Knowledge Management:
A Case of a Multinational Company Subsidiary in Indonesia

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ABSTRACT

In today's economy, knowledge is seen as an important asset to most organisations. Knowledge management (KM) thus becomes a vital issue in management practices. Implementation of KM aims to exploit the organisation's knowledge in order to perform well. However, there is no single guide as to how organisations must implement KM. Such implementation depends on the organisation's characteristics and circumstances. This dissertation particularly explores how a multinational company subsidiary located in Indonesia, i.e. Nokia Siemens Networks (NSN) devises its KM strategy. It discusses the ways in which NSN implements its KM strategy, impacts to the organisation and some future challenges. The study employs qualitative research method using interview as data collection instrument in order to gain greater details for in-depth analysis. The findings indicate that NSN firstly identifies the required knowledge for their daily work, then exploits a balanced view involving both human- and system-strategy to manage the organisation's knowledge. A number of activities are identified for each KM process: creation, storage, distribution and application. The organisation also utilises “personal objective setting” to ensure the execution of KM. The study suggests that KM affects the organisation's people, process as well as products. It also reveals several foreseen challenges including the need to establish an independent Competence and Knowledge Management department as well as regulate KM-specific reward system. Despite that this study does not propound a comprehensive assessment of KM implementation in NSN, it offers is an empirical evidence which will add to the growing body of knowledge management study.
DECLARATION

I declare that no portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.
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CHAPTER 1 - INTRODUCTION

“The knowledge economy is not as yet all-conquering, but it is well on the way to being so... it marks a major transition in the nature of economic activity. Information technology, plus communication technology, are the enabling media of the new economy, but its agents are knowledge workers... The know-how of such workers is the most valuable property firms have.” (Giddens, 2000:69)

1.1. BACKGROUND

Many scholars (Kluge et al., 2004; Hislop, 2005; Radding, 1998) seem to agree with Giddens’s (2000) view on the emergence of a knowledge economy. According to Hislop (2005), the reasons for this are threefold. First, knowledge is of central importance and valuable to advanced economies. Second, knowledge is deemed to be the key to organisational performance. Third, the organisation’s nature has become more knowledge-intensive. Without a doubt, knowledge is an important asset for every organisation (Davenport & Prusak, 2000). Scholars further argue that knowledge is a source of competitive advantage in business environments (Mudambi, 2002; Bou-Llusar & Segarra-Cipres, 2006). Thus, managing knowledge has become vital to an organisation’s success in today’s global economy (Kluge et al., 2004; Radding, 1998).

My previous work experience\(^1\) to some extent confirms this view. I myself have experienced the processes as well as difficulties of managing knowledge in a multinational company (MNC). These experiences led me to conduct this study in exploring more about knowledge management within such contexts. Borrowing from Quintas et al. (1997:387), the term Knowledge Management (KM) here means ‘the process of critically managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities.’

This study examines KM themes and issues in the organisation subject to this study, i.e. Product Customisation Department ("the Department") in the Nokia Siemens Networks

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\(^1\) I worked in the studied organisation from 2004 until 2008.
(NSN) subsidiary in Indonesia. NSN is selected because I have the required access to information which allows me to further explore KM. This study investigates KM themes including its KM strategy formulation, its KM implementation, impacts as well as challenges faced by the Department. The fact that the Department is a subsidiary of an MNC implies that a multinational strategy must be taken into account. According to Bartlett and Ghoshal (1989), a multinational strategy is a strategy of managing across border whereas the foreign subsidiaries run nearly autonomously, allowing them to quickly respond the local markets. In this case, the organisation refers to an Indonesian foreign subsidiary competing in mobile telecommunication market.

Studying the main themes have led to analysing several associated issues. These issues consist of, among others, types of managed knowledge (Nonaka, 1994), KM processes (Heisig, 2001a), the role of information and communication technology (Radding, 1998), human resource practices such as reward systems for KM-related efforts (Bartol & Srivastava, 2002). Organisational culture has also become of interest to this study as it potentially fosters KM initiatives within the organisation (Gupta et al., 2000).

1.2. RESEARCH OBJECTIVES AND QUESTIONS
As KM is seen to be a business practice (Radding, 1998), every organisation must formulate strategies in order to be able to acquire the potential value of KM. Strategy formulation is a critical step in managing knowledge within an organisation (Davenport & Prusak, 2000). This first step depends highly on the organisation’s characteristics and conditions, as well as the type of knowledge to be managed (Greiner et al., 2007). Having experienced the process of KM in the Department, I am interested on how the organisation devises its KM strategy. This leads to the first research question of this study:

*How does the Department devise its strategy to manage knowledge and what is the rationale?*

One important theme following strategy formulation is KM implementation. This study
explores on the implementation of KM in the Department as well as factors that facilitate and inhibit the implementation. These issues are associated with the second research question:

**How are the strategies implemented and what factors facilitate and inhibit the implementation?**

Moreover, KM implementation has created several impacts that affect the Department. This study aims to analyse those perceived impacts encompassing the third research question:

**What are the impacts of KM on the Department?**

Finally, this study also seeks to understand the challenges of KM implementation in the Department. Such understanding is needed to enhance the strategy and to improve the implementation processes so as to gain a better value of KM. This final objective aims to answer the last research question:

**What are the challenges of managing knowledge within the Department?**

1.3. RESEARCH METHODOLOGY

The methodology chosen for this research is case study\(^2\), i.e. investigating KM initiatives in the Department. Choosing a case study as a methodology allows this study to 'tell-it-like-it-is' from the respondents' point of view (Stark & Torrance, 2005). Furthermore, this study is mainly conducted using qualitative research method. According to Creswell (2003), a qualitative research is exploratory in nature whereby the researcher seeks to listen to the respondents and build an interpretation based on their ideas. Researchers “interact closely with those they study and minimise the distance between themselves in order to gather detailed and subjective information” (Creswell, 1994:159). The

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\(^2\) Some scholars refer to 'case study' as a method (Crotty, 1998) or an 'approach' (Stark & Torrance, 2005) while others consider it a methodology (Yin, 1994; Denzin & Lincoln, 2000)
analysis is realised by linking the concepts found during literature review with the empirical data (Coffey & Atkinson, 1996).

This research uses three instruments to collect empirical evidence: (1) in-depth interviews, (2) direct observation, and (3) secondary data. In-depth interviews were conducted to acquire in-depth insights about KM in the Department. Interviews were arranged with five members of the Department who have the capabilities of assessing the organisation's KM strategies, implementation, impacts and challenges. Among these five respondents were two managers and three project leaders (see Appendix 1). Interviews were carried out via electronic mail (e-mail) and over the telephone from the UK for about 30 to 45 minutes. The telephone interviews were recorded and transcribed for analysis. These interviews were carried out in Bahasa Indonesia (Indonesian language) to help the respondents provide as much detailed information as possible for this research (Converse & Presser, 1986). Six open-ended questions were asked to explore the objectives of this study (see Appendix 2).

The second instrument is direct observation which relates to my previous working experience in the Department. In this case, Olson (1985) explains that direct observation provides an insider perspective whereby the researcher has an extensive direct experience with the subjects of the research. While such instrument has some advantages for understanding the study, it also poses some concerns which will be explained further in Section 1.4.

The last instrument is secondary data. One predominant source of secondary data is the company's website which contains the company's profile including its vision, mission, business units and global presence. Additionally, Mr. Andi Wijaya (Head of Product Customisation Indonesia) provided a document which contained organisational overview specific to the Department (see Appendix 3). Another source of data is from the NSN annual report. Other published articles concerning NSN are also referenced to support several arguments.
Table 1.1 consolidates the research questions and corresponding instruments as well as interview questions. The interview questions are translated to *Bahasa Indonesia* which is used during the interview.
### 1.4. LIMITATIONS OF THE RESEARCH

This study has several limitations that need to be considered. Firstly, this is a Master’s research project which is limited to a three-month period. The limited time affects the depth of exploration in an attempt to study the complexity of KM strategy formulation.

<table>
<thead>
<tr>
<th>No</th>
<th>Research Question</th>
<th>Area of Investigation</th>
<th>Predominant Theories</th>
<th>Main Instruments</th>
<th>Interview Questions</th>
<th>Presentation of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How does NSN’s Product Customisation Department devise its strategy to manage knowledge and what is the rationale?</td>
<td>Motivation / Key Drivers</td>
<td>Zac (1999a, 1999b); Becerra-Fernandez et al. (2004); Hislop (2005); Desouza &amp; Evaristo (2003)</td>
<td>Electronic In-depth interviews with open ended questions, organisation’s reports, and my own personal experience</td>
<td>How does NSN Product Customisation department Jakarta form its strategy to manage knowledge? Please explain</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>2</td>
<td>How are the strategies implemented and what factors facilitate and inhibit the implementation?</td>
<td>Selection of Activities, Systems and Tools for each KM processes Knowledge Creation Knowledge Storage Knowledge Distribution Knowledge Application</td>
<td>Heitsig (2001); Nonaka (1994); Alavi &amp; Leidner (2001); Radding (1998)</td>
<td>Electronic In-depth interviews and my own personal experience</td>
<td>How are the formed strategies being implemented? Translation to Bahasa Indonesia: Bagaimana strategi KM dimplementasikan di departemen?</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>4</td>
<td>What are the challenges of managing knowledge within the Department?</td>
<td>Challenges of knowledge management</td>
<td>Davenport &amp; Prusak (2000); Bartol &amp; Srivastava (2002); de Gooijer (2000); Chase (1997)</td>
<td>Electronic In-depth interviews</td>
<td>What are the potential and future challenges of KM in the department?</td>
<td>Chapter 5</td>
</tr>
</tbody>
</table>

Table 1.1 - Consolidation of Research Questions, Methods and Main Instruments

Source: Author
and implementation. Due to this reason, the method of examining a single case study is chosen as a viable option to inquire in-depth information.

Second, the limited research time also affects the number of interviewees which may restrict the viewpoints. However, all respondents chosen for this study have good knowledge of the Department, particularly in the area of KM (e.g. Senior Managers, Project Leaders). Consequently, the interviews provided in-depth views for investigation and analysis of this study.

Third, this study is conducted in one department of a MNC subsidiary located in Jakarta, Indonesia. Therefore, the strategy formulation and implementation as well as the associated impacts and challenges may not be generalised. However, studying a single case study has allowed this research to examine the themes and issues in greater detail.

Lastly, this study is aware of any potential bias which may occur during analysis due to my previous employment in the Department. Olson (1985) refers to this condition as an 'insider perspective'. However, having had first-hand experience in the Department has enabled this research to explore deeper details for analysis purpose.

1.5. CHAPTER OUTLINE
The research report is divided into six chapters organised as follows.

Chapter One introduces the study and its objectives, points out the research questions, as well as describes the methodology and limitations.

Chapter Two outlines the literature review on KM. It firstly justifies the definitions and types of knowledge. It continues to elaborate the use of knowledge as well as how to manage knowledge in organisations. KM strategy and processes are put forward as framework to analyse KM strategy formulation and implementation within an organisation. The chapter also identifies impacts and challenges faced by organisations in their attempts to manage their knowledge.
Chapter Three attempts to answer the first research question by explaining findings of this study in regards to KM strategy. Beforehand, it introduces the organisation subject to this research: a subsidiary of a MNC residing in Jakarta, Indonesia. Further, it discusses the KM strategies formulation steered by Zack’s (1999b) theory. In the context of MNC, it illustrates the role of the Head Quarter (HQ) as well as other subsidiaries in the Department’s KM. The driving forces behind KM are subsequently described to understand the rationales of managing knowledge.

Chapter Four seeks to answer the second research question. It elaborates the findings and analysis of KM implementation in the Department. Heisig's (2001a) model of KM process, Nonaka's (1994) theory of knowledge conversion and Choi & Lee's (2002) terms of human- and system-strategy are widely used in discussing the implementation. The discussion discovers that the study findings have slightly modified Heisig's (2001a) model. Further, this Chapter reveals several factors that facilitate and inhibit the implementation.

Chapter Five aims to answer the third and fourth research questions. It identifies the impacts created by KM implementation in the Department. These impacts are categorised into intended and unintended consequences drawn from Giddens' (1984) definition. This Chapter also outlines the challenges faced by the Department in the near future. The challenges are analysed by employing Heeks’s (2002, 2006) Design-Reality Gap model.

Chapter Six concludes the study by explicitly answering all research questions. It synthesises the findings and provides several recommendations for NSN. This Chapter finally describes some lessons learned and closes with some final remarks.
CHAPTER 2 - LITERATURE REVIEW

“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.”

(Kluge et al., 2001:191)

2.1. INTRODUCTION

The question of how an organisation manages its knowledge has no single answer which encompasses all sorts of issues for all kinds of organisations. Yet, the above critical statement expressed by Kluge et al. (ibid) highlights some of the predominant issues in KM. The main purpose of this Chapter is to address KM-related literature. First, the definition of knowledge is clarified in Section 2.2. Section 2.3 expands on the explanation of knowledge in organisations. The Chapter progresses with elaborating KM themes in Section 2.4 encompassing strategy, process, MNC-specific issues, impacts, influencing factors and challenges, before concluding in Section 2.5.

2.2. WHAT IS KNOWLEDGE?

Scholars seem to agree that the term ‘knowledge’ in itself is not easy to define (Mertins et al., 2001; Hislop, 2005; Nonaka, 1994). One of the most prominent distinctions is between data, information, and knowledge (Radding, 1998; Hislop, 2005). Data is raw numbers, words, images and facts derived from observation or measurement (Dretske, 1981; Alavi & Leidner, 2001). Information is processed data (Machlup, 1980; Alavi & Leidner, 2001) in a meaningful pattern (Hislop, 2005). Knowledge is authenticated information that has been assimilated into a coherent framework of understanding (Vance, 1997; Alavi & Leidner, 2001).

The data-information-knowledge relationship can be represented in a pyramid. Data supports the generation of information, which is used to generate knowledge. Figure 2.1 shows this relationship in terms of (1) position on a continuum, (2) volume (large to
small), (3) value (lower to higher) and (4) human involvement. However, this hierarchy can be seen inversely. As Tuomi (1999) argues, knowledge exists which, when articulated and structured, becomes information which, when designated a representation, becomes data.

According to Heisig (2000), instead of a hierarchy, a continuum ranging from data via information to knowledge is proved to be the most practical scheme in the context of KM. Accordingly, the typical questions for data and information include ‘who – what – where – when?’; whilst for knowledge the questions are ‘how – why?’ (Eck, 1997). In the real world organisations, people rarely have problems with the ambiguity of the term knowledge. Of significance is that they know which kind of knowledge is relevant to their job (Mertins et al., 2001).

2.3. KNOWLEDGE IN ORGANISATIONS

After introducing the definition of knowledge, the remaining Sections describe the
nature of knowledge in organisations. This is established through identification where knowledge resides and classification of knowledge.

2.3.1. Knowledge Reservoirs: Where does Knowledge reside in Organisations?
In identifying knowledge reservoirs, Becerra-Fernandez et al. (2004) suggest three categorisation encompassing people, artefacts and organisational entities as displayed in Figure 2.2.

Firstly, knowledge considerably resides in people. Chua (2002) classifies this into individual and collective knowledge. At a fundamental level, Nonaka (1994) argues that knowledge in organisation can only exist at the level of the individual. However, some scholars contend that knowledge can reside in social groups (Zander & Kogut, 1995; Spender, 1996; Skyrme, 2000; Hislop, 2005), which Chua (2002) refers to as collective knowledge. It is grounded in the relationships among members of the organisation (Becerra-Fernandez et al., 2004). Within an organisation, collective knowledge includes organising principles, practices, and relative organisational arrangements on goals, missions as well as past experiences (Zander & Kogut, 1995). Another example is community of practice which is a “group of people who have a particular activity in common, and as a consequence have some common knowledge, a sense of community identity, and some element of overlapping values” (Hislop, 2005:59).
Secondly, knowledge is stored in organisational artefacts. They include *practices* or routines embedded in the organisational procedures, rules and norms expanded over time through experience (Levitt & March, 1988). *Technologies* and information systems (e.g. Wiki pages) are also considered in this category (Radding, 1998). Another artefact considered here is *knowledge repositories*. These include paper-based (e.g. paper-based documents) and electronic-based (e.g. the company’s website containing answers to frequently asked questions) storage.

Thirdly, knowledge exists in organisational entities. These entities are considered in three levels (Becerra-Fernandez et al., 2004). The first level is an organisational unit such as department whereby some knowledge is stored in the relationships among the units’ employees. The second level is the entire organisation, for example a business unit or a corporation. The last level embodies the knowledge that is stored in inter-organisational relationships established between, for instance, the organisation and its customers.

2.3.2. Classification of Knowledge

Some scholars have suggested ways to classify and characterise knowledge (Polanyi, 1966; Chua, 2002; Nonaka & Takeuchi, 1995; Kogut & Zander, 1992). Yet, the widely used one is knowledge classification proposed by Nonaka (1994).

Extracting from 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 (Becerra-Fernandez et al., 2004) and transmittable in systemic language (Nonaka, 1994). Hislop (2005) regards this type of knowledge as objective, separate from individual and social value systems. An example of this category is a user manual.

On the contrary, **tacit** knowledge is the knowledge that people possess which has a personal quality and is difficult to codify (Hislop, ibid). It is “deeply rooted in action, commitment and involvement in a specific context” (Nonaka, 1994:16). Polanyi (1975)
argues that tacit knowledge forms the background to interpret explicit knowledge. For example, a stock market analyst gains knowledge and experience through the years of observing a particular industry. Such knowledge is used to decide when to buy or sell stocks. Moreover, Table 2.1 summaries the difference between tacit and explicit knowledge.

<table>
<thead>
<tr>
<th>Tacit Knowledge</th>
<th>Explicit Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexpressible in a codifiable form</td>
<td>Codifiable</td>
</tr>
<tr>
<td>Subjective</td>
<td>Objective</td>
</tr>
<tr>
<td>Personal</td>
<td>Impersonal</td>
</tr>
<tr>
<td>Context Specific</td>
<td>Context Independent</td>
</tr>
<tr>
<td>Difficult to share</td>
<td>Easy to share</td>
</tr>
</tbody>
</table>

Table 2.1 - Characteristics of Tacit and Explicit Knowledge
Source: Hislop (2005:19)

2.4. KNOWLEDGE MANAGEMENT
Knowledge in organisations is an essential asset for organisational learning (Dixon, 1994; Pentland, 1995). Here, Dixon (1994:7) defines organisational learning as

“the intentional use of learning processes at the individual, group/team and organisational level to continuously transform the organisation in a direction increasingly congruent to organisational objectives and stakeholders’ expectations.”

Some reports have linked organisational learning with KM (Alavi & Leidner, 1999b; Andrews & Delahaye, 2000; Schultze & Leidner, 2002). Chapter One has introduced the definition of KM affiliated to this study. The following Sections feature some relevant themes and issues of KM, comprising KM driving force, strategy, processes, impacts, influencing factors as well as potential challenges.

2.4.1. Drivers for Knowledge Management
The topic of KM has come to the top of the management agenda in the mid-1990s (Quintas, 2002). Since then, researchers have analysed the forces that urge organisations to pay more attention in managing their knowledge (Becerra-Fernandez et al., 2004; Alavi & Leidner, 2001; Davenport & Prusak, 2000). One of KM’s driving forces is
accelerating market volatility (Quintas, 2002; Becerra-Fernandez et al., 2004). Changes in markets and industries, globalisation, and new forms of competition have increased rapidly. Such changes demand continual development of organisational knowledge. The need to continually develop organisational knowledge through learning is one of the key features of KM (Quintas, 2002).

Becerra-Fernandez et al. (2004) identify two other KM drivers. An increasing knowledge domain complexity is identified as one of them. Consequently, the knowledge required to complete a task has also become more complex. Such complexity needs to be well-managed for organisation to avoid any confusion in the future. Another driver is an increasing speed of responsiveness. Nowadays, organisations are challenged to respond to any organisational dynamics with limited time. To be able to respond quickly, information and knowledge related to relevant situations should be accessible when needed.

2.4.2. Knowledge Management Strategy

In order to utilise the organisation's knowledge resources and capabilities, KM strategies formation is an important issue (Hansen et al., 1999; Zack, 1999a; Beckman, 1999). Zack (1999b) identifies three research areas for KM strategies. First, an organisation must identify which knowledge is seen unique and valuable. Second, it must be determined how these knowledge resources and capabilities can support the organisation's product and market positions. Third, it is essential to find the link between KM strategies and its processes. Each KM processes must be conducted by appropriate KM strategies. KM processes will be further explained in the next Section.

KM strategy is described in two categories reflecting their focus (Hansen et al., 1999; Zack, 1999a). The first is system strategy (Choi & Lee, 2002) which emphasises the capability to create, store, distribute and apply the organisation's explicit knowledge (Davenport et al., 1998; Lee & Kim, 2001). The second is human strategy that stresses knowledge sharing via interpersonal interaction (Choi & Lee, 2002) utilising dialogue through social networks such as teamwork (Swan et al., 2000).
Past studies have explored guidelines to employ system and human strategy (Hansen et al., 1999; Bierly & Chakrabarti, 1996; Zack, 1999a; Bohn, 1994; Singh & Zollo, 1998). They can be classified into three views: focus, balanced and dynamic. Focus view suggests that organisations pursue one strategy predominantly, while using another to support it (Hansen et al., 1999; Swan et al., 2000). The balanced view recommends organisations to employ both system and human strategies with a right balance (Bierly & Chakrabarti, 1996; Zack, 1999a; Jordan & Jones, 1997). The dynamic view proposes organisations to align their strategies with the characteristics of knowledge they possess (Bohn, 1994; Singh & Zollo, 1998). Figure 2.3 reflects these three views in accordance to the degree of human- and system-strategy each view utilises.

2.4.3. Knowledge Management Processes

Many studies have identified the processes of KM (Radding, 1998; Heisig, 2001a; Becerra-Fernandez et al., 2004; Alavi & Leidner, 2001; Holzner & Marx, 1979). Although many scholars propose the KM processes in different ways, there are four processes that are of importance to KM. These processes are (1) knowledge creation, (2) storage, (3) distribution and (4) application.
This study adopts KM processes framework introduced by Heisig (2001a). The reason for this is because its model has cyclical process which is consistent with Dixon’s (1994) definition of organisational learning. Moreover, Quintas (2002) argues that organisation seeks to innovate focusing on the need to build their knowledge bases cumulatively. The cyclical KM processes proposed by Heisig (2001a) enables organisations to continually build their knowledge through knowledge creation, storage, distribution and application. Figure 2.4 displays the KM processes framework.

![Figure 2.4 - Knowledge management processes](image)

Source: modified from Heisig (2001a:28)

Nonaka (1994) – further reaffirmed by Nonaka and Takeuchi (1995) – suggests four modes of tacit-explicit knowledge conversion which intertwine with each KM process. Figure 2.5 illustrates these modes. The first mode is referred to as socialisation. It converts tacit knowledge between individuals. Examples of this mode 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

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3 Heisig’s original model uses the term Generate Knowledge. Here, the term Knowledge Creation is used as suggested by many predominant scholars in KM topic (Nonaka, 1994; Alavi & Leidner, 2001; Quintas, 2002; Choi & Lee, 2002).
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’ (Becerra-Fernandez et al., 2004). All in all, Nonaka et al. (2000:11) emphasise that knowledge conversion is “a continuous process of dynamic interactions between tacit and explicit knowledge”.

![Four Modes of Knowledge Conversion](source: Nonaka (1994:19))

**Knowledge Creation**

The first KM process refers to how organisations develop new content or replace the existing content (Alavi & Leidner, 2001; Pentland, 1995). Some of the instruments that can be used to promote knowledge creation are the acquisition of external knowledge (e.g. training sessions organised by third parties), the setting up of interdisciplinary teams which include the customers, as well as the enabling of various methods to elicit tacit and explicit knowledge (Mertins et al., 2001).

Recalling the knowledge conversion modes, Nonaka (1994) argues that knowledge can be created through all four modes. Individuals can discover new knowledge gained from sharing experiences through **socialisation** processes. Organisational knowledge is also created when individuals write down their personal knowledge which enables the
**externalisation** process. New, explicit knowledge can be created through the **combination** of existing explicit knowledge. Furthermore, individuals gain knowledge by learning the existing explicit knowledge through the process of **internalisation**.

**Knowledge Storage**

In an effort to prevent losing track of the acquired knowledge, storage and retrieval of organisational knowledge – also referred to as organisational memory (Stein & Zwass, 1995; Walsh & Ungson, 1991) – embody this second KM process (Alavi & Leidner, 2001). This process relates to what was explained in Section 2.3.2 whereby knowledge in organisation is stored in people, artefacts as well as organisational entities.

Referring to Nonaka’s (1994) knowledge conversion modes, Becerra-Fernandez et al. (2004) argue that knowledge storage process encompasses the **externalisation** as well as **internalisation** modes. The first is realised when individuals writing down their knowledge, therefore, storing the knowledge in a particular media (e.g. documents, systems). The latter concerns with the individuals' learning process which automatically memorises the newly-learned knowledge inside their minds.

**Knowledge Distribution**

Knowledge distribution aims to provide the right knowledge to the right person at the right time (Mertins et al., 2001). Alavi & Leidner (2001) identify this as ‘knowledge transfer’ whilst Becerra-Fernandez et al. (2004) call 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 & Meckling, 1996). Such transfer occurs at different levels: between individuals, between groups, from individuals to groups, across groups, and from the group to the organisation (Alavi & Leidner, 2001).

Becerra-Fernandez et al. (2004) claim that **socialisation** is used to facilitate knowledge distribution, particularly for tacit knowledge (Nonaka, 1994). In contrast, **exchange** process is identified as an enabler of the sharing of explicit knowledge between individuals, groups and organisations (Grant, 1996a). An example of exchange process is
the distribution of product design document from one employee to another, who will eventually utilise the explicit knowledge available inside the document.

**Knowledge Application**

Knowledge contributes to organisational performance when it is being applied for decision-making and performing tasks (Becerra-Fernandez et al., 2004). Therefore, the application of knowledge is the most essential process of KM (Mertins et al., 2001; Alavi & Leidner, 2001). Grant (1996b) recognises two mechanisms for knowledge application to create organisational capability: direction and organisational routines. Direction is “the principal means by which knowledge can be communicated at low cost between specialists and the large number of other persons who either are non-specialists or who are specialists in other fields” (Demsetz, 1991:172 cited in Grant, 1996b:379). An example of direction is when a software deployment team ask about an installation problem to an expert. Likewise, organisational routines invoke the application of knowledge placed within the organisational procedures and rules that guide future behaviour (Becerra-Fernandez et al., 2004). The essence of organisational routines is that “individuals develop sequential patterns of interaction which permit the integration of their specialised knowledge without the need for communicating that knowledge” (Grant, 1996b:379).

**2.4.4. Knowledge Flows in Multinationals**

KM strategy and implementation differs in each organisation. Some studies report KM in public institutions (Syed-Ikhsan & Rowland, 2004; Liebowitz, 2004; Wimmer & Traunmuller, 2000); private sectors (Bate & Robert, 2002; Swan et al., 1999; Alwis & Hartmann, 2008); as well as non-governmental organisations (Hurley & Green, 2005; Schueber, 2003). This Section focuses on managing knowledge in a Multinational Company (MNC), particularly the organisational structure that affects knowledge flows.

Hislop (2005) identifies two structural forms of multinationals: centralised hierarchical and decentralised network structure. The first assumes the corporate centre – known as the Head Quarter – provides a platform and foundation for knowledge-creating
activities. Knowledge flows in a unidirectional way, from the corporate centre out to the organisations business units. There are few independent interconnections between business units. Figure 2.6 depicts the centralised hierarchical structure.

Figure 2.6 - Centralised Hierarchical Structure for Multinationals
Source: Hislop (ibid:200)

The latter structure presupposes that “knowledge creation is not the sole responsibility of the corporate centre” (Hislop, ibid:201). Knowledge flows to both directions between the corporate centre and business units (Andersson et al., 2005; Mudambi & Navarra, 2004). Within this structure, there exists many interconnections between interdependent business units. Figure 2.7 illustrates such structure.
2.4.4. Knowledge Management Systems

One aspect of KM strategy and implementation concerns knowledge management systems (KMS). KMS is “a class of information systems applied to managing organisational knowledge” (Alavi & Leidner, 2001:114). They are usually ICT-based systems which support the processes of knowledge creation, storage, distribution and application.

There are several forms of KMS (Radding, 1998; Becerra-Fernandez et al., 2004). Electronic mail (e-mail) is considered an essential component of KMS as it allows individuals to access and share knowledge (Radding, 1998). The document management system is another form of KMS (Radding, ibid; Becerra-Fernandez et al., 2004) which archives various forms of documents (e.g. word processing, presentations, manuals, memos).
Collaboration tools are also one of the KMS components. Groupware is an example of collaboration tools which supports the communication as well as collaborative efforts of individuals (Becerra-Fernandez et al., 2004). It consists of e-mail, electronic meeting systems and video-conferencing technologies. It allows individuals inside an organisation to exchange ideas, both formally and informally, therefore supporting the knowledge distribution process.

Another example of a commonly used collaboration tool is Wiki technology. Wiki\(^4\) refers to Web-based software that enables its users to easily edit pages online in a browser (Ebersbach et al., 2006). 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 KM, especially knowledge creation, storage and distribution. Currently, there are many open-source platforms with public licensing Wiki systems available, such as Twiki\(^5\) and MoinMoin\(^6\).

Seamless KM-related systems integration can potentially foster KM implementation in organisations (Alavi & Leidner, 1999b). Alavi and Leidner (ibid) further argue that KMS at least integrates various tools in three areas: database and database management; communication and messaging; and browsing and retrieval. Nemati et al. (2002) go beyond these three types of tools and propose a so-called knowledge warehouse that integrates all relevant KMS with decision support systems and data warehouses.

A reliable ICT infrastructure is critical to KMS deployment. It includes the set of technologies, networks, protocols as well as standards to support the organisation's KM strategies (Radding, 1998). Technologies here consist of, among others, the hardware for storage, servers, desktop as well as operating systems and software. Networks denote the local area network, Intranet and Internet. Organisations must further determine the

\(^4\) The term Wiki is the short form for “WikiWikiWeb” (Schaffert, 2006). The word is rooted from a Hawaiian word for “fast”. It was originally developed in 1995 by Ward Cunningham (Ebersbach et al., 2006) for the PortlandPatternRepository which contains an incomplete and casually written history of programming ideas (Cunningham & Cunningham, 2009).

\(^5\) For further information: Twiki (2009)

\(^6\) For further information: MoinMoin (2009)
protocols and other standards to be associated with its entire infrastructure.

### 2.4.5. Impacts on Organisation

KM implementation has created several impacts on organisations. In addressing these impacts, categorisation of 'intended result' and 'unintended consequences' drawn from Giddens' (1984) Theory of Structuration can be used for the analysis. Giddens (ibid:xix) notes that 'intended results' are those that “hold because actors themselves know them – in some guise – and apply them in the enactment of what they do”. On the contrary, 'unintended consequences' are results that are not originally intended in certain circumstances, either may or may not be foreseen beforehand.

Moreover, Becerra-Fernandez et al. (2004) identify four categories of KM impact on an organisation:

- **KM affected the people** (i.e. employees). It enhances the employees' learning process achieved through externalisation, combination, internalisation, and socialisation (Nonaka, 1994; Swan, 1999). Employees are able to retrieve knowledge required to adapt to any circumstances in the organisation (Becerra-Fernandez et al., 2004). Wiig (1999) suggests that such ability could eventually lead to employees' job satisfaction.

- **KM enables improvements in organisational processes** characterised as efficiency, effectiveness and innovation. Efficiency comprises processes that are cheaper, quicker and produce more outputs, while effectiveness embraces processes that are better and new (Heeks, 2008b; Wauters & Lorincz, 2008). Moreover, KM facilitates organisations to develop and produce innovative solutions as well as organisational processes (Becerra-Fernandez et al., 2004).

- **KM affects the organisation's products**. Proper KM implementation enables organisations to offer new products or improve earlier products (Becerra-Fernandez et al., ibid).

- **KM also influences the overall organisational performance** both directly and indirectly. Direct impact occurs when KM enables organisations to create innovative solutions which generate revenue and profit. It can be examined
through calculating the organisation’s return on investment (ROI). The indirect impact appears within the organisation’s activities that are not directly associated with its vision, strategies or revenues. For example, KM might improve the organisation’s advantageous negotiating position compared to its competitors.

2.4.6. Factors Influencing Knowledge Management

After analysing the impacts, this Section examines the factors that are facilitating and inhibiting KM initiatives in organisations. One facilitating factor concerns ICT infrastructure. ICT is considered one of the dominant themes in KM literature (Michailova & Nielsen, 2006; Riege, 2007; Park & Kim, 2005). In fact, several scholars argue that many KM initiatives rely upon an integrated ICT infrastructure as an important enabler (Alavi & Leidner, 1999a, 2001; Chourides et al., 2003). ICT facilitates KM processes by equipping organisations with communication and data storage capabilities (Radding, 1998).

People are considered another facilitating factor for KM. Employees’ willingness to share their knowledge and expertise are of importance to successful KM initiatives (Storey & Quintas, 2001). Such willingness is derived from interpersonal trust amongst the employees (McInerney & LeFevre, 2000; Roberts, 2000; Andrews & Delahaye, 2001); rewards system for employees (Swan, 1999; Hansen et al., 1999; Jarvenpaa & Staples, 2000); and supportive organisational culture (Heisig et al., 2001). Organisational culture here encompasses leadership and commitment (Swan, 1999; Prusak, 1999), the sense of equity and fairness in the organisation’s work and decision-making process (Hislop, 2005; Kim & Mauborgne, 1998), as well as communication transparency and openness amongst the individuals inside the organisation (Heisig et al., 2001; Gupta et al., 2000).

Each of the mentioned facilitating factors can become inhibiting factors in opposite circumstances. For instance, ICT has some limitations which can inhibit the organisation’s KM initiatives (Swan, 1999). Swan (ibid) points out that ICT cannot codify all organisational knowledge, especially tacit knowledge. In many cases, a disintegrated
ICT infrastructure – consisting of hardware, software and network infrastructure – may prevent the employees' willingness to engage in the organisation's KM activities (Swan, 1999). Further, such unwillingness will certainly inhibit the overall KM implementation within the organisation. Likewise, in terms of organisational culture, lack of leadership and communication openness may restrict the KM activities (Mertins et al., 2001; Heisig et al., 2001).

2.4.7. Challenges for Organisations
To this day, organisations are to face challenges to optimise their KM implementation. This Section uses Heeks's (2002, 2006) Design-Reality Gap model, displayed in Figure 2.8, in determining potential challenges in KM. Although this model is originally designed to identify existent gaps between design assumptions/requirements and the reality in information systems projects, it is also useful as a checklist to analyse future challenges of KM implementation.

![Design-Reality Gap Model](image)

The major challenge for an organisation is to effectively and systematically manage its
knowledge (Wiig, 1999). The following describes KM challenges for each dimension in Heeks’s (2006) Design-Reality Gap model:

1. **Information.** This dimension assumes that information must be existent in the organisations in order to succeed in executing any project initiatives. In relation to KM, Gupta and Govindarajan (2000) claim that maintaining sources of valuable knowledge is critical so as to succeed in KM.

2. **Technology.** This second dimension concerns relevant types of technologies required for the corresponding project, i.e. KM projects. One challenge here is to find innovative technologies to capture knowledge, particularly tacit knowledge. Heisig (2001b) recommends using 'in-a-nutshell' videos recording the experts sharing their knowledge.

   Another challenge is to continuously maintain a strong and integrated ICT infrastructure to support its KM implementation. Seamless integration of the various KM tools and systems can lead to successful KM initiatives (Alavi & Leidner, 1999b). However, Gupta et al. (2000:20) emphasise that KM is not about more or better tools, but rather it is about “a new perspective to link the pieces of information that promotes understanding and accelerate action – in other words, to create knowledge”. This means that another challenge remains on how organisations integrate systematic KM into daily work (Davenport & Prusak, 2000).

3. **Processes.** The third element considers the required processes or activities undertaken by all related parts of organisation. In terms of KM, these activities should manifest the relevant KM processes (i.e. knowledge creation, storage, distribution and application). Besides that, other processes that support KM implementation are also taken into account. For example, human resource management practice to determine KM-related reward system (Swan et al., 1999; Jarvenpaa & Staples, 2000). In light of this, Bartol and Srivastava (2002) suggest some mechanisms of a reward system in order to promote knowledge sharing behaviours.

   Another example here is the need to measure KM performance to justify KM investments (Chong et al., 2000). Though many believe that it is difficult to

4. **Objectives and Values.** This dimension is often the most important one because the 'objectives' element encompasses issues of organisational strategies and politics, and the 'values' component embodies organisational culture. In regards to KM, the former indicates the importance of comprehensive KM strategies (Merono-Cerdan et al., 2007; Nonaka & Takeuchi, 1995). These strategies must be linked to corresponding KM processes (Zack, 1999b) and remain aligned with the organisation's business strategies (Davenport & Prusak, 2000; Wiig, 1999). The latter is concerned with creating organisational culture that promotes KM (Heisig et al., 2001; Gupta et al., 2000). Some scholars refer to this as ‘knowledge culture’ (King, 2007; Oliver & Kandadi, 2006). ‘Knowledge culture’ is defined as “a way of organisational life that ... enables and motivates people to create, share and utilise knowledge for the benefit and enduring success of the organisation” (Oliver & Kandadi, 2006:8). Szulanski (1996) proposes one motivational force for people to be willing to share their knowledge is the organisation’s institutional structures such as values, norms and accepted practices. Moreover, studies show an important connection between the success of KM initiatives with the organisation's openness and collaborative culture (Leidner et al., 2008; Barrett et al., 2004; Davenport & Prusak, 2000; Oliver & Kandadi, 2006; King, 2007).

5. **Staffing and Skills.** These two components cover the number of staff and their competencies. In order to manage KM, an organisation may need to employ a number of staff which has KM-related competencies (i.e. knowledge and
experience). This dimension corresponds to the following dimension of management systems and structures.

6. **Management Systems and Structures.** This dimension concerns the overall management systems, including organisational structures, required to foster any project execution. In this case, KM may lead to organisational change such as reorganisation (Desouza & Evaristo, 2003; Claver-Cortes et al., 2007; Vorbeck & Finke, 2001). Several studies report that many organisations have established a team or specific department focusing on KM projects, strategies, design and implementation (Chase, 1997; Vorbeck & Habbel, 2001). Such establishment allow other departments in the organisation to focus on their own respective functions (Chase, 1997).

7. **Other Resources.** The final component covers time and money. In this case, the amount of time and money to manage KM implementation has posed certain challenges to many organisations. The analysis of this dimension may relate to justification of KM investments (Chong et al., 2000) as previously explained in the process dimension.

2.5. **SUMMARY**

Carried out from Kluge et al.'s (2001) observation as quoted at the beginning of this Chapter, a literature review of KM has been presented. The definition of knowledge was justified initially and shown how it is represented within organisations. Knowledge in organisations was rationalised by describing the knowledge reservoirs, i.e. people, artefacts and organisational entities. Knowledge was then classified as tacit and explicit.

KM was explained further emphasising on themes such as strategy, processes, driving force, and knowledge flows in the context of MNC. In terms of driving forces, these included increasing market volatility, knowledge domain complexity and speed of responsiveness. As for KM strategy, this Chapter focused on two theories which will be used to steer the discussion in the upcoming Chapters. The first theory was by Zack (1999b) which defines three research areas for KM strategies. The second was proposed by Choi and Lee (2002) which categorised KM strategies into human- and system-
strategy. These strategies closely intertwined with KM processes that include knowledge creation, storage, distribution and application (Heisig, 2001a). In terms of MNC knowledge flows, centralised hierarchical and decentralised network structures were defined.

In addition, some influencing factors (i.e. facilitators and inhibitors), impacts and future challenges were elaborated. The identified facilitating factors for KM were an integrated ICT infrastructure, people's willingness to share knowledge, as well as communication and organisational culture openness and transparency. On the other hand, the inhibiting factors included ICT limitation to codify all existing organisational knowledge, a disintegrated ICT-based KM-systems, as well as lack of leadership and communication openness within the organisation. With regards to KM impacts, they were classified as intended and unintended consequences (Giddens, 1984). Furthermore, this Chapter described four groups of KM impacts: people, process, products and organisational performance. In relation to KM challenges, this Chapter illustrated challenges utilising Heeks's (2002, 2006) Design-Reality Gap model.
CHAPTER 3 - KNOWLEDGE MANAGEMENT IN NOKIA SIEMENS NETWORKS: STRATEGY

“Our products and solutions now directly impact 1.2 billion people in over 150 countries. We firmly base our success as a truly global player on our extensive knowledge of local market demands and out focus on finding the right solution for you.” (Nokia Siemens Networks, 2009)

3.1. INTRODUCTION
As a multinational company operating globally in a volatile market of telecommunications, Nokia Siemens Networks – the organisation subject to this study – has recognised its extensive knowledge of telecommunication market. Hence, managing knowledge becomes a crucial point for its business survival. One area of interest to this study is how the organisation forms its KM strategies.

Section 3.2 introduces the studied organisation. The global company organisation is briefly explained followed by the description of the Department where the study was conducted. The findings of KM strategy within the Department as understood from the interviews as well as reflected from the author’s own observations are then presented in Section 3.3. These findings address the first research question. They are analysed by applying framework and theories outlined earlier in Chapter Two, leading to conclusions in Section 3.5.

3.2. THE GLOBAL TELECOMMUNICATIONS COMPANY
Nokia Siemens Networks (“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 employed an estimated 60,000 people in more than 150 countries (Nokia Siemens...
Networks, 2009a). In the mobile network market share, Reuters (2007) reports that NSN is positioned in second place, behind the market leader Ericsson. Through innovative solutions (Nokia Siemens Networks, 2009m), NSN's vision is that

“by 2015 we will live in a world where five billion people will be connected, mostly via broadband, from virtually any place in the globe ... Inspired by [this] vision, [NSN] have one simple mission: to connect the world” (Nokia Siemens Networks, 2009b).

In order to execute its mission, NSN designs an operational model that is organised towards being close to its customers (Nokia Siemens Networks, 2009c). As such, NSN establishes five business units which offer a range of products, services and solutions. These business units are (Nokia Siemens Networks, ibid):

1. **Broadband Connectivity Solutions** – providing solutions for transport networks that are the underlying infrastructure for all mobile and fixed networks (Nokia Siemens Networks, 2009d).

2. **Converged Core** – the forefront of convergence in multimedia, telecommunications and the Internet with portfolio solutions ranging from circuit-switched voice services to IP-based systems for data, voice and multimedia (Nokia Siemens Networks, 2009e).


4. **Radio Access** – supporting a broad range of radio access technologies, including GSM\(^7\), WCDMA, and WiMAX. The unit's own mission is “to enable the broadband evolution and to increase [the] customers' profitability by optimising total value of ownership for their radio access networks” (Nokia Siemens Networks, 2009g).

5. **Services** – providing integration of all in-house products and the knowledge on

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\(^7\) Global System for Mobile communications, is ‘an open digital cellular technology for transmitting mobile voice and data services’ (GSMA, 2009)
third-party technologies to deliver end-to-end deployment through consultancy or outsourced operations (Nokia Siemens Networks, 2009h).

NSN is operating globally in seven regions: Asia Pacific, Greater China, Latin America, Middle East and Africa, North America, North East and West South Europe (Nokia Siemens Networks, 2009i). Figure 3.1 illustrates all regional coverage. Its Global Head Quarter (HQ) consists of Operational HQ located in Espoo, Finland (Nokia Siemens Networks, 2009a) and a Research & Development (R&D) centre located in Munich, Germany. Hereafter, HQ refers to NSN's Global HQ.

![Figure 3.1 - NSN Global Presence](source: Nokia Siemens Networks (2009i))

**Product Customisation Department**

This study is conducted particularly in the NSN's Product Customisation department (“the Department”) - also known as Solution Centre - located in Jakarta, Indonesia. During the time of this study, the Department was part of the Business Support System (BSS) business unit. Figure 3.2 depicts the BSS business unit. It aims to intensify NSN's support to Indonesian network operators in the areas of communications and information technology (Wijaya, 2009; see Appendix 3). 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’\(^8\) 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.

\[\text{Figure 3.2 - BSS Business Unit Global Structure}^{9}\]

Source: developed from Nokia Siemens Networks (2009c) and Ariawan (interview, 11/06/2009)

The Department has five subdivisions shown in Figure 3.3: 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 (Wijaya, 2009). Its headcount at the time of this study was 71 employees (Wijaya, ibid).

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\(^8\) ‘time-to-market’ is ‘the length of time it takes from a product being conceived until its being available for sale’ (Wikipedia, 2009).

\(^9\) The Author has learned that there will be organisational change within the BSS business unit as of 1 July 2009. According to Wijaya (interview, 17/06/2009) and Ariawan (interview, 11/06/2009), there will be re-organisation affecting the Department which is not the scope of this study.
In Indonesia, Telkomsel has been one of NSN’s success stories highly influenced by the Department’s performance (Nokia Siemens Networks, 2009; Wijaya, 2009). The Department had taken part in the customisation development and deployment of one of NSN’s product called Convergent Charging solution in Telkomsel (Wijaya, 2009; Nokia Siemens Networks, 2007; 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. The next Section illustrates how the Department devises its strategies to manage knowledge.

### 3.3. KNOWLEDGE MANAGEMENT STRATEGY IN NSN: FINDINGS

When investigating KM initiatives in the Department, all respondents acknowledge that they have applied in their activities. In fact, studies have shown that both companies of origin – Nokia and Siemens – have applied KM (Voelpel et al., 2005; Davenport & Probst, 2002; Gamble & Blackwell, 2001; Chase, 1997; Civi, 2000). According to Gamble & Blackwell (2001:7-8),

> “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”.

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10 Telkomsel has been the largest cellular telecommunications operator in Indonesia by market share (Telkomsel, 2008)
The ShareNet is then adapted by NSN and renamed to IMS (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009). Similarly, Nokia values KM demonstrated by establishing the Knowledge Management Department that is responsible for organising KM concepts and strategies (Chase, 1997). Further, Nokia adopts a KM business strategy to move the organisation to a network-based learning organisation (Civi, 2000).

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] personal 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 (Nugroho, interview, 16/06/2009).

One significant aspect of the Department’s KM strategy is providing wide access to document resources as well as experts, not only from the HQ, but also from other subsidiaries (Wiharjito, interview, 05/06/2009; Nugroho, interview, 16/06/2009; Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009). Through accessing relevant documents, employees are able to, for instance, learn new knowledge, solve problems and make decisions about future opportunities (Wiharjito, interview, 05/06/2009).
Likewise, access to experts – both technical and managerial – has enriched the Department’s knowledge as the experts share their knowledge relating to particular subject or project (Ariawan, interview, 11/06/2009).

The Department’s KM strategy is then broken down into employees’ tasks and responsibilities which varies by each individual (Wijaya, interview, 17/06/2009; Nugroho, interview, 16/06/2009. Nugroho (ibid) sees the Department’s attempt in shaping 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 “personal objective setting” - an activity that defines each employee’s task and responsibility (i.e. their ‘objective’) every certain period of time. Nevertheless, regardless of which product they are assigned to, Wijaya (ibid) emphasises the need of constantly encouraging employees to be involved in the Department’s effort in managing knowledge.

All employees will be given training and ‘enabling’, as required for further customisation project activities. The term training is used for acquiring general knowledge, while the term ‘enabling’ - which include On-The-Job Training (OJT) - refers to obtaining project-related knowledge. As revealed by Wijaya (interview, 17/06/2009), the ‘enabling’ 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. Based on the author’s observation, well-distributed knowledge could improve the execution of customisation project within the department.

The Department manages several types of knowledge (Wiharjito, interview, 10/06/2009; Puspaningsih, interview, 09/06/2009):

- It mainly manages knowledge which considers as the ‘know-how’ in customising its products. However, the managed product knowledge is limited to the products that are being implemented in the Department’s customers. Thus, it
does not cover all the available NSN's products. The managed product knowledge is usually tied upon the current or future projects. Project ‘know-how’ includes understanding feature specifications, modifying software codes, customisation testing as well as data administration. By using this ‘know-how’ knowledge, the development team customises existing products to fit in with customer’s requirements.

- It manages the customised product's software codes. Whenever the code is created or modified, the development team member must put code comments which explain the objective of the lines of codes. Combined with the technical specifications, these code comments are very useful for reverse engineering purposes.

- The ‘Know-how’ considers customer's business processes that are critical knowledge to the Department as to develop product customisation based on the customer's requirements. One customer has its own specific business processes. Even if, for example, two customers deploy the same product, the implementation is likely to be different as each customer would have to customise the deployed product to align with its business processes.

- In addition to customer's business processes, the Department also manages knowledge relating to customer’s overall network architecture and service design.

- The Department's own internal business processes are also part of the managed knowledge. These processes include those relating to project management as well as personnel development (e.g. personal training).

There are several factors that motivate the Department in managing knowledge. The mobile telecommunications market accounts for the first motivation (Wiharjito, interview, 05/06/2009). The rapid changes in the mobile telecommunications market – particularly in Asia Pacific as the Department’s business coverage – has caused all mobile telecommunications operators to encounter these changes with a rapid business development. Changes within the operators’ business affect the NSN’s business. In fact, according to Wijaya (interview, 17/06/2009), both customers’ and NSN’s businesses are
the two significant factors that motivate the Department to implement KM. A vast amount of knowledge relating to the customer's business and processes has to be managed in order to compete well.

Another motivation which originates internally is the need to distribute the existing knowledge (Puspaningsih, interview, 09/06/2009). Knowledge in one person must be shared with others to be able to gain more benefit from it. This is of importance to set a knowledge base that every employee must have. Furthermore, Ariawan (interview, 11/06/2009) notes that the need to have a standardisation of product customisation is also a motivation of KM within the Department. Even though product customisation is specific to one customer's business processes, according to the author's observation, there is likelihood that general customisation techniques are similar, or even the same. This standardisation is deemed to alleviate new product customisation projects.

However, despite its importance, there is no formal written KM strategy. Currently, there is no specific KM subdivision within the department's organisational hierarchy which particularly functions as a KM strategic solutions provider. One reason for this is because HQ does not provide clear guidelines for KM (Wiharjito, interview, 10/06/2009). Another reason concerns the working environment. The Department seems to foresee no problem with its current KM (Nugroho, interview, 16/06/2009). The fact that the Department's employee turnover is low has helped in maintaining the existing knowledge circulating within the Department (Nugroho, ibid). Such circulation is also helped by a friendly working environment which allows employees to easily and comfortably share their knowledge (Nugroho, ibid; Wiharjito, interview, 05/06/2009). These conditions consequently evolve to what Wiharjito (interview, 05/06/2009) refers 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 pages), others are triggered by the HQ. These include managing knowledge of internal business processes and new
product or technology (Wiharjito, interview, 10/06/2009). The HQ further ensures access to knowledge storage as well as to product and technology experts (Wiharjito, interview, 05/06/2009). The former consists of providing network infrastructure for accessing the HQ's knowledge library – i.e. documents server (Wiharjito, ibid; Puspaningsih, interview, 09/06/2009; Nugroho, interview, 16/06/2009). The latter is intended to support the Department's work processes in need of experts' consultancy (Wiharjito, interview, 05/06/2009; Ariawan, interview, 11/06/2009). The consultancy is usually required when new knowledge is being captured or shared from other sources, or when documents have insufficient information and need to be confirmed.

3.4. KNOWLEDGE MANAGEMENT STRATEGY IN NSN: DISCUSSION

Recognising the importance of knowledge as suggested by the quotes presented earlier in this Chapter, the study finds evidence of the Department's efforts to manage its knowledge. This Section analyses the findings by linking them with KM theories described in Chapter Two. It consists of two Sub-Sections discussing (1) how KM strategy is formed in the Department and (2) the rationale behind the strategy formulation.

3.4.1. How Knowledge Management Strategies are devised in the Department?

This Sub-Section attempts to answer one part of the first research question. Zack’s (1999b) research areas into KM strategies mainly steer the discussion. Heisig’s (2001a) model is then employed to examine the Department's KM strategies. The role of HQ in the Department's KM implementation is also investigated by incorporating Hislop's (2005) knowledge flow theory in multinationals.

The first research area defined by Zack (1999b) is identifying the valuable knowledge that needs to be managed. The findings presented in Section 3.3 have identified four types of knowledge managed within the Department. Each type is classified into either explicit or tacit knowledge (Nonaka, 1994; Polanyi, 1966). First, some of the project ‘know-how’ – e.g. manuals, documentations, technical specifications – are considered explicit knowledge (Becerra-Fernandez et al., 2004), while the project experience ‘know-how’ is specified as tacit knowledge. Second, software codes are identified as explicit
knowledge stored inside Clearcase\textsuperscript{11}. Third, some of the customer's business processes knowledge is considered to be explicit knowledge as they can be obtained from the customer's company profile. However, there are several other information and knowledge about customer's business processes which are gathered through project experience. These kinds are viewed as tacit knowledge. Fourth, the customer's network design and architecture is specified as explicit knowledge as it is retrieved from the customer's network specification documents. Finally, some of the Department's internal business processes are available in documents; hence they are classified as explicit knowledge. On the other hand, several other internal business processes are not yet documented and remain as tacit knowledge kept inside each individual's mind.

The second area is to examine how the knowledge resources and capabilities can support an organisation (Zack, 1999b). According to Wijaya (interview, 17/06/2009), 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 personal development. Such personal development would in turn benefit the Department's work processes as the employees gain more knowledge useful for executing projects.

The final and most essential research area identified by Zack (1999b) is to find a link between KM strategies and its processes. Based on the findings, the Department seems to employ the balanced view which uses both human and system strategies with a right balance (Bierly & Chakrabarti, 1996; Jordan & Jones, 1997). The implementation of these strategies will be explained in detail in Chapter Four. Beforehand, it is beneficial to understand the high-level overview of KM strategies foreseen within the Department.

In linking the Department's strategies with KM process, Heisig's (2001a) framework of KM process is employed for the analysis. As described in Chapter Two, the model

\textsuperscript{11} Clearcase is a software configuration management that provides “sophisticated version control, workspace management, parallel development support and build auditing to improve productivity” (IBM, 2009)
suggests that KM is a continuous cycle of activities with four main processes: creation, storage, distribution and application. With regards to the findings, the Department firstly determines the required knowledge associated with the Department’s product portfolio (Wijaya, interview, 17/06/2009). 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 (Heisig, 2001a; Alavi & Leidner, 2001; Mertins et al., 2001). When the required knowledge is obtained, it will trigger the process of knowledge storage, whereby knowledge is stored inside a specific media or system (Radding, 1998; Pentland, 1995). Newly acquired knowledge is expected to be distributed amongst the Department’s employees as part of the knowledge distribution process (Mertins et al., 2001; Pentland, 1995). Hereafter, the available knowledge is ready to be put to use for executing a project through the knowledge application process (Becerra-Fernandez et al., 2004; Alavi & Leidner, 2001). Figure 3.4 illustrates the overview of Department’s KM strategies.
The Department's KM strategies seem to have followed the model consistently. In the next Chapter, how these strategies are implemented will be explored.

Being a subsidiary office of an MNC, the Department's devised KM strategies are also influenced by the HQ. However, Wijaya (interview, 17/06/2009) mentions that 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 (Nokia Siemens Networks, 2009m). Many scholars argue that KM affects a company's innovation capability (Alwis & Hartmann, 2008; Swan et al., 1999). 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’.

The organised KM efforts are limited to the Department's product portfolio reflected by the project execution (Wijaya, interview, 17/06/2009). As suggested by Wijaya (ibid) and Wiharjito (interview, 05/06/2009), 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 & Navarra, 2004). In this case, it is evident that some of the knowledge creation activities (e.g. ‘enabling’) are initiated by the Department in Jakarta (Wijaya, interview, 17/06/2009; Wiharjito, interview, 05/06/2009). Figure 3.5 depicts the knowledge flows in NSN with regards to the Department work process. It can observed that this figure is similar to Hislop’s (2005) model for the decentralised network structure for MNC as revealed in Chapter Two.

Figure 3.5 - Knowledge Flows in NSN (with respect to the Department's work process)
Source: adapted from Hislop (2005:201)

### 3.4.2. The Rationale: What motivates the Department to manage its knowledge?

This Sub-Section explores the rationales in terms of forces driving the Department to implement KM. These drivers are categorised into external and internal drivers. The telecommunication market is considered the external drivers (Wiharjito, interview, 05/06/2009). According to Becerra-Fernandez et al. (2004:4), the “pace of change, or
volatility, within each market domain has increased rapidly in the past decade”. Changes in the market affect the customer's business. Such impact is good opportunity for NSN – particularly the Department – to further elevate its business (Wijaya, interview, 17/06/2009).

The internal driver of KM in the Department is the need to distribute the knowledge within the organisation (Puspaningsih, interview, 09/06/2009). Becerra-Fernandez et al. (2004:4) identify this as one way to 'diminish individual experience'. When knowledge is well-distributed, the department will no longer rely on certain individuals to solve problems. Diminishing individual experience could result in standardisation of processes, i.e. product customisation procedures, which enable every employee to acquire knowledge relevant to their work (Ariawan, interview, 11/06/2009). Having a well-distributed knowledge base would in turn lead to an intensified speed of responsiveness (Becerra-Fernandez et al., 2004).

3.5. CONCLUSION
Recalling the research objective drawn in Section 1.2, this Chapter attempts to answer the first research question. The answer to this is by firstly determining the knowledge to be managed and how knowledge can benefit the Department. The Department manages five types of knowledge that include project 'know-how', software codes, customer's business processes and network architecture, as well as the Department's internal business processes itself. Hereafter, the strategy is devised by adopting a balanced view – utilising both human and system strategies in the right balance. The Department benefits from the decentralised structure employed by the global NSN organisation as it allows the Department to create knowledge autonomously, producing a two-way knowledge flow between HQ and subsidiaries as well as among the subsidiaries themselves.

The study finds that the Department has formed strategies for all KM processes: creation, storage, distribution and application. The next chapter describes how these formed strategies are implemented.
CHAPTER 4 - KNOWLEDGE MANAGEMENT IN NOKIA SIEMENS NETWORKS: IMPLEMENTATION

"In a knowledge-driven economy, talk is real work."
(Thomas H. Davenport and Laurence Prusak, 2000:90)

4.1. INTRODUCTION

In Chapter Three, the Department’s KM-related strategies have been identified. This Chapter proceeds with the strategies implementation as presented in Section 4.2. It reveals both factors that facilitate and inhibit the implementation. The analysis of KM implementation aims to elaborate the findings by applying three predominant theories: (a) Heisig’s (2001a) KM process framework, (b) Nonaka’s (1994) knowledge conversion theory, and (c) Choi and Lee’s (2002) term of human- and system-strategies.

4.2. KNOWLEDGE MANAGEMENT IMPLEMENTATION IN NSN: FINDINGS

Wijaya (interview, 17/06/2009) explains that the implementation of KM in the Department 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 Department’s 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 so as to execute projects.

The organisation planning is then broken down into individual planning. This individual planning is realised in each employee’s ‘personal objective setting’ (Wijaya, ibid). Employees will be appointed some objectives, tasks and responsibilities, including KM-related tasks, planned for the next six months. For example, an employee could be assigned to learn about database management system as part of his/her ‘personal objective setting’. Wijaya (ibid) stresses out that these ‘personal objective setting’ ensure the execution of KM initiatives within the Department. What is still missing inside this ‘personal objective setting’ is a reward mechanism to acknowledge
employees’ efforts in engaging in KM activities.

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 (Nugroho, interview, 16/06/2009; Wiharjito, interview, 05/06/2009; Ariawan, interview, 11/06/2009). New training of general subjects will be planned further and included inside the ‘personal objective setting’. Usually, these general-subjects trainings are organised by a third party.

To accelerate the learning process, an employee will be assigned to a particular project. Beforehand, he/she will undergo series of ‘enabling’ activities to learn a project-specific knowledge (Nugroho, interview, 16/06/2009; Wiharjito, interview, 05/06/2009). ‘Enabling’ is also known as on-the-job training (OJT) program. During ‘enabling’, 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 (Nugroho, interview, 16/06/2009).

In a project, an employee has several tasks such as reviewing or updating project documents (e.g. technical specification), or modifying software codes of certain product. He/she utilises some tools and systems related to KM, e.g. docu-server, IMS, local Shared Drive to store documents (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009; Nugroho, interview, 16/06/2009). In other cases, Clearcase is utilised for products' codes customisations (Wiharjito, interview, 05/06/2009) while ReviTo is used to review project documents collaboratively (Nugroho, interview, 16/06/2009).

Employees are very much encouraged to share their project knowledge and experience (Wijaya, interview, 17/06/2009; Wiharjito, interview, 05/06/2009). Wiki pages are set up to support knowledge-sharing processes (Puspaningsih, interview, 09/06/2009; Ariawan, interview, 11/06/2009; Nugroho, interview, 16/06/2009). These Wikis are managed locally within the Department (Wiharjito, interview, 10/06/2009). They are deployed using a
free licensed WikiEngine\textsuperscript{12} called MoinMoin and Twiki. Currently, 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 (Puspaningsih, interview, 03/07/2009). However, due to the tight project schedule, these contents are not frequently updated (Wiharjito, interview, 05/06/2009). As a result, there are some gaps between the available knowledge and the ones that are actually stored in the wiki-pages.

Although it is encouraged, but according to my observation knowledge sharing is sometimes disregarded. For example, when one employee is assigned to resolve a problem or an issue, he/she usually works individually to solve, document and apply the solution. The reasons for such circumstances are because, as mentioned earlier, KM is given a low priority (Wijaya, interview, 17/06/2009). Moreover, Wiharjito (interview, 05/06/2009) believes that 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) is utilised for communicating with experts from HQ and other subsidiaries. Online meeting tools such as WebEx and NetMeeting are also used for the same purpose.

\textbf{Facilitating Factors}

When investigating the enabling factors, all respondents agree that a good information and communication technology ("ICT" hereafter) infrastructure is of importance for a success KM implementation (Ariawan, interview, 11/06/2009; Nugroho, interview, 16/06/2009; Puspaningsih, interview, 09/06/2009; Wiharjito, interview, 05/06/2009; Wijaya, interview, 17/06/2009). ICT infrastructure consists of systems and network

\textsuperscript{12} WikiEngine is a software package to run a Wiki server.
infrastructures. According to Wijaya (interview, 17/06/2009), having a reliable ICT infrastructure is imperative for NSN as a multinational company. This keeps the global NSN organisation well-connected.

Such good ICT infrastructure has given the Department a significant advantage for its KM implementation. Employees have the capability to access varieties of resources relating to the Department’s product portfolio (e.g. technical specification). ICT infrastructure has also provided the Department the ability to connect with technical experts in HQ and other subsidiaries. Employees are able to be involved in online discussions. In other aspects, ICT infrastructure has changed the way employees acquire new knowledge through the introduction of online training.

Another facilitating factor of KM within the Department is employees’ willingness to share knowledge (Wiharjito, interview, 05/06/2009; Puspaningsih, interview, 09/06/2009; Ariawan, interview, 11/06/2009). This is harmonious with the Department’s commitment to generate a communication openness which fosters knowledge sharing. Hence, this condition creates what Wiharjito (interview, 05/06/2009) refers to as an ‘information openness culture’.

**Inhibiting Factors**

Several factors have been identified as inhibitors of the Department’s KM implementation. One significant inhibitor relates to the limited human resource which affects the Department’s KM, especially knowledge-sharing activities (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009; Nugroho, interview, 16/06/2009; Wiharjito, interview, 05/06/2009; Wijaya, interview, 17/06/2009). Wijaya (interview, 17/06/2009) points out those KM activities have not been the top priority for the employees. Although some of their activities are linked in managing knowledge (e.g. project online discussions, email correspondence with experts in another subsidiaries), there is considerably little time allocated for knowledge sharing. Nugroho (interview, 16/06/2009) and Wiharjito (interview, 05/06/2009) share that due to the tight project timeline, employees do not have time to, for example, update the Wiki page with
relevant project knowledge and experience. Employees manage to update the project Wiki page content only when they are not too busy with any project executions, which happens quite rarely (Puspaningsih, interview, 09/06/2009).

As it becomes a low priority, there are also few actions to promote KM (Puspaningsih, interview, 09/06/2009; Nugroho, interview, 16/06/2009). Some employees feel that they are not motivated to engage in KM activities. They are more focused on executing projects, rather than sharing their knowledge.

Another factor that is hampering the Department’s KM implementation is the fact that the KM-related tools and systems are not yet integrated (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009; Wiharjito, interview, 05/06/2009). For example, there are at least three local project Wiki pages set up for three different projects (Puspaningsih, interview, 09/06/2009; Nugroho, interview, 16/06/2009). Each of the Wiki pages is managed by corresponding project team members. Furthermore, these Wiki pages are only accessible locally within the Department. Likewise, the Department cannot access other subsidiaries’ project Wiki pages (Wiharjito, interview, 10/06/2009). As the consequence of having disintegrated tools, employees feel discouraged to be more involved in KM. Ariawan (interview, 11/06/2009) points out the importance of a so-called “single sign-on” KM system to ease and further to encourage the employees in managing the Department’s knowledge.

4.3. KNOWLEDGE MANAGEMENT IMPLEMENTATION IN NSN: DISCUSSION

Based on the study findings as described in the previous Section, it is evident that the Department has put substantial amount of efforts in realising the formulated KM strategies as discussed in Chapter Three. This Section associates these findings with the existing theories. It comprises analysis of KM processes, the influencing factors (i.e. facilitators and inhibitors), as well as reflection of the Department’s overall KM strategy and implementation.
4.3.1. Implementation of Knowledge Management Processes

The implementation analysis is presented in two dimensions. One dimension regards the KM processes, as the analysis attempts to extract the major issues relevant to (1) knowledge creation, (2) knowledge storage, (3) knowledge distribution, and (4) knowledge application (Heisig, 2001a). Another dimension concerns Nonaka's (1994) knowledge conversion theory. Additionally, Choi and Lee's (2002) classification of human- and system-strategy will be used to indicate how the Department employs the balanced view as argued in Chapter Three.

Knowledge Creation

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 organisation, these training materials are treated as newly created explicit knowledge. As such, these training sessions are considered a combination – the process of creating explicit knowledge from explicit knowledge (Nonaka, 1994; Alavi & Leidner, 2001; Becerra-Fernandez et al., 2004). The use of training materials stored in a document management system embodies the system strategy (Choi & Lee, 2002).

From the individual perspective, ‘enabling’ sessions are considered a means to create knowledge (Wiharjito, interview, 05/06/2009; Nugroho, interview, 16/06/2009; Puspaningsih, interview, 03/07/2009). During the ‘enabling’, individuals learn not only about explicit knowledge (e.g. software codes), but also tacit knowledge (e.g. project experience) from other employees who act as their mentors/trainers. Employees receive new knowledge through observation and practice (Becerra-Fernandez et al., 2004). This is classified as a socialisation process (Nonaka, 1994; Alavi & Leidner, 2001). Alavi and Leidner (2001) stress that socialisation process may not per se create a new organisational knowledge. This is congruent with the ‘enabling’ process, as it basically distributes knowledge within the organisation. That is why, referring to Heisig’s (2001a)
model, Knowledge Creation process not only trigger the knowledge storage process, but also connects the Knowledge Distribution process achieved through ‘enabling’ activities. This will be explained later in this Section. Furthermore, ‘enabling’ process considerably covers both human and system strategies (Choi & Lee, 2002).

**Knowledge Storage**

Similar to the knowledge creation process, the next process of knowledge storage also has two perspectives: individual and organisational. From an individual perspective, knowledge is stored inside each individual’s mind (Mertins et al., 2001; Becerra-Fernandez et al., 2004). Whenever an employee creates knowledge, he/she 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). It represents the human strategy (Choi & Lee, 2002).

From an organisational perspective, individuals are encouraged to document what they learn in order to prevent knowledge loss. This means that knowledge is converted from tacit to explicit as referred to an *externalisation* process (Nonaka, 1994). Individuals write down their knowledge in manual documents which are then stored in document management systems such as IMS, docu-server, Clearcase or local Shared Drive. The utilisation of these systems encompasses a system strategy (Choi & Lee, 2002).

Another approach of knowledge storage is by utilising Wiki pages. Individuals record their newly created knowledge or any experience relevant to project executions inside the Wiki pages. This also reflects an *externalisation* process (Nonaka, 1994). The wiki also contains the description of product features written down from manual documents and technical specifications. This implies that knowledge storage process also involves *combination* (Nonaka, ibid). This finding adds Becerra-Fernandez et al. (2004) theory which only considers internalisation and externalisation parts of the knowledge storage process.

The use of information technology as storage media confirms scholars’ theory that
Knowledge also resides in the organisation information systems (Radding, 1998; Davenport & Prusak, 2000; Hislop, 2003; Mertins et al., 2001), or as Becerra-Fernandez et al. (2004) refers to artefacts. IMS and docu-server are document management servers provided by the HQ. The first stores documents relating to NSN’s products, while the latter keeps the projects-related documents such as Requirement Specification and Functional Specification (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009). Clearcase is a configuration management server that stores the software codes of all products relevant to Department's projects. It is updated by the Department whenever a product customisation project is generated (Nugroho, interview, 18/06/2009).

**Knowledge Distribution**

In this KM process, the individuals are encouraged to share or distribute their knowledge among themselves, more specifically experience sharing (Wijaya, interview, 17/06/2009). Knowledge sharing can be done in two ways. The first option is through formal workshops or discussion forums can be set up whereby the individual who acquired the new knowledge presents what he/she has learnt. ‘Enabling’ session is an example of formal knowledge sharing. It is organised to prepare the individuals before involving in a specific project. Through ‘enabling’ sessions, sharing knowledge for one individual can become a knowledge creation process for another individual. Thus, referring to Heisig’s (2001a) model, knowledge distribution process should in fact trigger the process of knowledge creation. Figure 4.1 depicts the modified model of framework.

The second way is that individuals share their knowledge is through informal meetings with their colleagues. These are useful; however, they are hard to manage. Despite the difficulties, 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. Wiki is accessible to all individuals; therefore, it supports the knowledge distribution in the Department. It enables the internalisation process (Nonaka, ibid) – one that is excluded
by Becerra-Fernandez et al. (2004) as part of knowledge sharing initiatives. The Wiki pages also support the **exchange** process as it supports the sharing of explicit knowledge (Grant, 1996b). The utilisation of Wiki pages embodies a system strategy (Choi & Lee, 2002).

NSN's well-connected network infrastructure has taken an important role for knowledge distribution process. It has supported the use of several knowledge distribution systems or tools. The study finds that there are at least three categories of tools for this process (Radding, 1998; Becerra-Fernandez et al., 2004):

1. **Communication.** Electronic mail (e-mail) is one of the tools in this category (Alavi & Leidner, 2001). Online meeting tools are also another example of this category. It is provided to support organisational activities, especially relating to project execution utilised for discussing project execution issues. NSN also provides a web-based discussion forum in its Intranet called **BSS Community.** This forum is commonly used for any issues relating to the organisation of NSN's BSS business unit.

2. **Collaboration.** Wiki pages are deployed to foster collaboration in the Department. Another tool considered this category is ReviTo – a collaborative document reviewing tool allowing its users to comment on or annotate project documents (Nugroho, interview, 17/06/2009).

3. **Document management.** IMS, docu-server, and local Shared Drive are the three systems available in the Department that store business-, product- and project-related documents. These systems enable document sharing across the organisation (Becerra-Fernandez et al., 2004; Alavi & Leidner, 2001).

**Knowledge Application**

Wijaya (interview, 17/06/2009) stresses knowledge application is the most important KM process in the Department. Wijaya's statement agrees with the argument by Mertins et al. (2001:4) that knowledge application is in fact “the most essential task of knowledge management”. Knowledge application triggers the whole cycle of KM processes.

Knowledge application in the Department means participating in project executions
(Wijaya, interview, 17/06/2009). After an employee is prepared with relevant knowledge through training and ‘enabling’, he/she then takes part in at least one ongoing project. For example, if an employee is involved in the Development team, he/she applies his/her knowledge through developing customisation of a certain product. In doing so, an employee will interact with Clearcase. This is evidence of system strategy adoption (Choi & Lee, 2002).

Based on the author's own observation, an employee will discover more new knowledge while taking part in an on-going project. Due to the scope of the project, the formal training and ‘enabling’ session cannot cover the entire knowledge needed to support the project. Consequently, referring to Heisig's (2001a) model, knowledge creation process is initiated to fill in the gap of knowledge required for project execution.

The findings also suggest that the knowledge application process directly triggers knowledge storage process without going through the distribution process. This is evident from the fact that sometimes employees are working and doing their tasks individually. Wiharjito (interview, 05/06/2009) admits that this is due to the tight project schedule which gives no sufficient time for employees to share their knowledge. Therefore, the findings slightly modify Heisig's (2001a) model as illustrated in Figure 4.1.

4.3.2. Facilitators and Inhibitors

After learning how KM is being implemented in the Department, this Section analyses the factors which facilitate and inhibit the implementation. People (i.e. the employees) and culture take part in the success of KM implementation (Storey and Quintas, 2001; Heisig et al., 2001). The study finds that employees' willingness to engage in KM activities is one of the facilitating factors for the Department's KM implementation. Storey and Quintas (2001:359) suggest the fact that 'employees are willing to share their knowledge and expertise' is crucial to the success of KM implementation. Furthermore, the employees' willingness to share knowledge has in turn created what Wiharjito (interview, 05/06/2009) refers to as 'information openness culture' within the Department.
The study also finds that a good ICT infrastructure plays an important and critical role in KM. ICT is one of the dominant themes in KM literature (Hislop, 2005; Radding, 1998; Park & Kim, 2005; Michailova & Nielsen, 2006; Riege, 2007). ICT provides data and information communication capabilities for the company which in turn become the foundation for advanced tools and systems to handle corporate knowledge (Radding, 1998).

Chourides et al. (2003) argue that ICT is in fact a fundamental enabler in KM. In the context of MNC, ICT is one key feature which allows an MNC to 'create conditions for efficient knowledge sharing between HQ and subsidiaries as well as between subsidiaries themselves' (Michailova & Nielsen, 2006:45). This argument is confirmed in this study that NSN's ICT infrastructure has enabled the Department to access product- and project-related documents and systems as well as the technical experts across the entire global organisation.

Even though ICT is identified as one of the KM facilitators, the study finds that ICT too is an inhibiting factor. This is due to the fact that the systems and tools utilised for KM initiatives are not integrated (Wiharjito, interview, 10/06/2009; Ariawan, interview, 11/06/2009). The existing systems do not allow employees to provide a single update or modification of the knowledge repository. This means that multiple systems have to be updated whenever new knowledge is created or shared. Sometimes one of the relevant systems is not updated appropriately because of another inhibiting factor: time. Due to the tight project schedules, employees don't have sufficient time to do it. The “I have no time” excuse is considered one of the most commonly mentioned barriers for KM in organisations (Heisig, 2001a).

Another inhibiting factor is the few efforts initiated by the Department's management to motivate the employees in engaging in KM initiatives (Nugroho, interview, 16/06/2009; Puspaningsih, 09/06/2009). Although Wijaya (interview, 17/06/2009) argues that the ‘personnel objective setting’ has been used to ensure the implementation of KM, setting
KM-related tasks as a low priority does not help in fostering the Department's KM. One of the reasons is due to the absence of an explicit and integrated strategy of KM implementation (Alavi & Leidner, 1999). Furthermore, the few efforts to motivate and to promote KM put forward the question of management leadership and commitment (Prusak, 1999; Mertins et al., 2001). Mertins et al. (2001:5) suggest that the Department's management must also ‘promote and personify’ within day-to-day business activities.

4.3.3. Reflecting the Overall NSN's KM Strategies and Implementation

One activity that is considered essential for KM implementation in the Department is ‘personnel objective setting’ for each employee (Wijaya, interview, 17/06/2009). This activity is not categorised to any KM processes. Wijaya (ibid) suggests that ‘personnel objective setting’ ensures the execution of KM implementation in the organisation. This activity manifests the department’s effort in embedding KM activities into the department's work process (Davenport & Prusak, 2000). Moreover, ‘personnel objective setting’ signifies the Department's priorities towards employees' personal development which in turn will foster the organisational knowledge (Grant, 1996a, 1996b; Spender, 1996).

Figure 4.1 illustrates the overall KM implementation in the Department. The study findings suggest the need to modify Heisig’s (2001a) KM process framework. As justified earlier in this Chapter, new lines connect between knowledge creation and distribution processes as well as between knowledge storage and application processes. In addition, the ‘personnel objective setting’ process is established to ensure and augment the KM implementation execution.
Further, Table 4.1 illustrates the overall KM strategy and its implementation. It summarises the Department's KM strategy which encompasses each KM process explained in Chapter Three, as well as activities relating to each process as elaborated in this Chapter.
<table>
<thead>
<tr>
<th>KM Process</th>
<th>Strategy</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Creation</td>
<td>- Identify required knowledge, based on the available product portfolio</td>
<td>Activities:</td>
</tr>
<tr>
<td></td>
<td>- Acquire knowledge through training</td>
<td>a. “Enabling”, associated as socialisation process. The use of individual interaction (e.g. work observation and mentoring) as well as access to KM-related systems (e.g. docu-server) embody both human and system-strategy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Third party training, associated as combination process. As the training materials are stored inside a KM system, therefore this represents the system strategy.</td>
</tr>
<tr>
<td>Knowledge Storage</td>
<td>- Use varieties of storage media, ranging from individual minds to KMS</td>
<td>Activities:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Individual learning, considered as internalisation process. It illustrates the human-strategy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Documenting/storing knowledge, identified as externalisation process. It denotes the system-strategy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Combination process of storing relevant documents. It represents the system strategy.</td>
</tr>
<tr>
<td>Knowledge Distribution</td>
<td>- Distribute through organising formal and informal knowledge sharing sessions (e.g. workshop, &quot;enabling&quot;)</td>
<td>Activities:</td>
</tr>
<tr>
<td>Knowledge Application</td>
<td>- Knowledge application through project execution</td>
<td>a. Individual learning (internalisation), embodies human strategy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. “Enabling” and workshops (socialisation), considered as both human and system strategies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. The use of wiki-page to support exchange process. This represents the system strategy.</td>
</tr>
</tbody>
</table>

**Overall Figure**

---

3Table 4.1 - The Department’s KM Strategy and its Implementation

Source: Author
4.4. CONCLUSION

This Chapter addresses the second research question. KM implementation is realised through various tasks and activities. Firstly, knowledge is created through training and ‘enabling’ arrangements. It is then stored in various media including Wiki pages and document management systems. Afterwards, it is distributed in knowledge sharing sessions such as ‘enabling’ and applied to project executions. The study reveals that the process knowledge distribution can trigger knowledge creation, and establishes a connection between knowledge storage and application processes. These findings modify Hesig's (2001a) model of KM processes framework. In addition to the KM processes, the Department involves the process of ‘personnel objective setting’ to ensure that KM is being executed by individuals.

This Chapter also presents the factors that facilitate and inhibit KM implementation in the Department. Interestingly, ICT infrastructure is considered one of the facilitators as well as the inhibitors. The next Chapter examines the current impact and future challenges of KM in NSN, particularly in the Department.
CHAPTER 5 - KNOWLEDGE MANAGEMENT IN NOKIA SIEMENS NETWORKS:
IMPACTS AND FUTURE CHALLENGES

“An investment in knowledge pays the best interest.”
(Benjamin Franklin cited in Davenport & Prusak, 2000:xviii)

5.1. INTRODUCTION
Chapters Three and Four have revealed that the Department, or NSN for that matter, is very much aware of the importance of KM. Yet, reiterating Franklin's quote as stated above, does KM implementation really pay the best interest? This Chapter highlights the impacts created by KM and the perceived challenges for future implementation. The findings are correspondingly presented in Sections 5.2.1 and 5.2.2. Moreover, Section 5.3 discusses these two themes by associating the findings with the theories identified in Chapter Two.

5.2. KNOWLEDGE MANAGEMENT IMPACTS AND CHALLENGES IN NSN: FINDINGS
This Section discloses the study findings with regards to the perceived KM impacts and challenges in the Department.

5.2.1. KM Impacts in the Department
KM implementation in the Department has created several impacts. One impact concerns the work environment. Both Wiharjito (interview, 05/06/2009) and Puspaningsih (interview, 09/06/2009) suggest that KM has enabled knowledge distribution across the Department. When employees receive new training, they have the responsibilities to share their newly-acquired knowledge to other employees. This is accomplished through various activities, including organising formal workshops and informal discussions, as well as providing summary of the training material and storing it in the document server.

Furthermore, Wiharjito (interview, 05/06/2009) argues that a well-distributed knowledge condition affects the work load distribution among the team members. To some extent,
employees’ workloads will be balanced according to their tasks and responsibilities. Knowledge distribution, too, indicates that more employees acquire the knowledge. This circumstance influences the employees work schedule. Because knowledge is distributed well, one employee can act as a substitute for another who is on leave. These knowledge distribution impacts cause the employees to feel better about their work load, hence increasing their job satisfaction.

Additionally, Wiharjito (ibid) mentions that knowledge-sharing activities have improved the relations amongst employees themselves. Through knowledge-sharing sessions, employees interact with each other and further create an ‘information openness culture’. ‘Information openness culture’ signifies that employees are willing to share knowledge to others through transparent and open communication. This is achieved through natural interpersonal trust and friendly working atmosphere.

Another impact relates to employees' learning processes. Nugroho (interview, 16/06/2009) associates this with online training which complements the classroom-based training. The online training is carried out by utilising video-streaming, live or recorded, transmitted through the Intranet. Such approach is able to reach more of an audience as it is accessible throughout the organisation. Yet, despite the new learning experience, Nugroho (interview, 07/07/2009) further comments that the current learning process for new employees is considered slow. It cannot adhere to the requirement of project circumstances. The cause of this is because the current KM implementation does not stimulate sufficient self-learning. There is no single system where new employees can go to in order to find project-related knowledge. As a result, they highly depend on the mentor/trainer (i.e. the employee who shares his/her knowledge).

New learning processes, too, influence employees’ personal development. Wijaya (interview, 17/06/2009) indicates that employees feel they have the chance to learn and acquire more knowledge. Having more knowledge will subsequently enhance the employees’ competence which further affects the employees’ readiness to be involved in upcoming projects. Nevertheless, as Nugroho (interview, 07/07/2009) notes the slow
learning process for new employees, to some extent this affects the employees’ readiness too.

Other impact of KM implementation is a refinement of the Department’s process efficiency and effectiveness (Ariawan, interview, 11/06/2009). Puspaningsih (interview, 09/06/2009) suggests that projects can be executed accordingly because product- and project-related knowledge is accessible through the Intranet. The KM infrastructure also facilitates access to experts if the required knowledge is not yet documented. Ariawan (interview, 11/06/2009) further adds, due to the accessible knowledge and expertise, KM subsequently also improves the quality of the project deliverables. However, Nugroho (interview, 07/07/2009) argues that, in some cases, the current KM activities somehow lessen the quality of project deliverables. Nugroho (ibid) illustrates the situations as follows. During ‘enabling’ sessions, the mentor/trainer is usually also involved in at least one ongoing project. At these times, the trainer’s work load is increased with an additional ‘enabling’ load. As part of the ‘enabling’, the trainee (i.e. the employee who is observing the mentor/trainer) is given some tasks relating to the project execution. After the trainee finishes these tasks, the trainer has to check whether they are done appropriately. In many cases, due to a tight project schedule, the tasks checking cannot be done properly because the trainer has his/her own tasks to be fulfilled. Therefore, some of the project deliverables may not be delivered in the best quality possible. Moreover, the extended work load may diminish the employee’s (i.e. trainer’s) job satisfaction.

5.2.2. Future Challenges of KM in NSN

Although KM has been implemented, the study also finds numerous challenges for improving KM implementation within the Department. Ariawan (interview, 11/06/2009) and Puspaningsih (interview, 09/06/2009) foresee that the KM process in itself is considered to be a challenge on its own. Puspaningsih (ibid) particularly notes that capturing and storing the existing knowledge is not easy. The rapid change of business and organisation may impact the employees’ dynamics which could lead them to leaving the company. The Department must find a way to at least minimise the loss of
knowledge as a result of an employee leaving the organisation.

One other challenge is the need to establish an incentive or reward system for the employees in relation to KM (Wijaya, interview, 17/06/2009; Wiharjito, interview, 05/06/2009; Ariawan, interview, 11/06/2009). The reward system must be able to calculate the employees' KM effort and how much of that effort has affected the business. Both Ariawan (interview, 11/06/2009) and Wiharjito (interview, 05/06/2009) suggest that the reward scheme will motivate employees in engaging more KM. Wijaya (interview, 17/06/2009) further indicates the need to measure what portion of the business performance - in terms of return of investment (ROI) - is regarded as the impact of KM.

Another challenge is the need to establish an independent department within the global organisation (Wijaya, interview, 17/06/2009; Puspaningsih, 09/06/2009; Nugroho, interview, 16/06/2009). This department is responsible to maintain and monitor KM processes. It must design and form a comprehensive KM strategy which includes KM activities, systems as well as a KM reward system. The implementation itself is carried out in all subsidiaries. With regards to this need, Wijaya (ibid) and Ariawan (interview, 11/06/2009) share that the Head Quarter has already planned to set up this KM department, which will be known as the Competence and KM department13.

Challenges also occur in integrating and maintaining KM-related ICT infrastructure (Wiharjito, interview, 05/06/2009; Puspaningsih, 09/06/2009; Ariawan, interview, 11/06/2009). The Department must provide sufficient hardware capacity (e.g. Hard-drive) for KM-related tools and systems. In terms of integration, one particular area that needs attention is the Wiki pages (Puspaningsih, interview, 09/06/2009). Wiharjito (interview, 05/06/2009) suggests that the Wiki pages need to be integrated and consolidated, not only within the local Department, but also throughout the global organisation. If this is achieved, it would potentially enhance and accelerate the knowledge distribution

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13 Since the Competence and Knowledge Management department was yet to be established during the course of this research, it is thus beyond the scope of this study.
process across the entire organisation.

5.3. KNOWLEDGE MANAGEMENT IMPACTS AND CHALLENGES IN NSN: DISCUSSION
The following Section analyses the findings described earlier. In discussing KM challenges, this report uses Heeks's (2006) Design-Reality Gap model as a categorisation reference to identify the potential challenges for KM implementation in the Department.

5.3.1. Knowledge Management Impacts: Intended or Unintended
In discussing the impact of KM, the study uses Giddens's (1984) classification of intended and unintended consequences.

**Intended Impacts**
KM has affected the people in the Department (i.e. the employees). The study reveals KM has accelerated the employees' readiness towards project execution (Wijaya, interview, 17/06/2009). Such readiness reflects what Becerra-Fernandez et al. (2004) refer to employee adaptability. As KM processes allow employees to continually learn, employees are able to retrieve information and knowledge required to adapt with organisational circumstances. Their continual learning further improves their personal development (Wijaya, interview, 17/06/2009).

In terms of process, KM affects the employees' learning process as well as improves the Department's work process. The former is shown by various internalisation, externalisation and socialisation activities (Nonaka, 1994) such as arrangement of knowledge sharing sessions, the use of new forms of online training utilising video-streaming through the Intranet (Nugroho, interview, 16/06/2009) and the deployment of Wiki pages to distribute project-specific knowledge (Ariawan, interview, 11/06/2009; Puspaningsih, interview, 09/06/2009). In addition, KM has enabled the employees' to gain knowledge not only from the local Department, but also from other subsidiaries or even external parties (Wiharjito, interview, 05/06/2009).
The latter includes process efficiency and effectiveness (Becerra-Fernandez et al., 2004; Heeks, 2008b). Efficiency is achieved through quicker process in project handling (Heeks, 2008b). Having had reliable access to documents, information and knowledge has improved the Department's responsiveness towards solving project-related issues (Puspaningsih, interview, 09/06/2009). Likewise, KM augments the Department's process effectiveness indicated by the improvement of quality in project deliverables (Ariawan, interview, 11/06/2009).

Furthermore, the improvement of project deliverables quality can also be classified as KM impact on product. KM facilitates the Department to produce product customisation as required by the Department's customers (Ariawan, interview, 11/06/2009).

**Unintended Consequences**

The findings suggest two types of unintended impacts. The first is positively-viewed unintended impact. In this case, KM has affected the employees’ relationship among themselves (Wiharjito, interview, 05/06/2009). Their willingness to share knowledge with their colleagues is a display of interpersonal trust (Hislop, 2005). In turn, this impact consequently stimulates KM implementation in the future (Davenport & Prusak, 2000; Andrews & Delahaye, 2001; McInerney & LeFevre, 2000; Roberts, 2000).

The second type of unintended impact is perceived negatively. Current KM implementation does not allow self-learning, particularly for new employees, which subsequently results in slow learning process (Nugroho, interview, 07/07/2009). The KM-related tools and systems are not yet integrated. There is no single point which new employees can access and search from for project-related knowledge (Ariawan, interview, 11/06/2009). Consequently, such slow learning process can potentially disrupt the existing work process (Becerra-Fernandez et al., 2004).

**5.3.2. Future Challenges**

The findings suggest KM implementation in the Department faces several challenges. These challenges are explored by utilising Heeks’s (2006) Design-Reality Gap model as
summarised in Figure 5.1. Gupta and Govindarajan (2000) argue that the existence of valuable knowledge source is considered potential challenge of KM in an MNC. Recalling Heeks's (2006) model, such a challenge refers to the information dimension. Yet, the findings presented throughout this report suggest that valuable knowledge sources are existent and accessible by the Department. Given these circumstances, the remaining challenge is to maintain the accessibility of these knowledge sources.

One major challenge for KM implementation in the Department is to capture and store the existing knowledge, especially tacit knowledge (Puspaningsih, interview, 09/06/2009; Ariawan, interview, 11/06/2009). Many scholars agree that solving this challenge highly depends on how the strategies are formulated and implemented (Nonaka & Takeuchi, 1995; Davenport & Prusak, 2000; Merono-Cerdan et al., 2007). Many believe that ICT progress could potentially solve the problem (Becerra-Fernandez et al, 2004). Referring to Heeks's (2006) model, this refers to the technology dimension. In the context of this study, the integration of KM-related tools and systems may potentially improve KM activities within the Department. For instance, the project-related Wiki pages can be integrated as to provide accessible knowledge for all employees, regardless of what project they are assigned to (Wiharjito, interview, 05/06/2009). In terms of securing tacit knowledge, it is well-noticed and discussed in Section 4.3 that the lack of time is identified as one of inhibiting factors for KM implementation. To overcome this issue, Heisig (2001b) suggests the use of 'in-a-nutshell' videos that present expert knowledge. As a matter of fact, these methods have already been used for online training – both recorded and live sessions – as a complement to classroom training (Nugroho, interview, 16/06/2009). Thus, the use of this method can be extended as one way to capture tacit knowledge.

However, some scholars imply that the solution goes beyond ICT implementation (Zack, 1999, 1999a; Davenport & Prusak, 2000; Hansen et al., 1999). Another major challenge of KM implementation in the Department is the need to establish a reward system (Wijaya, interview, 17/06/2009). Scholars argue that incentive and reward systems may positively affect the knowledge sharing behaviours across the organisation (Bartol &
Srivastava, 2002; Swan et al., 1999; Jarvenpaa & Staples, 2000). Bartol and Srivastava (2002), for instance, propose reward mechanisms that are contingent on knowledge sharing behaviours as well as on performance at individual, group and organisation levels. The need for a KM-based reward system indicates existent gaps in the process as well as management systems dimensions (Heeks, 2006).

Measuring organisational business performance with respect to KM initiatives is another challenge (Wijaya, interview, 17/06/2009). Such measurement is not yet available in the Department. It is acknowledged by many scholars that understanding the impact of KM initiatives on business performance is difficult (Carlucci et al., 2004; Marr & Schiuma, 2001). Consequently, organisations find it hard to justify KM investments (Davenport & Prusak, 2000; Chong et al., 2000). Despite that, several scholars argue that KM investments can be justified by analysing the KM performance itself (Dooly et al., 2007; Lee et al., 2004; de Gooijer, 2000). For example, de Gooijer's (2000) framework of KM Performance Scorecard can be utilised to assess the current KM performance. The described potential challenge illustrates a gap within the management systems dimension (Heeks, 2006).

Some reports take note of the importance of organisational structure change to incorporate the organisation's dynamic needs towards KM (Claver-Cortes et al., 2007; Chase, 1997). In this case, establishing an independent Competence and KM department in the global NSN organisation is inevitable (Wijaya, interview, 17/06/2009; Ariawan, interview, 11/06/2009). The intended department focuses on designing strategies as to accommodate requirements to manage knowledge (Chase, 1997; Vorbeck & Finke, 2001). It must also monitor the development of KM practice in each subsidiary as well as provide a solution for every KM problem (Wijaya, interview, 17/06/2009). In one of her empirical studies, Chase (1997) notes that an independent and separate KM department would allow all the functional departments in the organisation to focus on their main objectives and tasks. Such organisational change reflects a gap in the staffing as well as management structures dimensions (Heeks, 2006).
Understandably, the aforementioned challenges addressed in this study exemplify gaps between the reality and the expectations/requirements for KM in the Department. These emphasise the **objectives and values dimension** (Heeks, 2006). Moreover, the rapid change in mobile telecommunication market – expressed earlier by Wiharjito (interview, 05/06/2009) – stresses the importance of grappling with these challenges in a timely manner (i.e. Heeks's **other resources dimension**). The initiative to establish Competence and KM Department (Wijaya, interview, 17/06/2009; Ariawan, interview, 11/06/2009) shows that NSN has put forward a substantial amount of effort in grasping the future challenges in KM.
5.4. CONCLUSION

Recalling the third research question, it is evident that KM implementation in the Department has created some impacts – both intended and unintended. The intended results include new learning process for the employees, an augmented process efficiency and effectiveness, as well as improvement of project deliverables quality. The
identified unintended consequences concern the positive improvement of relationships amongst the employees, and the negative impact of slow learning process for new employees that potentially affect the quality of project deliverables.

This Chapter, too, addresses several challenges to answer the final research question. The perceived challenges are incorporated with Heeks's (2002, 2006) Design-Reality Gap dimensions. Major challenges encompass the dimensions of (1) technology (e.g. seamless ICT integration); (2) processes (e.g. mechanisms for reward systems, measurement of KM performance); (3) objectives and values (e.g. designing a comprehensive KM strategy); (4) staffing; and (5) management structures (e.g. the need to establish Competence and KM Department).
CHAPTER 6 - CONCLUSION

“The great end of knowledge is not knowledge but action.”
(Thomas Henry Huxley cited in Davenport & Prusak, 2000:162)

6.1. INTRODUCTION

Huxley’s view, as quoted above, expresses the importance of taking action in managing knowledge. Certainly, throughout this study, it is evident that the Department has conducted series of actions to manage knowledge. Section 6.2 recalls the entire research followed by synthesis of the findings. Some recommendations are suggested in Section 6.3 to potentially improve KM implementation in the Department. Section 6.4 features some lessons learned, before closing this study report with some final remarks.

6.2. REVISITING THE RESEARCH QUESTIONS

This study is guided by four research questions as identified in Section 1.2. In this Section, the findings and analysis will be summarised to answer each research question.

Recalling the first research question – How does NSN’s Product Customisation Department in Jakarta devise its strategy to manage knowledge and what is the rationale?, the answer is that KM strategies are devised by exploiting a balanced view which applies both human and system strategies with the right proportion. They are the result of project planning efforts from Head Quarter (HQ) and the local subsidiary itself (i.e. the Department). Moreover, the Department benefits the global NSN's decision to employ a decentralised structure which allows knowledge distribution from HQ and other subsidiaries. The rationale behind the devised KM strategies is derived from an increased pressure on the telecommunication market volatility as well as the internal need to distribute knowledge throughout the Department. Chapter Three elaborates the findings and analysis.

The study goes on further by examining KM implementation within the Department as reflected in the second research question – How are the strategies implemented and what factors facilitate as well as inhibit the implementation? The answer to this is as
follows: by determining corresponding activities for each KM processes. Firstly, knowledge is created through series of training sessions as well as ‘enabling’. Secondly, knowledge is stored in various media such as docu-server, IMS, and Wiki pages. Thirdly, it is then distributed by arranging ‘enabling’ or other knowledge sharing sessions. Lastly, knowledge is applied in the Department’s daily activities, mainly for project execution tasks. To ensure the entire KM implementation, ‘personnel objective setting’ is conducted to assign KM-related tasks and responsibilities for all employees. The factors that facilitate the implementation include employees’ willingness to share knowledge, the ‘information openness culture’, as well as good ICT infrastructure. On the other hand, disintegrated KM systems and lack of effort to motivate and socialise KM are among the inhibiting factors of KM implementation within the Department. The detailed discussion is outlined in Chapter Four.

The study also investigates the third research question: **What are the impacts of KM implementation to the Department?** These impacts are categorised as intended and unintended impacts. The intended impacts are (1) new learning process for all employees; (2) an enhancement of process efficiency and effectiveness; and (3) an improved quality in project deliverables. As for the unintended consequences, they include positive impact affecting the employees’ relationship among themselves, and negative consequence due to the perceived slow ‘enabling’ process for new employees which further could influence the working process as well as the quality of project deliverables. Detailed findings and analyses are described in Chapter Four.

The final research question asks **what are the challenges of managing knowledge in the Department?** The findings and analysis foresee major challenges in five dimensions: (a) technology (e.g. utilising innovative ways to capture knowledge, seamless KM-related systems integration); (2) processes (e.g. regulating mechanisms for KM-based reward system, designing measurement of KM performance); (3) objectives and values (e.g. designing a comprehensive KM strategy, establishing organisational culture to promote KM); (4) staffing and (5) management structures (i.e. the establishment of Competence and KM department which designs, maintains and monitors KM processes throughout
Chapter Five outlines this analysis.

6.3. SYNTHESIS OF THE FINDINGS
The results of this study explicitly address the themes of KM strategies, implementation, impacts and challenges which are naturally specific to the Department. The discussions in Chapters Three, Four and Five have given an outlook of the magnitude of KM-related issues associated with a Multinational Company. These issues are synthesised as illustrated in Figure 6.1.

![Figure 6.1 - Themes and Issues Synthesised from the Findings](image)

The discussed KM-specific themes include knowledge type and strategy, KM process, KM strategy-process linkage as well as KM-related systems. In a specific MNC context, themes of MNC structures which affect the organisation's knowledge flows are addressed too. In another aspect, KM discussions also affect other organisational themes such as human resources practices and organisational culture. Moreover, impacts and challenges in KM are also considered to be essential topics in this study.

6.4. RECOMMENDATIONS FOR NSN
This study is not meant to assess or evaluate the Department's KM initiatives. Instead, it
is an academic research project of organisational KM-related processes so as to contribute to the field of KM, especially in the context of a Multinational Company. Nevertheless, I would be happy if this study could benefit the Department – or NSN for that matter – in its efforts to improve its KM initiatives. As such, herewith I offer some recommendations.

**Recommendations on KM Systems and Tools**

A recommendation can be suggested with regards to KM-related systems and tools. As expressed in Chapter Four, disintegrated KM-related systems is considered to be one inhibiting factor for KM implementation in the Department. Some efforts can be made gradually to integrate the corresponding KM systems and tools. For example, consolidating all Wiki pages available within the Department is a start. This can then be carried out on the global NSN organisation context, by combining all relevant Wiki pages from HQ as well as other subsidiaries.

In a more comprehensive level, a so-called knowledge warehouse can be developed. Nemati et al. (2002) suggest such solutions to not only facilitate knowledge creation and storage, but also enhance the knowledge sharing process across the organisation. A slight modification can be made from the original model proposed by Nemati et al. (ibid). Instead of developing a data warehouse, this knowledge warehouse can integrate the Wiki pages and document management systems. Some important functions of this solution are a single sign-in page to access all product- and project-relevant knowledge, as well as a search page which allow the users (i.e. the employees) to explore certain topic of knowledge.

**Recommendations for Reward Systems**

One of the challenges described in Chapter Five is the need to create and regulate a KM-related reward system. Literature presented in Chapter Two shows some empirical studies on how organisations reward their employees to promote their KM initiatives. In particular, Bartol and Srivastava (2002) explore some reward system options that can be adopted. For instance, NSN can employ a reward mechanism based on employees’ effort
in contributing their ideas, information and expertise to a database or a system. Some weight is given to such efforts and can be further consolidated into the employees' overall rewards. In NSN's case, the intended system can be in the form of an integrated Wiki page as recommended earlier in this Section. In addition, Bartol and Srivastava (ibid) mention that this mechanism require a validation system/experts which evaluates the relevance of the idea or information provided by the employees. Recalling NSN's future plan of establishing a Competence and Knowledge Management Department, the validation system/experts can be developed by this department.

Another idea for KM-related reward system is to add KM-specific criteria to the employees' personal evaluation. Managers and project leaders assess their employees or team members to monitor their knowledge-sharing behaviours either at individual level, team level, or across functions/business units. These criteria are then given a certain weight and can be included as part of the employees' performance appraisal.

**Recommendation for further research**

The results of this study have presented many insights under the theme of KM, particularly in the context of MNC. One of the most important issues is establishing a comprehensive KM strategy for the global NSN organisation. As discussed in Chapter 3, currently there is no formal guideline for KM. Many scholars have agreed that such KM strategy is necessary to be formed to steer the implementation.

The synthesis findings described in Section 6.3 can be employed as a starting point by NSN for conducting further research. Moreover, there are other KM areas that are not covered in this study, but might become of significance to the organisation in the future. Further research will provide more perspectives that can contribute to a more holistic view of KM initiative within the organisation. In light of this, it is recommended that NSN allocate their resources for future research.

**6.4. LESSONS LEARNED**

To this point, there are three predominant lessons that can be learned from this study.
One, the circular KM process displays a dynamic organisational learning process as suggested by Dixon (1994). Such a circular process allows the Department to continually create, store, distribute and apply both existing and newly-acquired knowledge. Moreover, the practice of ‘personal objective setting’ as part of KM implementation ensures the congruency of KM processes with the organisational objectives and stakeholders’ expectations. Dixon (ibid) argues that this circumstance profoundly supports the Department’s quest to become a true learning organisation.

Two, the discussion of KM implementation in Chapter Four indicates that all KM activities are about tacit and explicit knowledge conversion as proposed by Nonaka (1994). Furthermore, Nonaka et al. (2000) emphasise that knowledge conversion 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.

Finally, 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. Moreover, organisations must further ‘promote and personify’ the use of these ICT-based KM, or KM for that matter, in their daily activities (Mertins et al., 2001:5). Otherwise, ICT-based KM deployment would only prevent the organisation to foster KM. Eventually, it could become an investment failure.

**6.5. FINAL REMARKS**

This research was initially grounded by four research questions as described in Chapter One. To this point, the study has provided proper answers to these questions through exploring empirical evidence in the context of the Department. As it was noted at the beginning of this report, the findings exposed in this study may not be generalised since they mainly represent the Department. They might, however, be deemed as inspiration for future studies which address KM strategy and implementation themes in other organisations.


255-261.


Heisig, P. (2001b) 'Securing Tacit and External Knowledge in the Insurance Industry –
14, pp. 319-397.
Nokia Siemens Networks (2009c) Mode Of Operation – Nokia Siemens Networks, Nokia


Wijaya, A. (2009) SC Jakarta, Email to M. Amalia [Online], 17 June, Available: Email: mirta.amalia@postgrad.manchester.ac.uk [Accessed: 17 June 2009]


APPENDIX 1 - LIST OF INTERVIEWEES

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Role of Interviewee</th>
<th>Instruments</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wijaya, Andi</td>
<td>Head of Product Customisation (PC) Indonesia</td>
<td>VoIP call via Skype</td>
<td>17-June-2009</td>
<td>28 mins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email</td>
<td>17-June-2009</td>
<td>N/A</td>
</tr>
<tr>
<td>Wiharjito, Tony</td>
<td>Head of PC Development Indonesia</td>
<td>Email</td>
<td>5-June-2009</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email</td>
<td>10-June-2009</td>
<td>N/A</td>
</tr>
<tr>
<td>Ariawan, Mukti</td>
<td>Project Team Leader</td>
<td>Email</td>
<td>11-June-2009</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VoIP call via Skype</td>
<td>11-June-2009</td>
<td>30 mins</td>
</tr>
<tr>
<td>Puspaningsih, Ika</td>
<td>Project Team Leader</td>
<td>VoIP call via Skype</td>
<td>9-June-2009</td>
<td>45 mins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Messenger</td>
<td>3-July-2009</td>
<td>N/A</td>
</tr>
<tr>
<td>Nugroho, Rakhmat</td>
<td>Project Team Leader</td>
<td>Email</td>
<td>16-June-2009</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email</td>
<td>7-July-2009</td>
<td>N/A</td>
</tr>
</tbody>
</table>
APPENDIX 2 - INTERVIEW QUESTIONNAIRE

A.2.1. INTERVIEWEES’ VERSION

This questionnaire is in Indonesian language. This version was sent prior to the interview sessions.

Pertanyaan untuk Wawancara

A. Introduksi

1. Pengantar tentang tujuan studi (oleh pewawancara)
2. Informasi dasar tentang organisasi (beberapa informasi mungkin sudah tersedia di web atau publikasi lain):
   1. Visi dan misi
   2. Tujuan dan sasaran NSN COO BSS PC Jakarta
   3. Sejarah singkat serta perkembangan departemen NSN COO BSS PC Jakarta (i.e. sebelum dan sesudah merger antara Nokia Networks dan Siemens Communication)
   4. Jumlah staff
3. Informasi singkat mengenai narasumber
   1. Nama dan jabatan Anda?
   2. Berapa lama Anda memegang posisi tersebut?

B. Strategi Knowledge Management

- Bagaimana strategi “Knowledge Management” (KM) diformulasikan di departemen NSN BSS PC Jakarta? Faktor (motivasi) apa saja yang mendorong formulasi KM tersebut?
- Bagaimanakah peran dari Head Quarter dan kantor cabang lain (NSN BSS PC di negara lain) dalam memformulasikan strategi KM tersebut? Apakah formulasi strategi KM selalu digerakkan oleh HQ?

C. Penerapan Knowledge Management

- Bagaimana strategi KM diimplementasikan di departemen? Upaya-upaya apa saja yang dilakukan untuk menyerap knowledge baru (e.g. knowledge tentang produk, klien, bisnis proses), mengelola serta mengaplikasikan knowledge tersebut?
- Faktor apa saja yang mendukung dan menghambat implementasi KM?

D. Dampak Knowledge Management

- Bagaimana dampak dari penerapan KM terhadap departemen? Adakah dampak yang tidak diharapkan (“unintended impact”) sebagai hasil penerapan KM? (misalnya perubahan struktur organisasi untuk mengakomodasi kebutuhan fungsi baru sebagai pengelola KM tools)

E. Tantangan dan Potensi Penerapan Knowledge Management

- Dalam hal penerapan KM, tantangan serta potensi apa saja yang
Interview Questions

A. Introduction
1. Introduction of the objectives of the study (by interviewer)
2. Basic details of the organisation:
   1. Vision and Mission
   2. Aims and Goals
   3. History and recent developments
   4. Workforce
3. Interviewee details
   1. Name and function
   2. Time in current role

B. Knowledge Management Strategy
- How does NSN APAC's Product Customisation department form its strategy to manage knowledge? Please explain.
- To what extent does the Head Quarter and other subsidiaries affect the strategy formation?

C. Knowledge Management Implementation
- How are the formed strategies being implemented?
- What are the factors that enable and hamper the implementation?

D. Knowledge Management Impact
- To what extent does KM impacted the department?

E. Challenges
- What are the potential challenges of KM in the department?

F. End-Note
The interviewer will write up this interview and send it back to you as soon as possible, for corrections. Please feel free to add more information. Would you like to see the report as a result of this study?

Thank you very much.
A.2.2. RESEARCHER’S VERSION

This version includes some 'probing questions' to ensure that all research questions were answered in deeper details.

A. Introduction

1. Introduction of the objectives of the study (by interviewer)
2. Basic details of the organisation:
   (a) Vision and Mission
   (b) Aims and Goals
   (c) History and recent developments (i.e. before and after the merger between Nokia Networks and Siemens Communication)
   (d) Workforce
3. Interviewee details
   (a) Name and function
   (b) Time in current role

B. Knowledge Management Strategy

4. How does NSN APAC's Product Customisation department form its strategy to manage knowledge? Please explain.

   Probing Questions:
   a) What are the key drivers / motivation behind the strategy formation? What are the knowledge being managed (e.g. best practice; know-how; software code; project experience; business process; knowledge about customer, products, processes and competitors)?

5. To what extent does the Head Quarter and other subsidiaries affect the strategy formation?

   Probing Questions:
   a) How is the relationship with Head Quarter (direct and indirect lines)?
   b) How is the relationship with other subsidiaries?
   What are the roles of Head Quarter?

C. Knowledge Management Implementation

6. How are the formed strategies being implemented?

   Probing Questions:
   a) What are the strategies for knowledge creation (e.g. certified training, knowledge transfer from other subsidiary)? What conditions facilitate the knowledge creation process?
   b) What are the strategies for knowledge storage/retrieval (e.g. knowledge management systems)?
c) What are the strategies for knowledge transfer/sharing (e.g. group session, KMS)? What conditions facilitate the knowledge transfer/sharing process?
d) What are the conditions that facilitate and encourage knowledge application?
e) What are the tools enabled to support knowledge management (e.g. document server, wiki, IMS)?
f) How are the tools implemented (i.e. information architecture)?
g) Is there any adaptation required?
h) Who is responsible for maintaining and adapting the tools used?
How are the KM tools being aligned with the overall IS/IT strategy of the department/organisation?

7. What are the factors that enable and hamper the implementation?

Probing Questions:
a) Please identify factors that enable the KM implementation (e.g. organisational, technical, physical location, workforce)?
b) In what way does such factor enable the KM implementation?
c) Please identify factors that hampers the KM implementation? In what way does such factor hamper the implementation?

D. Knowledge Management Impact
8. To what extent does KM impacted the department?

Probing Questions:
a) Please identify the impacts of KM implementation (e.g. organisational, competitive advantage, performance)?

E. Challenges
9. What are the potential challenges of KM in the department?

Probing Questions:
a) Please identify the challenges of KM implementation (e.g. employee turnover, HQ and other subsidiaries support, organisational merge with ex-Nokia Networks)? Which are the key challenges?

F. End-Note
1. The interviewer will write up this interview and send it back to you as soon as possible, for corrections. Please feel free to add more information.
2. Would you like to see the report as a result of this study?

Thank you very much.
Solution Center Jakarta and Unified Charging, Overview for Executive

Andi Wijaya
March, 2009

Objectives of the NSN Development Center Jakarta

- Intensify Nokia Siemens Networks support to Indonesian network operators in the areas of Communications and IT
- Significantly shorten Time to Market of new products/features and services for Indonesian and regional customers
- Cultivate innovations with our business partners in Indonesia and increase local value add (as per the directives of Indonesian regulator)
- Become a technology hub in the region, Center for the Show Case of NSN Product e.g. Unified Charging and
IN Solution Center Jakarta
Value Proposition

- One of Low Cost Location for the Solution Center
- Established organization since 2003, with 71 Head Count.
- Serving two largest Customer in APAC, Telkomsel Indonesia and DTAC Thailand
- Respected & high skilled people within IN Solution Center Jakarta, acknowledged by customer from their excellent reputation, in area of IT/Telco Consultancy, Development, System Test and System Integration.
- Established Infrastructure for IN Application Development with committed investment

Relevant Developments in Indonesia

- **Exponential growth** continues
  - 50-60m new subscribers expected in the next 3 years
- **Cost Reduction**, by employing local talented people and strengthen the relationship with local University is one way for NSN to get competitive market rate in the production cost.
- **Fierce competition** with new entrants expected
- Demand for **new services**, e.g. HSDPA prepaid, mobile broadband, etc.
- **Telkomsel** as a largest NSN Single customer required local competence from NSN to support their business.
- **New Greenfield operator in the region of Indonesia which will required BSS solution from NSN.**
- **XL** can become an opportunity for NSN BSS solutions (Amdocs replacement)
- **Ericsson** appointed in Sep’06 to replace NSN IN/Charging in Indosat
  - Project significantly delayed, Win-back program in place, the presence of Development center in Indonesia is a key factor for the Win-back program
- **Skilled Resources**
  - Our competitors (Ericsson, Alcatel) are aggressively headhunting key NSN IN resources. By setting up a Development center in Jakarta, NSN provided a good place for talented people to work with.
Scope of the Solution Center Jakarta

- Development and customization of IN/Charging Services
- Systems integration of NSN solutions, with associated development of supporting solutions (e.g. Provisioning, Revenue Assurance etc)
- Joint System Test & Integration with NSN customers
- Architecture & Business Process Consulting (e.g. Purtona in Australia)
- Customer satisfaction program in the region of APAC
- Research and Development for the Unified Charging System

Worldwide support by Customer Project Support Team

Remote Services

- Problems: Trouble Resolution Service
  Tier 3 expert support, claim corrections from R&D and OEM partners

- Questions: Technical Query Service
  Deliver tier 3 expert support for technical and operational queries

- Critical Problem: Emergency Service
  The emergency team provides a 7x24 standby support for critical problems

- Improvements: SW Updates
  Compilation, test and release of regular updates (Standard Correction Version)

- Implementation: SW Update Installation
  The Update Team takes over/supports SW update installations worldwide

On-Site

- HW Maintenance: 3rd Party Equipm. Support
  CPS is involved in escalations and as long as it is unclear if SW or HW problem

- Local: Advanced Network Support Care Management
  Will be delivered by local experts (no BSS PC participation)
Reference projects

- **Indosat**
  - Marketing campaigns
  - IN Win-Back plan

- **Telkomsel**
  - Rescue service enhancement as part of the disaster recovery plan
  - Several joint system tests (e.g. Convergent Charging Phase 2)
  - Development, System Test and System Integration for Collect Call, Cost Control and others
  - New provisioning model for Telkomsel low ARPU subscribers and Rescue Service

- **Outside Indonesia**
  - Development and System Test for **DTAC Thailand**
  - Development, System Test and System Integration for **Purtona Australia**
  - IN Service Development: **Hutchison India**, **Globe Philippine**, **Bharti India**, **AWCC Afghanistan**

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**Unified Charging & Billing – NSN Portfolio**

- **Convergent Customer Care**
  - Reports
  - Order Management
  - Customer Care
  - Customer Self Care

- **Financial System**
  - Financial Reporting (GL)

- **EAI Middleware**

- **Unified Charging and Billing**
  - Product Catalogue
  - Customer Data
  - Event History

- **Bill Aggregation Bonus & Discounting Taxation**

- **Online Charging**
- **Offline Charging**
- **Charging Session Control**

- **TopUp**

- **Network**

- **Invoicing**
- **Accounts Receivables**
- **Payments & Collections**
What is this department contribute to Indonesia?

We are not bringing a Boeing Factory to Indonesia, but we brought a German Technology to connect 5 Billion people worldwide. Involve the young talented Indonesian people in the realization of an idea from customer, deliver the solution and provide end to end integration.

NSN not only making a business with the customer, but NSN provide a place for Indonesian to master the Telco Technology and enter the international competition in Man Power.

Our close relationship with the University like ITB and UI has bring new way of education on combining the Theory that students got in the class room with a real practical businesses.