Apply KM and SNS for Improving Labor Productivity of Vietnamese SME

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Abstract— **In today's knowledge era, knowledge management (KM) is increasingly considered the best strategy for improving the labor productivity of an enterprise. However, the effectiveness of KM on labor productivity (LP) is not known exactly. In comparison with other countries in the Southeast Asia region, the labor productivity of Vietnam is currently at a very low level. It requires a new management method for improving the labor productivity for sustainable development towards a knowledge society. Therefore, this research tries to apply KM to improve the labor productivity of Vietnamese enterprises, especially small and medium sized enterprises (SMEs) because of its important role in developing the Vietnam economy. However, in order to successfully implement a knowledge management system (KMS), a technology readiness, especially information-communication-technology (ICT) maturity, is a requisite. Furthermore, a suitable technical platform is also necessary for integrating various technologies for KMS and supporting knowledge management processes. Recently, social network service (SNS) has been considered not only as a popular technique for communication and collaboration, but also as a suitable platform for implementing a KMS in the enterprise. Therefore, this research explores the possibility to apply SNS in implementing a KMS and adapting business processes for better labor productivity. The method of this research is an inductive method based on analysis results of various sources, such as: literature reviews, empirical studies, technological trend analysis, depth interview, etc. Based on analysis results, recommendations for Vietnamese businesses and government in improving labor productivity are suggested.**

Keywords/Index Terms — **Knowledge Management, KMS, Social Network Service, Labor Productivity, Vietnamese SME.**

1. INTRODUCTION

Nowadays, knowledge is becoming more important for the sustainable development of a business as well as a country. In the knowledge economy, creativity is extremely important, so small businesses can provide the foundation for the development of the society better than the big business. However, in order to acquire, utilize and create knowledge effectively, organizations need to have a certain level of ICT maturity. Lack of an ICT infrastructure and appropriate labor skills, it is difficult to understand new knowledge or techniques, and unable to implement a KMS successfully. This has been proven through the inefficiency of knowledge transfer projects and the failure of KMS deployment in Vietnam in recent years.

On the other hand, labor productivity is one important factor to improve the competitiveness of an organization or a country. According to the OECD's definition (2002), labor productivity is measured by the total output value per hour of labor. Thus, to increase labor productivity, we have to increase total output value or reduce hours of labor. Before the 1990s, the common way to increase labor productivity is either to reduce the hours of labor by the equipment of new machines or to reduce the total number of employees. But today, above methods seem to be ineffective, especially with the emergence of high technology products and rapidly changing technology. Recently, to improve the labor productivity, organizations have focused more on increasing the total output value by investing in R&D and innovation to create new knowledge-intensive products and services, which require complicated labor skills. Therefore, in order to compete effectively with other businesses all over the world, Vietnamese businesses must improve their labor productivity based on investing more in their knowledge strength. However, currently, labor productivity of Vietnam is low (about 5,000 USD/ year – 2008). This requires a specific strategy based on KM to help increase the labor productivity of Vietnam and contribute to the development of the whole economy toward an industrialized country by 2020 as the government's plan.

Moreover, in Vietnam, the number of SMEs is very large (about 98%) and contributed more than 50% of total GDP. Therefore, SMEs become increasingly important and are considered the driving force for the economic development of Vietnam (Tran et al., 2007). The rapid development of technology also supports SMEs to become the major factor for economic innovation and to play an important role in connecting the global supply chain. On the other hand, SMEs are able to change easily and adapt quickly to

market demands and pressures of the economy. However, compared with large enterprises, most SMEs, in Vietnam as well as in the world, do not have enough resources to invest in R&D and

application of new technologies, or deploying a modern information system like KMS. Therefore, it requires a huge effort from SMEs as well as the support from the government to transform SMEs into knowledge-oriented enterprises. Therefore, a solution for helping SMEs to improve labor productivity is the key to open the door to the knowledge economy and to motivate the sustainable development of Vietnam in the 21st century.

In addition, the rapid development of ICT also opens up tremendous opportunities for Vietnamese enterprises in raising labor productivity and implementing a KMS successfully. One of such opportunities is the utilization of social network service in business. Various social network sites, which have many effective tools in connecting, communicating, marketing and knowledge sharing, increasingly become popular in Vietnam. Vietnam, with a large young population and a rapidly increasing number of Internet users, has become one of the most potential places for applying social network service (SNS) in business (ADMA, 2010). Furthermore, open architecture of SNS, which allows the integration and expansion of applications in the future, is an outstanding feature and makes it a potential technology for knowledge management in the organization. Moreover, interesting concepts of "connecting people in working and entertaining", "problem solving based on collective intelligence", "share feelings", etc. through social networking are also the advantages of social network service as an approach for modern management style. Based on this approach, SNS can help to increase the pleasure in working, the satisfaction of employees, and the labor productivity of knowledge workers. Therefore, applying SNS in implementing a KMS in SMEs can be an effective solution in increasing the labor productivity of Vietnamese SMEs, and contributing to the sustainable development of Vietnam on the way to be an industrialized country and to integrate successfully with the knowledge economy of the world.

In summary, the issue needs to be addressed in this study is to find solutions to improve labor productivity of Vietnamese enterprises and to help Vietnamese SMEs develop sustainably and compete effectively with other enterprises in knowledge economy based on their knowledge and technology capability.

Therefore, the main purpose of this research is to find a solution based on KM approach and new technology trend, e.g. SNS, for improving labor productivity of Vietnamese SMEs and contributing to the sustainable development of Vietnam economy in the 21st century.

The structure of this research is as follows: (2) Definitions and related works; (3) Approach for improving LP of Vietnamese SME; (4) ICT maturity of Vietnamese SME; (5) Implementing KMS in Vietnamese SME; (6) Prototyped KMS based on SNS for Vietnamese SME; (7) Policy Suggestion; and (8) Conclusions.

2. DEFINITION & RELATED WORKS

2.1. Definitions

According to Vietnamese Government, SME or small-and-medium enterprise is differed from big enterprise by its size of total capital and the average annual number of laborers. In this research, for simplification, SME refers to enterprise with less than 300 full-time employees.

According to OECD (2002), labor productivity is defined as output per unit of labor input. In general, labor productivity can be measured as average real output per hour of labor. Labor productivity can be measured for a firm, a process or a country. Labor productivity is highly related to employees' skills, especially in high tech organizations. Today, total number of knowledge workers increases in all fields of business, as a result, knowledge resources and innovation capabilities become important dynamics in raising labor productivity.

Knowledge management (KM) is regarded as a process which includes various activities. The KM process can be divided into creating internal knowledge, acquiring external knowledge, storing knowledge in documents and/or in routines (Teece, 1998), and updating and sharing the knowledge internally and externally (Alavi & Leidner, 2001).

Knowledge management systems (KMS) are the integration of technologies and mechanisms that are developed to support the processes of knowledge management.

ICT maturity of SME is the state of an SME, in which it reaches fully development state in applying Information Communication Technology in doing its business and managing its knowledge. There are several ways for measuring the ICT maturity, but 4 common factors used by many researches are: ICT Policy, ICT Infrastructure, ICT Application, and ICT Human Resource (Pham, 2010).

Social network service (SNS) is a representative of new generation of web technology (web 2.0), in which it focuses on building online communities of people who share interests and activities, or who are interested in exploring the interests and activities of others (Smith, 2006). The most powerful characteristic of SNS is the ability to integrate various applications for supporting online interaction between people in the network. Currently, Facebook is considered the 1st ranked social networking site in Vietnam with a lot of

commercial fan pages and total number of Vietnamese Facebookers is increasing very fast (greater than 11 millions – 2/2013).

2.2. Research method & related works

This research is based on Design Science methodology (Hevner et al., 2004). The method for this research is a combination of literature review, empirical study, developing trend analysis and depth interview.

Besides, from our previous researches (Pham & Hara, 2009; Pham, 2010; Pham & Hara, 2011), key lessons for Vietnamese SMEs in implementing a KMS are summarized as follows:

- A preparation phase is needed for improving the current ICT maturity of Vietnamese SME up to level 4 or 5 before implementing a KMS. (Pham, 2010)
- For a successful KM solution in Vietnamese enterprises, Technology capabilities should be improved first, and then Knowledge capabilities. (Pham & Hara, 2011)
- Using SNS or web 2.0 for KM can ensure the success of KMS because of its ability in combining 2 main KM strategies and integrating various technologies for KMS. (Pham & Hara, 2009)

3. APPROACH FOR IMPROVING LP OF VIETNAMESE SME

3.1. LP of Vietnamese SME

Compared with other countries in East and Southeast Asia, labor productivity of Vietnam is at a very low level (~5,600 USD – 2008)

According to Phan N.D. (2009), Vietnam's labor productivity has been increasing at a rate of about 5% per year from 1990 to 2007. The highest growing rate of LP of Vietnamese enterprises is in industry sector.

Currently, most of Vietnamese laborers belong to agriculture sector (54%), where LP growth rate is very low. Only 20% laborers are in industry sector and 24% laborers are in service sector, where LP growth rate is fairly high. This structure explains why current labor productivity of Vietnam is very low.

In the wake of the global financial crisis, Vietnamese enterprises meet a lot of difficulties in the struggle to survive and develop in a more changeable and competitive environment. Recently, the high rate of the movement of skilled employees makes the businesses become unstable and forces them to have a more effective strategy for human resource management to stabilize staff and to improve their LP.

Other researches (Tran et al., 2008; VPC, 2009) also show that Vietnamese laborers are insufficient and unqualified. This problem must be solved and improved for maintaining sustainable development and raising the performance of Vietnamese enterprises as well as the whole economy.

Recently, Vietnamese government has emphasized the goal of generating productive and equitable employment. But this goal has an inherent dilemma because of Vietnam's high growth rate of labor force and low level of labor productivity. In short, in the coming years, the goal of generating productive and equitable employment will continue to be a tremendous challenge. This requires the government to have a systematic solution for developing Vietnam economy based on knowledge strength.

3.2. Approach for improving LP of Vietnamese SME

Based on previous study (Pham & Hara, 2011), labor productivity of Vietnamese enterprise is affected mostly by employee satisfaction, which is affected mostly by KM. Therefore, to raise the labor productivity, Vietnamese enterprises should focus on improving the satisfaction of their employees based on the KM approach. This approach will stimulate KM processes, such as: Knowledge Accumulation, Knowledge Sharing, Knowledge Utilizing and Knowledge Creating. An adaptive KM approach could be a solution, which aims at applying modern ICT gradually to maximize the effectiveness of KM processes toward increasing employee satisfaction in the enterprise.

Besides, through above study, the most important capability affecting the KM of Vietnamese enterprises is found to be technology capability (TC). So, applying modern technology and improving ICT maturity level will help in implementing a KMS successfully. By comparison between 2 parts of TC (Techno-ware and ICT-ware), an interesting finding is that Techno-ware has more impact on Satisfaction and Labor Productivity, while ICT-ware has more impact on KM. Therefore, raising ICT maturity is very important for Vietnamese enterprises before they can apply a KM solution.

Therefore, in this research context, the solution is focusing on ICT investment and KM approach based on intangible assets. Some main points of this solution are summarized as follows: (1) improving ICT maturity of Vietnamese SME; (2) improving quality of labor force by investing on human resources by recruiting, training, educating and reforming business processes; and (3) finally, encouraging knowledge management and innovation by implementing KMS and introducing innovation policies in business.

4. ICT MATURITY OF VIETNAMESE SME

Based on our previous study (Pham, 2010), a tool for measuring the ICT maturity of SME is proposed as a lever for improving LP of Vietnamese SME. This

tool includes a questionnaire for collecting data about 4 main factors of ICT use (Infrastructure, Application, Human resource, and Policy), a 5-stage roadmap for ICT maturity (Inactive, Basic, Substantial, Web-based, and Knowledge-oriented), an ICT maturity index, and suggestions to improve ICT maturity index for each stage.

Based on this tool, a survey had been conducted for Vietnamese SME (about 100 companies). The survey results showed that, currently, there is no Vietnamese SME reached level 5 (knowledge-oriented), and there are only 25% of SMEs reached level 4 (web-based). Whereas, there are more than 50% of large enterprises reached level 4 or 5. The ICT maturity index (ICTMI) of Vietnamese SME is summarized in following figures.
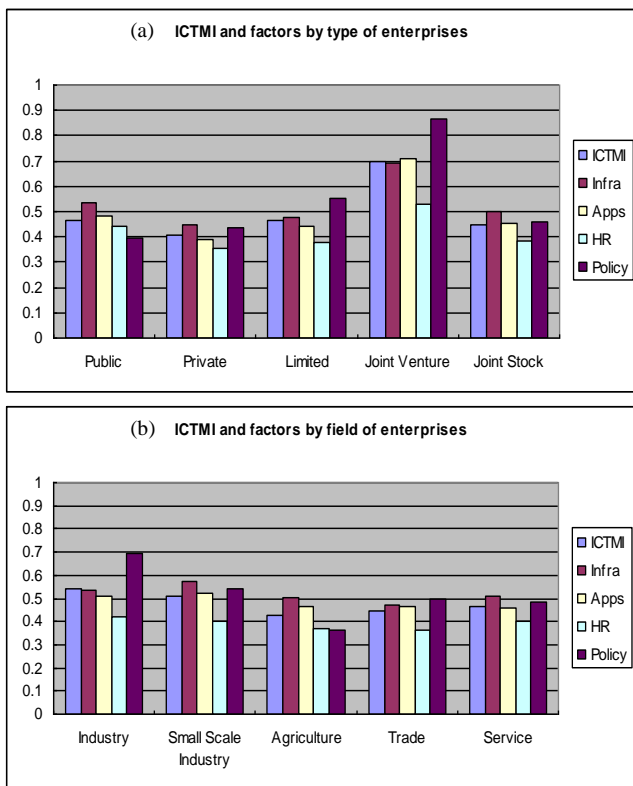

Figure 1. Comparison of ICTMI and other factors by type and field of business

In summary, the ICTMI of Vietnamese enterprises is at an average level (Substantial). For SMEs, the highest ICTMI belongs to enterprises with about 100-200 employees. By type of enterprises, the Joint Venture companies get the highest ICTMI (0.7), and the Private companies are in the lowest position (0.4). In comparison with other factors of ICTMI, Human Resource is at a lowest level for most of enterprises and should be improved to raise the ICTMI.

5. IMPLEMENTING KMS IN VIETNAMESE SME

According to Vu H.D. (2008), Vietnamese SME is increasingly being supported by the government, such

as: an office for supporting SME development was established; some government decrees on the assistance in the development of SMEs were issued, etc. However, currently, successful case of KMS implementation in Vietnamese SMEs is still rare.

Based on our previous study (Pham & Hara, 2011), KM level of Vietnamese enterprises is at an average level (3.5) in the scale of 1-5. Below figure shows the KM level of Vietnamese enterprise by field and type.
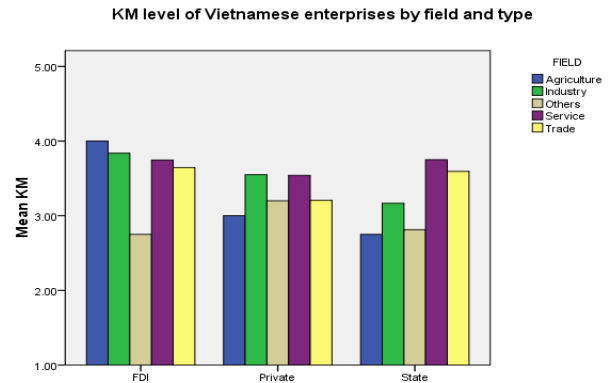

Figure 2. The KM level of Vietnamese enterprises

Above figure shows that half of the enterprises in the survey data started their KMS project. Contrast with current hesitancy of Vietnamese SMEs in implementing a KMS, this result indicates that business environment in Vietnam is increasingly ready for a KM solution and they should apply KM solution as soon as possible. Successfully implementing a KMS will help them effectively compete with other enterprises and sustainably develop in the future.

However, implementing a KMS in Vietnamese SME could be a challenging task because of the lack of experience and resources of SME. Through previous study (Pham & Hara, 2009), SNS is found to be a good platform for facilitating KM processes and ensuring the success of KMS implementation.

6. PROTOTYPED KMS BASED ON SNS

In order to illustrate above solution of KMS based on SNS in Vietnamese SME, a prototyped KMS based on SNS will be implemented for a Vietnamese SME, which is BR&T Ltd. Company. The main purpose of BR&T in building a KMS is to manage its knowledge in various consulting projects and to improve the effectiveness of consulting activities by sharing case-based knowledge.

6.1. System requirements

Based on documents of BR&T about its old KMS project and above ideas of KMS based on SNS, the core requirements are made as follows:

TABLE 2: BR&T'S REQUIREMENTS OF A KMS BASED ON SNS

Functional requirement	Non-functional requirement
Storing information about experts and	Convenient for learning and

their experiences. Building a knowledge base of solved problems for reusing. Communicating and collaborating tools for problem solving. Knowledge sharing tools between consultants. Search function for finding expert, information & knowledge. Tools for managing experts, problems, & related information. Admin tools for monitoring users & protecting security.	using. Adaptable, friendly and good looking user interface. Support rich content information, such as: audio, video, map... Knowledge base can be accessed from anywhere and anytime.

6.2. System analysis and design

Architecture of KMS based on SNS: The architecture of demo KMS includes 3 layers (business, project, social network layer) and is illustrated in following figure. In order to demonstrate the solution, a prototyped KMS based on SNS is built using open source code of Elgg SNS package (Sharma, 2008). The environment for testing server includes: Windows 7 operating system, Apache web server, My SQL DBMS and PHP programming language. The client environment are networked PCs with Mozillar Firefox web browser. Knowledge source includes experts' brain and knowledge base stored in My SQL database.
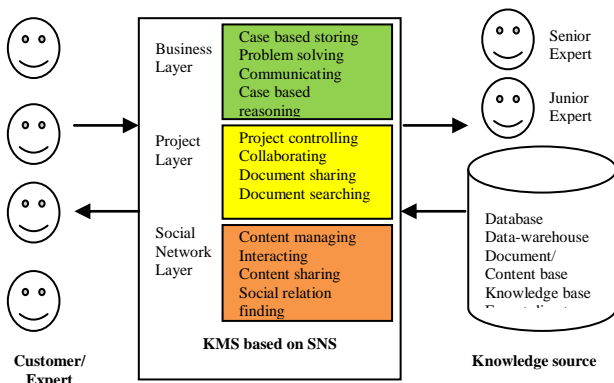

Figure 3. Architecture of KMS based on SNS

Through the demo KMS based on SNS, one of the most important advantages of KMS based on SNS is realized that knowledge flow (relational capital) can be managed and derived. All relations of an employee will be visualized and can be searched through friend network, which is considered a part of that employee's department capital. So that, when someone quits his/ her job, new one who takes that job can set up new relations based on those relationships quickly. On the other hand, SNS also helps sharing knowledge between employees of different departments and different projects directly (tacit knowledge) and indirectly (explicit knowledge). Furthermore, using SNS for KMS, emotion of employees can be visualized through their activities, comments and friend networks.

Above benefits are very important in controlling employee satisfaction, which mutually affects KM

activities and determines the labor productivity (Pham & Hara, 2011).

7. POLICY SUGGESTIONS

In general, the overall solution for improving labor productivity of Vietnamese SMEs of this thesis is to apply a KMS based on SNS in Vietnamese SMEs. Based on theoretical bases, increasing ICT maturity, adapting business environment and raising employee satisfaction are top priorities in preparation for successfully implementing a KMS based on SNS in Vietnamese SME. In short, ICT maturity is used as a central base of a see-saw, in which, one end is labor productivity of Vietnamese SMEs and the other end is KM approach. SNS is used to facilitate KM approach, while employee satisfaction supports labor productivity.

The above solution also helps Vietnam speed up its transitional process toward a modern economy. Currently, the ICT maturity is realized very important for successfully applying the proposed solution (KMS based on SNS) in Vietnam context. Based on the ICT maturity model and real situation of Vietnam, some recommendations for Vietnamese government and Vietnamese SMEs to stimulate their ICT maturity at this time could be summarized as follows:

7.1. Suggestions for Vietnamese government:

ICT infrastructure: Continuing to improve the national ICT infrastructure in the direction of increasing internet accessing methods; raising internet bandwidth and density of broadband user, firmly integrating with global network, and gradually lowering the digital gap between urban and rural area; investing on R&D and technology exchange for applying modern technologies in protecting information security and maintaining effectiveness of national ICT infrastructure.

ICT policy: Adjusting rules and completing legal framework for e-commerce, e-business, e-government and knowledge-based society (intellectual property, security, etc); creating rules and mechanisms for encouraging the investment in ICT sector and applications of ICT in business for further development by various ways, such as: giving capital supports for newly established or expanded enterprises, building industrial zones for ICT sector, providing prizes or incentive tax for leading enterprises in applying ICT in doing business, etc.

ICT application: Creating supporting organizations, such as: SME support center or local KM

solution committee, for encouraging KMS implementation in businesses; encouraging using licensed software or shared application structure, such

as: open source applications and cloud computing; investing on national security applications for safely protecting important information systems of organizations; playing a pioneer role in implementing KMS based on SNS in SOEs and deploying e-Government for reforming administration and providing better public services.

ICT human resource: Investing more on vocational schools, research institutions and high level education for providing enough high quality labor force for the society; enhancing the quality of colleges/ universities, especially in ICT specialized; encouraging setting up of private funds on R&D for facilitating innovation and increasing number of hi-tech experts; attracting overseas Vietnamese, especially professors or scientists, to go back and work for local organizations by providing worthy opportunities and awardable benefits or compensation.

7.2. Suggestions for Vietnamese SMEs:

ICT infrastructure: Modernizing manufacturing technology and gradually improving ICT infrastructure of enterprise, for example, increasing PC/ laptop/ mobile devices density per employee, using LAN, Wireless LAN, WAN to connect all departments/ divisions, ensuring the 24/7 access of intranet, internet and high speed connections for anyone in need, etc; applying security layers for safely protecting personal information, intellectual properties and business secret.

ICT policy: Making regulations/ rules for information accessing and knowledge sharing in the enterprise; encouraging employees to use internal information systems/ social network/ KMS in communicating, collaborating, interacting and sharing knowledge; creating open business culture, which allows all opinions and ideas to be voiced and carefully considered; adapting assessment system in order to encourage innovation, and knowledge sharing among employees; raising investment in R&D for creating new and high-valued products/ services.

ICT application: Frequently upgrading ICT applications in according with new technology trends in the world for a better performance; assigning CIO/ CKO for managing ICT projects, and aligning ICT strategies and business strategies of the enterprise; ensuring the synchronization of ICT applications and safely protecting information and software used in all departments/ divisions; implementing pioneer KMS project, deploying KMS in the whole enterprise, and adapting KMS for ensuring the success of the project as well as increasing labor productivity and overall competitiveness.

ICT human resource: Gradually improving employees' skills during working time by meetings, training courses and self-learning system through KMS; promoting employees based on achievement of continuously self-learning and skill-improving; completing recruitment system of enterprise for attracting and recruiting qualified employees; establishing networks of customers, suppliers, external and internal experts for facilitating innovation and creating better products/ services; connecting with various research institutes, universities, business partners and professional associates for exchanging knowledge and keeping up with new developing trends.

8. CONCLUSIONS

In general, in order to turn Vietnamese SMEs into knowledge-oriented ones, not only the important role of knowledge should be recognized, but also the business environment for KM solution must be ready. This paper proposes a solution for improving LP of Vietnamese SME toward a knowledge-oriented one through 2 stages: (1) improving ICT maturity; and (2) implementing a KMS based on SNS.

The ICT maturity is considered an important condition for a successful KMS. The tool for measuring the ICT maturity is very important in knowing the current situation of ICT use and preparing for applying KM solution in Vietnamese SMEs.

Using SNS as an organizational model and a technological platform, Vietnamese SMEs can make them ready for KM solution and overcome difficulties in implementing a KMS. The proposed KMS based on SNS can be further developed for conducting a KMS project in Vietnamese SMEs in practice.

Besides, a demo KMS based on SNS is also implemented for a Vietnamese SME, which shows that the ability for applying SNS in implementing a KMS in Vietnamese SME is feasible.

However, there are some limitations of this research, such as: the sample size is small, the demo system is not tested in a large scale, economic feasibility of proposed solution is not considered…

Some implications for future works are: (1) Measuring the ICT maturity of Vietnamese SME with a bigger sample size; (2) Testing the demo KMS based on SNS in a large scale of Vietnamese SME (different fields, sizes); (3) Analyzing side-effects of applying KMS based on SNS on LP of Vietnamese SME.

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