competitive advantage, and the resource-based view of capability believes that the capability of the enterprise comes from the resources it owns, and then derived the core capability theory and the dynamic capability theory of the enterprise to further improve this theoretical

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system. These theoretical systems can effectively explain the development process of traditional enterprises. However, with the further deepening of knowledge economy and the intensification of globalization, enterprise development will face many problems different from traditional scenarios, and the boundaries of enterprise resources will be further expanded. The theory of enterprise resource classification holds that enterprise resources are mainly composed of tangible resources and intangible resources. In the background of knowledge economy, intangible resources represented by intellectual property rights play an increasingly important role in enterprise development. Because there is a close relationship between enterprise capabilities and resources, some scholars have proposed the enterprise intellectual property capabilities that are closely related to enterprise intellectual property rights. There is a relationship between intellectual property capabilities, corporate value, and corporate growth and development. In addition, the external environment has always been an important factor in the study of enterprise-related issues. Environmental factors have an important impact on the formation of enterprise capabilities, and they have a moderating effect on enterprise capabilities. At the same time, environmental factors have a regulating effect on the relationship between intellectual property rights and enterprise growth, and this regulating effect mainly comes from two aspects: the industrial environment and the policy environment. The Moderating Effect of External Environment is the relationship between Intellectual Property Capabilities and Firm Growth.

X RESEARCH ON ORGANIZATIONAL OR PERSONAL CAPABILITIES

It comes to ability, the common terms in management are com petence, competence or capacity, capability. Among them, competence is the most common. Such as the core competence theory of the company (CoreCompetence of the Corporation) was first known in the management circles. In 1990, CK Prahald of the University of Michigan and Gary Hamel of the London Business School published "The Core Competence of the Corporation" in the "Harvard Business Review", after the efforts of many scholars, it has become a relatively complete school of corporate strategic management capabilities. The company's core competence refers to the company's main ability, that is, the strength of the company in an advantageous position in the competition, and it is a kind of ability that other competitors are difficult to achieve or cannot possess. Focusing on core competencies, the core competencies of an enterprise are mainly related to the coordination and cooperation between various technologies and corresponding organizations, which can bring long-term competitive advantage (competitive advantage in long-run) and superior profit (superior profit) to the enterprise. In terms of technology, the core competence is mainly to adjust and integrate various technologies and functions. For example, Casio puts the radio function on a chip, thus producing a miniature radio the size of a business card. This kind of production must organically combine multiple technological flows, including miniaturization technology, micro-processing technology , microprocessor design, material science and ultra-thin precision packaging technology, etc., all of which are indispensable. In terms of organization, core competencies emphasize the overall coordination of the organization. In Casio Corporation, miniaturization only forms the company's competitiveness, but to transform this capability into best-selling Casio products, it is necessary to ensure that all links and functions such as technology, engineering, and marketing can be coordinated as a whole. Therefore, it is necessary to ensure that technical experts, Engineers and salespeople can share information and build consensus on customer needs and technical possibilities.

On the basis of core competence, American management guru Richard D' aveni (1992) and American economist Teece (1992) put forward the theory of dynamic competence, Teece (1997), theory of dynamical capabilities was proposed. Dynamic capability refers to the ability of an enterprise to integrate, create, and restructure internal and external resources to continuously seek and utilize opportunities in a changing external environment. The ability to keep pace with the times. Core competencies are mainly for organizations, such as companies.

American management scholar PL. Yu et al. (1991) proposed the theory of habit domain, combined with psychology, behavioral science and mathematics, pioneered the idea of capability set analysis (1990). Domestic scholar Feng Junwen (1999, 2010, 2012,) carried out a relatively systematic research outlook on capability set analysis , and proposed the ideas of capability system management and capability management , which further enriched the content and system of capability research from the perspective of management. Capability set mainly refers to the collection of skills, data, information and knowledge to solve practical problems in reality. Capability sets can be divided into four categories: the decision maker's real need capability set, perceived need capability set, real acquired capability set, and perceived acquired

capability set. The process of composition and dynamic transformation. In the aspect of capability set analysis, various capability expansion methods based on multi-objective mathematical programming have been proposed, such as Feng (1998). Later, Yen-Chu Chen, Po-Lung Yu (2013) put forward the theory of innovation dynamics, which further enriched the thinking of habit domain and capability set analysis. Capability set analysis can target organizations or individuals.

XI RESEARCH ON MATURITY MODEL

The earliest maturity theory is the "Quality Management Maturity Grid" proposed by the quality management master Crosby (1979) in his book "Quality is Free", which is used for the early quality summary evaluation of the production process of the enterprise. Then Humphrey (1988) of the Software Engineering Institute of Carnegie Mellon University in the United States constructed the software capability maturity model CMM, focusing on the software process and software development capabilities to solve the problems caused by lack of discipline and confusion in the software development process. The resulting low development efficiency and budget overruns. The maturity model includes a systematic system and scientific methods, which can not only characterize the process of a certain ability from weak to strong and achieve sustainable development, but also provide a set of practical observation indicators for enterprises to objectively locate their own management ability level and Developing and implementing improvement measures points the way. At present, CMM has developed to the stage of Capability Maturity Model Integration (CMMI). The CMMI model establishes a grading standard to describe the maturity of enterprise capabilities. The CMMI model has been developed into three categories: acquisition-oriented, service-oriented and development-oriented. The development-oriented CMMI is composed of best practices applied to product and service development, including 22 process areas, including: 16 core process areas, 1 shared process area, and 5 development process areas. So far, the maturity model has a development history of more than 30 years, and the total number of models exceeds 30, which are widely used in various fields and have achieved good results. Knowledge management , technology management, quality management, performance management, human resource management, project management , budget management, information management, production management , public service , cultural management, product development , safety management, standardization management, comprehensive risk management , Scholars have proposed maturity models in fields such as building information management, government data governance, and data management capabilities .

The maturity model was first proposed by the Software Engineering Institute (SEI) of Carnegie Mellon University in the United States in 1986. The software capability maturity model (Capability Maturity Model For Software, SW-CMM) is used to evaluate A set of standards for software capabilities and maturity levels is used to evaluate and improve the software development capabilities and processes of software organizations . It is the most authoritative and widely used maturity model in the software field. Since the 1990s, in order to guide enterprises to cultivate and improve project management capabilities, and help enterprises to continuously improve their own management, some organizations have proposed multiple project management maturity models (Project Management Maturity) on the basis of referring to SW-CMM. Model, PMMM). The most famous ones include: the K-PMMM model proposed by Harold Kerzner, the five-level project management maturity model PMS-PMMM proposed by PM Solutions of the United States, and the organizational project management model of the Project Management Institute (PMI). Organizational Project Management Maturity Model (OPM3). The K-PMMM model establishes the maturity model at the height of strategic planning, rather than the maturity model established solely from the project management level. The PMS-PMM M model puts forward strict evaluation criteria for project-based organizations, and combines the maturity level and nine domain theories in the PMI project management knowledge system. The strong comprehensiveness of the OPM3 model makes the organization's projects closely linked with the organization's strategic goals, and has certain applicability to all project management fields.

There are also many scholars in China who are committed to the research of maturity model. Tsinghua University developed China Software Capability Maturity Model (CSCMM) based on SW-CMM model and combined with the actual situation of our country.

Walter Shewart published Principles of Statistical Quality Control in the 1930s. This principle was further developed and demonstrated in the works of W. Edwards Deming (1986) and Joseph Juran (1988, 1989). SEI researchers apply these principles to software development, changing it into the Software Process Maturity Framework. The framework establishes the basic principles of project management and project engineering for quantitative control of software process, which is the basis for

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continuous improvement of software process. In fact, the idea of transforming quality principles into a maturity framework was first proposed by Crosby (1979) in his book "Quality is Free". Crosby's Quality Management Maturity Grid describes five stages of evolution when adopting quality management practices. The maturity framework was later refined by IBM's Ron Radice and his colleagues under the guidance of WS Humphrey to adapt it to the needs of the software process (1985). In 1986, WS Humphrey brought this maturity framework to the Software Engineering Institute (SEI), and added the concept of maturity level, forming the basis of the software capability maturity framework currently used throughout the software industry. WSHumphrey published a preliminary maturity questionnaire in 1987, which provided a software process evaluation method for software development organizations as a tool, and further proposed software process evaluation and software capability evaluation methods in the same year, in order to estimate the software development organization's software process maturity.

In recent years, the maturity model has been introduced into project management and supply chain management, forming a project management maturity model and a supply chain management maturity model. The establishment of the organizational management maturity model is based on a perspective and concept of continuous improvement and improvement. The ability is regarded as a process of continuous improvement, and the ability is divided into different levels, which are continuously improved with the development of organizational innovation activities. Therefore, we can analyze the improvement process of innovation management capability from the perspective of organizational management maturity theory. The maturity model is considered to be a process that describes the continuous development of an entity over time, where the "entity" can be a person, an organizational function, etc. The maturity model has the following characteristics. Entities can be divided into a limited number of maturity levels from immature to mature, and each maturity level has a specific prescribed maturity level. The main evaluation methods for capability maturity include scoring method , analytic hierarchy process , fuzzy comprehensive evaluation method, data envelopment method, network evaluation method , multi-level gray evaluation , close value method, etc.

In terms of capability maturity model, CNKI searched for "capability maturity model", and a total of 327 dissertations related to relevant content, and 1309 journal papers related to related topics. There are few literatures on the maturity model research involving "intellectual property" and "intellectual property management". According to CNKI literature search, there are only 3 articles that are completely related to the subject , one is about the maturity of intellectual property transformation ability, one is about the maturity of intellectual property management system, and one is about the maturity of intellectual property management, and the other is about the maturity of " intellectual property ability". There is no literature on degree. So far, there is no systematic research on intellectual property capability maturity.

XII RESEARCH ON THE ROLE OR INFLUENCING FACTORS OF INTELLECTUAL PROPERTY RELATED TOPICS

Home in China and abroad mainly focuses on the research on the role or influencing factors of intellectual property related topics. Among them, the role is mainly to study the role or impact of intellectual property management and intellectual property protection on corporate innovation, performance, and growth. Influencing factor research is mainly to study the factors that affect intellectual property management or intellectual property protection. For example, scholars Gan Jingxian, Qi Yong, etc. (2018, 2020) studied the impact of innovation and knowledge exchange on the creation, sharing, protection and management of intellectual property rights.

Research on this aspect is inseparable from the measurement of intellectual property related energy topics, including intellectual property creation ability, intellectual property management ability, and intellectual property ability. Regarding the measurement of intellectual property rights, Song Hefa (2013) gave a more scientific index system. Wu Jiahui (2016) discussed the evaluation method for military enterprises.

XIII RESEARCH ON SYSTEM ENGINEERING TOOLS AND TECHNICAL METHODS

There are many methods related to system engineering , mainly in system prediction, system decision-making, system simulation, system evaluation, system modeling, system optimization , system control, system planning, etc. Large -scale systems engineering methods include Analytic Network Process (ANP for short) for system decision-making, Data Envelopment Analysis (DEA for short) for system evaluation and decision-making , and System Dynamics (System Dynamics for short) method for system prediction and simulation. s

Dynamics, SD for short), Fuzzy Comprehensive Evaluation for system evaluation (Fuzzy Comprehensive Evaluation ,FCE for short) , Interpretative Structural Modeling for system modeling (Interpretative Structural Modeling, ISM for short) , and Multiple Objective programming for system optimization Programming , referred to as MOP) , etc. The basic research of these methods is relatively mature, and there are continuous synthesis methods through integration such as ISM-FCE and so on.

IXX. CONCLUSIONS AND FUTURE RESEARCH PROSPECTS

Throughout the relevant research, there are a few research results on the maturity of intellectual property capabilities. From a national level, the subject of intellectual property rights involves the country, government, region, industry, enterprise, etc. Even if there is a small amount of research, it is mainly aimed at the enterprise object. However, different institutions or organizations have different characteristics and structures of intellectual property capabilities, and none of the related studies has a capability maturity model for different institutions or organizations, such as the national intellectual property capability maturity model, the government intellectual property capability maturity model , the industry Intellectual Property Capability Maturity Model , Regional Intellectual Property Capability Maturity Model, Enterprise Intellectual Property Maturity Model, etc. The construction of an integrated intellectual property capability maturity model has important theoretical significance and practical value. Based on the maturity model, there are few results in the evaluation of the maturity of intellectual property capabilities. Although there are some indicator systems for measuring intellectual property capabilities, how to combine them with maturity for evaluation, and then provide various institutions or organizations with strategies or paths for improving intellectual property capabilities and benchmarking intellectual property capabilities is still an important issue. .

Looking at the relevant research, there are few research results on IP capability maturity. From a national level, the main body of intellectual property capabilities involves countries, governments, regions, industries, enterprises, etc. Even if there is a small amount of research, it is mainly aimed at enterprise objects. However, different institutions or organizations have different IP capability characteristics and structures. There is no capability maturity model for different institutions or organizations, such as the national IP capability maturity model, the government IP capability maturity model, and the industry maturity model. Intellectual Property Capability Maturity Model, Regional Intellectual Property Capability Maturity Model, Enterprise Intellectual Property Maturity Model, etc. The construction of an integrated IP capability maturity model has important theoretical significance and practical value. Based on the maturity model, there are currently few achievements in the evaluation of intellectual property capability maturity. Although there are some index systems for measuring intellectual property capabilities, how to evaluate them in combination with maturity, and then provide strategies or paths for various institutions or organizations to improve their intellectual property capabilities, and conduct benchmarking management of intellectual property capabilities, is still an important topic.

Based on the theory and method of systems engineering, combined with the idea of capability system management in the habitual domain theory, intellectual property capability can be divided into multiple capability subsystems, such as environmental capability, creativity capability, application capability, protection capability, service capability, management capability, Eight capability systems including economic capability and performance capability. It can comprehensively use tools and technologies in the fields of modern system modeling, optimization, prediction, decision-making, simulation, evaluation, and control to systematically model, optimize, predict, decide, simulate, evaluate, and control the maturity of intellectual property capabilities and other aspects of theoretical and applied research, put forward a set of organic methods suitable for the systematic management of intellectual property capabilities in organizations and regions, establish a set of intellectual property capabilities maturity models and evaluation theories, and select some representative regions, countries or governments . Conduct applied research with enterprises and form several case study reports. In response to these problems, further research can be carried out in the following aspects in the future to enrich the achievements in modeling and evaluation of intellectual property capabilities and their maturity.

(1) Definition and characteristic analysis of intellectual property capability system

Comprehensive use of interpretive structure modeling (ISM), respectively for countries or regions (such as provincial regions, municipal regions, etc.), industries or industries (such as high-tech industry, defense technology industry, chip industry, environmental protection industry, etc.),

enterprises ((such as start-up technology enterprises, high-tech enterprises, listed companies , etc.), other organizations (such as colleges and universities, non-profit organizations, project organizations) and other object types, discuss the connotation, composition, characteristics and measurement index system of intellectual property capabilities, such as national knowledge Intellectual property capability, government intellectual property capability, provincial-level regional intellectual property capability, intellectual property capability of start-up technology enterprises, etc.

(2) Analysis of Factors Affecting Intellectual Property Capability

Intellectual property capabilities are affected by many factors, and analyzing the influencing factors is the premise of evaluating intellectual property capabilities. For various types of intellectual property subjects, qualitative and quantitative analysis of the influencing factors and the degree of influence is carried out by using the exploratory factor analysis and confirmatory privacy analysis methods in the structural equation model.

(3) Construction of IP Capability Maturity Model

Using the hierarchical structure model technology, it is aimed at different types of intellectual property subject objects and different types of intellectual property capabilities (for specific intellectual property capabilities, such as intellectual property creation ability, intellectual property management ability, intellectual property application ability , intellectual property protection ability, IP performance capability, IP environment capability, IP service capability), and build a maturity model of IP capability.

(4) Design of the evaluation index system of intellectual property capability maturity

Design specific evaluation index systems for different types of intellectual property entities and different types of intellectual property capabilities, including index types, index names, index attributes, index meanings, index standard values, and index calculation or measurement methods. The maturity level can be obtained by comprehensive processing according to the index system, and conversely, the index system can also be designed according to the maturity level. This subject will design the corresponding indicator system based on the maturity level.

(5) Design of evaluation method and index construction of intellectual property capability maturity

On the basis of the maturity evaluation index system, corresponding comprehensive evaluation methods are designed for different intellectual property entities and types of capabilities, and an intellectual property capability index is formed to monitor the dynamic changes of different intellectual property entities and types of intellectual property capabilities. Development. The evaluation method is designed by using AHP, network analysis method ANP, data envelopment analysis DEA, fuzzy evaluation method FEE and other systematic analysis methods, and the principle of index construction is used to construct the intellectual property capability index. Attempt to establish an IP capacity monitoring system.

(6) Case study on the application of intellectual property capability maturity evaluation

Select a number of specific intellectual property entities, such as enterprises, provincial governments, international companies, and specific types of capabilities, such as intellectual property application capabilities, intellectual property creation capabilities, intellectual property management capabilities and intellectual property service capabilities, and use them to analyze typical application cases, form several case studies or application reports.

(7) Research on strategies or policy suggestions for improving intellectual property capabilities

Based on the application and case analysis results of intellectual property maturity evaluation, put forward targeted strategies or policy recommendations for improving intellectual property capability maturity. Propose a maturity improvement strategy for organizations such as enterprises' intellectual property capabilities, and put forward maturity improvement policy recommendations for government or regional intellectual property capabilities. Attempt to propose the establishment of an intellectual property capacity monitoring system.

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