

How to Enhance Intellectual Property Business Organizations' Capabilities? A Business Process Maturity Perspective

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Abstract

The organizational performance of intellectual property management departments is often subjective and not easy to evaluate in a traditional way. The software development department is similar to the intellectual property management department, as both are highly autonomous, rely heavily on professional manpower, and provide professional services. It is also difficult to use traditional factors to evaluate their competitiveness and success. Generally, the capabilities of the software development department can be evaluated by the Capability Maturity Model (CMM). The higher the maturity is of the organizational capability of the department or company, the better is the work performance. This research refers to the concept of CMM to evaluate the capability maturity of an intellectual property management organization and the key success factors of the Business Process Maturity Model (BPMM) to analyze and discuss such an organization. In this research, we use Analytic Hierarchy Process (AHP) as an analysis tool. We analyze and compare In-house IP group and Law Firm IP group; their performance is mostly considered to be related to personal profession and is often regarded as difficult to evaluate. The capabilities that determine the overall maturity of an organization are usually not easily distinguished. Therefore, it is difficult to use a unified standard to measure the completion time and cost of a case. This is what the two different intellectual property management organizations have in common.

Keywords: intellectual property management, capability maturity model, business process maturity model

1. Introduction

Because the intellectual property management department mostly deals with patents, trademarks, trade secrets, copyrights, and other legal-related services, its performance cannot be determined by volume, quantity, quality, efficiency, and even cost. It is not like a product manufactured by an individual workstation. The work performance of the intellectual property management department is very difficult to measure, and because the composition of the intellectual property management department is highly professional, it must rely on a high degree of autonomy or self-discipline of the members within the department to complete the work accordingly. Its management depends on wisdom. Therefore, the intellectual property management department cannot use traditional factors such as tangible asset value, cost control, quality control management, or optimized inventory management to evaluate or determine its competition and success. The dynamic capability of the department or enterprise determines the efficiency and competitiveness of the department or enterprise.

An intellectual property management department is very similar to a software development department. Both are highly autonomous, rely heavily on professional manpower, and provide professional services. It is equally difficult to use traditional factors to evaluate their competitiveness and determine success factors, and the dynamic capabilities of the department are also of equal importance. Generally speaking, the capacity maturity model (CMM) can be used to measure the capability of a software development department. The organizational capability maturity of a software department affects its performance. The higher the organizational capability maturity is, the better is the performance of the department or company.

The objective of this research is to refer to the concept of CMM to evaluate the capability maturity of the intellectual property management organization and analyzes the intellectual property management organization based on the key success factors and capability areas of the Business Process Maturity Model (BPMM).

2. Literature Review

Thinking from the perspective of strategic management, how to profit from innovation can refer to the framework of Profit from Innovation (PFI). Basically, one needs to consider PFI as a combination of three parts: regimes of appropriability, the dominant design paradigm, and complementary assets (Teece, 1986). The combination of these three parts determines the proportion and distribution of profits for participants such as innovators, customers, latecomers, or suppliers. Strong regimes of appropriability - that is, innovators with better protection of intellectual property rights - will have more time to acquire complementary assets to ensure profit.

In the framework of PFI, the regimes of appropriability and the allocation of complementary assets are sufficient to influence network diffusion and alliances of innovation. This also affects the continuation of the advantages of advanced innovators, the acquisition of core capabilities of innovation strategies, and even the success of startups (Pisano, 2006). Enterprises with strong regimes of appropriability can reduce their dependence on complementary assets, and regimes of appropriability can be understood as the protection and management of intellectual property rights. Capturing value from the process of innovation usually depends on management decisions and business strategies to shape intellectual property rights and industrial architecture (Pisano & Teece, 2007). If innovative technology cannot create an inherently strong threshold, then having patents and trade secrets or making the technology difficult to plagiarize becomes an important tool for countering other imitators or owners of complementary assets. Therefore, the task of professional managers is to ensure the establishment of intellectual property protection within the enterprise, such as: establishing complete protection of patents, trademarks, copyrights, or trade secrets, or establishing or purchasing key interdependent complementary technologies or assets. A good business model is only based on simply selling an invention or a single innovative component, and it cannot allow innovators to capture the main value (Teece, 2010). Therefore, in order to obtain profits in the process of innovation, the intellectual property management department has an important position in the operation of enterprises. Its maturity and its organization and capabilities are very important.

If companies want to create intellectual property rights such as patents, trade secrets, copyrights, and trademarks to protect their core technologies and maintain industrial competitiveness, they must do their best to apply for patents and trademarks and build trade secret barriers. This requires a professional organization such as the intellectual property management department to deal with intellectual property rights related services or cases. However, the intellectual property management department is different from the product manufacturing department or engineering department. This type of organization usually relies on the experience of senior managers in the organization to make decisions from strategy to budget. The completion time of various intellectual property-related cases or services is also determined after the person responsible for the case and the manager coordinate details. Due to the high professionalism and autonomy of the work, related personnel are not easy to manage. Most of them rely on guidance, self-discipline, and compromise between the persons in charge and managers. They tend to give more right to autonomy to the persons in charge. At present, related academic research on intellectual property rights is mostly focused on using intellectual property rights such as patents, trademarks, and trade secrets as research indicators, and the content of much research generally concerns patent-related content (Candelin-Palmqvist et al., 2012). The analysis of the influencing factors of the competitiveness and capability maturity model of the department for intellectual property management or maintenance is currently lacking.

Due to the characteristics of high professionalism, self-discipline, and service provision, the intellectual property management departments are different from the manufacturing departments, as the former cannot use traditional factors such as tangible asset value, cost control, quality control, or optimized inventory management to evaluate or determine its competitiveness and success. Whether the relative department or enterprise's dynamic capabilities are available or not determines the department's or enterprise's work efficiency and competitiveness. The dynamic capability of a company or organization refers to the company's ability to integrate, establish, and reorganize internal and external competitiveness in response to a rapidly changing environment (Teece et al., 1997). The dynamic capabilities referred to include: the ability to sense and shape opportunities and threats, the ability to seize opportunities, and the ability to maintain competitiveness by strengthening a merger to protect the tangible and intangible assets required by the business or organization (Teece, 2007).

The above-mentioned intellectual property rights are usually regarded as part of the business of law firms. In order to effectively enable the R&D department to produce patents, companies will allocate their internal intellectual property management departments and legal resources based on the specificity and complementarity of resources (Somaya et al., 2007). Therefore, intellectual property management departments can be roughly divided into two categories: intellectual property law firms (law firm) and enterprise internal management departments (in-house legal). Because the intellectual property law firm and the internal intellectual property management department of

the enterprise are located outside and inside the enterprise, the positioning is different. Therefore, we hypothesize that the capability areas of focus by the internal intellectual property management department of the enterprise and the intellectual property law firm will be different, because the difference in organizational business positioning will affect the key factors of capability maturity.

Regardless of whether it is an intellectual property law firm or an enterprise's internal intellectual property management department, we can collectively refer to it as the intellectual property management department below. The performance of the intellectual property management department is often regarded as impossible to assess, because this type of organization is a highly autonomous, knowledge-intensive professional service company (Von Nordenflycht, 2010). The handling of services or cases by the intellectual property management department is not for an engineering project or product. The quality of such businesses or cases produced by experts is difficult for non-expert clients to judge. Therefore, from strategy to budget, this type of organization usually relies on the experience of senior managers in the organization to guide, nudge, and persuade related members. The time for completion of various intellectual property projects is also determined after the person responsible for the case and the manager coordinate and compromise. However, there is usually no guarantee of the schedule and budget for completion, and because the formulation of strategies cannot be followed by the management, the quality of the case is often compromised in order to complete the schedule. The completion of the case depends on the personal ability of the person in charge and self-discipline, and there is a lot of space in the process of case execution to adjust the progress of the work. Therefore, it is difficult to determine the time and budget for the completion of the case, because there is a difference between cases. There is no uniform standard for measuring the time and cost of case completion. The core of the intellectual property law firm's business is more inclined to be determined by individual ability or self-discipline and autonomy than the internal intellectual property management organization of the enterprise. We assume that when the personnel are no longer within their core competence, then individual performance cannot easily highlight the internal personnel development of the enterprise, and the firm attaches more importance to individuals and their personal performance.

In many enterprises, the management or operation of intellectual property rights is only given to legal personnel or intellectual property experts, who are less involved in the overall strategic planning and decision-making of the enterprise. As a result, the enterprise loses the opportunity to develop the value of intellectual property rights and should integrate various functional departments and break the silo to integrate (Fisher III & Oberholzer-Gee, 2013). The management of intellectual property rights cannot only be entrusted to technical managers or corporate legal personnel (Reitzig, 2004). Intellectual property rights strategies can affect industrial architecture and standards, create and maintain competitive advantages, differentiate in product technology development and brand differentiation, and increase industry entry barriers. The internal intellectual property management department of the enterprise also needs to vertically integrate the management of the company's management of each department and horizontally integrate the collaboration between the various departments. Unlike the intellectual property law firm's focus on intellectual property rights cases and services, the internal intellectual property management department of the enterprise focuses on the overall process, and as a result of execution it pays more attention to overall performance evaluation. The overall performance of the law firm comes from the work contributions of the participants, and so it pays more attention to personal ability.

Information technology consultants or design companies, such as software development companies, and intellectual property management departments are both professional service companies (Von Nordenflycht, 2010). The same knowledge-intensive enterprises that deal with intangible intellectual property also rely on the brains of the participants, a high degree of self-discipline, and coordination between workers and managers, and each case is different. The improvement of the software development process requires the setting of meaningful goals. It is thus necessary to understand the difference between mature software development organizations and immature software development organizations. In an immature software development organization, the software development process is usually just a mix of participants and their managers during the project.

Sometimes even if the software development process has been set, the relevant personnel still will not strictly follow and implement it. Immature software development organizations are usually reactive, and managers are typically forced to solve some current crises in real time as if fighting a fire. The completion schedule and budget are often exceeded due to a lack of actual measurement control. When the specific deadline is reached, it is usually only possible to compromise on the functionality and quality of the software product to ensure that the deadline is achieved. To this end, measuring the maturity of a software development organization's capability structure began in August 1986 to improve the software development process. In 1987, the five maturity stages of CMM were derived: initial stage, repeatable stage, defined stage, managed stage, and optimizing stage (Paulk et al., 1993; Paulk, 2009). As for the similarity between software development organizations and intellectual property

management organizations, studying the performance and capabilities of intellectual property management organizations should actually be a reference to the evaluation methods and structures of software development organizations. Therefore, the operation of the intellectual property management department should be as mature as the ability of the software development organization. The higher the maturity is of the intellectual property management department, the more that a completion schedule and budget can be fixed or standardized.

A case study of introducing CMM into empirical research has appeared in the discussion of the capability maturity of intellectual property management organizations (Fu & Chou, 2019). The case study proposes to evaluate company A's intellectual property management organization with a capability maturity model. Company A's intellectual property management organization has reached the fourth stage (managed stage) of the capability maturity model. Company A successfully operated an intellectual property management organization during a specific period, especially using patents as protection of its core technology and maintaining its industrial competitiveness. During the case study period, the number of patent applications grew rapidly. This case study points out the importance of the intellectual property management organization as the company's regimes of appropriability. Even if the department focuses on the experience, ability, and self-discipline of the staff, it can define the content of the work in words and documents for each process and sub-process.

Since each process and sub-process are defined in words and documents, the actual operation of each process will reduce the intervention of personnel and unify the actions of the operators. Moreover, the intellectual property management organization adopts standard documentation, information systems, and personnel collaboration and clarifies the organization's strategic goals. Even if the cases handled are different, the work of the personnel will tend to have the same standard, supplemented by experience, ability, and self-discipline. This is done to achieve the documented standardization of professional experience that cannot be achieved by intellectual property legal professional service organizations in the past, while ensuring the quality, cost, and completion time of cases and services.

From the above case study, it can be seen that the introduction of a capability maturity model can improve the effectiveness and organizational capabilities of the intellectual property management department. The factors that affect the maturity of organizational capabilities are relatively important to the intellectual property management department. Especially in the information technology era, any organization in the value chain should redesign its business processes in response to customer needs, services, and quality, rather than automate existing processes (Hammer, 1990). The organizational capability maturity model has also been expanded and applied to various other business process management (BPM) fields year by year. It is generally called the Business Process Maturity Model (BPMM). Tarhan et al. (2016) searched for research on business process management from 1990 to 2014 and sorted out 61 of them. The limitation of related research is the lack of evidence or limited guidance on the application side. The current mainstream research is still in the early stage and lacks applied methods, and future research can be directed towards improving methods in all stages of the existing model.

According to other studies, CMM has added to each maturity stage to explore the application of business processes from the perspective of functional units and value chains (Harmon, 2004). The difference from the former is that the basic process management model is added in the defined stage of Level 3, which includes process planning, process execution, and process management. Level 3 defines the stage focusing on the development of a well-integrated process description. In the level 4 management stage, in addition to the above, a system for measuring the performance of each process is added. At the same time, the various processes, sub-processes, and activities in the value chain are horizontally integrated. Moreover, vertical integration of each functional department can maintain the same goal with the management department after the measurement.

The early maturity model, according to the conditions and complexity required by the overall timeliness of business process management, is extended and revised, and a new multi-dimensional business process management maturity model is proposed. It includes several elements: factors, stages, and scope (organization and time). Some studies redefine the five stages of business process management maturity and propose models with five influencing variables: strategy, control, process, people, and technology. They further design work items that should be executed under different variables at different stages (Fisher, 2004). There are also studies that maintain the five maturity stages of the original CMM and propose six underlying key success factors: strategic integration, culture, people, corporate governance, methods, and information technology; these represent independent variables that affect BPM success (Rosemann & De Bruin, 2005a). De Bruin and Rosemann (2005) also develop the various stages of the implementation of capability maturity under the business process. Specific competence factors should be prepared under the above six key success factors (Rosemann & De Bruin, 2005b; De Bruin & Rosemann, 2007).

From the literature review, we learn that whether it is CMM's or BPMM's description of each maturity stage, or

modification of the description of each stage, as well as model success factors and driving factors, they are all descriptive explanations, lacking evidence materials and research cases to illustrate the relationship between the design of the case and the framework. However, there is a lack of empirical research and in-depth discussion on which of the specific success factors that affect the maturity of capabilities has an impact. We aim to use the business process maturity model to explore the capability maturity of intellectual property management organizations, including law firm and in-house intellectual property management department. Since the scope of business involved in the intellectual property law firm is limited to the application and maintenance of pure intellectual property rights cases, the capability areas that focus on the maturity of capabilities should be different from the internal intellectual property management departments of the enterprise. Because the internal management departments need to cooperate with the R&D department, the key success factors focusing on the maturity of the two different organizations' capabilities should be different.

3. Methodology

We use Analytic Hierarchy Process (AHP) as an analysis tool in this research. The reason why we use AHP is the information needed in this research is not directly available to the general public. The information providers need to have concerns senior experience and expertise in the industry, and so the number of people is relatively small, and it is not suitable for a large number of questionnaires to obtain information. AHP can be used to make decision-making based on multiple decision criteria hierarchically under uncertainty (Saaty, 1990).

This study analyzes the main points of the impact of business maturity on the intellectual property group. Then clearly distinguish the key success factors that affect the business process management maturity model of the intellectual property management organization. The steps of this research are as follows:

1. Structure the evaluation factors of the research theme and establish a layer structure.
2. Set the comparison scale for each factor for evaluation and establish a comparison matrix.
3. Prepare relevant questionnaires and collect data for senior experts in the industry.
4. Collect the questionnaires and calculate the relative weight of each factor for evaluation.
5. Verification consistency.
6. Identify the evaluation factors that have the highest impact on the maturity of the intellectual property management organization.

We mainly consider the factors and capability areas of the capability maturity model shown in Figure 1 (Rosemann et al., 2015) for analysis to confirm the importance of each factor or capability area - mainly, a two-layer decision factor structure. The first layer is the factor layer, including Strategic Alignment, Governance, Methods, Information Technology, People, and Culture. The second layer is the capability area of each factor, including five capability areas as shown in the figure.

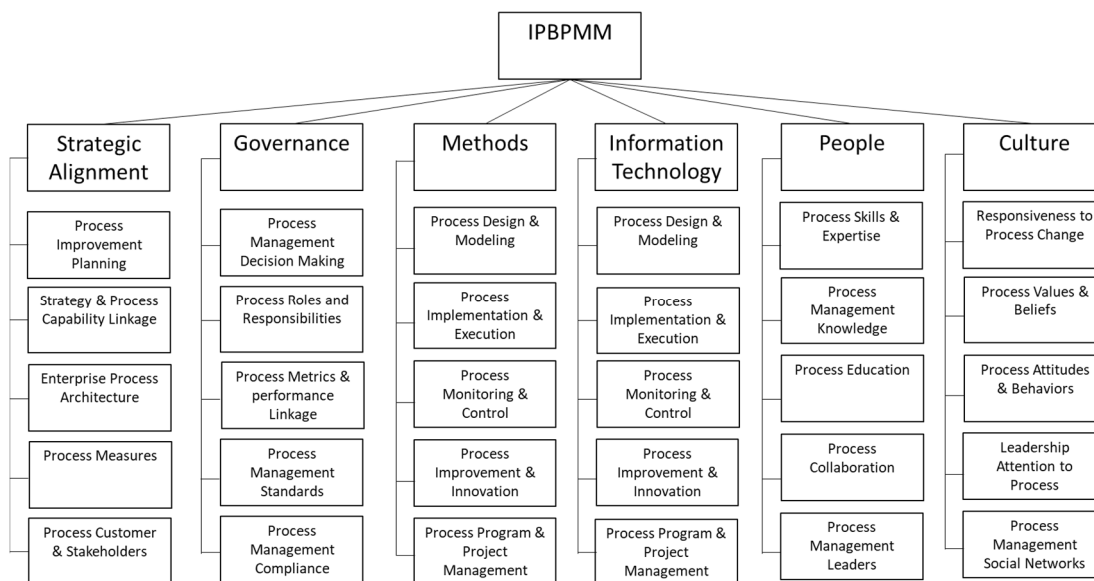


Figure 1. The Factors and capability areas for each factor

In this research, we choose Chinese senior intellectual property practitioners as our experts to gather their opinions. Research on China's intellectual property rights has been very hot in recent years. According to the press materials of the World Intellectual Property Organization (WIPO) on April 7, 2020 (WIPO Press release, 2020), China was the country with the largest number of international patent applications in 2019. It applied for 58,990 international patents through the Patent Cooperation Treaty (PCT) system, becoming the country with the most patent applications in the world. In 2019, China also filed 6,339 Madrid trademark applications, ranking third in the world. Therefore, judging from the number of patent and trademark applications that are among the highest in the world, China has achieved considerable results in the management of intellectual property rights.

A senior intellectual property expert in China examining Western academic theories may notice some special features. Therefore, this research selects two groups of senior practitioners of intellectual property rights in China to conduct decision-making analysis and investigation. In total, 20 participating experts were divided into two groups: enterprise group (In-house group) and Law Firm group (Law Firm group), of 10 people each. Among them, the In-house group has an average working experience of 15.5 years in the relevant intellectual property management field, while experts in the Law firm group have an average working experience of 18.4 years in the relevant intellectual property management field. Experts in the In-house expert group are directly employed by general enterprises, work in the intellectual property management department within the enterprise, and directly contact and link with R&D personnel and other internal personnel in the work process. Experts in the Law Firm group are employed by the intellectual property law firm, but there is no direct contact with internal personnel in the work process.

4. Findings

Whether for the company's internal intellectual property management department (In-house) or intellectual property law firm (Law Firm), they both are often regarded as highly professional and autonomous organizations, and their performance is mostly considered to be related to personal profession and is often regarded as difficult to evaluate. The factors and capability areas that determine the overall maturity of an organization are usually not easily distinguished. The reason is that the schedule and cost for this type of organization to handle business or case completion are mostly determined by the ability and self-discipline of the person in charge. In addition, there is a lot of room in the case execution process to adjust the progress of the work, and it differs from case to case. Therefore, it is difficult to use a unified standard to measure the completion time and cost of a case. This is what the two different intellectual property management organizations have in common. However, the focus of this research is whether these two types of intellectual property management organizations vary in the composing factors of the maturity of their capabilities and their capabilities areas.

Table 1. The rank of the factors weights for In-house and law firm groups

Factors	In-house		Law Firm	
	Weights	Rank	Weights	Rank
Strategic Alignment	0.364313	1	0.328782	1
Governance	0.20127	2	0.21007	2
Methods	0.112971	3	0.105913	5
Information Technology	0.103205	6	0.05657	6
People	0.107698	5	0.188004	3
Culture	0.110524	4	0.11066	4

From the data in Table 1, we can compare the opinions of the experts of the In-house group and the experts of the Law Firm group at the first factor level. Both groups believe that strategic alignment and governance are both first and second important, and culture is the fourth most important. They also believe that the factor of information technology is the least important and can rely on professional technical personnel and the technological application of related innovations is the least important. The experts of the In-house group consider people less important than the experts of the Law Firm group and pay more attention to methods.

The two groups of experts are completely different in the importance of methods and people. Compared with the experts of the Law Firm group, the experts of the In-house group believe that people are less important and pay more attention to the method, while the experts of the Law Firm group think that the importance of the people is obviously greater than the method. This is related to the different positions of the two groups of experts in the

value chain.

In the business process value chain for general enterprises to generate intellectual property rights, the management of the enterprise vertically manages the various departments that generate the intellectual property rights process, including business units, process units, drafting units, and agency units. The process has to go through the horizontal chaining of brain mining, case review, system introduction, case filing, writing, and case application. The experts in the In-house group are the intellectual property management organizations within the enterprise, and so they are responsible for everything from creative brain mining and protection of trade secrets to patent application, maintenance, evaluation, and use.

In the horizontal direction, it is necessary to integrate the R&D department, product department, agent unit, and law firm out of the business unit in a series, and the vertical direction can integrate reporting to different levels of management. Therefore, the experts of the In-house group are basically in the position of the key link in the internal value chain of the enterprise, and they must take into account the full life cycle of intellectual property rights, the generation of value, and the transmission of information.

Although some experts in the Law Firm group have experience working in an enterprise, because the external units of the enterprise do not need to directly face management in the process, at most they can achieve some horizontal integration in the value chain. The law firm's job is to focus on the application and maintenance of patents, trademarks and copyrights, and compliance with government regulations, as well as litigation disputes related to intellectual property rights in the future. Therefore, experts in the Law Firm group work focus on specific points of intellectual property rights work rather than looking at all stages of the entire life cycle. Therefore, the experts in the Law Firm group focus on personal subjective abilities such as professionalism, experience, self-discipline, and professional ethics, especially patent drafting, which requires relatively high personal professional abilities, and personal self-discipline and professional ethics.

The business processes that the experts of the In-house group and the Law Firm group are concerned about are not exactly the same. Taking patents as an example, the In-house group is concerned with the generation and mining of ideas, the conversion of ideas into patents, the application and maintenance of patents, the use or termination of patents, and even intervention in the protection and management of ideas before they are converted into patents and business secrets that are not suitable for patent applications. The Law Firm group is focused on transforming creative proposals in the latter half of the enterprise value chain into patent texts for application to the government, as well as process control related to the patent application process and compliance with government regulations and guidelines.

Responsibility requirements and reward systems are also different. The responsibility that the experts of the In-house group must concentrate on might meet the company's annual or quarterly goals. The content of these goals may be to complete a number of patent applications and maintenance of specific data, or to achieve monetary goal of monetization, or to achieve management of the non-data goals that are then awarded annual or quarterly rewards based on the completed goals. The experts of the Law Firm group, especially attorneys, patent agents, or patent engineers, mostly complete a specific number of patent applications and then draw a percentage from the fees of each case as their monthly bonus. This also causes the experts of the In-house group to pay attention to the results of the final work and the method to enhance the horizontal and vertical integrated value chain. The experts of the Law Firm group emphasize the performance of their personal expertise, and the overall performance of the firm also depends on each contribution of the staff. Relatively speaking, the factor of people is more important.

Table 2 ranks the second-level capability areas of this investigation. We find from the opinions of the two groups of experts that four capability areas are ranked in the top five capability areas, although they are in different orders.

The biggest difference is that the fifth capability area of the Law Firm group is in the process skills and expertise of the people, while the fifth capability area of the In-house group is in the process measures of strategic alignment. The process skills and expertise of the people are ranked 15th from the view of the experts of the In-house group, and the process measures of strategic alignment are also ranked 15th from the view of the Law Firm group. This shows that the law firm's work focuses on the application and maintenance of patents, trademarks and copyrights, and compliance with government regulations, as well as future litigation disputes related to intellectual property rights, and so it pays more attention to personal skills, expertise, self-discipline, and professional ethics. The In-house group spans the complete value chain and pays more attention to the final output of the process. As for who is used in the process, it is not very important to the In-house group experts. We can also see that law firms usually employ patent attorneys or patent agent with license qualifications, while corporate employers consider whether they can perform their work efficiency in their jobs rather than specific government-recognized qualifications. Four of the bottom five capability areas in the Law Firm group's ranking are in information technology, which

relies mainly on professionals, and the firm relies on professionalism. The bottom five capability areas in the In-house group are scattered across people and culture, but everyone agrees that the social network in culture is the least important.

Table 2. The rank of the capability areas weights for in-house and law firm groups

Factors	Capability Areas	In-house		Law Firm	
		Weights	Rank	Weights	Rank
Strategic	Process Improvement Planning	0.042007	8	0.041906	8
Alignment	Strategy & Process Capability Linkage	0.088261	2	0.109659	1
	Enterprise Process Architecture	0.066214	4	0.069852	3
	Process Measures	0.064943	5	0.028050	15
Governance	Process Customers & Stakeholder	0.102889	1	0.079313	2
	Process Management Decision Making	0.066374	3	0.063803	4
	Process Roles & Responsibilities	0.042290	7	0.050026	6
	Process Metrics & Performance Linkage	0.029396	13	0.030143	14
	Process Related Standards	0.035807	11	0.031748	13
Methods	Process Management Compliance	0.027402	14	0.034350	10
	Process Design & Modeling	0.038820	10	0.021366	20
	Process Implementation & Execution	0.020742	17	0.026152	17
	Process Monitoring & Control	0.016480	25	0.020351	22
	Process Improvement & Innovation	0.020358	18	0.023982	18
	Process Program & Project Management	0.016570	24	0.014060	24
Information Technology	Process Design & Modeling	0.030276	12	0.011616	27
	Process Implementation & Execution	0.017493	23	0.013435	25
People	Process Monitoring & Control	0.019456	20	0.009765	28
	Process Improvement & Innovation	0.015688	27	0.012410	26
	Process Program & Project Management	0.020292	19	0.009344	29
	Process Skills & Expertise	0.025529	15	0.051251	5
	Process management Knowledge	0.013411	28	0.021151	21
Culture	Process Education	0.012302	29	0.032645	12
	Process Collaboration	0.017556	22	0.048852	7
	Process Management Leaders	0.038901	9	0.034105	11
	Responsiveness to Process Change	0.018260	21	0.014537	23
	Process Values & Beliefs	0.042932	6	0.037910	9
	Process Attitudes & Behaviors	0.024155	16	0.027910	16
	Leadership Attention to Process	0.015733	26	0.022107	19
Process Management Social Networks	0.009423	30	0.008196	30	

Further analysis of the capability areas of Strategic Alignment. The capability areas that the experts of the In-house group value most are process customers and stakeholders, while the capability areas that the experts of the Law Firm group attach the most importance to are the strategy and process capability linkage.

The most important thing for a company is the results produced by the process and delivered to the customer. Therefore, the relevant stakeholders and the end customer in the process are relatively important. The enterprise's intellectual property management organization is a complementary resource and is an indirect contribution in the process of producing products or providing customer services. Therefore, for the In-house group experts, process customers and stakeholders are valued, but for a Law Firm, intellectual property-related services are directly provided by the law firm to its clients. The law firm must rely on the lawyers and patent agents to provide services, or even final legal proceedings. In the law firm, these professional personnel face clients with their own professional capabilities directly. Therefore, the professional people employed by the law firm have a direct contribution to the law firm's performance, and the experts in the Law Firm group attach importance to the strategy and process capability linkage.

Process improvement planning is the least valued by the experts of the In-house group, while the capability area of the process measures is the least valued by the experts of the Law Firm group. For jobs that are more professional and more self-disciplined, evaluation or measurement is actually redundant, because professional and highly disciplined personnel will naturally do their job well. The In-house group considers the final results of the process in the enterprise, which is also related to its position in the value chain. For In-house experts, they are in the planned process, and they do not need to plan to improve.

In the second-level capability area of the Governance factor, the two groups of experts believe that process management decision making, and process roles and responsibilities are both important, and the weight rankings are both the top two. Among them, the experts of the Law Firm group believe that the weight of process roles and responsibilities is more important than the opinions of the experts of the In-house group. Although the management of both organizations relies on the experience of senior staff, the management of the Law Firm usually focused more on the experience of senior managers in the organization, from strategy to budget. The completion schedule of various intellectual property rights projects is also determined after the compromise between the person responsible for the case and the manager coordinate.

Experts of the Law Firm group believe that process management compliance is relatively important, while the expert group of the In-house group considers it the least important. This should be related to the fact that most experts in the Law Firm group are patent attorneys or agents. Their training and relevant license qualification examinations emphasize that all assignments must comply with law and government regulations. However, the focus of the opinions of the experts of the In-house group is not on process management compliance. Most companies will delegate this part of work to a law firm's experts, and so they will not spend time and effort on process management compliance.

In the second-level capability areas under the Method factor, the expert opinions of the In-house group first emphasize process design and modeling. The weight value of the process design and modeling given by the experts of the In-house group is much higher than that of the process implementation and execution from the expert opinions of the Law Firm group. It can be seen from this point that the experts of the In-house group must take into account horizontal and vertical integrations of the process within the enterprise, and so they pay more attention to the long-term execution effect of the process. However, the experts in the Law Firm group seem to only care about the short-term execution effect of the process, because they do not need to do like the experts in the In-house group and integrate the process of products or services. Experts from the Law Firm group give higher weights to process implementation and execution as well as process monitoring and control.

In the second-level capability areas of the Information Technology factor, as in the analysis of the capability areas under the method factors in the previous paragraph, the In-house group's expert opinions still focus on process design and modeling. Experts of the In-house group give the process design and modeling weight twice as much as the process implementation and execution of the first capability area in the expert opinion of the Law Firm group. The expert opinions of the In-house group are the same as the previous method factor, as they all consider the long-term effects of process. The weight of the first item in the opinion of the law firm's experts is not high. Compared with the expert opinions of the In-house group, the Law Firm group still considers the short-term execution effect of the process. Moreover, the Law Firm group's weighting ranking is exactly the same as the previous method factor. The two capability areas of process Implementation and execution and process monitoring, and control are selected together for consideration by experts.

In the second-level capability areas under the People factor, the In-house group experts value the process management leader, followed by process skills and expertise, while the Law Firm group experts first emphasize process skills and expertise, followed by process collaboration. This shows that the company relies on top-down leadership, and it also values that good leadership will determine the success of the process. The law firm obviously exhibits bottom-up group performance and attaches importance to the skills and expertise of the grassroots staff, as well as collaboration among people. The bottom of the law firm's collaboration and specific implementation is the core of the firm's operation.

In the second-level capability areas under the Culture factor, both the In-house group experts and the law firm experts agree that process values and beliefs as well as process attitudes and behaviors are important. Experts in the In-house group gave even heavier weights to process values and beliefs, showing that employees of enterprise intellectual property management organizations with higher maturity levels have clearer confidence and belief in the goals and final value of the process. In addition, attitudes and behaviors also determine the effectiveness and efficiency of the process.

From the above comparison, we know from the first level of capability maturity factors that the experts of the In-

house group think the people factor is less important in the process. From the opinions of the experts of the In-house group, the method factor is relatively more important. This point proves that the enterprise attaches great importance to the overall process and execution results, and so it pays more attention to the method factor. The overall performance of the law firm comes from the contribution of the participants, and thus it pays more attention to the factor of people.

The weight value of the second-level capability area also shows that the In-house group experts rank the weights of the process skills and expertise related to individuals at 15th among all capability areas, while the Law Firm group experts rank the capability areas of process skills and expertise in 5th. It is obvious when the personnel are no longer within the scope of core competence that their performance at internal development of the enterprise is not easy to highlight.

From the perspective of the second level of capability areas, the opinions of the Law Firm group experts show little attention paid to the process measures under the strategic alignment but do emphasize the process management compliance of the governance factor. From the perspective of people factor and related capability areas, as well as methods and information technology, when compared with the expert opinions of the In-house group, the differences in the organizational positioning of the internal intellectual property management department and the intellectual property law firm do affect the key factors and capability areas in the capability maturity model.

5. Conclusions

The key factors of business process capability maturity are used to evaluate intellectual property management organizations, for which the consensus of the two groups of experts is on strategy alignment and governance. Both groups think the factor of information technology is the least important. Therefore, in the future, especially when building intellectual property management organizational capabilities, the first priority is whether company leadership has a clear strategy to achieve goals, as well as whether management is able to communicate smoothly within the organization and understand the direction, timing, and degree of achievement of the goals contained in its strategy. The second most important consensus of the two groups of experts is corporate governance. The decision-making process within the organization and the sharing of various management roles and responsibilities also have a certain impact on the establishment of organizational capabilities. The least impactful factor is information technology, which relates to the application of technology that directly relies on professional information technology personnel and related innovations.

The two groups of experts also have different focuses on the key factors of the business process capability maturity of the intellectual property management organization. It can be seen from this research's results that the biggest different key factor is that the two groups of experts have extremely opposite opinions on the importance of people factor and methods factor. Experts in the Law Firm group believe that people are obviously more important than methods, while experts in the In-house group believe quite the opposite. From the perspective of key factor people, its ranking of importance from the opinions of experts in the In-house group is 5th, while its ranking of importance from the opinions of the Law Firm group's experts is 3rd. Thus, the importance of people factor in the enterprise is not as high as in the law firm. For enterprises, the performance of the group and the final output of the overall process are the most important. However, for the law firm, every professional is responsible for a case, and personnel are the most important factor in terms of whether the case can be completed or not. This proves that the enterprise attaches great importance to the overall process and execution results, and so it pays more attention to the method factor. The overall performance of the law firm comes from the work contribution of the participants, and so it pays more attention to the people factor.

The contribution of this research is that past business process capability maturity models only describe the nature of the evaluation and have not been verified in the intellectual property management organization. Through an investigation and analysis of expert opinions, this research obtains empirical data and verification in the capacity maturity model of intellectual property management organizations. Moreover, the importance of its key success factors and capability areas are ranked according to the perspectives of Chinese In-house group experts and Law Firm group experts.

This research still has shortcomings. Although we gained the opinions of two groups of intellectual property management experts in China based on the key factor of the maturity of business process capabilities, it remains to be verified how the same experts in Western academia view these key factors and capability areas. Future research can follow up on this path or investigation.

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