

KNOWLEDGE MANAGEMENT IN SCIENCE AND TECHNOLOGY ENTERPRISES IN VIETNAM

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Abstract:

Science and Technology (S&T) enterprises and knowledge based enterprises in general are positioned in center of interest of researchers and policy makers for S&T development of Vietnam. This is seen clearly through numerous documents of the Party and the State of Vietnam¹. However, the problem is how to mobilize the knowledge and the knowledge management in this type of enterprises. This paper is a contribution to clarify some aspects of knowledge and knowledge management in some typical S&T enterprises.

1. Knowledge and knowledge management in enterprises

Knowledge, as recognition and skills, is created by the human nature. The most general definition states that knowledge is “information in action”, which means the target-oriented information. Information becomes knowledge when it is interpreted by individuals under certain circumstances and bound by faiths and commitment of individuals (*Nonaka et al., 2000*).

Knowledge exists under two forms: explicit and implicit. First, explicit knowledge is the one which is identified and encoded. This type of knowledge is easy to be defined, stored and accessed (*Wellman, 2009*). This type of knowledge can be easily administered by ordinary information management systems which facilitate the storing, searching and modifying of documents. Second, implicit/tacit information is interpreted as “the knowledge of techniques and methods which are applied in certain manner to produce certain outputs without any clear explanation by individuals (*Rosenberg, 1982*). Nonaka (1991) gave an additional interpretation that said “the implicit knowledge is of individual nature and therefore difficult to

¹ Resolution No. 20-NQ/TW dated 31st October 2012 of the 6th Conference of the XI Session of the Party for the S&T development for industrialization and modernization in socialism-oriented economy and international integration.; Decision No. 1244/QD-TTg dated 25th July 2011 for Approval of main S&T orientations, objectives and tasks, 2011-2015 periods; Decision No. 418/QD-TTg dated 11th April 2012 for Approval of the S&T Development Strategy, 2011-2020 periods; Decision No. 592/QD-TTg dated 22nd May 2012 for Approval of the Program of development supports for S&T enterprises and public S&T organizations to implement the self-governing mechanism and other documents.

be identified or encoded then very difficult to be transferred to others". This type of knowledge is considered as the most valuable source of knowledge capable to lead to innovation in enterprises.

1.1. Knowledge in enterprises

Researchers propose various types of knowledge in enterprises. The definition of type of knowledge is highly needed for enterprises to capitalize this type of knowledge. Researchers distinguish the tangible form of knowledge (data, procedures, models, algorithms, analysis and synthesis of documents) and intangible form of knowledge (professional capacities and capabilities, individual knowledge, historical knowledge, context knowledge and etc.). Knowledge capital or Intellectual assets in enterprises exists and develops in individuals or group of individuals. IP assets of enterprises are accumulated under various forms and originate from different sources.

1.2. Knowledge management

On basis of the above definition of knowledge, many concepts of knowledge management were proposed. Knowledge management is the identification, optimization and effective management of intellectual assets, which may be seen under explicit form of human produced products or under implicit form of knowledge hidden in every individual or group of individuals (*Snowden, 1998*). Knowledge management is the support for sharing of knowledge, the efforts to make something useful with knowledge and to achieve the targets of the organizations through structuring technologies and knowledge content (*Davenport, 1998; Huysman and De wit, 2000*). Knowledge management is a systematized block which is updated and applies knowledge to maximize the knowledge-related effectiveness of enterprises. This process also requires the re-investment for knowledge for regular updating of knowledge (*Wiig, 1998*). Knowledge management is the creation of knowledge followed by the explanation, propagation, use, maintenance and renovation of knowledge (*De Jarnet, 1996*). Knowledge management applies the systematized approaches for searching, understanding and using knowledge to create values (*O'Dell, 1997*). Knowledge management is the control of knowledge existing in an organization to achieve targets of the organization (*Van der Spek and Spijkervet, 1997*). Knowledge management includes stages to create, store, propagate and apply/commercialize knowledge to increase productivity, benefits and growth of the organization (*APQC, 2000*).

It is possible, therefore, to state that the main content of knowledge management in enterprises includes stages to create, store, propagate and apply knowledge to achieve the targets of the enterprise.

2. Role of knowledge management in enterprises

Today the competitive pressure gets increasingly tough and the market experiences a fast change. Enterprises need to identify knowledge as main capacities to keep their competitiveness. Knowledge management needs to be combined with long-term and strategic decision making process. This would create the background for capacity of development and allow the ongoing improvement of existing measures and systems. The following summarizes some roles of knowledge management in enterprises.

2.1. Knowledge management and successful innovations

Knowledge management has the role to raise successful innovation. This statement is based on numerous studies which say that knowledge management is a source capable to increase economic benefits on innovation. Barney (1991) said that there are only a few assets which can facilitate the fast development of enterprises.

These assets (capacity, organization procedure, knowledge) become important sources of enterprises if they are well controlled by enterprises. Liao and Chuang (2006) considered that knowledge management creates chances for enterprises to absorb innovations. Huergo (2006), being based on surveys made for Spanish manufacturing enterprises, indicated the meaningful impacts of technological management towards innovation of products and process. A study by OECD (2003) on knowledge management in industrial enterprises of Germany, France and Canada showed that knowledge management produce a strong impact on trends of innovations and intensity of creations.

2.2. Knowledge management and successful use of human resources of enterprises

Another function of knowledge management, in addition to innovation enhancement, is its impacts on successful use of human resources of enterprises. This matter is related to “dynamic capacities” of enterprises.

Teece et al. (1997) defined the “dynamic capacities” as capabilities of enterprises to integrate, build and re-structure internal and external capacities for purpose to adapt themselves to fast changing environment. The term of “dynamic” used by the authors is to describe the capacities to renovate and to adapt to continuously changing business development. The

competitive advantages of an enterprise are seen through its management and organization processes which are based on its assets and its own future development path. Knowledge management and *know-how* are important factors to be taken to consideration for strategies of enterprises. Knowledge management includes the absorption of skills, learning and accumulation of organizational assets and intangible assets. Rare and valuable resources of an enterprise require certain capacities to be maintained and used successfully. These capacities can be interpreted as “extra-ordinary” in addition to actual capacities of enterprises. Many authors consider the knowledge management as important part, equally to all other rare, valuable and difficult-to-be-imitated assets.

2.3. Knowledge management as organization learning process

Levitt and March (1988) summarized studies and indicated that organization learning is a process based on daily works on an organization which includes procedures, formalities and technologies around and through out the activities of the organization. Argyris and Schon (1978) defined two levels of learning which are both related to identification and rectifications of defects in daily activities. We have the *Single-loop* learning when defects are rectified without any changes in existing policies and targets of the organization. We have the *Double-loop* learning when defects are rectified by changes of existing policies and targets of the organization. Therefore the organization learning in form of both *Single-loop* and *Double-loop* is related to effectiveness of the organization to maintain, improve and identify the way of activities. Certain organizations are very effective in ongoing processes of catch-up and improvement of arrangement of daily activities. For example, Toyota applies the TQM tools such as *6-sigma* and *lean manufacturing* to identify the causes of defects and the measures for waste reduction. Table 1 summarizes the importance of knowledge management for individuals, groups of individuals and enterprises as whole.

Table 1. Importances of knowledge management

| For individuals | For groups | For enterprises |
|--|--|---|
| <ul style="list-style-type: none"> - Support for individual jobs, time saving, better decision making and better settlement of problems. - Set-up of community links within the organization, feeling of contributions for the organization. - Enhancement of | <ul style="list-style-type: none"> - Development of professional skills. - Promotion of direct discussions. - Facilitation of setting-up networks and effective cooperation. - Development of moral values which is possibly | <ul style="list-style-type: none"> - Support for fixing strategic directions. - Fast settlement of problems. - Propagation of best examples. - Improvement of knowledge values of |

| | | |
|--|---|--|
| <p>satisfactions of labors.</p> <ul style="list-style-type: none"> - Helping the updating process. - Provision of opportunities and challenges for contribution. | <p>applied for all the members.</p> <ul style="list-style-type: none"> - Development of a common language. | <p>products and services.</p> <ul style="list-style-type: none"> - Enrichment of ideas among members and set-up of new ideas for innovations. - Facilitation to get advanced positions in competition. - Reduction of unnecessary procedures - Reduction of R&D costs. - Reduction of defects - Raising the diversity in business decisions through participation of many people. - Set-up of organizational memory by retaining intellectual assets. |
|--|---|--|

Source: Dalkir, 2005; Dubois and Wilkerson, 2008

3. Knowledge management in S&T enterprises

Some advantages in intellectual aspects of S&T enterprises in comparison of other enterprises are hereunder presented to have a more concrete analysis of the practice of knowledge management in S&T enterprises of Vietnam.

First, the title of S&T based enterprises or knowledge-based enterprises alone have a hint that they produce commodities or services based on development, ownership and use of intellectual assets. This would say that S&T enterprises are those which have their advantages in knowledge and they use them, particularly implicit knowledge, as competition advantages. It is necessary to emphasize knowledge and technologies are important for all enterprises, but only for certain of them the knowledge is mobilized and applied more in production process.

Second, the function of entrepreneurship in creation of knowledge is recently introduces in the theory of Schumpeter. This theory defines the important role of peoples with entrepreneur willingness which has human capital source and creates values.

Intellectual assets are initially set up in S&T enterprises by intellectual capacities of peoples with entrepreneur willingness which are oriented to market opportunities they target, and their implicit knowledge is applied for

new products and new technologies (*Lawson and Lorenz, 1999*). The knowledge which these people in initial stage hold is very important. Innovative ideas are always the main assets of enterprises in initial stage and are the background for enterprises to search investors to commercialize new products and services. The knowledge nature of peoples with entrepreneur willingness in initial stage of S&T enterprises is of commercial nature rather than technical one.

Initial knowledge assets in S&T enterprises can be coupled with professional experience and capacities of peoples with entrepreneur willingness. Flexible organizational structure, incentive measures and reasonable management are favorable for knowledge development and transfer of this knowledge to capacities of enterprises. If knowledge and experience remain kept by individuals without being shared the S&T enterprises have low chances for good and sustainable development (*Teece, 1998*).

Third, in addition to knowledge assets of peoples with entrepreneur willingness, S&T enterprises hold more forms of implicit knowledge in comparison to other types of enterprises, such as implicit knowledge from inventors, initial investors (*business angels, venture capitalists, family/friends and others*) and other sources of implicit knowledge. Each of this knowledge sources presents its challenges and requires, as rule, different management processes.

Fourth, S&T enterprises carry out intensively R&D and innovations activities, more than other types of enterprises. R&D and innovation activities require an intensive knowledge searching process, expression of high absorbing capacities for maximal benefits, creation, absorption, use and propagation of knowledge at high level (*Matthews, 2003*).

Practice of knowledge management in typical S&T enterprises

As indicated in Part 1, the process of knowledge management includes some main stages, namely *creation, storing, propagation and application/commercialization of knowledge*. For convenient purpose, the analysis of study cases will be presented in consecutive order of the three main stages: absorption, propagation and commercialization of knowledge. The analysis will deal with the practical process of these stages in typical S&T enterprises in Vietnam².

² Based on analysis framework presented in research by Makino, Chen and Yeh. (2002).

3.1. Description of study cases

Materials for study analysis were collected through discussions with leaders of enterprises. They are combined with observation of researchers, reports and documents provided by enterprises and from other sources.

Oil Product and Additive Development Company (APP-1996) and Vaccine and Biomass Company No. 1 (Vabiotech-2000) have the origin from research institutes. BKAV (2001), a network security company, was set-up by a group of students of Hanoi University of Science and Technology. Some enterprises hold yet links with “mother” organizations (case of Vabiotech and National Institute of Hygiene and Epidemiology). Supports from “mother” organizations, in set-up stage, were mainly infrastructure such as building, workshops and certain scientific research equipments.

APP was focused on research for application and development of technologies: simultaneously developing specific own technologies and gathering external technologies which would be localized and improved to produce suitable technologies, high quality products and competitive prices. Almost all the created products are results of R&D activities and the first locally produced products.

The annual R&D investment by APP is 2% of turnovers. They are offered for S&T projects of high importance, economic and scientific value. Almost all the research outcomes are applied for production within the Company or transferred as capital contribution. The completion of any S&T project leads APP to investment for producing facilities of new products. There are not only traditional technologies in focus of the Company but also the world's new trends are studied to produce clean technologies, eco technologies and environment friendly products (such as lubricants, hydraulic liquids, bio fuels) on basis of local re-cycled materials. In addition, APP has active participation in various research projects such as industrial development master plan and projects of management reforms.

The Company's R&D Center with advanced equipments provides multiple services, namely researches, pilot production, product tests, training and charge free consulting service. In addition to investment for scientific research purposes, APP conducts training and practical courses for graduate students, publication of teaching materials for vocational colleges. Tens of research papers are presented in international workshops and conferences, many of which are of high economic and scientific value and get prestigious prizes.

Vabiotech holds the particular attention for S&T activities in its efforts to develop new products. The Company mobilizes all resources for investment

of scientific research. In initial stage (2000), vaccine producing facilities of the Company were small rooms transferred from the National Institute of Hygiene and Epidemiology. They were capable of producing very limited products. In 2003, being supported by the Government, Ministry of Public Health, other line ministries, the full efforts of the Company led to the Korea-supported ODA project to build a plant to produce 5 types of vaccines according to GMP standards of WHO. The Plant had been completed and started operation by 2006. The Plant is classified as at the most technologically advanced level in the region and attracts the international attentions. Actually the Company starts the implementation of a GMP-based vaccine and biomass plant and a Bio-Medical Technologies Center in a Vietnam-Cuba cooperation program of the Government. In future years the Company will develop new vaccine and biomass projects to meet development of requirements by using its own capital sources, Government's preferential credits and cooperation programs of technological transfer.

During the last three years, the Company uses 7.2% of annual turnover for R&D investment. R&D activities are conducted in specific facilities of the Company and in cooperation projects the National Institute of Hygiene and Epidemiology, Military Medical Academy, Institute of Pharmaceutical Materials and many other R&D organizations. In addition, the Company collaborates with individual researchers to produce new products. The payment for external researchers is decided by their hosting organizations.

BKAV, a network security company, has its focus for fields of anti-virus software (versions for individual users are present in more than 103 countries with more than 10.5 millions of users; in Vietnam there is 73.95% of enterprises use this software), network security service, E-Government solutions, public certification of signature. Research activities of BKAV in field of network security are intensively conducted. Research by BKAV let identify serious holes in some software products of Microsoft and Google and the reports were forwarded to producers for settlement.

BKAV makes its organization structure based on group model:

- First group is in charge of professional works including experts for research and development of technologies and development of products in various fields, namely: anti-virus software, research of activities for network security, supply of network security service and training of network security experts, research for technologies and software packages for administrative reforms of enterprises, E-Government solution, research for public certification of signature and e-commerce;

- Second group is in charge of implementation of projects, development business, marketing, communication and etc. This group is to support the first group in field of promotion and commercialization of products and services;
- Third group is in charge of technical assistance and customer care which provides the effective use of BKAV products and services and maintains the sustainable relation.

Products of BKAV are not only famous in domestic market but also international one. They gain various prizes and awards, namely: First Class Network Security Service (2009) by Vietnam Information Security Association (VNISA); First Prize for E-Office Solutions in the ITC competition hold by PC World Vietnam Magazine in two years of 2009 and 2010; “Prides of Viet Trademarks”, June 2010; VB100 International Certification for BKAV anti-virus solution by the world leading anti-virus test organization, August 2010 and many other awards.

3.2. Absorption of knowledge

During initial stage of development, enterprises get technologies mainly from “mother” organizations (research institutes/universities). As rule CEOs of these enterprises are experts in their fields and they hold important knowledge sources. CEOs bring in technologies they hold. The role of these enterprises is to exploit them. Initial technologies of APP are knowledge of the “mother” institute or derivative of works of the “mother” institute. It is the typical example of social capital necessary for those enterprises who originate from State owned organizations. This origin helps them to develop their absorbing capacities. Similarly, Vabiotech has some main basic technologies of vaccine production which were created through cooperation between Vabiotech and the National Institute of Hygiene and Epidemiology. Therefore the start of many S&T enterprises is based on knowledge of “mother” organizations in large scale.

After the start stage, enterprises shifted their focus from production knowledge to market knowledge which are main implicit knowledge. For example, BKAV has its main R&D function to develop products. Here the new knowledge is created, after the set-up of the enterprise, is mainly the knowledge related to the one of commerce or operation nature. Globally, knowledge developed in this stage is the encoded one. Not so many implicit knowledge is developed within this stage. In this stage, some enterprises can identify other sources from which they can gather knowledge to maintain their competitiveness (typical case of Vabiotech).

The close cooperation with and supports from “mother” institutes can be observed in majority of S&T enterprises with the State own origin. Though the coordination is not acknowledged officially, but social relations make the main force sources of technological capital. The development of every enterprise much depends on their CEO and basic technologies inherited from the “mother” institutes. Initially the enterprises were designed as extension for commercial purpose of products of research institutes (*extended arms of institutes/universities*) and therefore, they get a rich support from “mother” organizations. In the process of economic reform and cooperation between the State and enterprises, the latter have more market-based chances to create force resources and technological development. However, the nature of State ownership status offers advantages for these enterprises in terms of social capital and absorbing capacities (*Makino et al., 2002*).

BKAV did not get much supports from the State. This enterprise had to gather technologies from market. They base their activities on their professional skills and conducted itself research projects or cooperation projects with other enterprises or universities. It also developed cooperation with clients to get technologies.

Globally in Vietnam, the State ownership originated enterprises pay less attention to clients to get technologies. There exist, however, some exceptions of which APP is a case. In this case, technologies to be developed dependently much on product knowledge and they were not transferred from “mother” organizations. These enterprises need develop close contacts with clients and suppliers to develop technologies. R&D divisions are set-up for technological development purpose, and therefore they can develop technologies in some other fields to extend business scope. From structure point of view, the creation of knowledge is coordinated by R&D divisions which has also the role of technical advisor for CEOs (case of APP) or S&T Advisory Board/Council (case of Vabiotech).

Another important aspect is the fact that the context can block the technological absorption process. For example, local clients are not stimulated to buy products/services from domestic enterprises. In addition, the technological development of enterprises gets impacted much from policies as well as capital source. APP and BKAV develop strong links with clients and therefore they can mobilize sources from clients in regular basis.

3.3. Propagation and promotion of knowledge

The propagation of knowledge among enterprises is facilitated through the reasonable organizational design. However, from this point of view, these

enterprises do not really integrate the propagation of knowledge in their activities (BKAV is an exception). Technological divisions are set-up to coordinate the participation of researchers and engineers. In fact, APP pays more attention for processing processes and it has only one service for R&D purpose. Vabiotech developed certain types of contact and cooperation between R&D and technical units in some projects. BKAV applied the matrix structure to enhance communication between marketing staff and product development staff. APP and Vabiotech assign to the Director Board and the Technological Council the duty of technological integration. CEOs play also the important role in product development thanks to their own knowledge in marketing and technological activities. These enterprises are typical evidences of diversified organizational structures of enterprises in terms of knowledge management. Vabiotech implements more individual and direct approaches. APP is based on functional divisions and BKAV uses the matrix structure. The diversity of organizational structures is due to their different stages of development of different ownership status. From learning point of view, BKAV emphasizes the “technological development” culture. It developed a system for information diffusion purpose and *ad-hoc* groups to develop new products or ideas. The skill-based assessment of activities is a new system of BKAV. Staff develop their capacities and then are ready to give contributions to fast development of enterprises. Achievement of young staff members, flexible environment, simplified human relations and opportunities for use of potentials are key success factors of enterprises. This cultural basis is very useful for enterprises (Leonard, 1995).

BKAV considers “technologies” as core value of enterprise and develops incentive mechanisms for technological sharing. With this core value, the high qualified labor force is equipped with spirits of team work and open cooperation. Vabiotech, though not being so well structured, emphasizes the exchange of ideas through conferences and workshops. It encourages the sharing of experiences among staff members and it recruits experienced experts in some projects. It sets up the salary system based on outcomes of research work and technological development. It also encourages the enhancement of qualification.

In this stage, the impact from institutional supports are not seen clearly. Instead, the role of CEO or high ranked research is found more important. From social capital point of view, the technological propagation is very important for enterprises (ongoing communication among leaders, researchers and engineers).

In terms of cultural differences in these enterprises, their absorption capacities can also change. The enterprises identified some channels to

integrate the knowledge diffusion within enterprises. This fact reflects certain shortage of absorption capacities necessary for absorption and proagation of technologies. The integration requires different adjustments at different time moments. When technological knowledge becomes more complex and implicit the reasonable coordination and organization mechanism is required for technological development. By this way they can improve their absorption capacities. In a relative vision, those enterprises which are sensible to flexible organization mechanism would be successful in technological integration (*Makino et al., 2002*).

3.4. Commercialization of knowledge

Enterprises also use another way to develop their market, namely through business partners. Therefore, for many enterprises, the institutional support is very important to understand and approach the market . At the same time, the social capital built from the early stage of cooperation with “mother” organizations and clients is very important too for commercialization of technologies. BKAV is the first among research enterprises to develop the market orientation. It participated in many market studies and focused activities on anti-virus software in initial stage. Here, its ideas of products can meet market requirements. It has its own famous trade mark. It can gain successes because it took ideas of clients to consideration in initial stage of knowledge creation.

However, when the market gets saturated and comes to high level of competition, enterprises need to develop new capacities to meet new market requirements. Technological commercialization becomes a hot topic at the present time. They need to develop new technologies to keep activities bound to clients. During the early years of development, with the nature of products, BKAV satisfied orders of clients, in terms of both products and services. It understood clearly the needs of clients in early stage of product development, and therefore it did not face too much problem in technological commercialization.

The success of knowledge management in this stage, however, depends much on social capital, particularly network relations of clients and partners. Almost all the products of BKAV were developed by orders of clients, and therefore the required knowledge is the implicit one. There are many difficulties for enterprises to commercialize their own knowledge without market contacts. Here, enterprises realize well the role of development of an organizational mechanism with integrated feed-backs from clients, in process of knowledge development. By this way, enterprises realize well the need of absorption capacity development through a linking mechanism.

4. Conclusion

In initial stage, the State ownership originated enterprises based their activities on coordination with “mother” organizations. The latter support the initial stage of technological development. Therefore, enterprises focus their attention on market demands and transferred technologies for business application. Enterprises gather their core technologies from “mother” organizations and these technologies secure their competitiveness in initial stage. Social and administrative relations are important factors in knowledge gathering process. The central role of enterprises in economic shift process and development during the last years provide them with conditions to secure the main market without serious difficulties. This re-confirms the point of view that the institutional support and the social capital cause impacts to knowledge gathering (*Makino et al., 2002*).

S&T enterprises pass the shift from academic activities to market ones and then they need to be supported in institutional aspects for knowledge gathering. This becomes particularly important when the State puts accent on promotion of development of S&T enterprises. When an enterprise is set-up, the problem is to reduce the dependence on “mother” organizations. Finally there is a link in “*sale-purchase*” relation between “mother” organizations and enterprises. Enterprises have to explore new markets and new product for its own existence and competitiveness. However, if clients in the past were from local market, they did not have too heavy pressures for development of modern technologies. They seek only the demand for development of new technologies when they start looking for markets abroad. The social capital (only in connection with “mother” organizations) would not enhance the absorption and integration of new technologies. Here, the State ownership originated enterprises have to develop their own sources to absorb market related technologies and knowledge to maintain their competitiveness. In transition economy, as Vietnam is now, the institutional supports are very important for development of enterprises. When enterprises can develop their own sources their dependence on institutional supports will reduce.

Knowledge diffusion is not conducted really well in almost all the enterprises. Enterprises depend much on heavy organizational structure for knowledge diffusion. Integration is not carried out well, except the case when CEO or senior managers take duties of integration. In almost all the enterprises CEOs are responsible for technological problems. Enterprises should concentrate technological development on small groups then integrate technologies. This situation has various causes. First of all, the products of newly set-up enterprises are highly focused, the market is not

really complex and the demands for high techs are not urgent. The culture of flexible organization and technological integration is not really developed yet among enterprises in developing countries. When the product market passes a fast development and innovations become a tough demand, there will be a need of mechanisms to facilitate the permanent interaction and close integration for successful diffusion of knowledge (*Makino et al., 2002*).

At the same time, there are not many incentive measures for sharing knowledge among divisions. The learning now is mainly a personal matter but not the one of divisions. From the point of view of mobility of human resources in knowledge based enterprises this matter of incentive measures is necessary for sharing knowledge among divisions. Here, social capital is required to facilitate the knowledge diffusion. When the organization mechanism of enterprises is not set-up reasonably the prevailing role will be of implicit knowledge and intangible relations, such as social networks and individual prestige. These intangible resources can enhance absorption capacities of enterprises.

Private enterprises have a better market concentration. They create products to fit the needs of clients by facilitating the involvement of clients in the initial stage of product development. However, the commercialization process was not integrated intentionally with the process of knowledge creation or diffusion. Clients use their products with feedbacks rather than further involvement into technological development.

Vietnamese enterprises give evidence that social capital can cause impacts to the knowledge commercialization process, in which the important role of institutional supports and the organization arrangement for knowledge management were not taken into exhaustive consideration by enterprises. It is clear that institutional supports have less value in the knowledge diffusion process than in the knowledge absorption and commercialization process. The role of institutional matters gets reduced during the development stage of enterprises. The topic of knowledge management is novel for Vietnamese enterprises and is not set-up as an institutional matter in enterprises. The dependence on the structure and learning mechanism is not sharpened yet clearly.

The social capital allows S&T enterprises to set-up a network to cover the shortage of network links. This network would include "mother" organizations, research institutes, universities and even clients. This network will settle the problems met in knowledge diffusion and knowledge absorption and commercialization. However, the problem of IP protection should be considered in more details./.

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