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Abstract

Facing unprecedented challenges and opportunities ahead in the knowledge economy, managing knowledge has been a priority for many organisations. Knowledge Management (KM) emerges and has quickly gained weight in research both from information systems perspective and management sciences. An amply documented dilemma is the absence of specific implementation guide due to different organisation's characteristics and strategies. At times, endeavours to integrate KM into the organisation's strategy and to customise it to meet organisation's characteristics instead create undesired problems because of its prioritisation. We explore the implementation of KM in a telecommunication multinational subsidiary in Indonesia and investigate factors that affect the performance as well as the impacts. Benefiting from innovation perspective we identify the way KM strategies are devised and put into action. Using in-depth interviews and direct observation, we map some problems associated with the strategy and implementation of KM. We learn in our case that the lack of organisation-wide integrated systems, which is typical across different organisations, does contribute to this problem. However the main predicament lies on the fact that KM enabling scheme is never explicitly prioritised in the organisation's information systems strategy.

Keywords:

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JEL Classification

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Rethinking strategy and implementation of knowledge management from innovation perspective: A lesson learned from a multinational subsidiary in Indonesia

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This paper builds on the first author's masters research.

Abstract

Facing unprecedented challenges and opportunities ahead in the knowledge economy, managing knowledge has been a priority for many organisations. Knowledge Management (KM) emerges and has quickly gained weight in research both from information systems perspective and management sciences. An amply documented dilemma is the absence of specific implementation guide due to different organisation's characteristics and strategies. At times, endeavours to integrate KM into the organisation's strategy and to customise it to meet organisation's characteristics instead create undesired problems because of its prioritisation. We explore the implementation of KM in a telecommunication multinational subsidiary in Indonesia and investigate factors that affect the performance as well as the impacts. Benefiting from innovation perspective we identify the way KM strategies are devised and put into action. Using in-depth interviews and direct observation, we map some problems associated with the strategy and implementation of KM. We learn in our case that the lack of organisation-wide integrated systems, which is typical across different organisations, does contribute to this problem. However the main predicament lies on the fact that KM enabling scheme is never explicitly prioritised in the organisation's information systems strategy.

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"It is the historical linkage between the knowledge –information base of the economy, its global reach, its network-based organisational form, and the information technology revolution that has given birth to a new, distinctive economic system …
(Castells, 2000:77)

1 Introduction

Organisations nowadays have been faced with the challenges of managing increasingly more complex activities in the knowledge-based economy. As Castells (2000) suggests, *knowledge economy* is characterised as being informational, global and networked. Not only that economic activities depend upon organisation's capacity to generate, process, and apply efficiently knowledge-based information that it is informational, its core activities of production, consumption, distribution, and components are organised globally in interactive business networks (p.77). In his view, information and knowledge plays an important role in modern economy, giving new perspective to the works of some earlier economists who had already hinted this issue, such as Marshall (1965), Hayek (1945) and Schumpeter (1951; Schumpeter, 1952). The consequence of this is clear: organisations working in knowledge economy cannot but conceive themselves as learning agents capable of creating and managing knowledge to achieve their purpose (Antonelli, 2008).

It is in this context that knowledge management (KM, hereafter) becomes significantly critical. Broadly defined, KM is "*the process of critically managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities"* (Quintas et al., 1997:387). As KM is seen to be a business practice (Radding, 1998), every organisation needs to critically formulates strategies in order to be able to acquire the potential value of KM (Davenport and Prusak, 2000). While KM strategy inherently depends highly on the organisation's characteristics and conditions, and the type of knowledge it manages (Greiner et al., 2007), the implementation hinges on various factors that can either facilitate or inhibit it. Then, as KM implementation impacts and affects the organisation, another challenge is to enhance the strategy and to improve the implementation processes so as to gain a better value of KM.

The notion of 'better value of KM' is critical here as human knowledge is unevenly distributed (Antonelli, 2008) not only because of human's inherent bounded rationality (as first coined by Simon, 1973) but also of our inability to escape from the information asymmetry. Therefore, in Antonelli's (2008) view, KM can only be justified in so far it helps appropriate knowledge that is central to firms' growth. In his words, "internalisation of knowledge exploitation and creation is necessary when knowledge appropriability is low" (p. 173). As communicating knowledge often implies resource sacrifice, then the implementation of KM as a technological platform must also be judged whether its benefit outweighs its cost and if it helps strategising knowledge exploitation to ensure the organisation can handle the implications arising from such implementation (Antonelli, 2008).

We take up this argument and use it to present the case of a multinational company subsidiary, Nokia Siemens Network (NSN) in Indonesia. The Indonesian context might help substantiate an instance of an emerging economy and latecomer development, which might impact the operation and working of multinational subsidiary. In this case we examine how KM strategies are devised, formulated and implemented. Adoption of innovations perspective (Rogers, 2003) is used to help understand these processes as we perceive KM as a technological innovation. This case has led us to analysing several associated issues framed within these two points. First, confirming Nonaka (1994) we anchor our observation on how

different knowledge is managed in the organisation. KM processes as defined by Heisig (2001) is found not to be a straightforward use, but rather a trajectory from devising strategies to implementation, which must take into account the role technology (such as ICT) (Radding, 1998), and human resource practices (such as learning and reward systems) (Bartol and Srivastava, 2002). Second, in reflection, borrowing Rogers' implementation framework of innovations (2003) what matters more is not the result of the use of KM as innovation but rather understanding the complexity of the implementation itself. Or, in other words, it is more about building a routine of continuous use of KM rather than a mere implementation. By featuring the case we modestly expect that it would enrich the literature on KM and innovation studies and widen the discussion on the role of KM as innovation in organisational performance.

The rest of the paper is structured as follows. We start by reviewing literatures relevant to KM, adoption of innovations in organisations and introduce the context in which this study is based. Next, benefiting from innovation perspective we discuss how KM in this case is understood, put into strategy and implemented. Then, we highlight some problems that we found and discuss them. The last part concludes.

2 Issues in managing knowledge in organisation and innovation

The question of how an organisation manages its knowledge has no single answer which encompasses all sorts of issues for all kinds of organisations. As Kluge et al. (2001) put,

> "The real question is how can a company systematically exploit all dimensions of knowledge and fully utilise them to improve revenues, profit and growth... Because of the very nature of knowledge, it is difficult for managers to predict what measures can really improve performance, and how to encourage and guide knowledge flows within an organisation." (p.191)

This highlights some of the predominant issues in managing knowledge in organisation. That the term 'knowledge' in itself is not easy to define has been agreed by many (e.g. Hislop, 2005; Mertins et al., 2001; Nonaka, 1994). Part of the difficulty perhaps lies on the distinctions is between data, information, and knowledge (Hislop, 2005; Radding, 1998). At the practical level, data consists of raw numbers, words, images and facts derived from observation or measurement while information means processed data in a meaningful way and pattern (Alavi and Leidner, 2001; Dretske, 1981; Hislop, 2005; Machlup, 1980) and knowledge is understood as authenticated information that has been assimilated into a coherent framework of understanding (Alavi and Leidner, 2001; Vance, 1997). While this categorisation, or the one similar to this, has apparently been widely used in information systems domain, at the conceptual level we can borrow Castells' framework (2000) to distinguish the difference between information, knowledge and understanding. He makes clear that

> "Knowledge and information are critical elements in all modes of development, since the process of production is always based on some level of knowledge and in the processing of information. However, what is specific to the informational mode of development is the action of knowledge upon knowledge itself as the main source of productivity" (p.17)

Clearly, in Castell's view, understanding can only be achieved when knowledge has been accumulated and acted upon. It is important therefore to manage knowledge for it is critical both for managerial and workforce alike. This resonates to Hayek's (1945) and Schumpeter's

(1951; Schumpeter, 1952) idea that knowledge, and therefore understanding, is subjective and cannot be treated as fixed. The dynamics of economic change depends on the dynamics of unique knowledge held by economic subjects rather than on the shared knowledge.

From the organisational management perspective, too, knowledge is deemed important. Barnard (1938), for instance, attempts to synthesise management theories at the organisational level. Though knowledge is not his central issues, he clearly emphasises on the importance of 'behavioural knowledge', i.e. non-logical and non-linguistic content, in the management process. He further posits that knowledge is *essential* securing a rational cooperative system in order to be able to organise problems in business management. On the contrary to Barnard's work, Simon (1973) develops a view of organisation as 'information-processing machine' which emphasises the logical aspect of human reasoning. He explores the nature of human decision making and problem solving which influence the executive managers in the organisation. As such, he designs a computer model of the human thought process and argues that we as human have only a limited cognitive capacity. This brings into conclusion that, because of the limited capacity, organisation should design itself in such a way that reduces the information load on them. Nonaka and Takeuchi (1995) try to encapsulate both Barnard's synthesis (which focuses on the importance of 'behavioural knowledge') and Simon's 'information-processing paradigm' (that emphasises on the logical knowledge). In their work, they posit that both 'behavioural knowledge' –further known as *tacit knowledge*– and logical –or *explicit*– knowledge are critical to organisations.

With this in mind, how do we classify knowledge? Some scholars have suggested ways to classify and characterise knowledge (Chua, 2002; Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; Polanyi, 1966). Yet, the widely used classification is perhaps the one proposed by Nonaka (1994). Building on Polanyi's work (1966), Nonaka (1994) explains two dimensions of knowledge: explicit and tacit. *Explicit* –or 'codified'– knowledge refers to knowledge that is articulated into words and numbers and transmittable in systemic language (p.16). This type of knowledge is objective, separate from individual and social value systems (Hislop, 2005). On the contrary, *tacit* knowledge is the knowledge that people possess which has a personal quality and is difficult to codify (Hislop, 2005) as it is "*deeply rooted in action, commitment and involvement in a specific context*" (Nonaka, 1994:16). In hindsight, this encapsulates Polanyi's argument (1975) that tacit knowledge forms the background to interpret explicit knowledge, and Hayek's reference (1945) to *tacit knowledge* as implicit, context-specific knowledge. Table **1** summarises the difference between tacit and explicit knowledge.

Tacit knowledge	**Explicit knowledge**
Inexpressible in a codified form	Codifiable
Subjective	Objective
Personal	Impersonal
Context specific	Context independent
Difficult to share	Easy to share

Table **1** Characteristics of Tacit and Explicit Knowledge
Source: Hislop (2005:19)

Nonaka (1994), then with Takeuchi (1995), suggests four modes of the conversion of tacit and explicit knowledge conversion. The first mode is *socialisation*. It converts tacit knowledge between individuals. In the firm context, the examples include On-the-Job Training (OJT) and apprentice work with mentors where individuals learn through observation, imitation and practice. To this point, knowledge is created through shared

experiences. The second mode is called *combination*. It involves the use of social processes to combine explicit knowledge possessed by individuals. Existing explicit knowledge can be reconfigured through sorting, adding, and re-categorising that lead to new (explicit) knowledge. The final two modes are concerned with conversion involving both tacit and explicit knowledge. *Externalisation* is the articulation of tacit into explicit knowledge through the use of metaphor (i.e. understanding and experiencing something). On the contrary, *internalisation* converts explicit into tacit knowledge which represents the traditional notion of 'learning' (as later corroborated by Becerra-Fernandez et al., 2004). See Figure **1**.

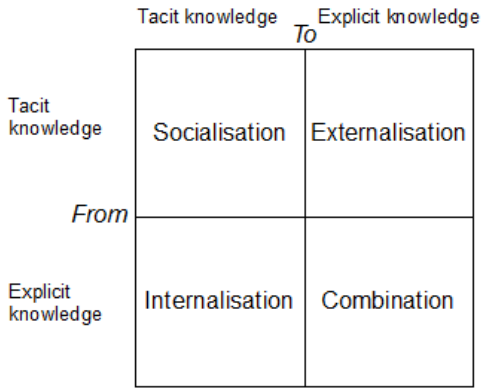

Figure **1** Four Modes of Knowledge Conversion
Source: Nonaka (1994:19)

Knowledge conversion is essentially "*a continuous process of dynamic interactions between tacit and explicit knowledge*" (Nonaka, 1994:11) and in the context of firms this plays an important part of the firm's survival in today's economy. The conversion of knowledge and how this can benefit the firms is dealt within the discourse of KM, which has come to the top of the management agenda in the mid-1990s (Quintas, 2002). Particularly this is because changes in markets and industries, globalisation, and new forms of competition have increased rapidly. Such changes demand continual development of organisational knowledge – a key feature of KM.

There are two aspects central to KM in organisation: strategy and process. Firstly, in order to utilise the organisation's knowledge resources and capabilities, the formation of KM *strategies* is important (Beckman, 1999; Hansen et al., 1999; Zack, 1999). There are two categories reflecting focus of KM strategy (Choi and Lee, 2002): system strategy which emphasises the capability to create, store, distribute and apply the organisation's explicit knowledge, and human strategy that stresses knowledge sharing via interpersonal interaction utilising dialogue through social networks such as teamwork (Swan et al., 2000).

The second aspect is the *processes* of KM (Alavi and Leidner, 2001; Becerra-Fernandez et al., 2004; Heisig, 2001; Holzner and Marx, 1979; Radding, 1998). Although many scholars propose KM process in different ways, there are basically four important processes: (1) knowledge creation, (2) storage, (3) distribution and (4) application. We adopt Heisig's model (2001) as it is relevant in our case. The model reflects continual knowledge building which resonates to Quintas (2002) argument that organisation seeks to innovate focusing on the need to build their knowledge bases cumulatively. See Figure **2**.

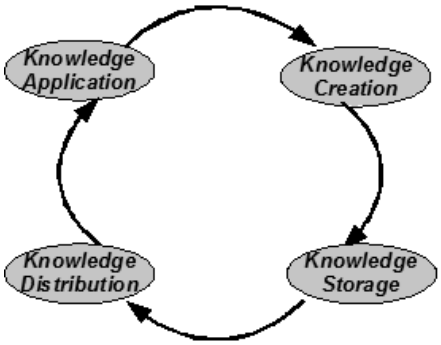

Figure **2** KM process
Source: Modified from Heisig (2001:28)[1]

We explore Heisig's framework. Knowledge creation is first KM process which refers to how organisations develop new content or replace the existing content (Alavi and Leidner, 2001; Pentland, 1995). Then, in an effort to prevent losing track of the acquired knowledge, storage and retrieval of organisational knowledge (or 'organisational memory' Stein and Zwass, 1995; Walsh and Ungson, 1991) embody the second KM process (Alavi and Leidner, 2001). This process focuses on the ways knowledge in organisation is stored in people, artefacts as well as organisational entities. Next is knowledge distribution that aims to provide the right knowledge to the right person at the right time (Mertins et al., 2001). While Alavi and Leidner (2001) identify it as 'knowledge transfer', Becerra-Fernandez et al. (2004) term it 'knowledge sharing'. This process mainly concerns the effective transfer between individuals so they can understand the knowledge well enough to act on it (Jensen and Meckling, 1996). Lastly, as knowledge contributes to organisational performance when it is being applied for decision-making and performing tasks, the application of knowledge is the most essential process of KM (Alavi and Leidner, 2001; Mertins et al., 2001).

Clearly, it is the issue of knowledge transfer that matters most in KM. While we can now understand why KM strategy and processes are central, it is are not always easy to implement it in firms. This possibly relates to how KM is adopted. Perceiving KM as a system (Alavi and Leidner, 2001:114), we can see it as an innovation, i.e. "*an idea, practice, or object that is perceived as new by an individual or other unit of adoption*" (Rogers, 2003:36). This system is usually ICT-based systems which support the processes of knowledge creation, storage, distribution and application, also known as KM systems (KMS). The instances, among others, are electronic mail (e-mail) and document management system (Becerra-Fernandez et al., 2004; Radding, 1998), and collaboration tools like Wiki technology that enables its users to easily edit pages online in a browser (Ebersbach et al., 2006)[2]. Seamless KM-related systems integration can also potentially foster KM implementation in organisations (Alavi and Leidner, 1999). To achieve this, a reliable ICT infrastructure is critical to KMS deployment. How we do understand the process in which and by which KMS are adopted and used in organisation?

The diffusion theory informs us that implementation of an innovation, like KMS, in organisations generally begins when a decision-making unit puts an innovation to use, i.e. that implementation follows the decision stage rather directly (Rogers, 2003:179). In the organisational context, however, the process is slightly different and implies an important

[1] Heisig's original model uses the term Generate Knowledge. Here, the term Knowledge Creation is used as suggested by many predominant scholars in KM (Alavi and Leidner, 2001; Choi and Lee, 2002; Nonaka, 1994; Quintas, 2002).

[2] Knowledge contained inside the Wiki is accessible to individuals in the organisation, allowing them to easily learn new knowledge. Thus, Wiki supports the processes of knowledge creation, storage and distribution.

distinction between initiation stage and implementation stage (Damanpour, 1991; Rogers, 2003). The *initiation phase* starts with 'agenda-setting' (pp.422-423), characterised by problem definition, prioritisation of needs and active search for innovation to contribute to problem solving. It is then followed by 'matching' (pp.423-424) in the sense that organisation puts innovation into a problem, fine-tunes and exploits it within its specific context. This stage happens when firms fine-tune themselves with the innovation characteristics and exploit the technological feature of it and put it within the context of their needs. The *implementation phase* comprises three stages. It starts when the use of innovation is widely spread across organisation, and is known as the 'clarifying' stage (pp.427-428). The next stage is called 'redefining/restructuring' (pp.424-427) when the organisation familiarises with the innovation in two ways: reconfiguring the innovation to match the organisation's needs and restructuring the organisation in order to implement the innovation. This implies a great deal of familiarisation through trial and practice in organisation level, which refers back to 'clarifying'. The last stage, 'routinising', happens when the innovation is incorporated into organisation's regular activities to advance the achievement of organisations' objectives (pp.428-430). This is depicted below.

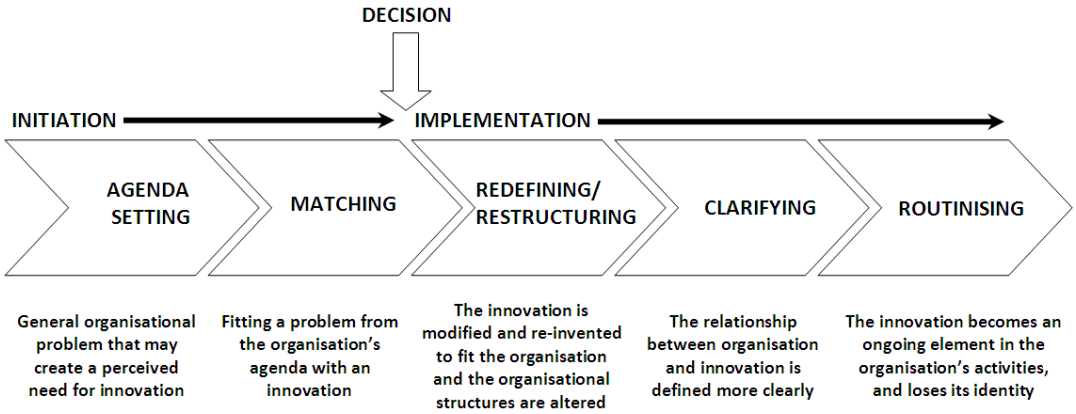

Figure **3** Innovation processes in organisation
Source: Rogers (2003:421)

Often, organisational innovation (Damanpour, 1991; 1992) is involved when an organisation adopts innovations, be it the implementation of a new technology, method, practices, or external relations. Organisational innovations also include the implementation of new methods for distributing responsibilities and decision making among staff for the division of work within and between firm activities and organisational units. It also covers new concepts for the structuring of activities, such as implementation of an organisational model that gives employees greater autonomy in decision making and encourages them to contribute their ideas. It is not difficult to imagine that social learning is important in organisational innovation. The idea is that one individual learns from another by means of observational modelling (Bandura, 1977; 1986; cited in Rogers, 2003:341). In many cases, social learning eases the process when an organisation adopts and familiarises itself with an innovation and needs to adjust its organisational features.

In a particular instance of innovation diffusion in organisations, like KMS in a firm, it is important to look at how organisations use and innovate in and around new technology to achieve their missions and goals, improve their organisational management and develop new strategies. As discussed above, managing knowledge in fact goes beyond applying and implementing certain technological innovations. We can therefore expect that both technological innovation and organisational innovation become the core of the discussion in our case. We now turn into our case study.

3 NSN Indonesia: The case

We chose case study at Nokia Siemens Networks ("NSN" thereafter) Indonesia subsidiary as a method[3] to argue for an instance of KM initiatives in one department of a multinational company subsidiary in Indonesia. The material for the case study is gathered through in-depth interviews[4] and observation in addition to publicly available secondary data. Choosing a case study as a methodology allows this study to 'tell-it-like-it-is' from the respondents' point of view (Stark and Torrance, 2005). We however realise the limitation of this method and would like the flag some of them. Firstly, due to the limited time available for the research, the method of examining a single case study is chosen as a viable option to inquire in-depth information. Second, inherently, because of this the findings cannot be generalised. However, studying a single case study has allowed this research to examine the themes and issues in greater detail.

3.1. About Nokia-Siemens Network

NSN is a multinational company established on April 1, 2007 as a result of a 50-50 joint venture agreement between Nokia Networks, one of Nokia's business groups, and Siemens COMM, Siemens's carrier-related operations for fixed and mobile networks (Nokia, 2007). Although NSN is jointly owned by Nokia and Siemens, its financial report is still consolidated by Nokia.

NSN employs an estimated 60,000 people in more than 150 countries (NSN, 2009a). In the mobile network market share, Reuters (2007) reports that NSN is positioned in second place, behind the market leader Ericsson. To achieve its mission 'to connect the world' (NSN, 2009c), the company designs an operational model that is organised towards being close to its customers (NSN, 2009d). Its Global Head Quarter (HQ) consists of Operational HQ located in Espoo, Finland (NSN, 2009a) and a Research & Development (R&D) centre located in Munich, Germany. Hereafter, HQ refers to NSN's Global HQ.

This study is conducted in the NSN's Product Customisation department ("the Department" thereafter) - also known as Solution Centre - located in Jakarta, Indonesia. When the study was conducted, the Department was part of the Business Support System (BSS) business unit. It aims to intensify NSN's support to Indonesian network operators in the areas of communications and information technology (Wijaya, interview, 17/6/09). Its purpose is also to become a communication technology hub for the Asia Pacific region. By establishing the Department in Jakarta, the 'time-to-market' of new products or features will be shortened because the customisation is developed in Jakarta rather than in R&D centre as it was previously done. The Department has five subdivisions, i.e. Development (DEV), System Test (ST), System Integrator (SI), Customer Product Support (CPS), and Test-Lab Management. Its scope of work ranges from product customisation development, system test and integration of NSN's solutions, as well as consultancy services of customers' architecture and business process. Its headcount at the time of this study was 71 employees.

[3] Some scholars refer to 'case study' as a method (Crotty, 1998) or an 'approach' (Stark and Torrance, 2005) while others consider it a methodology (Denzin and Lincoln, 2000; Yin, 1994)

[4] Please consult Appendix for the list of informants.

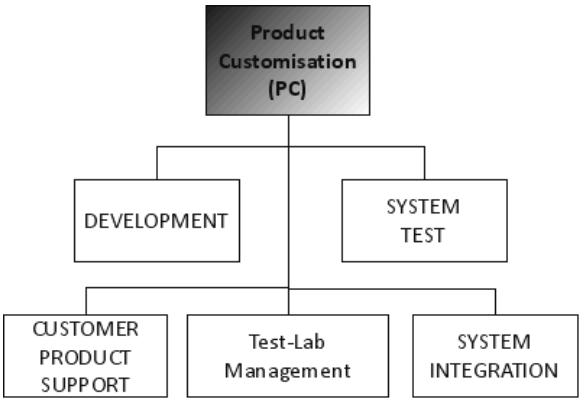

Figure **4** Subdivision Hierarchy of the Department
Source: Authors

In Indonesia, Telkomsel[5] has been one of NSN's success stories highly influenced by the Department's performance (NSN, 2009e). The Department had taken part in the customisation development and deployment of one of NSN's product called *Convergent Charging* solution in Telkomsel (NSN, 2009b; Schwartz, 2008). To be able to fully support its customers' needs, the Department must have sufficient related knowledge and manage them well with a comprehensive KM strategy. We now illustrate how the Department devises its strategies to manage knowledge.

3.2. KM in Nokia-Siemens Network

Through the interviews, all respondents acknowledge that the department has applied KM in their activities. In fact, both companies of origin –Nokia and Siemens– have applied KM (Chase, 1997; Civi, 2000; Davenport and Probst, 2002; Gamble and Blackwell, 2001; Voelpel et al., 2005). According to Gamble & Blackwell (2001),

> Siemens has about 100 knowledge management projects in motion ... With [its] global knowledge-sharing network, ShareNet, [Siemens] has chosen to focus on one of [its] key business processes, i.e. sales value creation, which is very close to our customers (pp.7-8)

The ShareNet, as cited above, is then adapted by NSN and renamed to IMS. Similarly, Nokia values KM demonstrated by establishing the Knowledge Management Department that is responsible for organising KM concepts and strategies (Chase, 1997).

Learning from past experience, as well as realising the fierce competition in the mobile telecommunications market, NSN understands the importance of managing knowledge. The Head of Department describes two key points of KM strategy in the Department:

> "[the first point is] that knowledge management in the Department is always aligned with the Department's product portfolio, which product will be customised by the Department. [Having known that], we can determine the knowledge needed to be captured by our [human] resources, in order for us to be able to sell the product [to our customer], as well as for us to execute a project. At this point, [afterwards] we can plan our knowledge management program. The second point is the importance to relate [our knowledge management program] with [each employee's] personnel

[5] Telkomsel has been the largest cellular telecommunications operator in Indonesia by market share (Telkomsel, 2008)

> development. [By this], we encourage our employees to exploit knowledge outside the Department's product portfolio. For instance, knowledge in [project] management, sales or leadership. This knowledge is also needed for project execution." (Wijaya, interview, 17/06/2009)

The Head of Development subdivision in the Department adds a third point of the KM strategy as "*leveraging through an 'information openness culture' amongst the employees*" (Wiharjito, interview, 05/06/2009). Such culture highly depends on how the employees interact with each other and on their interpersonal trust which subsequently leads to their willingness to share knowledge.

The Department's KM strategy is then broken down into employees' tasks and responsibilities which varies by each individual. The department attempts to shape a specialisation for each employee. This means that each employee tends to focus on gaining and managing the knowledge of certain products. According to Wijaya (interview, 17/06/2009), this is appointed during each employee's 'personnel objective setting' -an activity that defines each employee's task and responsibility (i.e. their 'objective') every certain period of time. All employees will then be provided training and 'enabling scheme', as required for further customisation project activities. The term training is used for acquiring general knowledge, while the term 'enabling scheme' -which include OJT- refers to obtaining project-related knowledge. The 'enabling scheme' will be based on one of the Department's product portfolios. The acquired knowledge is then stored in either document files, document management system, or collaboration system utilised for KM purposes (e.g. wiki-page). Employees are expected to share their knowledge in order to distribute the acquired knowledge. Such well-distributed knowledge could improve the execution of customisation project within the Department.

However, despite its importance, there is no formal written KM strategy. Currently, there is no specific KM subdivision within the Department's – or even in NSN's – organisational hierarchy which particularly functions as a KM strategic solutions provider. Consequently, HQ does not provide clear guidelines for KM to its subsidiaries. Moreover, the Department seems to foresee no problem with its current KM. The fact that the Department's employee turnover is low has helped in maintaining the existing knowledge circulating within the Department. Such circulation is also helped by a friendly working environment which allows employees to easily and comfortably share their knowledge. These conditions consequently evolve to what is referred to as an 'information openness culture'.

Although the HQ has given no specific guidelines for KM, it still plays an important role in managing knowledge within the Department. While some of the KM approaches are initiated by the local Department itself (e.g. setting up wiki-page), others are triggered by the HQ. These include managing knowledge of internal business processes and new product or technology. The HQ further ensures access to knowledge storage as well as to product and technology experts. The former consists of providing network infrastructure for accessing the HQ's knowledge library – i.e. documents server. The latter is intended to support the Department's work processes in need of experts' consultancy.

Through interviews, our respondents explain that the implementation of KM begins with the determination of business targets which must be achieved in certain period of time. These targets normally relate to the ongoing and future projects. The management then creates an organisation planning which covers the required activities undertaken in order to accomplish those targets. In relation to KM, such planning includes the knowledge need to be acquired and to be distributed in order to execute projects. The organisation planning is then broken

down into individual planning. This individual planning is realised in each employee's 'personnel objective setting' (Wijaya, interview, 17/06/2009), in terms of objectives, tasks and responsibilities, including KM-related tasks, planned for the next couple of months.

All new employees will be given basic knowledge through various training sessions when they join the Department. These sessions are held either in the form of classroom training or online training through the Intranet. New training of general subjects will be planned further and included inside the 'personnel objective setting'. To accelerate the learning process, an employee will be assigned to a particular project. Beforehand, s/he will undergo series of 'enabling' activities to learn a project-specific knowledge. 'Enabling' scheme is also known as on-the-job training (OJT) program. During 'enabling' scheme, employees are expected to be involved in group discussions and knowledge-sharing activities through the means of workshops, online discussion with the experts or informal forums.

Employees are very much encouraged to share their project knowledge and experience. Wiki-pages are set up to support knowledge-sharing processes. These Wikis are managed locally within the Department. Currently, the Wiki-pages are created for each project and not yet integrated between one Wiki project and another. The content includes modules/features specifications, data flows and test case descriptions, and error handling techniques organised by keywords. However, due to the tight project schedule, these contents are not frequently updated. As a result, there are some gaps between the available knowledge and the ones that are actually stored in the Wiki. Although it is encouraged, knowledge sharing is sometimes disregarded. The reasons for such circumstances are because KM is given a low priority. Employees do not have sufficient time for other tasks outside their current project responsibilities.

In many cases, document management systems (e.g. IMS, docu-server, local Shared Drive) have been functioning as a means of knowledge distribution as they store product- and project-related documents. Besides that, knowledge is also distributed using various means of communication. Electronic mail (e-mail) and online meeting tools (e.g. NetMeeting, WebEx) are utilised for communicating with experts from HQ and other subsidiaries.

4 Strategy and implementation of KM in NSN – A discussion

To start the discussion, it is worth noting that what we refer as KM here includes two major aspects: technology and organisational practice. The first relates to KMS implemented in the Department, whilst the latter concerns with the Department's work processes which are considered as part of its KM initiative (e.g. 'personnel objective setting', 'enabling' scheme).

4.1. Devising KM strategy: What to be prioritised?

How can the knowledge resources and capabilities support an organisation? The interview suggests there are two categories of activities which make use of the currently managed knowledge: work processes and personnel development. The knowledge is of course utilised for the Department's work processes such as project execution. Likewise, the Department encourages its employees to exploit the existing knowledge for their personnel development. Such personnel development would in turn benefit the Department's work processes as the employees gain more knowledge useful for executing projects.

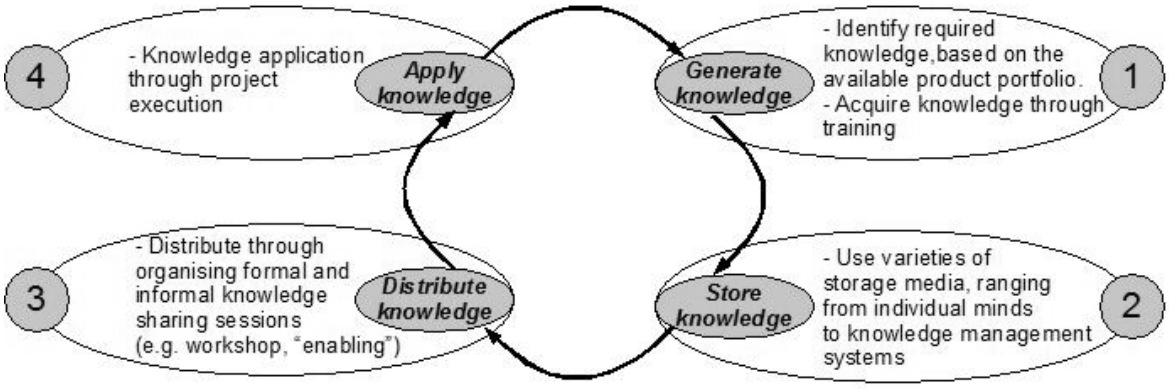

Figure **5** The Department's KM Strategies: Overview
Source: Authors – adapting Heisig (2001:28)

We then link the Department's strategies with KM process by employing Heisig (2001) framework. As illustrated in Figure **5**:

(1) The Department firstly determines the required knowledge associated with its product portfolio. Afterwards, employees are assigned to series of training sessions to acquire the needed knowledge. These first activities are categorised as part of the knowledge creation process;

(2) When the required knowledge is obtained, the process of knowledge storage is triggered, whereby knowledge is stored inside a specific media or system. Here, the system strategy is employed by utilising certain technology, e.g. Wiki pages (Choi and Lee, 2002). Yet, there is no guideline or checklist as to what the needed knowledge is to be stored. Such issue particularly affects the storage of tacit knowledge;

(3) Newly-acquired knowledge is expected to be distributed amongst the Department's employees as part of the knowledge distribution process. Knowledge distribution makes use of both system strategy (i.e. through the use of Wiki pages) and human strategy (i.e. through 'enabling' scheme). There is, however, lack of proper scheduling in organising knowledge distribution/sharing;

(4) Finally, the available knowledge is ready to be put to use for project execution through the knowledge application process.

By being informational, global and networked as substantiated above, NSN fits Castells' (2000) characterisation of organisations working in the knowledge economy. In the sense of our case study, being a subsidiary office of an MNC, the Department's devised KM strategies are also influenced by the HQ. However, there is no specific written guideline on how to manage knowledge within the Department provided by NSN's HQ. This fact is interesting considering NSN is an MNC with high dependence on technology innovation (NSN, 2009b). Many scholars argue that KM affects a company's innovation capability (Alwis and Hartmann, 2008; Swan et al., 1999). By not providing a 'global' KM guideline, NSN's subsidiaries may find it difficult to managing knowledge for project execution, let alone synchronising the subsidiaries' knowledge with the HQ. However, even though there is no guideline that covers the entire KM strategy for Jakarta's Department, NSN's HQ has been actively involved in the local KM processes. HQ provides several tools to be used for KM. It also has opened access to many document management servers as well as arranged some knowledge transfer activities such as 'enabling scheme'.

The organised KM efforts are limited to the Department's product portfolio reflected by the project execution. As suggested in the interviews knowledge does not always flow from HQ to the Department, but also from other subsidiaries where the required expertise resides. Knowledge creation is not the sole responsibility of the Head Quarters (Hislop, 2005). It can be done by the subsidiaries as well (Andersson et al., 2005; Mudambi and Navarra, 2004). In this case, it is evident that some of the knowledge creation activities (e.g. 'enabling scheme') are initiated by the Department in Jakarta.

4.2. Implementing KM strategy in NSN: technological and organisational aspects

We now analyse the implementation of KM. Alavi and Leidner (2001) denote a distinction between individual and organisational knowledge creation. The findings suggest that organisational knowledge creation in the Department is achieved through various training sessions held by third parties. During training, it is common that those parties provide written documentations of the training materials for the participants. To the Department, these training materials are treated as newly created explicit knowledge. Referring to Nonaka's (1994) conversion modes, these training sessions are considered as combination – the process of creating explicit knowledge from explicit knowledge.

Knowledge creation – 'Enabling' sessions are considered an important means to create knowledge. In these sessions all Nonaka's (1994) knowledge conversion processes (i.e. socialisation, externalisation, internalisation and combination) take place. *Socialisation* happens when the mentors/trainers share their work experience, which is considered tacit, to the trainees. *Externalisation* occurs when the trainees store their newly-learned knowledge in a media, e.g. document, or wiki-page. New knowledge can also be created through *combination* process whereby individuals transfer their explicit knowledge (e.g. manual documents) to another explicit knowledge stored in a different media. And *internalisation* is the result of applying explicit knowledge and routinising them so they become tacit to the individuals. A critical problem occurs when, due to the tight project timeline, such 'enabling' activities are often regarded as low priority. The mentors are usually more focused on executing projects, resulting 'enabling' session ineffective. In spite of that, knowledge creation can still occur through observation and practice by getting involved in a particular project. Furthermore, 'enabling' sessions basically distribute knowledge within the organisation.

Knowledge Storage – Knowledge storage has two perspectives: individual and organisational. From an individual perspective, knowledge is stored inside each individual's mind (Becerra-Fernandez et al., 2004; Mertins et al., 2001). Whenever an employee creates knowledge, s/he goes into the process of learning. This learning process reflects the *internalisation* process which converts the explicit knowledge (i.e. the materials learned) to tacit knowledge (Nonaka, 1994). From the organisational perspective, individuals are encouraged to document what they learn in order to prevent knowledge loss. As such, knowledge is converted from tacit to explicit known as *externalisation* process (Nonaka, 1994). Individuals write down their knowledge and experience in documents which are then stored in document management systems (e.g. IMS, docu-server, local Shared Drive, Wiki-pages). However, even though there are efforts to store knowledge, a problem arises on how to effectively capture and further properly store tacit knowledge. It is understood that not all tacit knowledge can be 'codified'. The focus, however, is particularly on how to store those which are deemed important for project execution.

Knowledge Distribution – Individuals are encouraged to share or distribute their knowledge among themselves, more specifically experience sharing. 'Enabling' sessions allow the process of *socialisation* to take place when one individual shares their work experience to another. Such sharing knowledge enables another individual to create new knowledge. This means, referring to Heisig's (2001) model, knowledge distribution process triggers the process of knowledge creation. Nevertheless, as mentioned earlier, 'enabling' sessions are prioritised rather lower particularly due to the mentors' tight project timelines. As a result, knowledge sharing through 'enabling' sessions is sometimes intently postponed. These sessions are mostly organised in an ad-hoc basis, specifically when additional human resource is needed in a project.

Informal meetings are particularly organised for tacit knowledge sharing; however, they are hard to manage. Furthermore, there is also the question on how to effectively share tacit knowledge. It is fairly impossible to completely transfer one's tacit knowledge because such knowledge sharing also relies on one's skills, experience and wisdom. In spite of that, it is crucial to find ways to transfer one's tacit knowledge that is deemed important for project execution. Albeit difficult, the Department's management strongly encourage these meetings as part of the *socialisation* process (Nonaka, 1994). Individuals are also expected to actively contribute in updating the Wiki-pages, sharing both their tacit and explicit knowledge. Wiki is accessible to all individuals; therefore, it supports the knowledge distribution in the Department. Such contribution enables the *internalisation* and *combination* process (Nonaka, 1994).

Knowledge Application – The interviews confirm the argument of Mertins et al. (2001:4) that knowledge application is in fact "*the most essential task of knowledge management*" as it triggers the whole cycle of KM processes. Knowledge application in the Department means participating in project executions. Sometimes employees have problems in applying their knowledge so as to fulfil project requirements. When this happens, they often ask their colleagues or request to attend a formal training session. This indicates, as suggested by Heisig (2001), knowledge application process undoubtedly triggers knowledge creation process. Additionally, applying knowledge also initiates knowledge storage process, as employees usually document the knowledge they apply.

In summary, it is evident that the Department has incorporated KM in their daily activities. Despite their efforts, problems still occur in every KM process. First, knowledge creation is hindered by the unavailability of the mentors who usually, for instance, prioritise their own project execution over organising 'enabling' sessions. Second, even though there are efforts to store knowledge, problems arise on how to effectively capture and further properly store tacit knowledge. The focus is particularly on how to store those which are deemed important for project execution. Third, the process of knowledge distribution interfered by the fact that the mentors are often too busy with their own projects thus they do not have sufficient time to effectively organise knowledge transfer sessions. Consequently, these sessions are carried out in an ad-hoc basis. Another issue needs resolving in knowledge distribution process is finding a way to effectively share tacit knowledge. Although it is understood that one cannot completely transfer his/her tacit knowledge, the Department can still focus on transferring one's tacit knowledge that is deemed important for project execution. Finally, knowledge application process may be interfered by the fact that sometimes employees do not know how to apply their knowledge to fulfil a project requirement.

Having learnt the problems occurred in every KM process, the Department – or NSN for that matter – should consider strategising their overall KM. Not only do they need to innovate through KM in order to improve their working process, they also need to understand KM as innovation in itself and hence are capable of producing a better quality of service – as well as to prevent knowledge loss.

4.3. Innovating through KM? A reflection

In addition to the implementation of KM, one activity that is considered essential for KM practices in the Department is the so-called 'Personnel Objective Setting' for each employee. While this activity is not categorised into any KM processes, it ensures the execution of KM implementation in the organisation. This activity manifests in the Department's effort in embedding KM activities into its work process (Davenport and Prusak, 2000) and signifying the Department's priorities towards employees' personnel development which in turn will foster the organisational knowledge (Grant, 1996a; 1996b; Spender, 1996).

In light of this, we suggest to modify Heisig's KM process framework (2001). We propose to have new links connecting knowledge creation and distribution processes, and knowledge storage and application processes:

- First, knowledge creation process not only triggers the knowledge storage process, but also connects the knowledge distribution process achieved through 'enabling' activities, which allows the employees to create knowledge and distribute it amongst other employees.
- Second, applying knowledge also initiates knowledge storage process, as employees usually document the knowledge they apply.
- Conversely, the third line implies that employees may apply their knowledge after they store them.

In addition, the 'personnel objective setting' process should be established and put in the framework to make it explicit that it functions to ensure and augment the KM implementation execution.

To summarise, we depict our contribution in Figure **6** below.

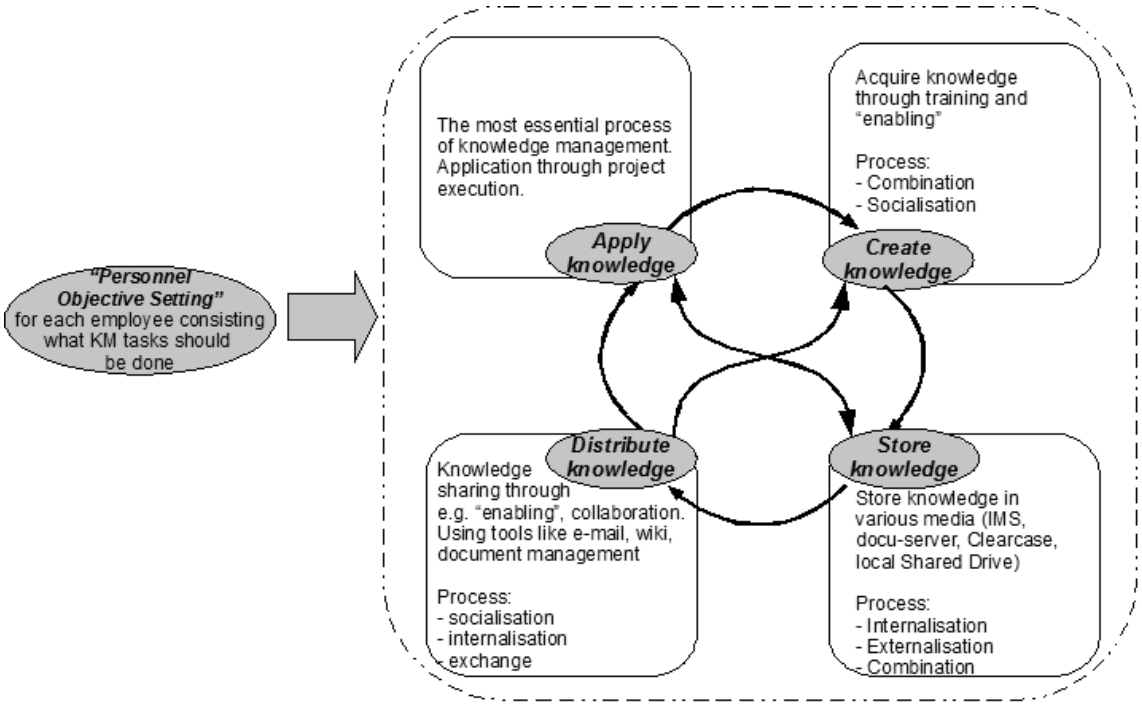

Figure **6** Overall the Department's KM Implementation
Source: Authors – modification of Heisig (2001:28)

How can we understand this strategy and practice from innovation perspective and what explanation can be offered?

We reiterate here that from the exposition of the case above it is relatively easily to identify at least two types of innovation taking place: one is technological innovation (in terms of the use of KM technologies) and two is organisational innovation (in terms of the organisation of personnel around their objective setting and knowledge transfer). Hence it is in these two directions –technological and organisational innovations—we offer our reflection. As amply documented above, the technological aspect of KM has been put in motion across the Department. To borrow Rogers' terms, our case as elaborated in the previous two sections demonstrates the way in which KM technologies have been adopted, used, implemented, and routinised (2003). But what about the organisational practices alongside the implementation of KM?

Our case shows the importance of organisational objectives (including values and norms), and the role that organisational leadership plays in the personnel objective setting. Diffusion theory indeed suggests that innovation that is compatible with existing values and norms is likely to be adopted quickly (Rogers, 2003:241,318). In this case, NSN values and objective , i.e. as manifested in the company's mission 'to connect the world' have been observed to be impacting not only the 'institutionalised use' of technology (i.e. putting KM technologies like updating Wiki pages into organisational routines) but also the 'institutionalisation' of the personnel objective setting –both in order to achieve this mission. It is because setting personnel objectives is well-suited to the objective that NSN is motivated to 'adopt' and explore the use, albeit it has to overcome difficulties and problems. But it is not enough. It is imperative to sustain this by trying it out more widely across the organisation, which includes matching with the organisational structure. From innovation process perspective (Rogers, 2003:422-430), we might have seen the phase 'agenda setting' and 'matching' blurred into each other when explaining the initiation stage of the adoption not only KMS as a physical system but also the way in which knowledge is being managed in the firm through personnel

objective setting and enabling scheme as a human system. However, even at the initiation stage, as thoroughly evidenced, the lack of technical and organisational skill can hamper this process. This is why 'enabling' scheme is important not only for the use of KM technology but also, more importantly, as an innovative means to transfer and share knowledge among staff – or '*social learning*' (Bandura, 1977; 1986; cited in Rogers, 2003). This case shows how social learning further eases the process when the Department familiarises itself with the setting of personnel objectives.

In the implementation stage, not only the adopted innovations (in this regard both KMS and personnel-related KM initiatives) are simultaneously exploited and explored by the organisation but also that the organisational innovation (i.e. personnel objective setting and enabling schemes) are widely adapted across the Department. Our case suggests NSN clearly not only saw opportunities for the KMS and enabling scheme, but they became aware that the organisation could exploit and explore both the technology and the knowledgeable staff more effectively to improve operational management and provide strategic management information to achieve their missions and goals. What we have here is akin to the 'redefining/restructuring' phase which initiates the overall of implementation phase as theorised by Rogers (2003). Then, in 'clarifying' phase, KMS and 'enabling scheme' are no longer seen as 'foreign' elements or to have foreign characteristics, but instead, are integrated into the organisation's properties and routines: KM technology has been identified as an inseparable part of the organisation and its use has become common practice and so is the enabling scheme. Finally, this case also shows the ways in which NSN and its staff enact structures which shape both their use of KMS as technological innovation and their participation in enabling scheme as an organisational innovation addressing personnel agenda setting. These then have become ongoing practices and roughly make up the phase of 'routinising', i.e. when an innovation becomes incorporated into the common activities of the organisation and loses its separate identity. It implies two important factors: sustainability (the degree to which an innovation continues to be used after initial efforts to secure adoption is completed –the decision to sustainability is called institutionalisation) and participation (the degree to which members of the organisation are involved in the innovation process) (Rogers, 2003). This case seems to confirm this theory as it shows how NSN, implementing KM as technological innovation and practicing 'enabling scheme' as organisational innovation to help personnel agenda setting, endeavours to continue the use of both innovations by institutionalising them (through conducts, specialised staff, etc.) and by widening the participation of the staff through social learning.

Overlaying Rogers' framework of innovation-process and our modification of Heisig's stage of KM process above, we propose the schema below.

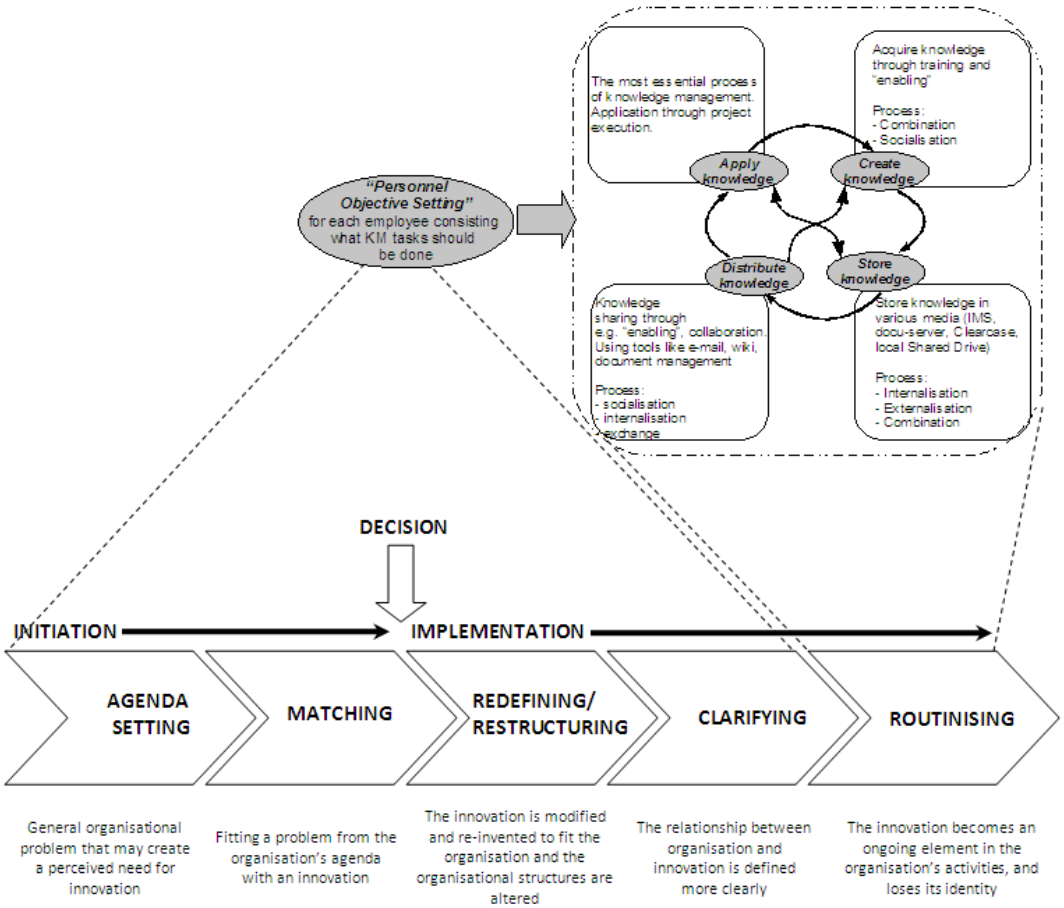

Figure **7** Summary of KM innovation in the Department

Source: Authors – overlaying modification of Heisig's model (2001) and Rogers' framework (2003)

It seems to us that, referring to the modification of Heisig's framework above, the 'personnel objective setting' as an initiation of all knowledge management practices is in itself an embodiment of the first four innovation-process stages. Here the innovation refers to as not only the technological artefacts that physically are used to assist the process of creating, storing, distributing and applying knowledge – but also organisational practices.

With this reflection at hand, we recall the problems in KM process as outlined in the previous section. To start with, those problems seem to have been contained in the last stage of implementation, i.e. routinisation. *First*, knowledge creation that has lower priority may indicate that organisational innovation around the 'human aspect' of KM might not yet be realised, let alone prioritised – unlike the technological system aspect (after Choi and Lee, 2002; Swan et al., 2000). *Second*, a problem of effectively capturing and properly storing tacit knowledge might indicate the need for further exploration and thus perhaps need a traverse back to the redefinition and restructuring of KM technology being adopted. This, of course, holds the argument that tacit knowledge can be 'codified' (Nonaka, 1994) and assumes that information is essential for project execution. *Third*, the ad-hoc knowledge distribution that has hindered tacit knowledge transfer again may reflect the inferiority of organisational innovation in the overall innovation strategy in KM. *Finally*, problems with staff not knowing how to apply knowledge to fulfil project requirements perhaps indicate the need to restructure, or even to clarify, both the technological and organisational aspect of the implementation of KM as innovation.

What we can see above is that despite KM innovation is often widely seen as technological innovation, it actually requires organisational innovation to make it fully work. What has

been problematised and discussed here emphasises the fact that organisational innovation (or the lack of it) is vital for the success of the implementation of technological innovations. Further, our case here shows that implementation of innovations –both technological and organisational – that leads to the routinisation is basically ongoing and processual. It depends on the learning from 'below', addresses emergent and unintended consequences of the organisation's strategic decisions, and learns from more deliberate innovation that have been adopted and implemented. Consequently, strategic implementation of KM in firms, or practice of enabling scheme in NSN, are not only about strategic processes of knowledge acquisition, but also questions the 'taken-for-granted' assumptions on which the existing knowledge management systems –both human and non-human—strategies are based.

In our final reflection, this case shows that due to the complexity of business activities in the knowledge economy, the knowledge that flows from such activities may not be easily predicted, let alone comprehended into understanding. This is why organisations need not only to prioritise, but more importantly to redesign the information flow in order to support both managerial and workforce understanding. This case compels us to recognise that actions or initiatives based on beliefs may not imply any corresponding knowledge in organisations: much action cannot be justified other than by the claim that it worked in the past. While this shows both the capacity and capability of organisations as learning agent, we very much doubt that organisations (or machines) are embodied knowledge for they embody information that is the product of human knowing, not the knowledge itself which is only in human minds.

5 Conclusion

As Marshall (1965) puts, knowledge is 'the most powerful engine of production' (p. 115). The case we have attempted to feature here shows how knowledge management strategies are devised and implemented in NSN, a multinational subsidiary in Indonesia. In Marshall's view (1965), KM implementation is understood as the need for a firm to have an appropriate mechanism to gather and utilise information and turn it into appropriate understandings. Our case corroborates that adopting knowledge management (KM) as innovation in an organisation is indeed multifaceted in nature for it comprises not only technological artefacts but also organisational practices.

Firstly, the KM process inherently allows the organisation to continually create, store, distribute and apply both existing and newly-acquired knowledge. The practice of 'personnel objective setting' as part of KM implementation ensures the congruency of KM processes with the organisational objectives and stakeholders' expectations. Secondly, the discussion of KM implementation indicates that all KM activities are about tacit and explicit knowledge conversion as proposed by Nonaka (1994). Later, Nonaka et al. (2000) also suggest that knowledge conversion, in essence, is also a continuous process from one's 'old self' into one's 'new self' through acquisition of new context, new vision and new knowledge. Such a continuous process is consistent with the dynamic process of organisational learning explained in previous lessons. Lastly, the use of ICT-based KM initiatives is derived from the assumption that these utilisations are beneficial to the Department. Nevertheless, organisations (i.e. the Department) must be aware of the specific functions of KMS as well as the extent to which these functions are useful for KM.

While often the technological features of KM revolve around ICT-based innovations, there are no single formulae as to what and how organisational practice should be conducted to

ensure a successful KM implementation. Although it is clear that both technological innovation and organisational innovation should be put in motion at the same time, our case indicates that often, even if inadvertently, the later can easily be neglected –and yet with strong justifications or rationales. What we learn from the case here is the shift of focus of attention in understanding how innovations work in organisation. What is important is not the type of technological innovation implemented in the organisation. Rather, that such technological innovation sometimes requires organisational innovation – and there is apparent danger that this can be unintentionally neglected, or given low priority. As we found here, the lack of organisational innovation is detrimental to the overall innovation undertaken in organisations, especially when a complex system (like KM) is adopted.

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APPENDIX

The following table lists the interviewees' names, interview time, duration and mode.

Name	Role of Interviewee	Instruments	Date	Duration
Wijaya, Andi	Head of Product Customisation (PC) Indonesia	VoIP call via Skype	17-June-2009	28 mins
		Email	17-June-2009	N/A
Wiharjito, Tony	Head of PC Development Indonesia	Email	5-June-2009	N/A
		Email	10-June-2009	N/A
Ariawan, Mukti	Project Team Leader	Email	11-June-2009	N/A
		VoIP call via Skype	11-June-2009	30 mins
Puspaningsih, Ika	Project Team Leader	VoIP call via Skype	9-June-2009	45 mins
		Messenger	3-July-2009	N/A
Nugroho, Rakhmat	Project Team Leader	Email	16-June-2009	N/A
		Email	7-July-2009	N/A