Knowledge Management Enablers Toward Successful New Product Development: A Case Study In A Semiconductor Manufacturing Firm

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ABSTRACT:

Knowledge management has been regarded as a key factor in enhancing organisational performance in organisations across the globe. The pivotal role of knowledge management is more pronounced in knowledge-intensive organisations such as those involved in research and development, and new product development. Using a case study of large semiconductor manufacturing firm in Malaysia, this study examines the role of knowledge management enablers in enhancing the performance of the organisation. It specifically looks at the four broad categories of knowledge management enablers identified from the extant literature which are strategy and leadership, corporate culture, people and information technology. Interviews, observation and document review were among the tools used to elicit information collected for further analysis. The results supports the findings obtained from previous studies regarding the role of these four knowledge management enablers when implementing a KM programme within an organisation. Interestingly, this study found that that both talent and succession management helps to retain much needed expertise and knowledge apart from keeping long-term as well as committed connections within the organisations knowledge workers.

Keywords: N*ew product development, Knowledge management, Socio-technical factors*

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1. Introduction

Since the 1980s, academics and practitioners took interest in knowledge management issues especially within the context organizational performance improvement (Wainwright, 2001). With knowledge taking on a key strategic role, many organisations have embarked on enterprise-wide knowledge management initiatives with the aim of leveraging as well as transforming organisational knowledge assets into core competencies to obtain competitive advantage (Wu, 2008). In general, effective knowledge management ensures that business-critical knowledge becomes more visible, more appropriately distributed, linked together at the right level of proficiency and adequately codified (Hofer-Alfeis, 2008).

Among all the critical business processes for enterprises to survive in today's highly competitive business environment, new product development (NPD) is one of key activities that is undeniably one of the most knowledge-intensive processes and is by itself constantly creating new knowledge (Söderquist, 2006). These new knowledge are considered to be useful ideas in which enhance the development of new products and processes to manufacture products and services for the organisation. The successful management of this knowledge becomes a distinguishing factor in the competitive advantage possessed by market leaders, particularly in a knowledge-intensive industry like the semiconductor industry (Appleyard & Kalsow, 1999).

NPD involves many functional areas, including engineering, marketing, manufacturing, and finance with these teams frequently composed of heterogeneous-skilled individuals who must interact and learn from each other for the project to be successful (Lynn et al, 2000). As NPD relies heavily on collaboration within cross-functional teams, the question of how such knowledge which to a large extent is tacit, should best be managed and disseminated is crucial. As enterprises start to manage their organizations' knowledge they need to be clear of the factors that will influence knowledge management practices within the organisation (Yeh et al, 2006). Knowledge management enablers allows the organization to develop its knowledge and also stimulate the creation of knowledge within the organization as well as the sharing and protection of it (Yeh et al, 2006).

To manage knowledge in an NPD effort, enterprises have to face issues of corporate culture, workflow processes, and the integration of group members' knowledge apart from strong top management support (Yeh et al, 2006). Enterprises also need to increase the usage of information technology in order to help the problem regarding the flow of information. Through a case study of a semiconductor manufacturing firm in Malaysia, the objective of this paper is to identify and investigate the effect that various KM enablers have in a semiconductor manufacturing company, explicitly focusing on its NPD process. The paper will first present a review of the extant KM literature providing an understanding of KM issues in general and the different types of factors that determine a KM initiative's success in particular. It will then analyse the case based on the reviewed constructs and concepts in an attempt of providing an overview to the various aspects in KM and hopes to provide a reference for similar organisations of these critical success factors, which need to be considered before, during and after the implementation their KM initiatives.

2. Review Of Extant Knowledge Management Literature

2.1. Knowledge Management

According to Call (2005), many different definitions exist for knowledge management and it is often defined as anything someone or organization wants it to be. He states that Bill Gates' definition of KM is simple and clear as "… nothing more than managing information flow, getting the right information to the right people so they can act on it quickly". Knowledge management can be defined as the process for acquiring, storing, diffusing and implementing both tacit and explicit knowledge inside and outside the organization's boundaries with the purpose of achieving corporate objectives in the most efficient manner (Magnier-Watanabe & Senoo, 2008).

On the other hand, Ergazakis et al (2002) provide us with a more complex definition stating that it is the process of creating value from the intangible assets of an enterprise and it deals with how best to leverage knowledge internally in the enterprise and externally to the customers and stakeholders. Call (2005) explains that in order to understand the basis of knowledge management, we must first agree on at least a broad definition of knowledge. He further stresses that none of these definitions are completely accurate, nor are they completely inaccurate and that the definition of knowledge management could change from company to company, even from initiative to initiative.

It is a common belief that by leveraging knowledge, an enterprise can stay competitive in the more globally oriented market of today (Ergazakis et al, 2002). KM has a significant influence on the success or failure of an enterprise. Based on recent survey by (McKeen et al, 2006) in an exploratory investigation of the organizational impact of KM discovered that not only did KM practices have a direct relationship with intermediate measures of organizational

performance but organizational performance also exhibited a significant and direct relationship to financial performance. It is clear that KM is an emerging field that has commanded support and attention from the industrial and academic community.

Many large, medium and small-scale enterprises are now engaging in KM in order to gain a competitive advantage in the market place. Ergazakis et al, (2002) reported that the majority of companies is using KM programs; according to a study by the Conference Board, sponsored by PriceWaterhouse Coopers, of 150 top executives of 96 leading companies (83% U.S., 14% Europe, 3% Asia/Pacific), eighty-two percent of the surveyed companies said that they are involved in KM activities and will increase their efforts over the next five years. Similar conclusion derived from another research that KM importance is acknowledged by over 90 percent of companies surveyed recently; it is so essential to corporate management that spending on KM worldwide was expected to reach ten billion US dollars by 2004 (Call, 2005).

2.2 Knowledge Management Enablers

Chong (2006) asserts that if KM is a critical determinant to an organization's success, then it is extremely important that a KM programme needs to identify critical performance indicators of success factors to gauge its performance. The analysis of critical success factors provides an important indication to organization to reflect KM performance. KM enabler refers to the key factors that determine the effectiveness of executing knowledge management within the organization, which are the driving force that solidifies knowledge management (Yeh et al, 2006). In other words, in order to ensure the success of bringing in knowledge management, it is crucial to be able to acquire the key enablers so as to make it possible to effectively utilize an organization's limited resources, reduce the use of manpower, material, and time, and still be able to achieve the expected results (Yeh et al, 2006).

Chauvel and Despres (2002) define KM enabler as barriers associated with KM and as structural or functional conditions in a company that are responsible, at some level, for the success or failure of a KM initiative. Others viewed KM enablers as those activities and practices that should be addressed in order to ensure successful implementation; these practices would either need to be nurtured if they already existed or be developed if they were still not in place (Wong, 2005). Based on all these findings, this research believes KM enabler refers to critical factors need to develop in an organization that serve as driving forces to solidifies knowledge management.

Chong (2006) further point out that although KM experts such as Davenport, Prusak, Stewart and Sveiby have developed the basic concept and ideas of KM since the late 1990s, the research stream of KM is still emerging and developing. Perhaps to date there has been no study that clearly defines boundaries and frameworks of KM. Since KM involves almost every field of business, i.e. management theory, marketing, management information systems and so on, the proposed success factors are fragmented and diversified. Yu et al (2007) found out that KM team activity, learning orientation, KM system quality, and KM reward to have a significant, positive influence on KM performance. Bishop et al (2008) identifies eight critical factors, which need to be considered before, during and after the implementation of a KM initiative, to ensure its effectiveness, as follows: (1) clear definition of KM; (2) business objectives; (3) integration with organisation; (4) champions and a supporting team; (5) top-level support; (6) demonstrate the benefits; (7) financial and non-financial rewards; and (8) balance between people and IT.

Among the studies conducted on identifying KM critical success factors, another comprehensive list of success factors have been presented with 11 key KM components (Chong, 2006). They consist of: (1) employee training; (2) employee involvement; (3) team working; (4) employee empowerment; (5) top management leadership and commitment; (6) information systems infrastructure; (7) performance measurement; (8) knowledge-friendly culture; (9) benchmarking; (10) knowledge structure; and (11) elimination of organizational constraints.

Yeh et al (2006) found out that among the enablers on the part of strategy and leadership; obtaining top managements' support is most important; among organization culture enablers is the forming of an atmosphere and culture of sharing is most important but needs to be supplemented by informational technology; among people enablers, other than training courses and channels that provide learning, employee incentive program is one of the executing key factor; and among informational technology enablers, other than the digitization of documents, the function of speedy search of information for its re-use is becoming more and more important. After considering several knowledge management theories from various scholars, it is believed that the success of KM is dependent on more aspects and can be grouped into some generic factors. However this research is only focusing on four key factors which are strategy and leadership, corporate culture, people and information technology. Based on these four generic factors, the summary is presented in Table 1.

Table 1 Summary Of Knowledge Management Enablers/Critical Success Factors (Source: developed for this study)

Author/s	*Enablers / Critical Success Factors*			
	Strategy & Leadership	**Corporate Culture**	**People**	**Information Technology**
Wong (2005)	Management leadership Management support Strategy and purpose Organization structure	Culture	Motivation aids Training HRM	IT
Chong (2006)	Management Commitment	Knowledge friendly culture	Training Involvement Team working Empowerment	IS Infrastructure
Bishop et al (2008)	Clear definition Business objective Champion Top level support	Integration	Support team Reward	IT
King (2008)		National culture Organizational culture Organizational climate	Team climate	
Lee et al (2000)	Organization structure	Collaboration Trust Learning	People skills Development	IT
Okunove & Karsten (2002)	Structure		People	IT infrastructure
Oltra (2005)	Strategy motivation		HRM practices Participative Cross functional	IT infrastructure Customization
Yeh et al (2006)	Top management support	Sharing culture	Training Learning channels Incentive	Digitization of document Speedy search

Singh (2008)	Leadership style	Employee effort
Yu et al (2007)		Team activity Learning orientation Reward

2.2.1. Strategy And Leadership

Effective knowledge management largely begins with a proper KM strategy which needs to be unique and company strategy is base on it to capitalize strengths and mitigate weakness (Wu, 2008). Halawi et al (2006) identify five basic KM strategies based on how organization approach and focus on their KM practices. They explained the concept as below that some practice knowledge management as a business strategy where the focus is on knowledge creation, capture, organization, renewal, sharing and use in all organizational activities. Others focus on the intellectual asset management strategy, which includes enterprise-level management of specific intellectual assets such as patents, customer relationships, and other organizational structural capital. A third approach is to concentrate on a personal knowledge strategy, which highlights each employee's personal responsibility for KM. A fourth strategy is the knowledge creation strategy which stresses organizational learning, research (both basic and applied) and development, and motivation of employees to innovate, learn from past experiences, and obtain new and better knowledge to enhance competitiveness. The fifth strategy is the knowledge transfer strategy, which emphasizes the systematic transfer of knowledge across the organization and the adoption of best practices.

After we understand the important relationship between knowledge management and company strategy, leadership then comes into play as an important role. Leaders are important in acting as role models to exemplify the desired behavior for KM (Wong, 2005). They should exhibit a willingness to share and offer their knowledge freely with others in the organization, to continuously learn, and to search for new knowledge and ideas. Wong (2005) believes that it is vital for leaders to model their behaviors and actions through deeds, not just words so that they can further influence other employees to imitate them and increase the propensity of employees to participate in KM. Oltra (2005) points out to other leadership competencies that would be important include steering the change effort, conveying the importance of KM to employees, maintaining their morale, and creating a culture that promotes knowledge sharing and creation.

Singh (2008) investigated the relationship as well as the impact of leadership styles on knowledge management practices based on collection of comprehensive quantitative data. His research findings indicate directive as well as supportive styles of leadership found to be significantly and negatively associated with the art of KM practices. It also depicts that consulting and delegating styles of leadership are positively and significantly related with managing knowledge in organization. Singh (2008) further derived the conclusion that only the delegating mode of leadership behaviors was found to be significant in predicting creation as well as management of knowledge for competitive advantage.

2.2.2. Corporate Culture

The relationships between KM and culture, or element of culture concerning the successful practice of KM are an important part of the conventional wisdom of KM (King, 2008). Similar opinion expressed by Lee & Choi (2000) that corporate culture are found to be significant in predicting the knowledge management processes. McDermott & O'Dell (2001) defined culture as the shared values, beliefs and practices of the people in the organization. They belief culture is reflected in the visible aspects of the organization, like its mission and

espoused values. On the other hand, culture also exists on a deeper level as well, embedded in the way people act, what they expect of each other and how they make sense of each other's actions. McDermott & O'Dell (2001) further add on that culture is hard to articulate, invisible to organizational members and is rooted in the organization's core values and assumptions.

These assumptions, or beliefs, represent interpretive schemes that people use to perceive reality and to make sense of it and they are formed over time as members of an organization make decisions, cope with problems and take advantage of opportunities (King, 2008). Then, the assumptions are passed on to other members of the organization. A specific culture emerges when all those in the organization accept these assumptions or beliefs as interpretive schemes. Finally, these underlying assumptions present a set of social norms that define the rules through which people interact in the organization.

The importance of culture to KM is outlined by Lee and Choi (2000) who state that organizational culture should have several components with regard to knowledge: (1) people have positive orientation to knowledge, (2) people are not inhibited in sharing knowledge, (3) knowledge management project fits with the existing culture. This is also a view held by other researchers who state that a culture, which achieves a best fit with an organization's KM practices, is one where the employees do not feel any inhibitions about sharing knowledge and it is also vital for an organization to develop an open and trusting culture. (Bishop et al, 2008).

McDermott and O'Dell (2001) found many examples where well-designed knowledge management tools and processes failed because people believed they were already sharing well enough, that senior managers did not really support it. They also point out that companies that successfully implement knowledge management do not try to change their culture to fit their knowledge management approach. They build their knowledge management approach to fit their culture. As a result, they conclude that there is not one right way to get people to share, but many different ways depending on the values and style of the organization.

King (2008) further listed four ways that organizational cultures (and subcultures) can influence KM. King explains that culture: shapes assumptions about which knowledge is important, mediates the relationships between organizational and individual knowledge, creates a context for social interaction and shapes processes for the creation and adoption of new knowledge.

2.2.3. People

The people involved with the implementation and management of a KM initiative play a vital role in determining its effectiveness within organization (Bishop et al, 2008). Qualified human resources are the key and a suitable human resource management (HRM) system is necessary for effective KM capacity to add value to the firm (Lin & Kuo, 2007). Adopting a proper HRM strategy and practices significantly affect organizational members' attitude, belief, and value systems that facilitating employees' absorption, transfer, sharing, and creation of knowledge (Shih & Chiang, 2005).

Integrating a KM initiative within an organization and within the daily activities of its people will require a change in the way employees work (Bishop et al, 2008). It is important to ensure the staff members recognize the value of KM (Bishop et al, 2008). They definitely want to see their knowledge contributions have been acknowledged and rewarded, through financial or non-financial means. However, it continues by stating that some authors have advised against financial rewards, recommending intangible rewards instead, such as peer recognition, learning opportunities and greater autonomy. Performance management programs

are also found to be significantly affect employees' motives and behaviors in participating KM activities (Shih & Chiang, 2005).

Learning orientation exists in all organizations in any form and it is the foundation of fostering organizational learning. When organizational members have a strong will to acquire knowledge to solve their problems and innovate on their business process, the organization is likely to accumulate high quality knowledge and will find it easier to satisfy its end users since KM tools, methods, and principles will render a good fit with such learning-oriented users (Yu et al, 2007).

2.2.4. Information Technology

Information technology (IT) from a KM enabler perspective is the fundamental building block that supports and coordinates knowledge management which among others include database, knowledge platform, performance evaluation management system, and integrated performance support system, etc (Yeh et al, 2006). One of the main role of information technology in KM is to accelerate the speed of KM transfer and creation (Carvalho & Ferreira, 2001).

KM can be enhanced and supported through applications of advance IT tools to create an infrastructure and a "field" for support of the timing, scope, and efficiency of the underlying KM processes such as creation; storage and retrieval, transfer and application (Easterby-Smith & Lyles, 2003).

According to Carvalho and Ferreira (2001), the implementation of a KM tool is complex process and has direct relationship with other KM enablers. They point out that the KM tool needs not only to be integrated to the existing IT infrastructure, but to the organizational culture, procedures and Human Resources policy as well. They also notice the differences between KM tool and other software like ERP (Enterprise Resource Planning) that are usually implemented in a top-down style, and the organization generally has to adjust its processes to the new system in a short period of time. Carvalho & Ferreira (2001) further assert that it is impossible to do the same with a KM system in which commitment and motivation of members is crucial to any KM program, much more than better KM tools. They believe KM requires a long-term strategy to involve people and to break paradigms of the people.

Desouza (2003) has the same opinion but adds that KM systems should encourage dialogue between individuals rather than just point to repositories. He asserts that it is impossible to capture all expertise in databases, thus technology must move away from this goal and foster communication. Organization must recognize that information technology is only one means to foster knowledge and using metrics such as access to the knowledge base or number of postings may not be a true indicator of knowledge-sharing behavior of employees (Desouza, 2003).

Yu et al (2007) believe the quality of the IT tools which measured in terms of response time, reliability, ease of use, etc is very important to the implementation of KM system. They explain that if the quality does not satisfy the users' expectations, then that system will not only be deserted by the users but also fail to improve organizational performance. On the other hand, an easy-to-use, easy-to-access, responsive, and reliable system will enhance the process and outcomes of end users' knowledge creation, sharing, and utilization.

Yu et al (2007) opine that if strategy and people are the main enablers for executing knowledge management, they then argue that information technology would therefore be the

fundamental tool for knowledge management due to its role in the transference of experiences within the organization. In addition to that, another key area that requires attention is corporate culture as it is the culture of open-mindedness and mutual understanding that provides the platform for the culture of mutual trust, collaboration and therefore motivation for mutual knowledge sharing in the organization (Yu et al, 2007).

3. Research Method

Based on the four major categories of KM enablers identified in the literature review, a case study of a large semiconductor manufacturing firm in Malaysia was conducted. The organization was selected due to its maturity, relative market share and innovativeness in ICT and systems. In addition to that, the researchers' close relationship with the organization allowed us to probe further as and when required in a cordial and welcoming research setting with the individuals in the organization.

The specific research methods used include semi-structured and unstructured interviews with employees, observations at meetings, discussions and training sessions, and document review. With regard to the confidentiality and anonymity of individual respondents and the organization, a pseudonym is used for the organization and the respondents were assured of the anonymity and confidentiality of their responses.

3.1. About VITRIX

VITRIX (a pseudonym) was founded in the late 1990s when the semiconductor operations of its parent company, were spun off to form a separate legal entity. In recent years, the company achieved more than EUR 4 billion in revenue annually.

VITRIX is one of the leading companies in the semiconductor industry. It offers semiconductors and system solutions for automotive, industrial electronics, chip card and security as well as applications in communications. Its products stand out for their reliability, quality excellence and innovative and leading-edge technology in analogue and mixed signal, RF and power as well as embedded control. A strong technology portfolio is characteristic for the company. With a global presence, VITRIX operates in Europe, USA and Asia-Pacific regions.VITRIX develops, manufactures and markets a broad range of semiconductors as well as complete system solutions addressing three central challenges to modern society: energy efficiency, mobility and security. Therefore research and development is a crucial activity and NPD process is the key focus in the company.

3.2. VITRIX And Knowledge Management

VITRIX invests approximately Euro 800 million a year in research and development, with over 30 major research and development locations all around the world and approximately over 5,000 employees involved in research and development. With more than 20,000 patents to its name, this is convincing proof of the company's technological leadership.

To stay competitive and on profitable growth in the interest of stakeholder, VITRIX challenge to turn these ideas (patents) into products. 'Idea To Product' (ItP) was defined as one of the VITRIX core processes with mission to provide in time the products for its portfolio according to customer and market requirements with a high gross margin. ItP process flow is further divided into chronological process steps, whereby each milestone (T1 to T10) requires realized activities at the defined timeline.

In other words, it is project management function's role to outline the tasks, goals, resources and responsibility to ensure proper project execution, and handshakes among cross-functional teams. The challenge here is to gather and process relevant information and encapsulated knowledge from a variety of internal and external sources. Knowing how to acquire knowledge and manage sources of uncertainty along the ItP process is vital in order to reduce the risk of failure of either the project or the resulting product. VITRIX is required to implement KM to address concerns, problems, uncertainties, assumptions, and the relationships between them.

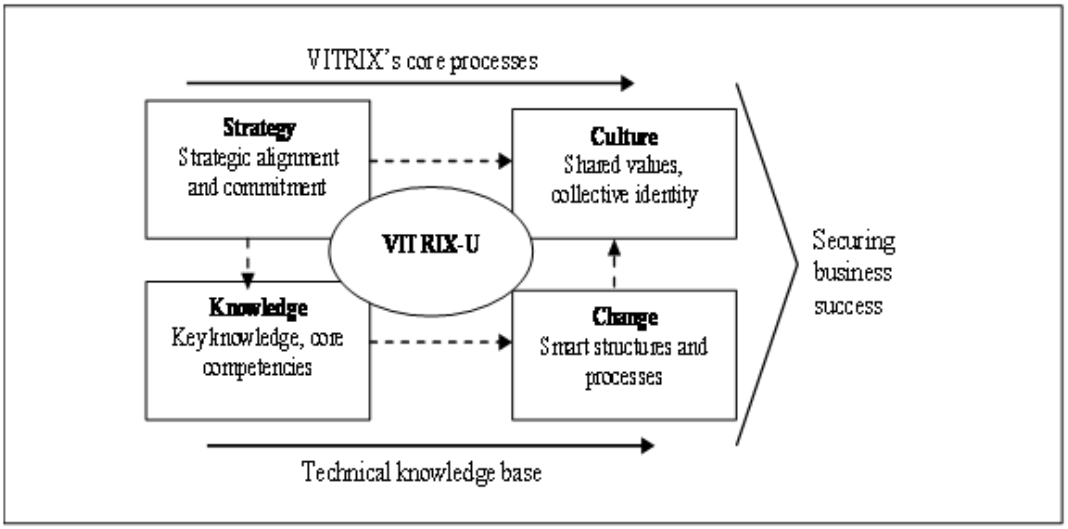
3.3. Knowledge Management Enablers

The four key KM enablers analysed in this study which are strategy and leadership, corporate culture, people and information technology shall be discussed in relation to the findings from the case study conducted at VITRIX.

3.3.1. Strategy And Leadership

Knowledge management is a prime topic of VITRIX. Top management strongly supports knowledge management and often uses different occasions to emphasize its importance to the first-level managers. The management board stressed mentioned that knowledge of the technical expert is the most important factor for the success of the company's NPD initiatives. Therefore the concept of VITRIX University (VITRIX-U) was kicked off in its headquarters in Germany to support the four fields of strategic corporate development and is an engine for corporate learning as illustrated in Figure 1.

Figure 1: Basic Ideas And Objectives Of VITRIX-U



VITRIX's management further defined the goals of the knowledge management programme to strengthen the technical leadership in the company by enhancing joint knowledge exchange and speeding up knowledge transfer and innovation within various strategic fields of knowledge. To this end, VITRIX develops and maintains a high level of technical leadership by:

- developing the technical competence of the experts.
- improving the link between management and technical experts:
- Management gives direction to technical community (strategy, roadmaps etc.)
- Experts provide management with feedback on technical trends and business opportunities.
- establishing platforms and tools, which support knowledge exchange and learning.

Numerous knowledge exchange platforms are already in place in the company. Internal management as well as technology & innovation forums are used as cross-functional dialog platforms, which build awareness for key strategic topics and drive innovation. People at VITRIX are engaged in communities of practice to share their technical as well as business-related knowledge and experiences. Another innovative concept initiated in VITRIX is iCommunity; it is a protected 'room' for selected top experts working together and self organized besides daily business on a defined topic, to create or initiate innovations for tomorrow. I-Community supports innovation and fosters knowledge sharing and creation by:

- providing defined and protected "room" (time/organization/topic) to work on various topics coined as i-topics.
- staffing projects strategically.
- providing time and room for lateral thinking.
- facilitating networks between experts.
- providing time for continuous and intensive working on topics

Management also plays an important role and able to influence the success of I-Communities in following ways by providing topic definitions and the staffing of the I-Communities. In addition to that, adequate time and resources are expended into this project thereby affording

the experts at VITRIX with unlimited communication possibilities on the I-Communities platform.

3.3.2. Corporate Culture

VITRIX is a global high-tech company with highly-skilled and fully engaged employees wgi work together across international boundaries in order to achieve the best. It is VITRIX's employees' deep and diverse knowledge which enables the organisation to drive innovative solutions in order to maintain its competitive position in the semiconductor industry globally.

Therefore, the organisation focuses very much on the culture of open-mindedness and understanding among research personnel when it comes to the topic of knowledge management. VITRIX fosters open-mindedness as well as cross-cultural understanding among its diverse and global workforce. Managing diversity within VITRIX requires it to enable every employee regardless of their background to develop his or her full potential to achieve higher organizational effectiveness. Thereby, VITRIX employees consider themselves as global team players and view cross-cultural interaction as the norm.

3.3.3. People

VITRIX employs a vision and corporate philosophy that stresses on continuous thinking, requiring everyone to never stop learning and developing themselves. VITRIX provides global learning and developmental opportunities for its leaders and employees. VITRIX proactively strengthens the competencies and skills of its employees through a variety of well-defined training and development opportunities.

On the other hand, with the talent and succession management approach, VITRIX enables its employees to reach their highest potential and contribute significantly to VITRIX's success. Research personnel are enthusiastic with good learning capabilities that look for challenging assignments to get professional satisfaction, therefore with "guarantee" demonstrated from management on their career path, research personnel become embedded in their jobs and their communities.

VITRIX management also believes great work should be recognized and rewarded. That is why compensation at VITRIX focuses on performance and results, which spurs on entrepreneurial thinking. VITRIX offers a wide range of benefits and other advantages, in line with local market practices, such as health care, insurances and pension programs. To support a good work life balance such benefits such as flexible working time and good environment are considered important.

VITRIX have achieved a high level of competence in design, intellectual property, and tools for development. Well-qualified specialists are engaged in designing chips and developing and testing software, focusing on industrial consumer, telecommunications, and micro controller products.

3.3.4. Information Technology

The organisation actively supports their employees' collaborative work in teams and networks across international borders. VITRIX invest heavily in IT to enable knowledge sharing among employees all over the globe, and pool the strengths of the employees in order to capitalize on its synergies. One of the examples is iShare, an eCollaboration platform that seamlessly connects employees, teams and information on virtual workspaces. As a central

communication and project or team management interface these workspaces facilitate collaboration by providing an optimized knowledge exchange. Furthermore, iShare provides employees with new and innovative personalized homepage called MySite where they can collect all information of interest on one single site.

MySite's aggregation, organization and search capabilities for people, teams and information enable users to work more efficiently. Numerous collaborative features open the door for real office integration and a paperless office environment. iShare offers employee with a place for flexible, integrated, easy and comfortable eCollaboration within a web browser, so that worldwide collaboration is no problem anymore. Listed below are some of the features of the tool that helps to foster the knowledge sharing:

- In the document library, employees can store and share all kinds of files with team members.
- With different types of customized or default lists for example employees can assign tasks to their team members, view important links and contacts, display Excel lists, announcements and news, team events or employee initiate discussions and surveys.
- For the lists and libraries employee can enable automated versioning, design different types of columns and different views to show the information in the best way for the team members. Employee can enable as well an alert function so that they are alerted via eMail when something changed in a list that is important for them.
- Employees can display and organise all these important information on one place.
- Employees can search their information via an integrated search engine.
- iShare offers employees the possibility to assign autonomous and very flexible and differentiated permissions for their iShare sites and lists.

4. Discussion

Analysing VITRIX's process of implementing knowledge management, it is clear that the most important factor is "gaining the support from top management". This is also one of the necessary processes before the execution of any strategy. This matches with Wong (2005), Davenport et al (1998), Bishop et al (2008) and Chong (2006) finding that management have to understand and see the value of knowledge management and be willing to play an active role during its implementation. Apart from this, VITRIX believes that the management needs to provide clear direction of its strategy to the technical community. In return, experts will provide more valuable feedback on technical trends and business opportunities to the management.

For the corporate culture enabler, the 'open-mindedness and understanding' is most important factor observed at VITRIX. This is in line with Lee and Choi (2000) and Bishop et al (2008) finding that organizational culture has a positive association with knowledge and ensures that people are not inhibited when sharing knowledge.

However, it needs to be supported by team collaboration tool, which is the support of the information technology enabler. This matches with Desouza's (2003) findings that KM systems should encourage dialogue between individuals rather than just point to repositories.

We have the same opinion that it is impossible to capture all expertise in databases, thus technology must move away from this goal and foster communication. With the set up of the iShare platform, VITRIX connects every expert's database, making the search of information much easier. In addition to the emphasis on the digitisation of reference material and the importance of the search function, VITRIX also emphasizes the transparency of information within the company, which means that the employees can find all the relevant topics when they enter the system.

The people enabler shows that other than the learning program for the talents and the channel of learning that are important – which is identical to Davenport et al (1998) and Alavi and Leidner's (2001) finding – incentives and rewards from management do play an essential role as well. On the other hand, VITRIX's talent and succession management helps to retain talents and to keep long-term as well as committed connections with their knowledge workforce.

5. Conclusion

A key challenge faced by NPD projects is how to acquire knowledge and manage sources of uncertainty in order to reduce the risk of failure of either the project or the resulting product. Since, people are directly responsible for knowledge production to ensure proper project execution and handshake, the application of knowledge management includes more than just the setting up of the system, or the application of information technology. It is also a mixture of a combination of various factors resulting in the difficulty of implementing knowledge management. Therefore, if enterprises know what the key enablers are, then they will be able to speed up the efficiency of knowledge management and make the process of implementation much easier.

This research first concludes that strategy and leadership, corporate culture, people, and information technology are four of the enablers in knowledge management, based on past-published papers. Through the case study of VITRIX, this study has found that for the strategy and leadership enabler, the most important part is to obtain the support of the top management. For the corporate culture enabler, the important part is the forming of a culture of open-mindedness and understanding to enable better collaboration among world team members. Apart from the training program, the channels of learning and the reward program for the employees are also key factors for the people enabler. However collaboration among research personnel needs to be supported by team collaboration tool, which is the support of the information technology enabler.

In essence, the results from this case study supports the findings obtained from previous studies regarding the role of strategy and leadership, corporate culture, people, and information technology enablers when implementing a KM programme. In addition, this research has also discovered that talent and succession management helps to retain scare knowledge, expertise and skills apart from ensuring that long-term as well as committed connections with the organisation's knowledge workers.

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