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# Learning in Collaborative Industrial Design Development

- A Comparative Multi-Case Study on The Critical Capability of Competence Development and Transfers

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## *Abstract*

*This study is focused on the central role of competence and commitment in knowledge intensive firms for building sustainable competitive advantage. These two central theoretical concepts are bridged into an integrative research framework. First, the dynamic capabilities view suggested by strategic management for the unwrapping of the processes by which service firms build distinctive competence sets the overarching context for the study. Then, an analytical approach is undertaken to explore competence development as a critical capability for organisational learning. Thus, organisational and managerial processes concerned with competence integration, learning and transformation are investigated in an evolutionary perspective, from their path dependency to their role in activating human capital to build commitment. A complementary static review of the firms' assets and distinct service delivery, together with a positivist measurement of organisational commitment were considered enabling. The central methodological construct is a multi-case study, involving three foreign subsidiaries of an engineering MNC.*

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## Abbreviations

| | |
|---|---|
| AC | affective commitment |
| CAD | computer aided design |
| CC | continuance commitment |
| CD | competence development |
| EDS | electronic database system |
| HR | human resource |
| HRM | human resource management |
| ISO | international organization for standardization |
| IT | information technology |
| MNC | multinational corporation |
| NC | normative commitment |
| NPD | new product development |
| PC | personal computer |
| PM | project manager |
| R&D | research and development |
| SLL | sharing lessons learned |

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# Chapter 1. Introduction

## 1.1 Research Objective and Questions

The purpose of this thesis is to study and compare competence development and transfer processes in relation to collaborative industrial design in three units of an engineering MNC. This focus is explained by a strong acknowledgement of the central role of competence and commitment for building sustainable competitive advantage in the knowledge intensive firms of the new economy.

Thus, rooted in the strategic competence-based view of the firm, the thesis is intended at exploring the correlations between the static endowment with resources, and the dynamics of capabilities and commitments in the three design subsidiaries of the MNC, during processes of organizational character-formation and distinctive competence development. In so doing, organisational and managerial processes/ routines concerned with competence development (CD) integration, learning and competence transfers and transformation are investigated in an evolutionary perspective, from their path dependency to their role in activating human capital to build employee commitment.

The integrative theoretical frame and research model bridging strategic and human resources management (HRM) to behavioural science is the context and the reason for an analytical approach to competence development and transfer processes at individual, group and subsidiary level. An understanding of how competencies are created, shared and preserved in each unit is pursued with an awareness of the social, interactive nature of these processes. The use of the concept of competence portfolios (i.e. the aggregate of sub-individual competencies together with group synergies, that constitutes the core asset to be moulded by leadership in the process of value creation in service firms), is considered enabling in uniting the micro- and macro-competence perspectives. A central, also multilevel, mediating agent in the research model is represented by the commitments (attitudes, behaviours) entered by social actors at individual, group or subsidiary level in the process of organisational character formation. Hence, organisational structure and culture are more than a function of the past or conditioned by future strategic options, they are also socially created and managed, and constitute determinants of learning.

Good epistemological congruence is aimed between the above theoretical approaches and the central, multiple case-studies methodological construct. The choice for this MNC (multinational corporation) operating in the field of engineering was rather arbitrary, and an

approach that can be used to design and implement practical measures was aimed in the formulation of the research question. The comparative case-study is conducted on three organisational sub-units of the MNC, called Unit A, Unit B and Unit C throughout this study. The choice for these specific sub-units is justified by their knowledge-intensive service delivery - engineering design, as opposed to the rest of the Units which operate as production facilities. Each of the subsidiaries emerged as an organizational unit in distinct contexts (time, location, purpose, ownership), but their internal integration increases in order to benefit from intra-MNC competence network synergies. It is exactly the diversity in their backgrounds, combined with the membership in the same organization that creates a fertile ground for both comparison and generalized observations.

The research methodology was largely qualitative, with semi-structured interviews being the main source of primary data collection, but a web-based survey was considered enabling, e.g. inventorying competencies, measuring commitments, assessing elements or organizational character found of relevance to knowledge-sharing. The mixed approach in data collection allowed reaching out to a wider base of informants, not only managers.

Based on the analysis of the findings, distinct competence profiles were identified for each sub-case units, captured as follows, in line with their dominant commitments: *The Tip of the Iceberg* (Unit A), *The Efficiency Ruler* (Unit B) and *The Enthusiastic Builder-Friendly* (Unit C). Furthermore, each case has a distinct contribution to a process-based understanding of business re-invention in dynamic markets of rapid technological change. Unit C is an illustration of a successful start-up in competitive environments as a socially embedded learning organization committed to competence maximization and synergies. Units A and B provide insights as to the avenues of sustainability in such environments of high erosion, but in very distinct ways: by continuance commitment to excellence and re-invention; by mix of commitments for re-invention. Within this frame, rich insights were reported on the capabilities of competence development, via match specific investments and human capital activation.

The main research questions aimed in support of this research framework can be summarized as shown beneath:

- What subsidiary and MNC strategic resources were in evidence for the specific service delivery in each Unit? What is the influence of the historical contexts (*path dependencies* and *developmental opportunities*) on resources configuration, competence capability building and commitments activation in each of the organizational Units studied?

- What were the capabilities for competence management and what cross-case commonalities are noticeable in CD investments? What were the organizational and managerial processes surrounding the development, transfer and preservation of individual and collective competence in each Unit?

- What were the dominant features of the organizational characters in each sub-case Unit, and in what ways were they shaped by commitments entered by social actors? Could a correlation be traced at each of the Units between management initiated systems for human capital activation and commitments?

### 1.2 Research Motivation: Competence and Competitiveness in Service Delivery

How firms outperform competitors and ensure successful positioning in their environments has always been a central theme in strategic management and business administration. With business under the increasing pressure of a fast paced and interconnected world in the era of globalisation and the new economy, approaches such as the industry-, resource-, and institutional- based views risked reaching their limitations. In response, the academic quest has accelerated in the past decades, moving from a static to a process-based, dynamic perspective. In this evolution, business science met behavioural science, and concepts such as competence, learning and commitment have become focal in explaining "how various parts within the organisation interact with each other over time to create something new and unique" (Nonaka and Takeuchi, 1995: 48-49).

Central to the theoretical foundation of this research are the following three main theoretical developments, all challenging and requiring further empirical investigation: (i) Teece, Pisano and Shuen's (1997) extension of the resource-based view through the concept of *dynamic capabilities*, aimed at explaining competitiveness in dynamic environments; (ii) the vital intangible asset for value creation in today's economy: *competence*, and the forms it takes, the processes by which it is developed, shared and preserved individually and collectively in various organizations; (iii) and one of the most researched, but still unbundled concepts in the organizational science and HRM literature since the 1960s, *organizational commitment*, as a form of human capital activation for alignment with organizational goals. Butler (2005; 2002) proposed in his recent works a model for empirical research on IT capabilities and resources were these theoretical insights are integrated; it is this integrative framework that inspired this study and serves it as a stepping stone (see *Appendix 1*).

Three contributions are essential in this thesis: (i) it deepens the understanding of the process-based, socially-constructed, competence development phenomena with comparative empirical research in three more organizations, furthermore characterized by a degree of interdependence; (ii) it does so by extending the application of Butler's research model to yet another field: industrial design; (iii) it switches focus to competence as *the* resource in service firms, and thus accentuates the role of human capital as carrier of competencies, as well as a more practical component: its activation and manageability.

The competence network of three organizational units located in different countries, evolving under different contexts, but for some time under the same ownership, can be a fertile terrain for interesting reflections with regards to the processes of competence development and transfers, and commitment. Although Butler's model was designed for research in the field of information systems, it is suggested in this thesis that industrial design is strikingly similar in the sense that it consists of a mix of technology and intellectual capital and even requires today a solid IT-based infrastructure for its application. A relationship connector (systems for human capital activation) is added to the hypothesis of the model to alter the passive perception of commitment as result of history to a dynamic one of manageable process. Moreover, levels of commitments are measured in this research in a positivist manner inspired by the Meyer et al. (1993) scale.

## 1.3 Structure of the Thesis

The main theoretical approaches of relevance, the research methodology and the way this study answers the research objectives proposed above are introduced by chapters, as follows:

***Chapter 2*** addresses recent theoretical developments in strategic management that cross the border line of two major institutional sciences: economics and sociology. First, the strategic resource-based view is the point of departure in stressing the role of intangible assets, path dependencies and dynamic capabilities in building distinctive competence in knowledge intensive firms. Within the critical capabilities framework, an analytical approach to competence development (including organisational learning), transfer processes and management is undertaken, largely based on Nordhaug's (2003) taxonomy of competencies in subsidiaries of MNCs. Second, a behaviourist perspective is integrated to the dynamic, process-based approach on competence development, through the emphasis on the mediating role of commitments in shaping organisational character. Consequently, an integrative theoretical framework and model is introduced for research applied to the selected case study in industrial design.

***Chapter 3*** introduces the line of thinking guiding the methodology of research and explains the epistemological choices made for the mix of qualitative and quantitative means of research employed. The central construct is a comparative study built on three sub-cases (Units A, B, C) which are foreign subsidiaries of an MNC in the field of engineering. A brief account is provided on the specific setting of the sources of data and on the appropriateness of the case study for the theoretical framework chosen in chapter two. Next, the design and administration of the guide for the *semi-structured interviews* and of the *web-based survey*, respectively, are illustrated, while stressing their congruence with the research aims and their limitations. Finally, an overview of the collected data characteristics, sufficiency and validity makes the transition to the next chapter where findings are presented.

***Chapter 4*** is largely exploratory in the first part, as it reports on the main findings for each of the sub-cases; each sub-case section is concluded with an integrative discussion of findings according to the dynamic research model. In keeping with the research objective, this chapter aims at explaining the processes by which these organisations develop and transfer competences in their quest for competitive advantage.

***Chapter 5*** discusses the findings in a cross-case perspective and draws concluding observations in two directions: (i) on the phenomena of competence development as a critical dynamic capability; (ii) on the phenomena of business transformation by commitments and path dependencies.

**Chapter 6** concludes the thesis with an account on the achievement of the research aims, and a screening of the implications for research, methodology and management practice.

# Chapter 2. Theoretical Approaches

## 2.1 Introduction

This chapter is designated at presenting the theoretical background for the research. The content of the chapter is organised in three main sections, headed as follows: 2.2. strategy and competence: value creation in knowledge intensive firms; 2.3 competence development as a critical dynamic capability and 2.4. integrating dynamic capability and commitment theory for research in industrial design. First, the concept of distinctive competence is introduced while following the milestones in the evolution of strategic thinking, from Porter (1980) to Teece, Pisano and Shuen (1997). Second, a micro-level approach is taken in presenting what competence is, what types of competencies can be identified in MNCs, and the importance of competence bases management. The section is further extended with a brief account on how competencies are created, transferred or lost, and which features of the organisational character enable competence development/ learning. Finally, all these theoretical insights are integrated in a research model for industrial design, inspired from the works of Butler (2005, 2002).

## 2.2 Strategy and Competence: Value Creation in Knowledge Intensive Firms

In management literature, a distinction can be made in the use of the concept of competence at strategic level (such as distinctive competence, core competence) and as the nuclear, micro-component of a firm's human resources (individual competence, sub-units of individual competence). It is the first perspective that is discussed in the next two sub-sections.

### 2.2.1 Knowledge-based Value Creation and Distinctive Competence

How firms outperform competitors and ensure successful positioning in their environments has always been a central theme in strategic management. Of focal interests today is explaining "how various parts within the organisation interact with each other over time to create something new and unique" (Nonaka and Takeuchi, 1995: 48-49).

In the strategy paradigm pioneered by Porter (1980), firms are successful dependent on their positioning in relation to competitive forces in the industry. This theory of how competitive advantage is achieved in relation to external environments was complemented later by the "introvert"- oriented perspective: that firms control strategic resources (i.e. valuable, rare, inimitable, and non-substitutable), which are heterogeneous among firms, and hence may play an important role in the creation of lasting value (Barney, 1991; 2001). With firm resources or

assets being both tangible and intangible in nature, a knowledge/ competence-based view of firm strategy soon emerged: "A company's value derives not from things, but from knowledge, know-how, intellectual assets, competencies - all of it embodied in people" (Hamel and Prahalad, 1996: 241; Hamel, 1991; Leonard-Barton, 1992; Eisendhardt and Martin, 2000). To synthesize and apply current and acquired knowledge, and manage interdependent, operational and administrative routines, firms develop *combinative capabilities* (Kogut and Zander, 1992; Zollo and Winter, 2002). But even a unique grid of idiosyncratic resources, and their specific deployment, may lose momentum in dynamic, unpredictable markets (McGrath et al., 1995; Teece et al., 1997; Eisendhardt and Martin, 2000). The theoretical approach that unites the "extrovert" and "introvert" views, and explains how firms can be successful although all competitive advantages erode over time, is the one proposed by Teece, Pisano and Shuen (1997):

They define *dynamic capabilities* as "the firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments" (p.516). From a strategic perspective, such capabilities cannot be bought, and competitive advantage is created through critical selection and commitment to long-term paths of competence development (*ibid.*). Moreover, they also distinguish between: (i) a *core competence*, i.e. "what a firm is able to perform with excellence compared to its competitors", as a reflection of its collective learning and competitive advantage (Grønhaug and Nordhaug, 1992: 440; Hamel, 1991; Nordhaug, 2007); and (ii) the *distinctive competence* (Selznick, 1957), i.e. a core competence that competitors cannot easily replicate.

### 2.2.2 The Dynamic Capabilities Framework and Its Applicability to Service Delivery in Engineering Firms

The dynamic capabilities framework is the best fit for the portraying of the perpetual "process of becoming" (Hamel and Prahalad, 1996: 242) of service firms delivering distinctive competencies in markets of cutting-edge technology. Hence, dynamic capabilities can be defined as organisationally specific, identifiable and manageable processes of competence integration, creation and transfer, reconfiguration and transformation that create value and evolve through learning mechanisms (Teece et al., 1997; Eisenhardt and Martin, 2000). The following dimensions contribute to their understanding (Teece et al., 1997; Butler, 2005):

(i) *Organisational and Managerial Processes*: Are stable patterns of behaviour or routines for organisational coordination/ integration (static concept), learning (dynamic concept) and reconfiguration (transformational concept). For engineering firms, an *integrative dynamic*

*capability* is to be found in the *new product development* (NPD) routines, as it requires cross-functional teams to "merge" distinct competencies into a new concept, or even coordinate engineering design with customer experiences, depending on the degree of customisation. Such patterns of current practice can be a source of differentiation for the firm, but employee motivation and commitment are important ingredients, as they are with the dominantly social processes of learning. *Learning* involves knowledge conversion and occurs at all levels: individual, group, organisational and inter-organisational (Levitt and March, 1988; Nonaka and Takeuchi, 1995). The capability of *transformation* or change is concerned with the firm's asset reconfiguration, e.g. resource allocation routines, and is in itself a learned organisational skill of adaptability.

(ii) *Positions*: While strategically relevant when specific or even unique, a firm's resources include various assets that may be tangible (physical; financial; location - e.g. can be a source of difficult-to-replicate advantages, in terms of costs, innovation, or client accessibility). Or, intangible (technological, e.g. patents, proprietary technology; intellectual: human – employees and competence base; reputational – image, relationships with partners; organisational - structure and culture etc.). Recent studies (Gooderham and Nordhaug, 2003: 222) show that, when asked to assess the significance of various sources of competitive advantage, managers attribute greater relevance to "un-traditional" resources, e.g. competencies of the employees; organisational culture; reputation of the firm's products; and customer relations.

(iii) *Paths:* Are the product of history, and may be best defined as strategic alternatives available to the firm, although constrained by future opportunities, as much as shaped by past performance, trajectories and positions. The repertoire of organisational routines (which is a function of past investments) may turn out to be dysfunctional and detrimental to learning and innovation (i.e. *core rigidities*, or the flip side of core capabilities, as proposed by Leonard-Barton, 1992: 118).

The theory is challenged by researchers that do not envisage dynamic capabilities as a source of competitive advantage unless they are applied "sooner, more astutely, or more fortuitously than competitors", based on the consideration that their key features can be developed across firms (Eisendhardt and Martin, 2000: 1117; Barney et al., 2001). Nevertheless, it is an appropriate frame for the exploration of competence development and transfer processes in engineering firms, due to the following considerations: industrial design is competence-, learning-, and innovation- intensive; its service delivery is complex (multi-technology), and has to respond to demanding customers and dynamic markets (Løwendahl et al., 1998; 2001).

## 2.3 Competence Development (CD) as Critical Dynamic Capability

The key tool that allows for strategic competence management in firms, thus bridging the two levels of analysis ("macro" and "micro"), is the competence base/ portfolio or the aggregate of sub-individual competencies, including work groups synergies. This section deals with competence development and transfer processes, and the features of organisational character that enable such learning.

### 2.3.1 What Is Competence? - Single Competence, Competence Types, and Competence Portfolios

- Single Competence - The Basic Unit in Competence Analysis and Management

Work-related competence is defined in this study as the "composite of human knowledge, skills and aptitudes that may serve productive purposes in organisations" (Nordhaug, 1993: 50). This conceptualisation is preferred for two reasons. First, it delineates from the related concepts of motivation, commitment etc., hence serving well this study where commitments are investigated independently as factors of causal influence in the relationship between competence and work performance (see discussion in *Section 2.4.1*). At the same time, Nordhaug's definition accounts for the interdependencies between the three components of individual competence, as follows: *aptitudes* that one is born with are the foundation for one's achieved *skilfulness* in performing work related tasks, as well as for the accumulation of *knowledge*, which can further enhance skill development.

Second, it allows the analysis of competence as sub-unit of individual competence, or *single competence*. This abstract extraction of sub-individual components of competence makes an important shift from the employee's competence, to the idiosyncratic variants of competence, as the most basic unit of analysis in human resources management. This does not exclude the fact that the employee is the carrier and the activator of the various components of competence, but it has the important advantage of allowing the grouping of these components by categories, independent of individuals. Thus, Nordhaug introduces in 1993 six generic competence types, which he later (2003) develops into a typology of competencies adapted to the logic of subsidiaries of MNCs. It is this later typology that is employed in this study, and a discussion of it is conducted next.

- The Classification of Competencies in Subsidiaries of MNCs

The starting point in Nordhaug's classification of competences is the distinction between general- and firm- specific competencies made by Becker in 1983, in his important

contribution to the human capital theory (Gooderham, 1995). Although Nordhaug retained it as relevant, this binary classification was considered insufficient to serve competence management applications. Hence, with firm specificity at the centre, two extensions have been made in opposite directions: to a contextual level (or *industry specificity*) and a functional level (or *task specificity*). Depth was given to the frame of this typology by dichotomising each of these three dimensions into low and high.

First, competencies that are highly *firm/ industry specific* are of little value and applicability in other firms/ industries, which is why firms tend to invest in developing this category of competencies. Second, *task specificity* defines the degree to which a competence can be deployed to perform a variety of tasks (low specificity, e.g.: problem solving capacity) or only one task (high specificity, e.g.: operating certain equipments). The resulting three-dimensional classification with six cells or degrees of idiosyncratic competencies was adapted later to accommodate the context of MNCs as global actors that operate various subsidiaries, as shown in *Fig. 2.1*. This classification is particularly relevant whenever each of the subsidiaries is fairly specialised in a different field. A detailed account of each category follows beneath.

| | | MNC Specificity: Low | MNC Specificity: High | |
|---|---|---|---|---|
| | | | SUBSIDIARY Specificity: Low | SUBSIDIARY Specificity: High |
| TASK Specificity: Low | | Meta-Competencies (I) | Intra-Organizational MNC Competencies (II) | Intra-Organizational Subsidiary Competencies (III) |
| TASK Specificity: High | | Standard Technical Competencies (IV) | MNC Technical Competencies (V) | Subsidiary-Unique Technical Competencies (VI) |

**Fig. 2.1 Classification of Competencies in Subsidiaries of MNCs (Nordhaug, 2003: 223)**

*Meta-Competencies (I)* or "skills in acquiring other skills" (Hall, 1986: 348) are especially important for the internal and external adaptability of firms, precisely due to their low specificity to both tasks and firms (Nordhaug, 1993: 58-62). Such competencies that facilitate transformation when possessed by the employees confronted with the change are: the ability to learn and transfer knowledge, to be creative and innovate, to manage change and transition; cultural sensitivity, foreign language mastery (esp. for cross-border contexts); communication and interpersonal relationship skills, delivery and negotiation skills, cooperative skills etc.

*Intra-Organisational MNC Competencies (II)* are indicative of the employees' familiarity with the MNC as an organisation: history and strategy, product/ service delivery, market positioning and resources, institutionalised and informal culture and values, structure and decision making, work processes and social networks, familiarity with different subunits etc. These competencies tend to develop with seniority and to be concentrated at managerial levels, as they are acquired and developed mostly by everyday learning at the workplace. However, firms acknowledge the importance of designing organisational handbooks and communicating them to all employees, both in order to ensure efficiency and to generate commitment through normative culture. When the strategic vision and long-term objectives are communicated to the employees they are more supportive to management initiatives, to the point it can prove an important tool against resistance to change (Selznick, 1957; Venzin et al., 2005). Introduction sessions for new-comers, mentoring programs and job rotation are but a few of the tools firms use to enable the learning of such intra-organisational competencies.

*Intra-Organisational Subsidiary Competencies (III)* are characterized by low task specificity, low MNC specificity and high subsidiary specificity. In other words, these competencies are the replica of the second category, but limited to the borders of each subsidiary/ unit. Besides the location-based organisational competencies such as awareness of communication channels and internal politics, these subsidiary specific competencies can be relevant for fairly autonomous units which may develop own values and norms, with some degree of dissociation from the corporate programs. Should this be the case, even internal newcomers with good intra-MNC organisational competencies will need a transition period for the learning of the unit specific organisational competencies.

*Standard Technical Competencies (IV)* is the first category within the group of technical competencies, which all exhibit high task specificity. The group of technical competencies includes professional/ vocational knowledge about specific procedures and techniques, and the corresponding task-oriented skills to use tools and operate equipments. The educational systems are the main providers of standard technical competencies which are fairly generic and can be applied in a range of firms/ industries or activities, such as PC/ software operating knowledge and skills.

*MNC Technical Competencies (V)* are portable across the MNC, but they are usually designed to meet the unique needs of the MNC, and hence, are not replicated in other firms. Examples include internal electronic systems; accounting, and budgeting or project management procedures; internally developed software etc. These competencies tend to be developed with

experience, and traineeships and apprenticeships are common examples of management designed tools to support their development.

*Subsidiary Unique Technical Competencies (VI)* are competencies with applicability reduced to the accomplishment of a limited number of tasks within a subsidiary. Such highly specific tasks may have to do with unique technologies or R&D, customised databases, local routines etc. Informal learning and in-house training play an important role in their development.

The employees remain the main organisational actors who are carriers of knowledge, skills and abilities, either individually or through atomic membership in social groups and networks at work. However, as discussed in the next section, the abstract typology of competencies presented has the advantage of allowing the assessment of the pool of competencies in organisations, and their management for alignment with firm strategy.

- The Role of Competence Portfolios/ Bases in Strategic Competence Management

The aggregate of individual competencies together with collective synergies from interaction at work within the internal and extended social networks, form the *competence portfolio/ base* of an organisation. Competence bases are unique internal resources and a firm's capability to design and reconfigure them is critical to successful business in the fast changing environments of the new economy.

*The Competence Chain*

In a process-based approach, the management of competence starts with the assessment of competence needs (*competence planning)*. Once the competence gap identified, the competence needs are satisfied either through *external acquisition* (recruitment, external consultants, inter-organizational cooperation), or through the *development* of the existent competency base. Either "bought" or "made", competencies produce returns through their application (*competence utilisation*) (Nordhaug, 1993: 28). A concept hereby termed "competence loss" is added to the competence chain in this study in an exploratory attempt to identify how competencies exit the chain, or under what circumstances competencies are not utilised. However, the nuclear theme of this thesis is *competence development* (CD); all the other stages in the chain are only tangential, to the degree their investigation is enabling for the central subject matter of the study. CD includes both formal (planned/ systematised) and informal learning. First, *formal learning* includes personnel training programs designed in-house or purchased from external providers. These can range from sophisticated models such as internal universities and traineeship programs, to courses for the appropriation of a certain technical skill (e.g.: design software) or conferences etc.; even employee consultation or

career planning programs play a role. Second, *informal learning* is by far the most comprehensive form of learning on-the-job, both independently and through interpersonal transfers (addressed in greater detail in *Section 2.3.2*). Job rotation, active participation in extended social networks, work groups, integration of junior staff, can all be supportive of such learning activities.

*Investments in Competence Development*

The inventorying of the competence base is useful for investment decisions in competence development. First, in gearing investments towards a *static fit* (i.e. best congruence between employees and their work, through task specific competencies) or "dynamic fit" (i.e. organisational flexibility, through meta-competencies and intra-organisational competencies). Second, in covering competency gaps, the return on investment from activating latent, but existing potential may be higher than from acquisitions in the market. Third, over-investments in firm-specific competencies may easily occur and create lock-in effects with impact on retention policies and commitments. Fourth, individual competency assessments can be utilized in succession and career planning.

*Competence Synergies: Collective Competence and Learning Networks*

Competence synergies are achieved through interaction in work groups/ teams, within the internal and extended professional networks (external communities of practice) or from interchanges between subsidiaries/ units holding specific competencies. First, *collective competencies* are shared competencies (codified knowledge, routines and practices, cultural identity etc.), embedded in the social context in which they occur. They are particularly relevant for R&D groups, for example, when the presence of each social actor is required for the collective competency to be demonstrated. They have both the advantage and the disadvantage of being unique and virtually impossible to replicate. Moreover, beyond the contribution to the relative competence advantage of the firm, whenever an employee possesses exclusive knowledge and skills, a *competence monopoly* may be created. If this is the case, the organisation needs to make greater personnel and/ or competence retention efforts; otherwise, the loss of the employee means the loss of the exclusive competence. Second, when various units within an MNC possess specific competencies, they can form an *internal learning network*, on condition that a learning contribution is made to the rest of the MNC. When subsidiary-unique technical competencies are disseminated to other parts of the MNC (other subsidiaries, headquarters), the subsidiary is an *enhancer* unit; otherwise, it is just a *server* unit (Gooderham, 2003). The highest degree of competence resources (even to the level of world-class specialist knowledge), and of learning contribution is recognised in

*centres of excellence* (Birkinshaw, 1998). Third, the learning network can also be *external*, resulting from inter-organisational cooperation for the purpose of exploiting complementary resources (Gooderham and Nordhaug, 2003; Van Wijk et al, 2003). These expertise exchanges normally take place between organisations which do not compete directly with each other, the main driver being the improvements in the common utilisation of each organization's relative competence advantages.

### 2.3.2 Organisational Learning and Unlearning: Competence Creation, Transfer, Loss

Individual learning is defined as "processes that lead to changes in one or more of the following dimensions: knowledge, skills, attitudes and other personality-related factors" (Nordhaug, 1993: 34-35). On the same logic, organisational learning is viewed as a process of change, but its main content is organisational knowledge "which can be embedded in physical artefacts (databases, equipments, documents), organisational structures (roles, reward systems, procedures), and people (skills, values, practices) (cf. Kim, 1993; Levitt and March, 1988; Schein, 1992)" (Caroll et al., 2003: 575-576; Leonard-Barton, 1992; Vera and Crossan, 2003).

*Competence Creation*

A widely accepted model to explain competence creation is the dynamic one proposed by Nonaka et al. (1995; 2000). They identify four modes of conversion between (i) *tacit knowledge*, i.e. subjective, complex, difficult to formalise *know-how* that is therefore *sticky*, and (ii) *explicit knowledge*, i.e. objective, possible to codify, information or *know-what* (Polanyi, 1966; Kogut and Zander, 1992; Szulanski, 2000; Tsoukas, 2003; Szulanski and Capetta, 2003). The conversion takes place through transfers during the interaction between individuals in a shared space for emerging relationships (Nonaka and Konno, 1998) termed *ba*. Hence, new individual competencies are created through processes of:

(i) *Socialisation*, when tacit knowledge inputs are converted through social interaction into new tacit knowledge. Socialisation results from observation, imitation and practice, such as in a master-apprentice relationship. The informal appropriation of cultural norms and even of some technical skills is characteristic of socialisation; the main competencies created are the organisational specific and unique technical competencies. (ii) *Externalisation*, when tacit knowledge is codified into knowledge that has explicit meaning to others. Concepts, metaphors, theories and analogies are used in the dialog between individuals in order to create new task-specific competencies (e.g. work procedures) or organisational specific competencies (e.g. routines, codes of conduct). (iii) *Combination*, when different inputs of

explicit knowledge are converted into new explicit knowledge, which becomes independent of the person who developed it initially. An example is the personal filtering (own interpretation, translation) of corporate mission and strategic goals by operational managers. (iv) *Internalisation*, when explicit knowledge is absorbed by individuals and internalised as tacit, personalised knowledge; the internalisation process is closely related to *learning-by-doing* (Dewey, 1938; Kolb, 1984) and plays an important role in the creation of task-specific competencies.

*Transfer Processes*

Competence transfers are "exchanges of competencies between colleagues, teams and organisational subunits in the firm" (Nordhaug, 1993). Such knowledge-sharing between employees is a form of knowledge (re-)creation, and involves a transformation in the cognition of all the subjects involved (Von Krogh, 2002). Nordhaug classifies competence transfers in three major categories: (i) *between an employee and a work task*, i.e. learning based on individual experiences in the development of task specific competencies; this knowledge is created through the transformation of experiences (Kolb, 1984), based on transactions between the person and the environment (Dewey, 1938); it requires a minimum of work motivation and even a significant degree of self-directed study in the case of highly professional occupations (researchers, engineers etc.); (ii) *between an employee and another employee*, or (iii) *between teams and employees or vice-versa*. Although all three categories can be embedded in social contexts, it is the latter two that consist dominantly of informal, on-the-job learning between individuals and/ or groups in all the forms of knowledge creation. In collective learning, the senior staff (*old-timers*) play an important role in the development of *new-comers*' (junior staff's) organisation- and task- specific competencies (Lave and Wenger, 1991). Interactive sharing is the most representative type of competence transfers between employees, particularly in creative/ innovative processes, but often these learning processes are unconscious and it is difficult for people to identify them. However, there are also formalised modes of transfer, such as the *work-method instruction* by peers and superodinates (mentorship, coaching etc.) or routines for *sharing lessons learned* (summarising one team's project experiences so that other employees may benefit of learning effects).

*Competence Loss*

The development (augmentation, reconfiguration) of the competence base receives much focus, but a loss of competence can also occur. Obviously, this happens when the carriers of competencies, the employees, exit the company. In turn, organisations strive to develop

knowledge repositories (Wasko and Faraj, 2000; Hayes and Walsham, 2001, 2003) or *memory systems* (Simon, 1991), i.e. databases, routines etc., to preserve the knowledge created by organisational learning processes, in spite of employee turnover. Moreover, even when knowledge retention does take place, *organisational forgetting* or *unlearning* also occurs, in three ways (de Holan and Philips, 2003): (i) involuntary loss, i.e. when knowledge created internally or transferred from another organisation is not integrated in the memory system, and when knowledge that is stored reaches a plateau, and then deteriorates; (ii) voluntary loss, i.e. when unlearning is actively desired by the organisation because stored knowledge impedes on transformation. An example of voluntary loss management is also the de-learning of new-comers in the process of internalising new values and behaviours. However, while attempts of storing explicit knowledge may be successful, it is generally accepted that the more an activity is little standardised, complex and rich in tacit knowledge, the less storable the knowledge is. After all, while "knowledge is in the notes, learning makes the music" (Dibella, 2003: 158). Plaskoff (2003: 164) even concludes that "since knowledge is socially constructed, focus on knowledge creation rather than knowledge transfer becomes paramount for organisational learning."

### 2.3.3 Organisational Character and Determinants of Learning

In his book "Leadership in Organisation", Selznick (1957) proposes the concept of *organisational character* based on a psychological analogy to human personality. He defines organisations as institutions infused with value, conditioned by social structures of distinct identity, and the character formation of which is a process which is: historical (experientially patterned), integrated (structured), functional (responsive to environments) and dynamic (modelled through interactions and commitments). The definition is preferred in this study precisely because of its comprehensiveness and process-based orientation. Nevertheless, only a limited number of organisational learning determinants are selected for the understanding of the organisational context as setting in this research, as follows.

*Organisational Structure*

*(i) Centralisation and Formalisation.* "The degree to which power and authority are concentrated at higher levels in organisations" (*centralisation*) and "the degree to which organisational activities are manifest in written documents, procedures, job descriptions etc." (*formalisation*) have a negative influence on knowledge-sharing capabilities, including inter-unit exchanges (cf. Rainey, 2003; Hall 2002; referred to in Kim and Lee, 2006: 373-4; Nordhaug, 1993; Tsai, 2002). Thus, decentralised decision-making and employee involvement, flexibility in job boundaries and routines, less stress on work regulation

stimulate collaboration and are of particular relevance for the development of innovative competencies;

*(ii) Systems for Human Capital Activation.* Performance-based rewards exert a positive influence on the motivation of the employees to create and share knowledge (Kogut and Zander, 1992; Nordhaug, 1993; Kim and Lee, 2006). A first distinction in HR systems is to be made between performance-based and seniority-based career systems, of which the first is found to be more stimulating for the CD of highly educated specialists (Nordhaug, 1993). Moreover, certain work culture features can be stronger incentives for such professionals motivated to learn than pecuniary rewards, e.g. the perspective of increased job performance through collaborations, personal recognition, opportunities for personal development (other than career related);

*(iii) IT Systems for Knowledge Integration.* Widely discussed in knowledge management literature (Davis, 1989; Grant, 1997; Wiig, 1997; Teece, 2000; Hayes and Walsham, 2001, 2003; Alavi and Tiwana, 2003; Butler and Murphy, 2007; King et al, 2008;), they are seen as: facilitators of communication through the electronic extension of channels as well as enabling knowledge creation, retrieval, transfer and application; and as e-repositories for knowledge storage, on condition they are enough user-friendly to meet practical applicability.

*Organisational Culture*

*(i) Social Networks.* Internal and external professional networks or communities of practice (Brown and Duguid, 1991; Klein, 2008) are facilitating contexts for competence-exchanges. Most of the exchanges and the social integration take place in informal interactions, although activities such as training or structured work teams (e.g. project teams) all play an important role in establishing *empathy* (Nordhaug, 1993; Truran, 1998). Internal CD tools, e.g. cross-functional movement or integration programs for new comers can enhance the development of a wider range of skills and network of relationships, and the organisational acculturation (Nordhaug, 1993; Dibella, 2003).

*(ii) Work Environment Culture.* "To be aware of culture is to increase the likelihood of learning" (Norman, 1985: 231, in Nordhaug, 1993: 217). And a simple measure of work culture is in the informal, everyday oral expression of value and beliefs, which hopefully is in line with the normative attempts to structure shared understandings. Two values considered to enable knowledge-sharing at work are trust and openness (Nonaka, 1994; Roberts, 2000; Von Krogh, 2002; Li and Tsai, 2009), and the higher the acculturation and group cohesion, the less needed the organisational centralisation (Selznick, 1957). In work environments, one important cultural threat to competence transfers is *job territoriality*, or resistance to

knowledge-sharing due to the prospect of losing one's power, power given by the exclusivity of the knowledge possessed (Nordhaug, 1993; Hsu, 2006). In addition, the learning culture is shaped by leadership[1] philosophies and management commitment to CD; the degree to which the HR function in an organisation is prioritised may also be reflective of the latter (Nordhaug, 1993).

## 2.4 Integrating Dynamic Capability and Commitment Theory for Research in Industrial Design

Before the integrative research model rooted in the dynamic capabilities framework is presented, it is the multilevel, dynamic concept of commitment that is introduced at the beginning of this last theoretical section.

### 2.4.1 The Role of Commitment in Shaping Competence Development

One of the classical definitions of organisational commitment explains it as: "the relative strength of an individual's identification with and involvement in a particular organisation" (Mowday, Steers, and Porter, 1979: 226, in Cohen, 2007: 338), which "makes it less likely that the employee will voluntary leave the organisation" (Allen and Meyer, 1996: 252). Emerging corroborated with theories on work motivation, commitment has been in focus in the organisational science and HRM literature since the 1960s (for reviews: Mowday, 1998; Meyer and Herschovitch, 2001; Steers, Mowday, and Shapiro, 2004; Cohen, 2007), and still is one of the most researched and challenging concepts. Accentuated recent focus is explained by the fact that, in the knowledge economy, "the only employees that are worth having are those with many other choices of employment" (Hamel and Prahalad, 1996: 238). In addition, various *commitment–performance relationships* have been suggested: *(i) work-related*, e.g. employee retention, absenteeism; job performance; or *(ii) firm performance*, e.g. sales, productivity, returns on investment (Allen and Meyer, 1996; Sommers and Birnbaum, 1998; Steyrer et al., 2008).

Similar to competence, commitment can be individual or collective (group, organisation). A widely accepted theoretical framework for *individual commitment* is the three-component model first proposed by Meyer and Allen in 1991 (Meyer, Allen, and Smith, 1993; Allen and Meyer, 1996; Meyer and Herschovitch, 2001). The three *mind-sets* that may characterize an employee's commitment to the organisation are: *(i) Affective Commitment* (AC) or *desire*, i.e. a positive emotional attachment, strongly correlated to work experiences and embracement of

[1] Leadership is defined by 54 researchers from 38 countries within the GLOBE Project (House et al., 2001) as "the ability of an individual to influence, motivate and enable others to contribute toward the effectiveness and success of organisations of which they are members" (p.494).

organisational values; *(ii) Continuance Commitment* (CC), as the perceived switch *cost*, i.e. rooted in Becker's (1960) *side-bet* theory of employee's perception of own investments (economic, social, career) with the firm; and/ or reflective of a lack of exit alternatives; *(iii) Normative Commitment* (NC), as an *obligation* to stay, result of the internalisation of norms. Thus, "employees with a strong AC remain with the organisation because they want to, those with a strong CC remain because they need to, and those with a strong NC remain because they feel they ought to do so" (Allen and Meyer, 1996: 539). It is generally accepted that the first two types of commitment (AC, NC) correlate positively with job/ firm performance, and vice versa for CC. Meyer et al. suggest a survey scale for the measurement of the three components, and propose that the combination of higher or lower *desire*, *cost* and *obligation* of an employee reflect his/ hers *commitment profile*. Although the most solid instrument developed so far, their scale remains controversial due to the argued overlap between the AC and NC dimensions, and some ambiguity with the CC construct.

Another important body of research on commitment deals with *collective commitments* as mediators for the distinctive competence in firms, and it was pioneered by Selznick (1957) in sociological institutionalism. He argues that organisational character formation is a process during which various commitments are entered by social actors in response to internal and external environmental pressures. The process results in a *distinctive competence* or, on the contrary, an *inadequacy* being acquired by the organisation. In order to be efficient, organisations need to define a clear purpose or mission, and to have the leadership capability to build and purposely select commitments in order to shape an organisational identity and develop competencies aligned to the purpose. Such commitments or "ways of acting and responding" (ibid. p.40) come with a downside: being embedded in the organisational character, they cannot be easily reformed. Certain inflexibility, resistance to change come with commitments, and even undesired behavioural patterns such as organisational *defensive routines* (Argyris, 1990) can result from uncontrolled, un-aligned commitments.

With the core of this research being constructed on a comparative case study, the term of *domain commitment* is proposed to identify the dominant collective commitment entered by organisational actors for a selection of specific, strategically critical domains: *strategy mission; market mission; CD integration; learning/ transfers; CD transformation; HR management; leadership philosophy*. Thus, *core domain commitments*[2] are the outcomes of

[2] This conceptualization is in line with: (i) Winograd and Flores' theory of managerial work consisting of the "articulation and activation" of the network of commitments (1986, p.150 in Lenney, 2009 p.556); (ii) motivational theories of goal setting (summarised in Steers, Mowday, and Shapiro, 2004); (iii) Meyer and Herschovich's (2001) theory of commitment as a force binding individuals to a course of action of

the leadership capability to activate human capital in the form of collective attitudes and behaviours supporting organisational goals critical to the development of the distinctive competence. To enable comparability even further, it is suggested to extend the concept of *commitment profile* to the level of each business unit, and to identify the aggregate of individual commitments as unit-level organisational *commitment for transformation* having a dominant nature: either affective, continuance or normative.

### 2.4.2 The Integrative Research Model for Industrial Design in an Engineering MNC

A model rooted in the competence-based view of the firm and integrating dynamic capability and commitment is introduced beneath (*Fig. 2.2*) for industrial design, in a form adapted from Butler (2005: 6; 2002; see *Appendix 1*), and based on the theoretical insights reviewed in the previous sections. The most important attribute of the model is that it bridges two theoretical perspectives that explain how firms build distinctive competence, through the mediating role of commitments. Hence, an integrative frame of strategic processes by which service firms deploy resources and built capabilities to generate and develop distinctive competence is the context to an analytical approach to organisational learning and transfer processes.

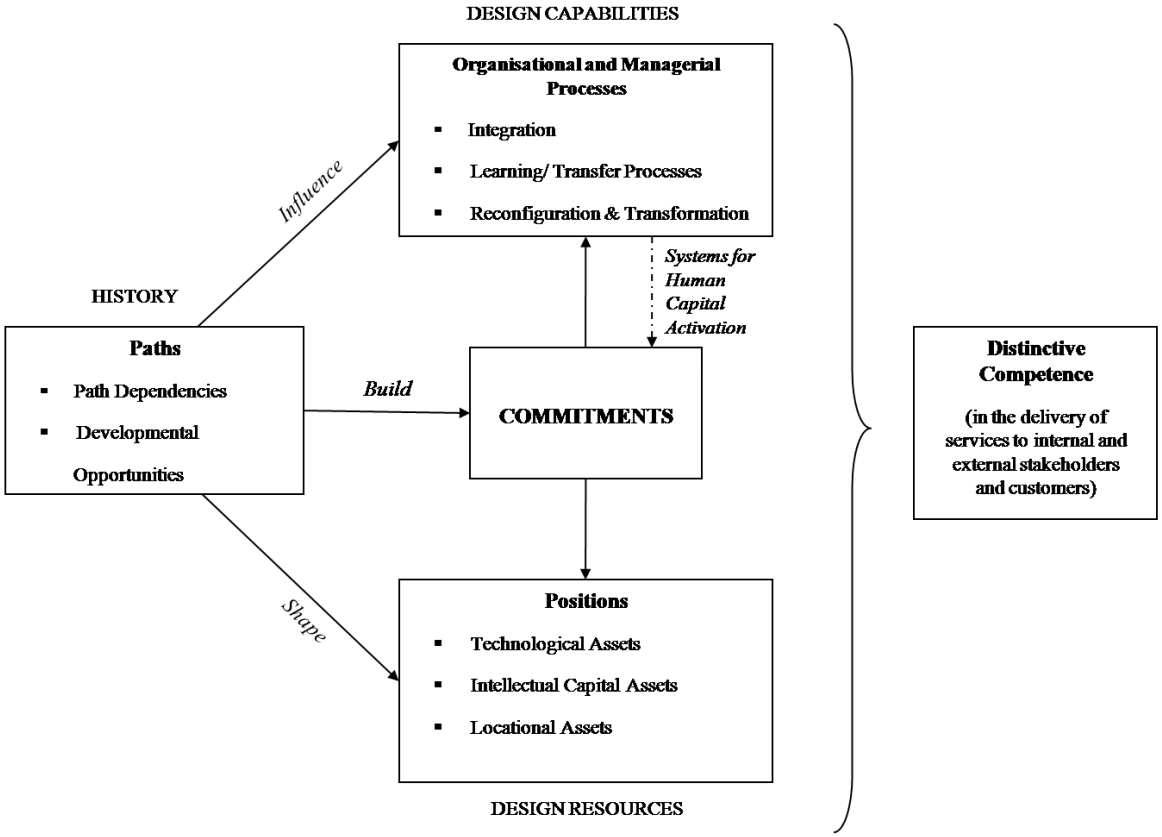



**Fig. 2.2** **An Integrative Theoretical Model for Understanding the Development and Application of Industrial Design Capabilities and Resources (*adapted from* Butler, 2005: 6)**

relevance to one or more targets (iv) Selznick's (1957) view of commitment being shaped by management decisions for alignment to distinctive competence.

In line with the dynamic, process-based perspectives of Selznick (1957), and Teece et al. (1997), capabilities are influenced, resources are shaped, and commitments are built as a function of the past, under the incidence of both path dependencies and developmental opportunities. However, Butler's (2005) original model was primarily designed for the understanding of the development of IT capabilities and resources. Industrial design is very similar in the sense that its kernel consists of a mix of technology and intellectual capital, and even requires today a solid infrastructure of information solutions for its application. Still, some differences pertain to the approach in this study, which is why the following modifications were made for better research congruence:

(i) To emphasise the ways in which *history matters*, and in keeping with Selznick's "clinical" *growth stages*, the term of "developmental" rather than technical opportunities is preferred, for three reasons: it includes, but at the same time, does not limit the investigation to scientific breakthroughs; it is particularly relevant when lived history of the units is not lengthy; development triggers exogenous to the industry may play a role, as it is the case with the rapid advancements in the related oil and gas industry for this particular case-study.

(ii) In the first building block of the model, Design Capabilities, the focus is on *competence development* and *transfer processes*, hence learning, at individual, collective and organisational levels. Amongst routines for integration, NPD processes are selected as most relevant; the dichotomy *innovation* versus *standardisation* is chosen to illustrate the potential tension in divergent or dual commitments in this industry with a high degree of customisation.

(iii) Since "recognising the congruencies and complementarities [...] between processes and incentives is critical to the understanding of organisational capabilities" (Teece et al., 1997: 520), a relationship connector is introduced between capabilities and commitments in the form of "systems for human capital activation" (e.g. performance-based reward systems; acculturation; incentives/ systems for knowledge-sharing or personal development). This is an additional hypothesis to the original model, which alters the solely passive approach of *commitment* as result of history, and brings a dynamic component from managerial processes.

(iv) In this study, commitments will be measured in their three-components (AC; CC; NC) based on the scale proposed by Meyer et al. (1993), to enable establishing correlations with the pertinence of measures to activate human capital, and to compare unit profiles.

(v) In the Positions building block, the selection of endowments presented in the model above was considered most appropriate, and two main remarks are to be made. First, *financial assets* were disregarded as the three organisational units under research are part of the same MNC, and investments to stimulate development may not be in direct relationship with the financial results of each unit. Second, *complementary assets* are renamed and limited to *intellectual capital assets (human, organisational, reputational)* to stress the role of the latter in industrial design.

(vi) The change in the empirical context required the application of Nordhaug's latest (2003) taxonomy of competencies adapted to subsidiaries of MNCs, as opposed to the original version (1993) designed for autonomous firms and employed by Butler.

The way the research model and the relevant theoretical approaches presented above are translated into a congruent research methodology is presented next, in chapter three.

# Chapter 3. Methodology

## 3.1 Introduction

This chapter is intended at explaining the manner in which the choice of epistemological approach is congruent with the research aims, and at describing in detail the design and the administration of the research. First, Section 3.2 accounts for the overall research strategy, methodology and how the research means meet the research aims. The central construct is a comparative study built on three sub-cases. A mix of interpretative and positivist research design was considered most valid for individual cases exploration. Second, Section 3.3 is concerned with the design and employment of the qualitative, interpretative means of research (semi-structured interviews). Third, Section 3.4 describes the design and administration of quantitative means (web-based survey). Finally, Section 3.5 presents main aspects of the approach in the presentation of findings and analysis of data.

## 3.2 Research Strategy

An overall umbrella of qualitative, interpretative research is representative of this study, whereby a comparative case study construct is central. This is justified by the foremost desideratum to contribute with in-depth research to an area deemed to require further investigation within real-life context (Yin, 1994), that is the contemporary phenomena of "how companies actually went about building core competence or capabilities" (Nonaka and Takeuchi, 1995: 48-49). Within the cases, a mix of interpretative and positivist research design was considered the most valid to best cover the integrative theoretical research framework. The interpretative dimension was managed with *semi-structured interviews*, while the latter resulted in the administration of *a web-based survey*.

*Research Setting*

Background interviews conducted in September-October 2008 with two top managers helped sharpening the focus of this study. In November 2008, the MNC was acquired by another large international group, and will be further on called the "regional MNC". The industry in which the regional MNC operates with its design and production facilities is one of long tradition, and its emergence in certain geographical areas was largely determined by natural conditions. Today, particularly following technological and oil related developments, and global warming and environmental concerns, the industry had become intensive in high technology and the products are more and more complex (Hildre et al., 2008). Moreover, extensive customisation involves continuous consultation with the clients, while production

facilities and equipment providers are the other two significant cooperation partners in the value chain (see *Figure 3.1*). In this customer driven industry, design may be defined as the process by which "a client's prototype for a new product is converted by *designers* into something that can be manufactured efficiently and effectively" (Bryson et al., 2004: 8).

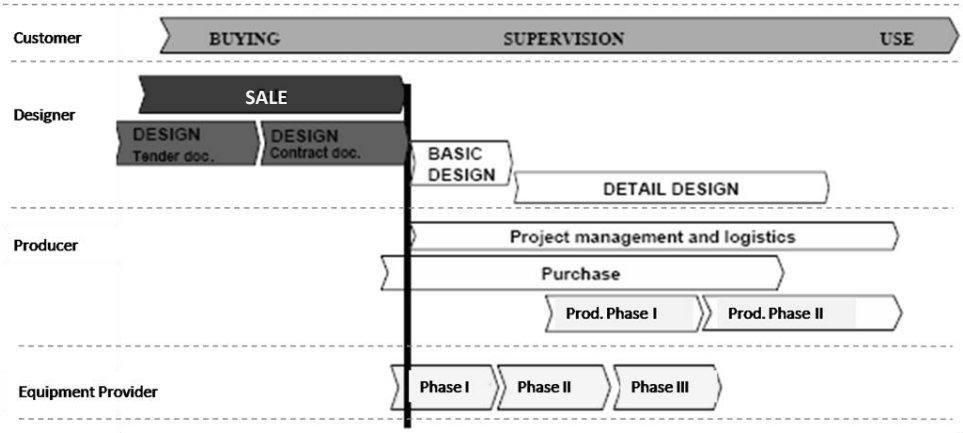



Fig. 3.1 Main Actors and Processes in Product Development and Built (*adapted from* Hildre et al., 2008: 115)

The engineering design process is subdivided into several, multi-technology phases with increasing degrees of details, and its service delivery is the result of a complexity of interactions. Thus, industrial design makes a useful setting for the research question focused on competence development, as illustrated by the following quote:

> Industrial design begins as tacit knowledge that is held in the mind of the designer or design team. [...] Product design and translation into a manufactured product involves teamwork in which different types of expertise and knowledge are combined. This means that the development of trust-based relationships between members of the product team is essential to the overall success of the project. This includes sharing knowledge that is relevant to the design process itself, appreciating the importance of different types of expertise (R&D, design, marketing, brand management) as well as information about other aspects of the client's activities (Rusten and Bryson, 2005: 16; 11).

According to Løwendahl (1992; 1997) the service delivery of engineering design firms ranges from *exploitation* of existent knowledge through reapplication, to *innovation*[3] or the application of new knowledge resulted from own research (Fosstenløkken, 2007: 78). Specialised workforce (*engineers*) trained in designated vocational institutions is required for the design process, and computer software, particularly variations of the so called CAD systems (*Computer Aided Design*) are a must.

[3] *Innovation* can take three forms: (i) *incremental*, when it "introduces relatively minor changes to the existing product, exploits the potential of the established design, and often reinforces the dominance of established firms"; (ii) *radical*, when "based on a different set of engineering and scientific principles and often opens up whole new markets and potential applications"; (iii) *architectural*, when it changes "the way in which the components of a product are linked together, while leaving the core design concepts (and thus the basic knowledge underlying the components) untouched" (Henderson and Clark, 1990).

*Comparative Case-Study*

Both diversity and similarities are to be noticed among the chosen Units (A, B, C). Each Unit is located in a different country, which allows extending observations across national cultures. Each Unit delivers engineering services of certain specificity, and has had a fairly independent development. Units A and C are specialised and positioned at the so called "high-end" market, developing complex and sophisticated products, while Unit B tends to develop a wider range of more classic products, with simpler missions. Units B and C belong to the same business area, while Unit A is part of its national organisation. This serves well the exploration of path dependencies in building distinctive competence. Overall, all three Units belong to the same regional organisational structure of the MNC. Although not acknowledged as such in the background interviews, some strategic intent exists to increase cooperation between the three Units, in order to benefit of operational and learning synergies. However, the fact that the Units have been sharing the same ownership, although at times in various forms or degrees, is a fertile platform to investigate upon Nordhaug's (2003) more recent taxonomy of competencies in subsidiaries of MNCs. Hence, the choice of the case studies serves well the binary approach of (i) instrumental sub-cases for in-depth insight, and (ii) collective/ comparative exploration.

*Interpretative Research*

The role of interviews as means of data collection for socially constructed processes is widely accepted in social sciences and business administration. Within the evolutionary perspective of the research model, the investigation of the processes of competence development and transfers is central. On the one hand, the processes of organisational integration, learning and transformation are socially embedded and complex. On the other hand, the ways capability and asset building was geared through development opportunities by strategic intent to create distinctive competence are highly contextualised. For all these reasons, interviews were targeted for primary data collection. Due to the complexities of the model, a degree of structure was necessary to insure all the targeted aspects of these processes were investigated. At the same time, an open format is more relaxing for informants and improves the scope of data. Thus, *semi-structured interviews* were preferred for data collection.

*Positivist Research*

A positivist touch was felt necessary for three main reasons: (i) the primary data selection method (the interviews) were quite restrictive in terms of the number and the characteristics of the selected informants (5-8 per unit, mostly with managerial responsibilities); (ii) the research model employed being complex, covering all the research issues during the interview

would have resulted in long, tiresome discussions, and may have reduced the willingness of the subjects to act as informants; (iii) some of the parts in the model (i.e. commitment assessment, meta-competencies etc.) were to be more suitably measured by means of a survey. Thus, *a web-based survey* was designed to: (i) fill in the remaining research gaps, (ii) improve validity through correlation of findings from two means of data collection; (iii) enlarge the representativeness of the findings through better coverage of the population sample, and (iv) counterbalance some of the unavoidably more interpretative nature of the interviews' analysis.

*Other Sources of Data Collection*

These consist of diverse written materials and observation. The first include MNC's websites, publicity material, internal corporate brochures and annual reports. The latter were based on field visits to Units A and C on the occasion of the interviews. For example, an open communication/ transparency policy was noticeable in both Units: offices, although individual, had glass walls and the office doors were kept open.

## 3.3 Semi-Structured Interviews

*The Interview Guide*

The Interview Guide **(**see *Appendix 2*) was designed on a 7-steps structure that follows closely the logic of the research model employed, i.e.: *Introduction*, *Interviewee background*, *Terminology clarification*, *The Organisation* (history and industry; service delivery and strategy; key resources), *Work processes* (integration), *Learning and transfer processes*, and *Interview feedback*. The order of the questions was designed to flow as naturally as possible, and the questions were numbered. On a general note, the questions were aimed at returning results in more than one area of interest. For instance, questions about strategy had a double role: (i) to assess intra-organisational competence, and identify managerial processes used to enable it; (ii) to help understanding the journey of the Unit towards the distinctive competence.

The Interview Guide was designed for a 60-90 minutes discussion, and a decision was made to test the interview guide on the first two informants (one from Unit B, one from Unit C). Although successful, test interviews resulted in more than 90 minutes of discussions, reason for which the number of questions in the interview guide had to be reduced, as follows: some questions were compressed in a way that made them both shorter and to yield better results; a couple of questions were eliminated as they turned out to be redundant, while another

required a too high degree of conceptualisation and was considered difficult by the interviewees. Some small adjustments were also made to improve understanding, such as giving the term of "business" as synonymous for "industry", or providing the informants with examples of what a learning situation could be if they had difficulties to illustrate a specific incident.

In the actual design of the interview questions, previous studies were helpful, mainly Nordhaug (1993; 2003; 2007), Døving and Nordhaug (2002), Fosstenløkken (2007), or Siemsen et al. (2007: 442) for the illustrative learning incident (q[4].42). Others were inspired by the background interviews with the two managers, such as questions 30 and 34. For the part on intra-MNC competence, questions 18-19 were designed based on publicly or internally defined corporate values. I selected the "hands-on management" value (q.19) because, in contrast to the "deliverables" in q.18 - which were just introduced by the new ownership, it existed for a longer period of time. In addition, it seemed to be closer to an attribute of project management and therefore easier both to implement as value and to discuss by the informants. According to the MNC's handbook, a "hands-on" approach implies: knowing the business and the product; being present in daily operations, but allowing decentralized decision-making; empowering subordinates; being proactive and discovering problems early on.

*Sample*

The sample was configured based on the "key informant" principle, with sufficient English language proficiency being an additional requirement. Considering the stress of the research question on the strategic perspective (*Positions, Distinctive Competence*) and historical evolution (*Path Dependencies, Developmental Opportunities*), key informants were considered employees with managerial responsibilities and/ or senior employees involved in design. The main means of variety was achieved through the mix of functional roles. Interview results showed a direct relationship between seniority and managerial positions and the relevance/ amount of information returned by the interviewees, confirming the appropriateness of this approach for this part of the research. Guidelines in choosing the informants were sent to each of the three Units, which made their own relevant selection. However, there are restrictions in the degree to which data from the sample can be generalised to the research population for the Design Capabilities section, in particular. This is where the role of the complementary Web-based Survey comes in, as a means of extending representativeness.

[4] "q." is an abbreviation for "question" in the Interview Guide.

*Interview Administration*

A total number of 19 interviews were conducted in the three Units, during December 2008-January 2009. Good overall representativeness was achieved in terms of the sample size, with 28% of the personnel with technical background involved in design. The account of the number of interviews and their coverage of research population for each sub-case unit is as follows: Unit A, 5 interviews (or 30%); Unit B, 8 interviews (or 32%); Unit C, 6 interviews (or 23%). A total of 27 hours of recordings was obtained, with actual average interview duration of 1 h 25 min. The shortest interview lasted 45 minutes, while the longest took 2 h 20 min. Generally, the interviewees were not reluctant at all to the recording of the discussions. Verbatim transcripts were made of the interview recordings, totalling a number of 220 pages. To ensure anonymity, I was the only person with access to the recordings. Elements that could make it possible to identify the interviewees, such as name and work role do not show on the transcripts, which received phoney numbers. Efforts were made during data analysis as well to avoid indirect informant traceability. Moreover, in line with the principle of informed consent, an "Information Sheet for the Interviewee" (see *Appendix 3*) was distributed by e-mail to the informants, at the time when the appointments for the interviews were made. This was a standard summary of the key aspects of the research, in an attempt to anticipate what the informants would like to know in advance about their role (Oliver, 2008: 116).

Informants were also given the opportunity to ask more questions at the very beginning of each interview. Aware that the interview is a potentially stressful experience for the informants, arrangements were made to ensure sufficient privacy and a relaxing atmosphere. Most of the interviews were conducted face-to-face, while some took place via an internet call, due to the long geographical distance. Face-to-face interviews were more interactive and easier to control, particularly in terms of asking/ offering additional information for clarification, as body language allowed better perception. The interviews conducted via the virtual call turned out more structured and less of a discussion compared to the ones in person. It was only in one case that another person was present during the interview, upon request for permission from the informant.

From after-interview feed-back, most of the informants did feel a bit out of their comfort zone with the topic of competence in focus: at times they were confused about what the "correct" answer was that I was expecting; other times the questions required them to reflect upon different issues in another way than they would normally do in their work (e.g.: "it's [...] challenging to think about issues from another platform; normally, that is enriching"[5]). Some even recalled

[5] Interviews extracts are presented within the entire thesis in a smaller font to distinguish them from other quotations and expressions.

with pleasure doing their own masters' thesis research: "I was actually doing [research] like this, with tape recorder and discussing with the people". Overall, high interest was noticed in providing comprehensive answers, so as the research would succeed.

*Interview Limitations*

The first limitation is concerned with what is both one of the benefits and one of the biggest challenges in interpretative research: researcher-informant interactivity. I felt a permanent conflict between making the interview a relaxed conversation and avoiding influencing the informants. This resulted mostly in following quite closely the expressions in the Interview Guide, but with focus on asking open questions, whenever I aimed at getting additional information. On the other hand, the order of the questions was easily changed to keep the flow of the discussion. However, influences from the interchange between researcher and informant - such as in appreciating what a leading comment is, is not easy, such as in the example below where the remark of the interviewer made the informant reflect deeper, and produce one of the strongest statements with regards to distinctive competence. It is not possible to tell if the statement would have emerged anyways, but at least the interchange had a positive result.

*Interviewee:* [...] Our job as designers is to take the [customer's] ideas and make it better than [the customer] believes, and utilize all [customer's] competence.

*Interviewer:* I expected you would say you take the customer's idea and make it happen, but you said "make it better"- that was nice put...

*Interviewee:* [...] I think that one of the key competence of the designers is how they should utilize and make things better from [the customer]; so the key competence of some of the people here is actually how they utilize other people's competence: customers, sub-suppliers and also people at the [production facilities].

Another limitation in this part of the research was the need to conduct the interviews in English. Overall, results were not compromised, but in about four cases they were marginally limited by the language barrier. Only one of these cases was rather extreme, as abstract concepts could not be properly communicated. On a positive note, conducting the research in English helped avoiding any post data collection translation-related limitations.

## 3.4 Web-based Survey Design

The survey matrix below summarizes in a tabular form the contribution of the Web-based Survey (see *Appendix 4*) to providing empirical evidence for the research model. The choice for the measures and items used, and a description of the way they serve this research, follows beneath.

| Survey Items | Source | Research Area Correspondence |
|---|---|---|
| **Section A**:<br>q.1 (11 items); q.2 (4 items);<br>q.3 (1 item); q.4 (1 item) | Nordhaug (1993; 2003; 2007)<br>Own | Meta-competencies (q.1: 1-4; 6-11);<br>Technical Competencies (q.1: 5);<br>Multiculturalism (q.2; q3);<br>Foreign language abilities (q.4) |
| **Section B**<br>q.5 (7 items);<br>q.6 (3-6 items) | Kim and Lee (2006)<br>Own | Organisational processes/ structure:<br>Centralization (q5:1-3); Learning barriers (q.5:4); Social networks (q.5:5-7); Work environment culture (q.6) |
| **Section C**<br>q.7 (5 items) | Kim and Lee (2006)<br>Own | Managerial processes (human capital activation):<br>Reward systems (q.7:1-5) |
| **Section D**<br>q.8 (3 items) | Kim and Lee (2006)<br>Own | Organisational processes:<br>Knowledge sharing (q.8:1);<br>IT utilization (q.8:2-3) |
| **Section E**<br>q.9 (9 items) | Meyer et al. (1993) | Commitment:<br>Affective (q.9:1-3); Continuance (q.9:4-6); Normative (q.9: 7-9) |
| **Section F**<br>q.10 (1 item) | Own (based on insights from the first round of interviews) | Organisational/ Managerial processes:<br>Need of change/ transformation |

Table 3.1 Web-based Survey Matrix

*Survey Measures and Items*

The survey was designed preponderantly based on items adapted from previous studies, particularly "The Impact of Organizational Context and Information Technology on Employee Knowledge-Sharing Capabilities" (Kim and Lee, 2006: 383-84) and the "Commitment to Organizations and Occupations: Extension of a Three-Component Conceptualization" (Meyer et al., 1993: 544). With the exception of the first four items which investigated basic characteristics of the respondents (Unit; duration of employment in the Unit; position of managerial responsibility or not), the Web-based Survey was composed of 10 questions. The answers were measured on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), or from 1 (very weak) to 7 (very strong), as the case may have been. Most of the variables were assessed with multiple-item measures to increase validity (see *Table 3.1*).

Commitments play a central role in the research model, and choosing an appropriate measuring instrument was of great importance for the development of this study. Even so, the choice for the items to measure commitment was rather obvious, as the Meyer et al. questionnaire is by now a classical instrument, and its reliability has been tested in more than

30 studies in the early 1990s alone (Allen and Meyer, 1996: 256-57). However, a shortened, 3-item version of the Meyer at al.'s 6-item scales was employed for each of the three variables: Affective Commitment (AC), Continuance Commitment (CC) and Normative Commitment (NC).

Given the fact that knowledge and innovation capabilities are fundamental to design activities, the approach of Kim and Lee (2006) in their study of how organizational culture, organizational structure and information technology impact knowledge-sharing among the employees appeared pertinent for the Design Capabilities section of the research model. In their research, centralisation, social networks, performance-based reward systems and IT applications' utilization are found to significantly affect employee knowledge-sharing capabilities in 10 organisations, in the way shown in the figure below:

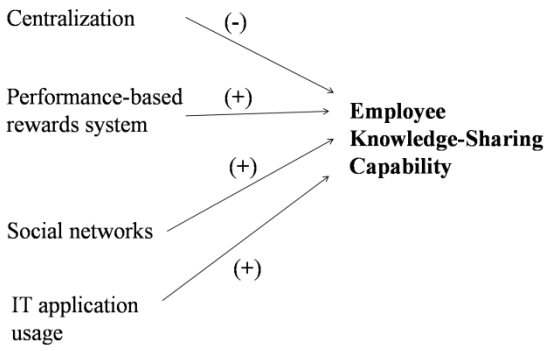



Figure 3.2 The Influence of Centralisation, Social Networks, Performance-based Rewards Systems and IT Applications' Utilization on Employee Knowledge-Sharing Capabilities (*adapted from* Kim and Lee, 2006: 371)

These five variables as well as other rewards systems, learning barriers and work environment culture are assessed in *Sections B, C* and *D* of the web-based survey, in line with the theoretical insights on organisational character-formation. The items for centralization are based on a scale used earlier by Hage and Aiken (1967) (Kim and Lee, 2006: 375).

*Section A* of the survey is concerned with a self-declared assessment of 10 meta-competencies, technical, engineering skills and employees' multiculturalism, mostly inspired by Nordhaug's work on competencies (1993; 2003; 2007;). The formulation of the first item in question 2 was intended at measuring how much people from other cultures are seen by the respondents as "out of the norm", since the word "strange" has a pejorative connotation. The results of this item in reversed key, together with the 3 other items in this question (q.2) are compiled into an "openness index" designated at measuring the ability of the respondents to work with cultural diversity.

*Section F* was based on insights from the first round of interviews, and has a practical aim as well. The multiple-choice question in Section F is purposed at understanding the perception of the employees as to what managerial process, if any, is an immediate priority in their unit, or which organizational process is in need of more transformation.

The standard deviations obtained for the variables in the survey range from 1.07 to 1.65 (see *Table 3.2* below), and the number of items has generally been reduced for each variable compared to previous studies. Variables 5, 6 and 7, which were measured through only one or two items, showed the highest dispersion of the answers. The reason for such a small number of items for the above mentioned questions is that inferences will be made about them based on other variables in the survey and/ or based on the interviews.

| **Variable** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| **SD** | 1.50 | 1.42 | 1.32 | 1.34** | 1.65 | 1.50 | 1.61 | 1.07 | 1.11 | 1.45 |
| **SD *** | n.a. | 1.16 | 1.17 | 1.05 | n.a. | 1.23 | 1.46 | 1.47 | 1.39 | 1.41 |

Table 3.2 Standard Deviations for the Variables in the Web-based Survey.

*Note:* 1. Multiculturalism; 2. Centralisation; 3. Social Networks; 4. Reward Systems; 5. Learning Barriers; 6. Knowledge Sharing; 7. IT Utilisation; 8. Affective Commitment (AC); 9. Continuance Commitment (CC); 10. Normative Commitment (NC); *Corresponding values in previous research (Kim and Lee, 2006 and Meyer et al., 1993, respectively); **Includes only three of the four original items, and two new items.

*Survey Administration*

With a population formed of people using IT systems in their everyday work, and each sub-case Unit located in a different country, conducting this part of the research in a web-based fashion seemed natural. An e-mail was sent on 19 March 2009 to everyone with technical background involved in design in the three sub-case Units, with an invitation to answer the survey by following the indicated link. An original deadline was set for 31 March 2009. However, two of the sub-case Units encountered technical difficulties in accessing the link and on 30 March 2009, instructions with another modality to access the survey were sent, together with an extension of the deadline to 10 April 2009 for all respondents. Overall, this resulted in the remaining Unit (Unit C) having one additional week compared to Units A and B, week during which 3 more answers were received. This is not considered to have distorted the results as for all three Units half of the answers were received in the first two days after launching the survey. Unit A did not return more results after the reminder sent to all on 06 April 2009, while one more valid answer from Unit B was received after the final deadline.

The total number of complete answers received was 30, of a population sample of 68, or a general response rate of 44.12 % (see *Table 3.3*). As discussed below in limitations, a higher

response rate would have served the research better, but it is not lower than what it is often encountered in research articles. Only 6 incomplete answers were registered, but it is not possible to tell if the same person started another answer sheet from the beginning and completed the survey or not. Managers are well represented, without being dominant, with a third (33%) of the answers, and a rather low percentage (10%) of the respondents had less than 1 year of seniority in their units.

| Sub-case Unit | Population sample | No of answers | Response rate | Representation in total sample |
|---|---|---|---|---|
| **Unit A** | 17 | 8 | 47 % | 27 % |
| **Unit B** | 25 | 8 | 32 % | 27% |
| **Unit C** | 26 | 14 | 54 % | 47 % |

Table 3.3 Sub-case Units' Sample size, Response rates and Representation in the total sample

*Survey Limitations*

There are two limitations that should be underlined. First, the response rates which, optimally, should have been between 60-70%. While for Units A and C, it can be concluded that the results reflect the opinion of the majority of the employees, the assessments for Unit B are based on answers from only a third of the personnel. Thus, for Unit B, although they do represent important information, results should be considered more cautiously, as they reflect the perception of only 6 engineers and 2 managers of the entire staff of 25. Second, the self-declared nature of such a survey. To take an example, the perception of the people with regard to their negotiation skills may be an expression of their under- or over- confidence in their abilities, and it does not have the more objective rigor of other measurement tools such as a 360° assessment. This can arguably be applied to individuals as well as groups, as an effect of national culture. While the nominal values can be seen as less relevant in terms of comparison between the three groups, within groups, ranking one skill with a score of 5 obviously means higher confidence in that skill than if ranked with 4 points. Thus, these results still provide a good starting point in understanding the main directions for further training, for instance, while helping drawing the profile of the typical engineer or manager in each sub-case Unit.

## 3.5 Data Analysis and Reporting

Sufficient valid data was retained to enable the discussion based on the proposed research model. The mix of interviews and survey, to insure larger representativeness of research population, was particularly helpful in Units C and B, as follows: in Unit C, somewhat lower coverage through interviews (23%) was compensated by good representativeness from the survey (54%); in Unit B, weaker coverage in surveys (32%) was complemented by good

reach through interviews (32%). Overall, a good balance was achieved to best support the validity of data analysis, as summed up below by sub-case Units. To avoid confusion, the following convention was made: interview informants are called "interviewees" throughout the analysis and reporting on data, while survey informants are called "respondents". Following the administration of the interviews, it resulted that all the interviewees were male, with an average age of 42 years and an average seniority in their Units of 6 years.

*Sub-case Unit A*

Out of the population of 17 in Unit A, 5 employees or 30% of the staff were interviewed for an average of about 1h 30min per person. All the interviewees were male, they had an average age of 47 years and 4 of them had managerial responsibilities. All the interviewees started their careers with Unit A when Unit A was established in the beginning of 2005, through transfer from the previous Unit entity or the production facility owning it. For the Web-based Survey, the employees were instructed to specify the number of years of seniority cumulated for the two workplaces, if they were among the ones transferred to Unit A following the spin-off. The results showed that all survey respondents had been employed in Unit A for longer periods than 1 year, and had an average seniority of 9.62 years. The survey response rate was 47%, as Unit A returned 8 answers, and half of the respondents were employees with managerial responsibilities.

*Sub-case Unit B*

With 25 employees relevant to this research, Unit B is the second largest of the three. Good coverage of research population was obtained through the interviews, with 8 persons or 31% of the Unit staff being interviewed. Only 1 interview was conducted face-to-face; for the others, advantage was taken of the possibility to have a call via an internet line. All the interviewees were male, with an average age of 42 years, while the average duration of the interviews was of 1h 25min per interviewee. Unfortunately, a rather low response rate of only 32% was obtained for the survey; among the 8 valid answers, one had to be discarded on Sections C, D and E being obviously biased[6]. However, considering the low response rate for this Unit, I decided to validate the answers of the same respondent for the remaining sections of the survey. Only one of the respondents had been employed in this Unit for less than 1 year, while the average duration of employment was 7.03 years. With just 2 managers answering the survey, although equivalent to a 25%, the representativeness of the data for this category is low, and cautiousness is required in the interpretations. Overall, the combination of the two means of research - interviews and survey, results in a fair basis for interpretation.

[6] Answers to questions on similar issues received equally high score in both normal and reversed key.

*Sub-case Unit C*

Unit C is the largest of the sub-cases in terms of population sample (26 persons), of which 6 (or 23%) were interviewed for an average duration of 1h 28m. The interviewees were all male, usually heads of functional departments, with an average age of 38 years and an average seniority in Unit C (and the MNC) of 3.5 years. As to the survey, a good response rate was obtained (54%), as well as an optimal representation of the managers (29% of the respondents). Average seniority in Unit C among survey respondents was 2.7 years, and the highest number of employees with less than 1 year of employment (3 persons) was recorded.

A descriptive account of the Units is incorporated in the first part of the findings under the frame of the strategic profile (service delivery, history, assets and distinctive competence), as it relates strongly to the evolutionary perspective of the discussions. In this study focused on individual and collective competence development, the following processes were considered core integration processes: *training*, *integration of newcomers*, *routines for sharing lessons learned*, *information solutions as knowledge repositories*, *project team work* (including *NPD routines*). However, the most relevant form of learning at work is dynamic and socially embedded, which is why another important block of the findings is focused on *employee-task transfers*; *interpersonal transfers between employees*; and *inter-organisational learning*.

In the next chapter, findings are reported for each sub-case Unit, first largely by presentation of findings, and at the end of each section, by an integrative discussion rooted in the dynamic research model.

# Chapter 4. Presentation and Integrative Discussion of Sub-Case Findings

## 4.1 Introduction

In this chapter, the three sub-case Units are introduced in alphabetical order (A; B; C). For each Unit, findings are presented and discussed in distinct sections organised as follows:

Each case study begins with a brief description of the Unit's strategic profile being given in its historical context, including main service delivery and key assets (positions). Second, an overview of the organisational character features (structure; work culture; employee commitment profile) is taken to identify learning determinants. Next, focus is set on the presentation of the competence portfolio (meta-competencies; technical competencies; intra-organisational competencies), to enable the discussion on dynamic capabilities. The following section introduces the main findings on Unit-level competence development (CD) capabilities for integration, learning and transformation. Finally, the section on each Unit is concluded with a discussion integrating organisational commitments, path dependencies and transformation capability.

First, sub-case Unit A which is identifiable as The Tip of the Iceberg.

## 4.2 Sub-case Unit A – *The Tip of the Iceberg*

### 4.2.1 Strategic Profile of Unit A

*Delivery and Growth Stages*

Unit A is a world centre of excellence with more than 50 years of experience in its specific engineering service delivery, which includes: project development and design, on the one hand and research-based consultancy, on the other hand. This mixed business model emerged about 5 years ago, when Unit A was established as a spin-off, on the logic that research can be "the tool to develop the right kind of concept" for design. Historically, natural geographical conditions determined the emergence in this particular location (country) of the production industry and its specific niche in which the Unit is positioned. Triggered by the request of a major oil client, Unit A was established as a research centre in the late 1960s with the setting up of the first facility in a former bomb shelter. Up to 2005, the Unit has been under the umbrella of various ownerships, in the form of a distinct organisational department within production facilities. Today, the regional MNC is the majority shareholder, and a Unit of a previous owner and a close cooperation partner also hold a significant portion of the shares.

Operationally, Unit A responds to the local organisation of the MNC, and not to the same business area as Units B and C. Although the industry in relation to which the Unit originated is, at large, declining and sensitive to oil market evolutions, the specific niche and the research core of the business of Unit A is one in incremental development. Hence, Unit A is considered to have a solid position on its market, which is global but with few competitors worldwide.

*Positions*

The first key *technological asset* is the *research facility*, which is unique because it is the only one of its kind in the world that is privately owned, and it is modern – new built when Unit A was established as an independent firm, although the third one built in the history of the Unit. In addition, the Unit held property rights for at least three significant *innovations* it developed (i.e. technological, and research methodology). The most dominant form of strategic assets is to be found within the category of *intellectual capital*. First, the *research database* is highly firm and task specific, therefore unique, for two main reasons: (i) it stores a large amount of data that resulted from a long research tradition focused on this specific field, and hundreds of published scientific papers; (ii) the "specific competence" of the database is given by the correlations between research reports and actual designs, result of the long lasting direct relationship with actual production, which offered the possibility to observe and test the products in real life conditions. This extensive knowledge repository gives the Unit a "status of expert": "[it] is very well known and recognized in the industry that we have this information". Together with good and close cooperation with customers and suppliers, and the reliability of the track record (which includes over half of world production), *reputation* emerged as a core strategic asset. All the above are considered irrelevant without the human capital and its *competence*, which is the most important asset: "the basic thing is [...] know-how, knowledge and capability of people", or "my colleagues are vital for me". *Location* is not a very specific asset, but it has some interesting characteristics from an evolutionary perspective: (i) there is tradition in this country for the industry and specific market segment; (ii) in 2005, discussions took place as to where to establish the new facility, but instead of following proximity to production a decision was made to locate where people with expert knowledge would be accessible; (iii) it is in a local business park, in the physical neighbourhood of one major cooperation partner.

*Distinctive Competence*

Very consistent results were recorded with respect to what makes this Unit dissimilar to competitors: *the mix* of the service delivery ("that's one key advantage for us, because we have two sources of knowledge"), embedded in the extensive, specific *competence* and boosted by the

*reputation* built on the reliability of the past performance. But, as another informant stressed, the hybrid business model has a competitiveness flip-side: it generates two categories of competitors, one for each product category. What is more, for the research part of the business, the Unit functions on the basis of a profit making logic and therefore receives "unfair competition" from the academia which has extensive access to public funding. The mission of the Unit is to continue to be preferred by its customers as a partner due to its core technological competence area and maintain its innovation capability, keep on being a forerunner in the field.

### 4.2.2 Organisational Character in Unit A, as Learning Environment

Based on the survey results[7] (see *Appendix 5*), very homogeneous perspectives are noted for managers and employees without managerial responsibilities, with one exception: managers are significantly more involved in external *professional networks* (5.75 vs. 4.00) and even in *informal communication* with other employees (6.00 vs. 4.50). All the employees are active participants in *teamwork/ project work* (5.75), but do not feel very involved in *policy making* (3.25). However, decision-making is rather *decentralised* (3.38), and the employees without managerial responsibilities believe that promotion is based on competencies and *performance* rather than seniority (5.00). IT application usage is close to the indifference point for electronic database systems (EDSs), and rather low for the company intranet (3.25). All employees show a rather strong interest in further personal and professional development (5.50), and tend to disagree (3.00) with the idea of job territoriality. Some examples of signs of intrinsic motivation are: "I think I was the only person in the world with full day of [the specificity] design work"; "I think it is a very interesting position to work on this worlds' leading [specific delivery]"; "whatever you do and whatever level, you always could be and could do better"; or "it's your own responsibility if you want to do well in a position"). Thus, among the elements of organisational structure and culture that support learning, two are clearly favourable: low centralisation ("non-hierarchy") and good social networks, while two are neither strong nor week: IT utilisation, and human capital activation. However, although clear incentives or well established systems to encourage knowledge sharing are not perceived (3.25), the sharing of know-how, information and knowledge is rather regular (4.88).

*Challenging and interesting work for people with high expertise* would be the wording to sum up the choices the employees in Unit A made to describe their working environment culture (see *Appendix. 6*). Innovation, even inspiration and "good spirit" in a rather "busy" environment are pointed out together with some voice of disagreement with the strategy ("shortsighted") or,

[7] Scale from 1 to 7, as explained in the methodology chapter.

on the contrary, of the Unit's mission not being communicated ("motivated and professionally skilled people, confused"). Some concern with a lack of systems ("chaotic", "disordered"), and a point is made to a lack of openness to cultural diversity. Overall, there is a certain difficulty in identifying the main features of the work culture in this Unit: "mixed", or not-matured, would be the best way to describe it (e.g.: "individualistic", but "cooperative"; "non-hierarchy", but superordinates are called "bosses"). Different possibilities for socialization during work breaks were noticeable in Unit A: employees can have lunch together at a cafeteria which is shared with another firm, or in a designated area at the premises of the Unit. These common rooms are the place where informal socialization can be extended with after lunch coffee or discussions in the morning "at the coffee table". The employee in Unit A has high AC (*desire*), low NC (*obligation*) and Medium CC (*cost*), suggesting an overall favourable organisational commitment profile (see *Appendix 5*). The most positive aspect is the high level of affective commitment for all employees, which is even stronger in the case of the managers. This profile suggests good satisfaction with job experiences for all employees, with employees without managerial responsibilities feeling more limited in their exit options and having a stronger sense of obligation to reciprocate to the benefits they receive and/ or their socialisation experiences, contribute to greater loyalty.

### 4.2.3 Competence Base Profile in Unit A

*Meta-Competencies*

Based on the self-declared assessment of their meta-competencies (see *Appendix 7*), the employees in Unit A have rather strong skills and abilities, particularly *problem-solving* (5.63), and *learning and transferring knowledge* (5.50), while making use of *creativity and innovativeness* (5.38). Least confidence is shown in *communication and interpersonal relationship skills* (4.13), followed by some concern with *abilities to manage change and transition*, and *prioritising, time management*. All employees in Unit A interact regularly in their work with foreign nationals (clients, colleagues etc.), and speak English and at least one more foreign language. Despite this, only the managers are rather skilled in working with cultural diversity, seemingly due to more physical contact with other cultures through travelling.

*Technical Competencies*

The competence base in Unit A is characterised by a high density of academic degrees (with an average time of relevant technical studies of 5.7 years), suggesting that the knowledge and skills held by the employees in this Unit are advanced, and therefore have a higher

substitution cost. This is also indicative of high task specificity, especially when sustained by the highest confidence level of all the skills assessed (6.13). In addition, cooperation with academia seems to be a main means of HR acquisition (recruitment of graduates and even researchers). The external market seems small and the vocational system does not prepare the future employees for the particularities of the tasks in this Unit, which is a sign of high firm specificity. Such unique firm and task specificity represents high entry barriers, and a significant learning process is expected of newcomers. The knowledge in this Unit is so specialised that not only the employees participate in exhibitions, conferences and academia, but at times they are the ones actually giving the lectures. Of course, for very distinctive competencies of strategic relevance, unplanned knowledge transfer through exchanges in professional networks must be avoided. The technical competence required for the work done was: (i) *standard* (design software, general engineering knowledge and skills), (ii) *MNC and subsidiary specific* (work processes, project management, particularly inherited from the production facility before 2005) and (iii) *subsidiary unique* ("the technology and the problems that we work with" are "not very valid in other environments"). When held by individuals, this unique competence is still considered mobile across companies or academia; but at the organisational level, some combinations of these competences are considered rather immobile: "many of them are more familiar to us than anyone else".

*Intra-Organisational Competencies*

Wide and consistent answers were received to the questions asked about the Units' service delivery (more detailed for one or the other of the deliveries, based on the degree of involvement), history (level of details in direct relationship with seniority), and market positioning and specific industry of the Unit (with strong interest and reflections), and of course, work processes. Less pertinent, but still good intra-organisational competence was noticeable with regards to the history and industry of the regional MNC. However, an obvious lack of strategy communication was observable at both levels. First, with regard to Unit-level strategy, it is interesting that the interviewees gave quite consistent answers, although often being insecure about them. Thus, although the strategy was not formally communicated, the employees were aware of it in a tacit way. As to the MNC strategy, much confusion was noticeable especially when it comes to the role of the Unit under the new ownership, and some interviewees openly admitted not being aware of strategic issues at this level. In addition to strategy, corporate values, either old ("hands-on management") or new, did not seem to have been promoted: the familiarity with them was either very little or non-existent.

### 4.2.4 Competence Development as a Critical Capability

- CD Integration

*Training*

Three main sources of training were observable: *external* (e.g. collective courses aimed at better communication with the clients: language course, customer relations, "general business orientation"); *customised external* (a mix of in-house needs and external consultant services, in an area that permitted customised purchase: project management); *intra-MNC* management school (described as good in providing feedback for personal and professional development). Participation in training is either planned top-down (e.g. "forced by their bosses" in collective courses), or unplanned, bottom-up (upon request to participate from an employee, the answer of the superordinate "normally is yes"). Unit A provides an interesting example of strategic integration via formal CD designated at homogenizing the two distinct groups that are specific for the mixed business model of this Unit ("one free consulting group", and the "[production] guys" involved in "real work" with "schedules" and other "systems"), through a common project management "language" for all the employees. Thus, beyond skill acquisition, this program is in one way a de-learning of previous match specific competencies and re-learning for the conditions in the newly created independent Unit, a process necessary to secure increased productivity. The planning of this course was supported by an inquiry conducted by the Unit some months before, both externally to assess customer satisfaction and internally. At the individual level, training participation management is rather ad-hoc, and sometimes supporting some "star" performance. This is most likely permitted by the small size of the firm, but could be further developed into a career management tool.

*Integration of Newcomers*

It is not really an issue in Unit A, due to the fact that the competence base was established through transfer. Just to induce an evolutionary perspective, the interviewees were asked to relate to their first employment with the previous firm. It appears that newcomer integration was largely informal (learning-by-doing, trial and error on the job, assisted by "patient" colleagues and "bosses"). Only one interviewee recognised a clear, but short (two weeks) introduction process with a designated tutor who showed him where to find what he needed and taught him how to accomplish work tasks and supervised his work, just to get "a soft start".

*Routines for Sharing Lessons Learned (SLL)*

A largely informal system was recognised in the form of a "briefing", "presentation", "report", "discussion" by the person in charge of the closed project or invention/ new development. This

happens during the regular operational meetings, which, as an effect of the small size of the Unit, take place every two weeks with the participation of all employees. Two points of disagreement were noticeable: (i) the functionality of the system - it appears to be something that the Unit tries to do, or shall be doing, and a summary in the form of a "lessons learnt sheet" should be available in the project file; (ii) the preservation in the knowledge repository for later study does not happen because the project itself is archived, or generally co-workers are aware of each other's work through their interaction anyway.

*IT Systems for Knowledge Integration*

Although extensive paper and electronic archives exist for both research and design documentation, their utilisation is reduced to storages of information. This happens because the relative advancedness of the competencies and the degree to which discrete activities need to be combined to develop new products, together with the stickiness of the knowledge, are important barriers to past knowledge utilization: "you can create a database, but it doesn't mean that you understand what you really have", because to develop a new product one "should know many kinds of things and then pick up various parts of the solution and then you can combine it", and "all the knowledge that I have, if I try to put it on paper, it's just a bunch of small dots [...] so it's very difficult to have it structured so that you have a good database of the knowledge". The main use of it in design is as a reference at the start of a new project, but even so, finding relevant information is based on one's experience with various projects, or by asking the co-workers that one assumes may have knowledge about it. And, there is so much information in the archives that "no one really knows what there is", while it could "take several years to scan all the reports" that are on paper to adapt them to electronic usage. The research function seems to be better served by databases (use of stored data and reports), which is in part due to the fact that research is a fairly standardised process, with well defined deliverables.

*Project Routines*

Some distinctions are noticeable between research and design work. The first usually precedes the second, it has a narrower scope and shorter duration, and requires a great degree of individual planning. The second is largely team based, with project teams composed ad-hoc by project managers on principles of functionality and resources allocation ("people that have the experience, competence and time available"). Depending on complexity and degree of customisation, a project can range from one week (to "write a paper" in response to a client inquiry), to months for concept development, or years for design packages. Once client requirements have been understood and the project team formed, involvement starts with the project kick-off meeting. Basically, every new order to develop a product for a client is new product development (NPD). The more novel the mission/ features of the project, the less reliable the Unit's

knowledge repository and the higher the innovative process in the sense of designing from "scratch" or "empty table". Innovation is geared by either "market pull" (as a "side-effect" of client work) or "technological push" (external, or in-house deliberate R&D investment). A balance of incremental innovation ("during some project you may see that there could be a need for a different kind of solution"), and innovation in jumps seems to exist.

- Informal Learning, Competence Transfers and Losses

Informal learning based on work experiences is the predominant type of learning, and the *employee-task relationship* plays a central role in the development of new task (including managerial), or Unit specific competencies. However, *interpersonal transfers between employees* and inter-organisational learning was heavily emphasised as well. The first is best summarised as walk-in, spontaneous interaction culture for problem ownership, as work challenges are solved in many cases by the "problem owner who is walking around and talking to people" as opposed to "if you try to organise it, then people come and have a meeting and then everybody is thinking that this takes a lot of time, and *I should be doing something else* and nobody is actually contributing". The ultimate knowledge creation, innovation, is also most favoured by informal exchanges: "but innovations can also happen just walking on the corridor and discussing, or at the coffee table in the morning [...]. All crazy ideas pop-up anywhere". Dynamic, socially embedded informal knowledge preservation is also explained by the "pop-up culture": "I think the most valuable thing is that older colleagues give their wisdom. I can ask questions and get answers [...]. Usually, I go to the door and just jump in and start asking the question. It's no problem!" In addition, project team work appears as a major arena for competence creation and transfer, through the collaboration required for the combination of specific competences ("when involved in different kinds of projects with different people is good practice"; "this way we get from all the specialists their special knowledge in that project"), even if it may include some "arguing" that it does not transgress to personal levels ("all our specialists have very strong opinions"). Nonaka and Takeuchi's combination is pointed out almost *ad literam:* "when you have different kinds of people, they might have parts of the solution and it should be just [...] combined in good ways". Examples of learning from *cross-organisational networks* abounded: clients, suppliers, regulatory bodies, subcontractors, production facilities, Unit C, and even competitors were mentioned. Competence is created and transferred when partners externalise their tacit knowledge through social interaction, which provides the members with an opportunity to combine and internalise new knowledge. As one interviewee summarised, new knowledge is created through "discussions with different partners" as "everyone has new ideas"- it is only a matter of being "open to learn new things", "just listen" and "take note" and "integrate". Two illustrative incidents were strong: (i) a recent presentation held by a supplier at the premises of the Unit was found very "educating", both in terms of product's novelty and learning effects

from new ways of "thinking"; (ii) *coopetition*[8] (Padula, 2007; Cornuel, 2009) was induced in one project due to special client requirements, but learning was limited to some new perspectives, "nothing very special". In terms of *competence loss*, all the employees related to a typical case of internal exclusiveness, or competence monopoly, concerning one person who recently left the company to a partner firm. Although he still is in the learning network, his substitution in Unit A is seen as difficult and unsatisfactory as he "was the specialist number one" in his field, and his departure made the Unit so vulnerable that "not allowing" the person to leave was the first solution that came to mind.

- Reconfiguration and Transformation of CD

The biggest concern of employees in Unit A has to do with competence loss: either associated with competent people leaving the company, with unsuccessful routines for competence preservation and transfer (sharing lessons learned, informal communication), tapping into external pools of competencies (via training, relationships with partners), or more focus on innovation, employee motivation and competence development. The most important facilitator for CD was considered the "knowledge": individual (experiential) from task performance, or collective (databases, and people as base for learning and synergic competencies: "the group as we have, the people and the key work that we do [...], this knowledge base around me that I can always rely on. Because I don't know everything and never will!").

### 4.2.5 Integrative Discussion: Commitments, Paths and Organisational Transformation

Beyond the natural conditions that favoured the historical appearance and development in the area of the category of technologies that are specific to Unit A, path dependencies could be clearly identified in the formation of distinctive competence in the Unit, and even explain its recently acquired autonomy. First, its advanced competence in the field is based on more than 50 years of designated research that definitely shaped its strategic technological and intellectual assets (research facility, database, synergic competencies and reputation), in a way that is best pictured by the metaphorical association of Unit A with the tip of an iceberg. Second, initially started up in times of global economic growth, the Unit survived harsher periods (unlike some competitors) due to its emergence as an in-house provider of expert knowledge for the production facility. In addition, its closeness to production gave it a competitive edge through a constant "reality check", but this came at the cost of feeling as the "unwanted child" when its market was down. In such moments, the Unit became somewhat marginal to the core business, and was to a large degree required to support itself financially.

[8] The term of "coopetition" became popular after Brandenburger and Nalebuff published the book with the same name. It is a concept that units the paradigms of competition and cooperation in strategic management and provides an integrative framework for a more accurate representation of inter-firm interdependencies that can be observed within a competitive arena (Padula, 2007: 34-36).

This was yet another step towards autonomy, as in search of independent profit sources, the Unit developed its own, external client base. The critical incident that finally gave way to "re-birth" was a seemingly unimportant one: the lease of the land where the previous research facility was located expired, and a decision to build a new one was made. This marked the independent establishment of Unit A, but in addition to research, the specific design group was "inherited" together with intellectual properties, and the hybrid business model was born. A dependency inherited from the times of being an "unwanted child" is the uncertainty, the difficulty to manage change and transition, due to the fact that the strategic role within the MNC network is not quite comprehended.

Certain commitment conflicts were inherited through these path dependencies as well. The first built-in, historical tension is exactly between commitment to research excellence and commitment to designing profitable, marketable products. This tension was illustrated by the emphasis one group puts on innovation and research, investing time and resources to develop new ideas, and the other on standardisation, avoiding starting development with a blank sheet. This is possible to mediate with flexibility in customisation, when the client requires new solutions. However, more often than not, clients are interested in cost effective solutions, not the best solutions. For the latter, the mediator is found in investments in internal development. These commitment conflicts can be associated with the general ones between invention and innovation, and between informal competence creation and routines for efficiency. When asked to identify the Unit with certain "deliverables", 100% of the interviewees identified the main commitment as related to advanced technology and innovation, due to the proven record and the tradition, or "atmosphere", "mind-set" of innovativeness.

Overall, the small size of the Unit and the recently gained autonomy are seen as enabling competence and product development. A potential core rigidity has to do with the way reference projects have to be identified: informally, either based on one's own experience or by asking around ("If it's a special project that I don't find from my own resource, then I would start discussing with the people that I know have done similar concepts"). This creates high entry barriers to newcomers, a longer learning process for Unit specific competencies, further accentuated by a lack of planning or systems in the integration of junior employees. Furthermore, HR management commitments are largely addressing the new customer orientation (strategic fit). Used to rely on corporate resources, the Unit does not have a designated HR function four years after its establishment. As a result, individual participation in training is mostly ad-hoc and not correlated with career planning; competence monopolies emerged due to a lack of incentives to avoid power bases formation; intrinsic motivation and affective commitment compensate well for a lack of more formalised systems of human capital activation, but there

is a danger of a lock-in effect for the employees without managerial responsibilities; the system for sharing lessons learned has limited functionality and scope (occasional oral exchanges). Although the organisational structure is, at large, favourable to learning and competence transfers, the culture has not matured yet, and normative efforts were not noticeable outside the scope of the project management course. EDSs, may be sub-optimally utilised as knowledge repositories, but the complexity of the work and the stickiness of the tacit knowledge required to be converted in the process may be so high that their role is limited to begin with.

With a focus on excellence and advanced competencies development for such a long time, the employees in Unit A are committed to their work, personal and professional development, and informal learning. A downside is that people may have difficulties to communicate and work in structured, goal purposed teams ("some people are very good at that individual work, but they are not very good or even able to operate in an open team environment. But there has to be a balance of individual work and team work, let's say in that sequence. You cannot have only one. And [...] very much of the teaming is spontaneous."). A too un-systematised work environment can create a sense of bad time management. Commitment to learning resulted in two vital strategic assets: (i) a competence base that is not just a sum of individual competencies, but contains team relation specific competencies, synergies that are not portable to other social contexts; (ii) learning to learn from external competence pools (academia, partners). An interesting hypothesis is that the nature of the activity that requires the combination of knowledge from discrete and highly specialised activities, the potential lock-in, and the intrinsic values may, in this case, be more relevant determinants of learning that other elements of the organisational context.

Based on developmental opportunities and path dependencies, the *core domain commitments* can be synthesised as follows: strategy mission - turning excellence into marketable products; market (global range, specific scope) - expert customisation; CD integration - training, informal CD; learning – informal (*walk-in*; *pop-up*), for innovation capability; CD transformation - integration of two functions/ cultures; HR management - foster expertise; leadership philosophy: did not pertain. From a strategic perspective, it could be said the overall *transformational commitment* is one of *continuance* (although by "re-birth"), based on the extensive, unique competence developed over a long period of time. Tangible, but especially intangible, assets are sources of unique competitive advantage that rivals will find difficult, if not impossible, to replicate. For Unit A, the biggest future opportunity and strategic challenge at the same time is to successfully manage this transformation, the core of which is the integration of the two functional groups, with the competencies they carry and their work cultures.

## 4.3 Sub-case Unit B - *The Efficiency Ruler*

### 4.3.1 Strategic Profile of Unit B

*Delivery and Growth Stages*

Unit B is a design and engineering consultancy firm established about 25 years ago. Its service delivery consists of two main categories: design, for a range of product types; and specific research analysis reports. Originally, Unit B started up as a sales/ project office in the same firm that owned Unit A, in direct relation with a large, novel oil related project in the same area of specialisation as Unit A still has today. In the end, the project did not materialise, but the sales office evolved into a small engineering consultancy firm. This was possible because, due to natural conditions in this country, the competence was needed anyway by the local industry. The bankruptcy of the foreign parent company about a decade later is the critical incident that forces the Unit to become self-sufficient. Conjunct with industry growth, this supported an autonomous expansion into new market segments, in two main directions: by product type, and geographically at continental level. The latter was further favoured by a specific institutional context and resulted in the opening of a sales/ engineering office in the neighbouring country. On the same logic, the opportunity was taken a few years later to acquire another small local engineering firm, which increased the client base and provided competence in another product category. With the decay of production in the country, more international commitments are pursued. Unit B doubled in size during the past decade, and a large part of its recent history is marked by numerous ownership changes. The last 5 years it has been under the structure of the regional MNC and it is today under the same business area or "operational ownership" as Unit C. The regional MNC and the Unit's continent are the two major clients, but more and more of the globally emergent areas are explored independently. The Unit does not have a very specific market segment positioning, with a fairly wide range of products that are not very complex and compete mostly on price. Competition is strong, and emergent markets are both a present opportunity and a future threat. The economic downturn was considered to have a moderate effect on business development.

*Positions*

*Technological Assets* are, at large, only enabling for the business of Unit B, with one exception: advantage was taken of recent general software developments to build a distinctive asset in the form of specific engineering modelling software. This appears to be firm- and even industry- specific, and with Unit B as the forerunner in its development, it qualifies for a unique, strategic asset. *Location* is also a strategic asset due to traditional access to markets

regulated by a highly contextualised institutional environment. It is *intellectual assets* that are considered most relevant, with the competence base *the* vital resource. In order to be key, human resources have to be qualified, experienced, and form a good match with the consultancy profile; in other words, competent and aligned with strategic commitment. In addition, the strength is in the collective, Unit level "expertise" including the data base of past projects, and intra-MNC learning effects. *Reputation* is also a core strategic asset, built on the relationship with clients, the track record, and by association with the reputation of the regional MNC.

*Distinctive Competence*

Although none of the core strategic assets are considered sources of a unique delivery, the combination of competence, reputation and the newly developed research methodology are considered valuable, rare, and difficult to replicate and substitute. The mission of Unit B could be defined as follows: to be a provider of competitive, reliable and flexible, engineering solutions ("the fact that we can offer a variety of services [...] what we are finding now is, the customer just wants to deal with one office that will do both concept design, as well as functional, and also production. So he doesn't want to have three different departments or companies working on the same project and blaming each other").

### 4.3.2 Organisational Character in Unit B, as Learning Environment

*The Flexi-Structure*

An interesting feature of this Unit is its "flexi-structure", in the form of "project management rotation", whereby senior engineers are appointed as project leaders upon availability, and permanent project manager (PM) positions do not exist in the organisational diagram: "the PMs are basically the senior engineers, the principle engineers, whatever, but there's no one that is actually PM, that's not the job". Not only does the organisation appear as "quite flat", but only the President has a strong administration role; other "senior" staff "get involved in the day to day running of the office" besides their project work. The overall career-system is most likely a mix of seniority and performance, since the ones in positions including managerial responsibilities consider themselves self-achieved, and the others agree, but such responsibilities are awarded only to "seniors". There are some distinct management roles, and the main difference from the employees without managerial responsibilities is lesser involvement in project work and higher involvement in external social networks, especially with customers. Key words in the reflections upon the management style were: coordination, man-hour allocation, cost, budget and schedule, common technical standards, proposal analysis, collecting and sharing design information, integrating design changes, and even the responsibility of "making sure" that "the

people [...] will be able to work things through". The flexi-feature is taken even further by a lack of formal departments: most of the interviewees considered they did not belong to a functional department, but they could identify themselves as being part of a functional work group. This appears to be possible due to the implementation of work routines and a fairly strong delineation of job roles. A considerable degree of *formalisation* was noticed in the emphasis on the role of standards and procedures "for everything" in insuring consistency: ISO system, CAD standards, calculations, documents, presentations, engineering reports (i.e. "standard look and standard things that are included with the document") etc.

*Top-down control driven by the need to meet deadlines, in an open, collaborative and positive work environment* (see *Appendix 6*), is a fair summary of the dominant characteristics based on the employees' choice of wording in describing their work culture in Unit B. The work is at times interesting and fast-paced, but there is some perception of "lack of experience" and "broad" scope of work. The employee in Unit B has high AC (*desire*), medium NC (*obligatio*n) and low CC (*cost*), which is an overall favorable commitment profile (see *Appendix 5*). A high level of affective commitment shows emotional attachment to the organization, but the organizational citizenship is somewhat stronger for the managers. A low CC means a perception of plenty of employment alternatives outside the organization and/ or fair recovery of the investments made in this organization. All the elements of an organisational structure (see *Appendix 5*) that support the development of good knowledge-sharing capability seem to be met in Unit B: low *centralisation* (2.72), high *social networks* (5.47), fair *IT utilisation* (EDS, 5.40; intranet: 4.70), low *job territoriality* (2.50), rather high *performance-based reward systems* (5.07) and high interest in *professional development* (5.50). However, when directly asked if their colleagues regularly share their know-how, information and knowledge with them, the employees without managerial responsibilities rather disagreed with the statement (3.60). This paradox is further enhanced by a significant difference in the perception of the two categories of employees with regard to the existence of clear incentives or well established systems to encourage knowledge sharing among co-workers: while the managers tend to consider they exist (5.00), the other employees perceive quite the opposite (3.60). The need of a more open environment between co-workers for sharing knowledge and helping out each other was also one of the main areas of transformation indentified by some of the employees without managerial responsibilities. Besides high formalisation and the role of seniority in career management, structural conditions that facilitate knowledge sharing seem to be in place; however, the features of the work culture and/ or the nature of the work may sabotage this capability so that regular transfers do not take place.

### 4.3.3 Competence Base Profile in Unit B

*Meta-Competencies*

In average, the employees in Unit B ranked themselves as strongly competent (5.55) in relation to the 10 meta-competencies measured by self-assessment, with no major differences between managers and employees without managerial responsibilities *(*see *Appendix 7)*. Highest confidence is shown in *abilities to learn and transfer knowledge* (6.25), to *solve problems* (6.00), to *manage change and transition* (5.88), to be *creative and innovative* (5.75), to *communicate* (5.75) and *perform in team settings* (5.63). Even the areas of lowest confidence still score fairly high: *negotiation and sales skills* (4.63); *ability to prioritise and manage time* (4.75). The "openness index" is also high in spite of more limited foreign language abilities, due to travelling and significant working experiences abroad, or the diversity of cultural backgrounds in-house. Such diversity favours tapping into various competence pools.

*Technical Competencies*

The interviewees in Unit B usually have higher education, the majority of it in the form of a bachelor's degree in the industry specific engineering background. With two exceptions (one graduate; one from university research), the employees had relevant previous work experiences in design and/ or production before they joined the Unit. Recruitment was initially through an extended internal labour market (40%), later by giving credit to people in search of a job (e.g.: "I just look at the telephone book, and then find this company, and ask for when there was some job opening, and got the job"), and recently even by graduates. All the above suggest low entry barriers and substitution costs, and not very significant MNC, subsidiary-specific technical competencies. Still, the vocational system is seen as providing just a standard competence that needs to be molded to ensure match specificity. Certain learning seems to be required, as the dichotomy *junior* vs. *senior* staff is strikingly present in the work culture.

*Intra-Organisational Competencies*

Employees in Unit B are most familiar with and consistent in respect to opinions about service delivery, internal routines and standards, industry conditions and challenges. The need for organisation learning was illustrated: "I knew I could do the job before I started here, I just didn't know how they did the job". Answers concerning the history of the Unit were more complex in direct relation with the seniority of the interviewees, but taking even rather extreme levels: two of the interviewees refrained from reporting on the topic. Moreover, the lower the position in the internal hierarchy (regardless of seniority), the less acknowledgeable the interviewees considered themselves in terms of what the strategy of the Unit was. Strategy

meetings that they attended were reported by top managers as taking place "every year or so". Hence, it could be questioned whether information about internal strategy does not flow further to other positions in the Unit, or if a conscious decision had been made to leave answering this line of questions as a prerogative of the top management. Except for the critical moment of the start-up (as a sales office), most of the history references are made with regards to the autonomous evolution of the Unit, familiarity with the MNC is fairly low, while corporate strategy and values (old, or new) have not been communicated at all.

### 4.3.4 Competence Development as a Critical Capability

- CD Integration

*Training*

Participation in training programs is the result of "a little bit of both" management and individual initiative, although the Unit "makes attempts to be proactive about training". The scope of training is usually specialisation in software or other design tools, external (including further education, and mandatory professional association courses), and even abroad. In-house training included software skill development, for the ones with lesser English proficiency to study abroad and participation in the management school of the MNC "several years ago".

*Integration of Newcomers*

It is of great concern in this Unit, but remains largely un-systematised mentoring: "More senior people that you work with will give you guidance at a certain point in your own experience [...]. It's very rarely been the case that you would be sitting down with some senior manager for an hour and say *OK, give me some guidance with what I should be doing*. It's more passed along during project contexts, but it's still called mentoring". The general expectation is that newcomers should learn by doing and observing, and a certain degree of work-method instruction by superordinates is expected from the PM of whatever project the "junior staff" is assigned to, and/ or senior engineers experts in a certain type of work task: "When we get a new person, and they are not put into any training program or anything like that, it's informal: they're given the job and it's expected that they'll require some training, and they'll ask more questions, but there's no formal process in place to kind of circulate them through different areas of the company or... get them on different jobs or that type of thing. [...] They'll get a job to do and they'll do as much as they can based on their education, and the rest of it, they rely on the senior people to help them out, tell them what to do"; "when I'm a PM for a particular project, part of what I'm doing is mentoring them, providing the information they need to learn how to do a task, and going over the calculations they've done [...] – that's just part of being a senior engineer in a technical company"; 'if you have any questions about the project, talk to the PM. If it's something to do with the actual design, how to do something, ask me". A brief introduction to

facilitate the use of IT solutions was claimed to typically happen: "the PM of whatever job the person is first put on [...] would come to their desk and kind of show them the roads".

*Routines for Sharing Lessons Learned (SLL)*

Two routines were identified: "de-briefs" and "lunch-and-learn". The interviewees strongly acknowledged that "de-briefings" take place at the end of projects, procedure possibly first established about 10 years ago. A meeting takes place with the project team, in the absence of the PM, moderated/ facilitated by a "Debriefing Coordinator", who is usually a senior manager that did not work on the project. A template with a series of questions is used, but the meeting is a fairly open discussion on what went wrong or right with the project, how to perform better the next time, both technically and in terms of organisational capabilities. It is also a form of feedback on the performance of the PM, but the facilitator would typically have a separate discussion with the PM and compile the information from both meetings. There are three shortcomings related to this routine: (i) it is not quite customary to make records (minutes of the meeting) and circulate them via the internal network; (ii) it takes place with irregularity; (iii) some results are presented in the regular meeting of the PMs, but they do not always reach the rest of the employees.

"Lunch-and-Learn" sessions are presentations given by the President of the Unit to all the employees that are gathered for this purpose, for lunch in "the big conference room". The interviewee associated this practice more with a "state-of-the-nation speech", happening a couple of times a year, but mentioned that very important issues that may come up from project "debriefs" are also presented and the power point is to be found afterwards on the intranet. Hence, this seems to be more a general presentation with the primary purpose to create employee participation rather than SLL. One of the interviewees with significant seniority claims that SLL has always been an issue, but the main difficulty comes from the fact that "it's almost like passing on traditions: one typically needs to discuss with someone who would say *I worked on a previous project and we did this, and it worked or it didn't.*"

*IT Systems for Knowledge Integration*

An electronic storage system is available in the internal network, for past project documentation, as well as other types of information: current projects and proposals; past correspondence; presentations and documentation from trade shows and conferences; regulatory information; some standardized resources for design (standard templates etc.). The most important benefit is reduced to a reference role (as a "design company you should have a database, otherwise you start all the time from zero"), because the final result is "never the same twice", and 'it's very limited amount of leverage of the previous one [project]", respectively to "see how certain

solutions were applied". However, to find which the relevant past project is, is not a very straightforward process and it requires socialization: "It largely relies on knowing which project has the information you need, which again goes back to a human, like someone in the office knowing *OK, that project is going to be relevant to us*. Or you go through and try to see if it is. If you're just starting and want to, say, *OK, I've got this specific design issue to deal with, what I can draw from?*, you have to go and ask someone first to see if they can think of any projects to which it was applied"; "finding the person who has it which [...] sometimes can be tricky, but usually if you go and ask whoever seems to be the most likely candidate to know about it, they'll know, and they'll also know who else knows it, and they'll tell you that".

*Project Routines*

The typical way to work is in project teams, designed top-down based on considerations of: (i) task functionality (as a mix of 3-4 distinct activities); (ii) resource allocation (including ensuring a mix of dissimilar levels of competence). Good communication with the client to understand requirements and make changes is vital for project execution, and the typical duration is 3-4 months. Great variation can be registered based on the type of the product and the scope of the work, from two weeks to four years. Every project is "different enough that each one is a prototype", while trying to anticipate market trends means running the risk of over/ under-designing as typically the client will not ask for a "new" or an "old" product, but something in between. Purposeful development is described just as a refinement or rethinking on existing products, except that it requires more time, money, research and fairly new ideas. Innovation is largely incremental (even quantified for tax reasons to 20-30% of engineering hours), as result of "innovative thinking out-of-the-box" during the "normal engineering design process". But, innovation cannot be forced: "sometimes the way things are normally done is the best way. You try to be innovative and you end up coming back to the way that's normally done". The only significant own development is the research methodology inspired from the external social networks.

- Informal Learning, Competence Transfers and Losses

The main sources of learning at work were identified as the three forms of informal competence development which are described below, in the order of their associated relevance. First, *employee-task transfer* which is facilitated by the everyday challenges in work tasks, including some individual study (e.g.: "everyday [in design] is a learning day"; or that they "grow with" the job: "most of our development occurs by doing a variety of different jobs, and learning how each one is different"), as well as by the need to embrace more administrative roles. All the four examples of a learning situation at work provided were technical in nature and of this relationship type. Even the development of the new service delivery was described as a collective variation that could be termed "team-task transfer". Second, *interpersonal transfers between employees* concern mostly project work interaction, but also the informal mentorship

described earlier. Generally, the attitude towards team work is not exactly enthusiastic, with teams seen as working "quite well", or "ok", or having their "positives" and "negatives", and difficulties related to communication within teams tend to be pointed out. Another routine (a weekly review of project status) is allowing top management to follow-up the evolution of projects, while it plays the secondary role of interchange of ideas between PMs. Finally, *inter-organisational learning,* to which Unit C plays a distinctive role via its employees who are often referred to as a source of knowledge exchange. However, there are two main drawbacks concerning the creation and transfer of competence within this relationship, due to the fact that communication and socialisation are restricted by geographical distance and time differences: (i) "we do occasionally meet face-to-face [...] and it's amazing how a few hours in a meeting there would solve what would essentially take days some times to cover on e-mail"; (ii) "there's never the equivalent of going in and saying *Hey, can I talk to you for a few minutes?".* Moreover, Unit C behaving like a client rather than a partner refrains some of the innovative processes: "Here, do this! Instead of *What can you do with the design?*" Other than this common reference, only a few and quite varied sources were pointed out: other professionals, and cooperation with university for research projects; discussions with some equipment providers, or subcontractors (both with little learning effects because these are "completely different set of skills"); and even a form of *coopetition*. The later was a source of learning as it allowed to "see how a competitor does business"; but this case was rather the exception to the norm, and it resulted from the need to cooperate on a project that was too big for either firm to do alone.

- Reconfiguration and Transformation of CD

The biggest facilitator of CD was considered the "pro-learning and pro-development" leadership, justified by the philosophy that "the company is pretty good in providing access to any avenue which is going to improve my performance because they know that in the long term it's going to improve their performance". Competence retention and preservation are important concerns for this Unit. First, by people leaving - and the damage is more significant the more competent the person was, because there "really is no way to completely cover" it by replacing the person. Second, by organisational forgetting, of the "use it, or lose it" type. This situation is the result of a combination of two factors: (i) the simple degradation of the knowledge needed for an optimal performance caused by the lack of continuous application of such knowledge; (ii) and a certain degree of failure to successfully integrating this knowledge into the Unit's memory system, as depicted in these two quotations: "We're actually pretty good, I would say, in filing things away and storing information, we usually can retrieve information about projects and the way we did things in the past. But [...] if you don't use that regularly, you're sure losing it"; "[...] over time, once you've worked on a certain [project] type, [...] and nothing has been done in that regard for 10 or 15 years, and then a project starts up... you may find the only people who have the design knowledge that would be useful for a project like that,

either they're not there, or they don't remember it all, or they are so senior in the company that they have so many responsibilities associated with their position that they aren't able to, sort of, seat down and explain the level of detail that would be helpful or useful".

### 4.3.5 Integrative Discussion: Commitments, Paths and Organisational Transformation

Beyond the natural conditions and the critical incident that favoured its setting, several path dependencies and commitment conflicts are noticeable in the evolution of Unit B. The critical path dependency is marked by the conditions when autonomy was first achieved, which seem to be haunting the Unit up to present: suddenly left without corporate support, and with the project for which it was originally set not materialised, Unit B has been on a constant quest for identity and self-sufficiency. There are several commitments or even rigidities built by this core path dependency.

First, without possessing core specific assets, Unit B did not quite stand out of the crowd, and with local industry concentration in decay, it had to follow markets and clients to survive. On the one hand, this strategic orientation to external-based growth built a strong commitment to flexibility, reliability and cost efficiency, and the reputation of having *this* distinctive competence became a strategic asset. On the other hand, it enforced a commitment to horizontal experimentation in terms of market segments: a wide range of product types were approached and some became more of a core competence at one point in time or another, but not consistently; this led to organisational forgetting, for the retention of competence that was not utilised for longer periods, was not feasible. Ultimately, by not developing specific competence for certain product categories, the delivery of the Unit could not gain depth and become complex, which reiterated the need to compete on cost, and further strengthened commitment to routines and effectiveness.

Human resources in Unit B are strongly aligned with this commitment to efficiency: they appreciate the benefits of routines, templates, standards etc. IT solutions are actively utilised for sharing (distribution, availability), due to the acknowledgement of the role of standardisation. The mediator between this formalism resulted from the need of control, and a type of work that requires a degree of autonomy (decentralisation) was the multirole, flexi-structure. Somewhat of a misalignment is the supposed commitment to innovation present in the official mission of the Unit, because innovation is largely incremental (as a normal creativity/ problem solving component of the design work), and at the most, reactive (by incorporating external development in technologies). The latter did result in the development of a specific, core delivery (research reports), but the value it brings is considered the gain in efficiency, and the reduction in cost, for the core design competence. The institutional context

contributed to a lack of commitment to investments in own research because it allows for the cost of NPD to be shared with the customer, which by this means becomes the owner of the intellectual property.

The core rigidity is in the retention of competence in general and of human resources as the carriers of it in particular. Beyond labour market restrains (little availability of HR), the main reason for high turnover rates is path dependent: the low specificity of the technical competencies allows high mobility. This is conditioned by the past preference to buy competence in the external market; some increased levels of own competence development, and therefore increased specialization seems to be the case more recently. In addition, some issues of human capital activation are of relevance, as discussed distinctly beneath. The commitment to the integration of newcomers is also reactive leadership, a consequence of high personnel turnover.

Second, association to various corporations established two dependencies. First, used to be "let down" by numerous corporations, a degree of purposeful strategic distance is noticeable, likely reinforced by limited contact with other parts of the MNC, and week normative communication from the regional headquarters. Thus, in describing the history of the Unit, a detachment from the numerous ownerships is observed (almost no efforts were made to recall the actual names), while the only comment on strategy was the one stressing the role of the Unit within the MNC network: that of an autonomous entity, partly active server (particularly for Unit C). Second, a phoney friend was inherited in a sense of a dependency to rely on corporate support functions which discouraged the setting up of own functional departments. This generated commitment to a flexible organisational structure, based on a multirole approach, which may explain the small differences in the self-assessment of competencies between the two categories of employees. The lack of own HR function resulted in reactive, ad-hoc and limited solutions to HR issues, including recruitment based on low screening and selection costs (with an average seniority of the interviewees of 11 years it can be assumed it worked well in the beginning).

Some of the consequences for the capabilities of individual/ collective competence development of the employees in Unit B stem from the above dependencies: (i) external, un-planned, operational (match specific) oriented CD; (ii) little inter-organisational learning; (iii) the sharing lessons practice ("de-briefs") started about at the time when the Unit doubled in size; (iv) the flexible structure and numerous meetings compensate for the high degree of formalism (rules); (v) low knowledge-sharing capability. Finally, this is the area of the major commitment conflicts. The first conflict is the classic one between formalism and learning - in

this case, between learning by doing as the dominant form of learning on the one hand, and formalism and routine work that make people feel "stuck" and "unvalued", on the other hand. A second conflict is the one between (i) the commitment to informal learning via interpersonal exchanges (especially during projects), and (ii) a work culture shaped by commitments that do not favour such interchanges. It can be concluded that human capital activation (learning motivation, career system, group cohesion etc.) and retention is the biggest internal challenge for Unit B. With its committed workforce, that embraces change and learning, and it is interested to develop, this culture-based transformation is doable.

The *core domain commitments* that form the commitment profile of Unit B can be summarised as follows: strategy mission – securing business; market (global) – competitive customisation; CD integration – by rules and flexi-roles; learning – by doing and by mentorship, for efficiency; CD transformation - competence retention; HR management – static fit, seniority-based; leadership philosophy – operational management. The overall, dominant characteristic of *transformational commitment* could be termed *normative*.

## 4.4 Sub-case Unit C - *The Enthusiastic Builder-Friendly*

### 4.4.1 Strategic Profile of Unit C

*Delivery and Growth Stages*

Unit C is a project development and design firm established in the year 2000. The Unit was set up by the regional MNC with the mission of being a link of competent technical support between production facilities and their two main partners: the external providers of design on the one hand, and customers, on the other hand. For the first 3-4 years, Unit C functioned with three employees. Market evolution soon turned unfavourable for the regional MNC, and put order books under great stress. Group management considered to respond to a niche that its marketing department had purposely identified. But the products were small and unsophisticated, and none of the partner designers wanted to develop them; a decision was made to allow Unit C to develop such designs. Their success turned out to be the critical incident for own design development: the next contract was awarded to the Unit in 2005, but a partner designer was partially involved. An "all time high" boom for this segment followed soon after, whereby an abundance of contracts on the market made availability of designers an issue. This greatly helped the market driven growth of the Unit: sales plans were achieved more than 200%, concomitant with a repositioning on the market for complex products. A

high increase in the number of employees followed, while this business model turned into a trend in the "regional cluster" (Porter, 1990, 1998): other external production facilities started up and/ or emphasised the role of their affiliated designers, toughening local competition to the point the local design market was split in half between independent designers and in-house designers. The relaxation of the market which followed the global economic downturn found Unit C attempting to position itself on the global market, but the regional MNC remains the main client.

*Positions*

*Technological assets* are considered as only enabling the service delivery. This being said, the specific market segment is one where the products are more and more sophisticated, incorporating technologies (including in the form of product equipment endowment) with an accelerated development since the 1980-90s (even to the point that "today's technology as used in design can be considered obsolete by the client in 3 years when the product is finished"). Two *intellectual assets* were considered core: (i) human capital, which is also *the* most important resource for their "knowledge-based company", but in a collective, synergic form (the "combination" of "good people", "young" and "experienced", with the "right competence" working "well together"), and (ii) reputation: relationship with clients, suppliers, intra-MNC ("short-lines" to group management); and by association with the reputation/ track record of the regional MNC. The Unit is the "child" of the MNC, and benefited of great corporate support that boosted its development: the first contracts were for traditional clients of the MNC, and a strategic decision was made that the sales organisation should support the allocation of a certain percentage of project orders to Unit C. Today, it is the learning effects from the collaboration and the vicinity to production facilities that are considered a strategic asset. This intra-MNC relationship builds up an organisational capital asset that is unique to Unit C. The *locational asset*, in the form of membership in the regional industrial cluster[9], is unique. This is because "the cluster is alive; it's more like an organism", which has the following benefits: (i) learning effects are generated for the whole value chain, lifting the entire product development process, including by individual CD through cross-firm job rotation: "people in this area are floating around: one time they are employed at the [customer], [another] at the [production facility], or at the design company, or at an [equipment] supplier, or whatever... So people get very experienced"; (ii) very strong extended social networks: after years of working closely together, one can "just pick up the phone and talk to the guy who makes [...] core equipment to the [products of] design"; or belong to "sort of a family, although we are competitors in some fields as well". Originally, natural geographical conditions triggered a long national tradition in

[9] Tallman et al. (2004) take the original concept of regional clusters as industrial districts and clearly connect it to knowledge in the following definition of an industrial cluster as "a group of firms tied together by geographical collocation and complex social interaction, in which informal understandings contribute to sharing technical knowledge" (p. 261)

the industry, while oil evolutions since the early 1970s gave impetus to this cluster's particular specialisation (Hildre et al., 2008).

*Distinctive Competence*

The specific delivery of this Unit could be defined as flexible, "builder-friendly", hi-tech engineering solutions. Flexible, because accommodating the clients even when they require modifications for the "10th time" is also a core competence. Builder-friendly, because: "[the customers] can trust that what they get is what a [producer] would like to build". High technology, because being a young firm has the advantage of a mind-set of openness to new developments: "we start with the technology today and try to improve it, [unlike] those with large history [that] always try to get some synergy from earlier projects, and they drag along on the history". But, as an effect of the cluster setting, the truly unique strategic resource is the collective competence of the human capital to "utilize other people's competence: customers, but also sub-suppliers, and people at the [production facilities]". The mission is to achieve global competitiveness (price and quality), while looking into internal sources of growth (own R&D) to improve the technological delivery.

### 4.4.2 Organisational Character in Unit C, as Learning Environment

All the structural conditions for knowledge-sharing capability seem to be in place in Unit C (see *Appendix 5*): low *centralisation* (3.11), high *social networks* (5.28), fair *IT utilisation* (EDS, 5.15; intranet, 4.40), low *job territoriality* (2.28), high *performance-based reward systems* (5.43) and strong interest in *professional development* (5.75). Thus, although indifferent (4.20) to the existence of clear incentives or reward systems to encourage knowledge sharing among co-workers, an exceptionally strong agreement with the statement "my colleagues regularly share their know-how, information and knowledge with me" is observed in Unit C (6.08). The employee in Unit C has very high AC (*desire*), high NC (*obligation*), and low CC (cost), which is a very favourable commitment profile (see *Appendix 5*). However, organisational citizenship is stronger for managers, and for the employees without managerial responsibilities the sense of obligation to reciprocate to benefits is marginally higher than their emotional attachment. The role of the manager is primarily technical, but the majority of the interviewees were committed to their secondary administrative tasks as well.

*Informal and pleasant atmosphere, for innovative solutions through exciting work in a dynamic environment* is the best description of the key features of the work culture in Unit C, as perceived by its members (see *Appendix 6*). No less than 16 words or expressions are used to describe the atmosphere in Unit C, including with very human attributes (e.g.: "fun",

”friendly”, “youthful”, “kind”, “pleasant”, “energetic”, “eager”). The employees relate to the type of work in a positive way, from plain and simple “engineering”, to ”exciting”, ”rewarding” and “good teaching”. Points like “customer orientation”, “solution orientation” and “flexibility” are direct connections to the strategy of the Unit, showing embraced norms. One contributor to the informal/ open environment may be the lunch break (organized in the form of a buffet, in a common room) which is an important context for socialization. Everyone present tries not to miss it, and even one day someone had birthday and served cake. No distinctive elements could be noticed to indicate who the employees with managerial responsibilities were. The common area serves as the place to have a conversation over a cup of coffee as well.

### 4.4.3 Competence Base Profile in Unit C

*Meta-Competencies*

Overall (see *Appendix 7*), the employees in Unit C perceive themselves as *team* players (5.79) who can manage well *change and transition* (5.79), have strong abilities *to learn and transfer knowledge* (5.64), to *solve problems* (5.57), to be *creative and innovative* (5.36), and of *communication and interpersonal relationship* skills (5.07). Everyone speaks English, but while the managers are truly internationally oriented, the rest of the employees have less significant contact with foreign nationals and therefore have a lower “openness index”.

*Technical Competencies*

All the interviewees in Unit C had higher technical education in the field (bachelor’s, and two master’s degrees). All of them had relevant and even extensive previous work experiences in design, production or equipment companies, and were recruited as the MNC lacked an appropriate internal market in the field: “I was employed because nobody with my background was presently in the company”. Education provided by the vocational system is just a base for the technical work, while the tradition for the industry in the region, created an early affective attachment to this occupation for some of the interviewees. Even more, when asked what competencies were needed to perform their work, the interviewees related very little or not at all to theoretical knowledge or experience (which may have been considered implicit), but to personal qualities alone (even such as “a sense of humour”). Though industry specific competencies were bought, it should be noted that a specialised market was readily available in the location of the cluster. The above appears to suggest low entry barriers, but the confidence gap between managers and employees without managerial responsibilities in the self-assessment of technical skills, in association with seniority, is an indicator of fairly high technical specificity.

*Intra-Organisational Competencies*

Although very familiar with their delivery, resources, work processes, industry conditions, the interviewees turned out more reserved or confused as to what the strategy was. But implicitly, they were very consistent in their view of what the strategic intent of the Unit and its role within the group were. The history of the Unit being very short, all the interviewees were familiar with the milestones (but still in direct relationship with seniority or lived history), and the fact that in the beginning the Unit consisted of only three persons and their first names was one of the most commonly made points. All interviewees recalled with pleasure being "employee no 2, 3, 4 etc." The majority of them were also familiar with the corporate definition of *hands-on management* and returned accurate, although somewhat selective, expressions of it (mainly decentralised decision making and empowerment, which were also appreciated as working well). Some of them were aware of the new corporate values as well, and half of them even embraced one of these values implicitly, or explicitly. This normative alignment to corporate culture stops when it comes to considerations about the group at large (particularly strategically), under the new ownership.

### 4.4.4 Competence Development as a Critical Capability

- CD Integration

*A leadership philosophy* for competence development indirectly emerged from random statements of (particularly two top-) managers, in the sense that: "the main thing as a leader in such an environment [is to] stimulate and make people develop [...], stimulate people to make their own decisions"; "if you invest in people then you facilitate for [their] development. And [...] investing in people - that can be many things, but the small things [matter]: [for instance] supporting the person's interests and maybe let the person work with tasks that [are] not the mainstream of what he is supposed to do"; "a philosophy to get the best from each individual person [is] very important"; "some of the people [...] try to approach me and they need help to solve a problem. I try to coach them, to tell them how they can figure out the problem themselves instead of seating down and solve it together with them. And I think most people in the office appreciate that way of approaching it, and they've learned to know me, that it's something I do intentionally". As in the end, "people think it is fun to work [here] because they get all these challenges".

*Training*

Several types of training were recognised: (i) *external*: courses (esp. software), continued technical education (bachelor's), but with participation in conferences, seminars, trade fairs etc. the dominant form (e.g. even events in principle unrelated could be a source of creativity: "if they're making equipment for kitchen, maybe their way of approaching the goal is better than ours, maybe we can use their way of thinking"); (ii) *hybrid*: a labour organisation plays a role in external

training, but overall there is a shortage of relevant buys; this resulted in a hybrid form of training sessions: seminars held by various lecturers at the premises of the Unit; these have the role to establish a common organisation culture, such as with regards to what innovation is; (iii) *internal*: e.g. intra-MNC university for managers; training session in Unit A. Participation is ad-hoc, and even highly decentralised in the case of various events: originally initiated by superordinates ("now we urge people to tell us about their interests and then we evaluate [...] what would be the pay-off towards the cost"), or word-of-mouth among colleagues, participation is reinforced by direct invitation following a onetime attendance ("if you're in, you're in"). The lack of systematized career/ development planning is pointed out per se by one of the employees: "of course we had courses and we've been on seminars, and things like that [...] but I've not had a plan like *Here you are today, on A, and you should finish on level B. You need to do this, this, this, before you can get there, either by means of the career ladder, either by means of specialist in one field* [...] – that has not been the case". In principle, such a process exits at corporate level nicely termed "Personal Business Commitment" discussions (aimed only at managers), but it is not consistent in application. Some department managers insisted in making a point that they hold annual discussions with their subordinates (role in the office, and development plans).

*Integration of Newcomers*

The interviewees relied heavily on their previous experiences and theoretical backgrounds at their beginning in Unit C, and the majority found their new roles confusing, because they were not defined (no "job descriptions"). Having succeeded in this challenge was very rewarding, and some support was mentioned (helpful co-worker; specialised training session).

*Routines for Sharing Lessons Learned (SLL)*

Systematic coordinated, internal cross-functional sharing of lessons learned is absent, and a variety of practices were mentioned in a struggle to identify such routines: "Monday meetings", "Friday meetings", "middle leaders meetings", "management group meetings" and the responsibility of the manager to "bring [issues discussed] down [...] if there's something [department employees] should know about". But their variety is in itself a proof of their very local and differential application, the reason for the above being that lessons are shared in everyday interaction within functional teams/ departments, as an effect of small size and open communication culture: "we've been so few [...] that everybody knows everything"; "we have a very open dialog and people, information goes around"; or "everyone can walk in everyone's office and share information". What is more, with learning effects from production considered a core competence booster, some attempts were made to institutionalise *external SLL routines*, i.e. (i) new product "check-lists" to incorporate post production comments from customers, equipment providers, regulatory bodies; (ii) "after

project meetings" with the production facilities, even in the form of designated area of discussion on the intranet.

*IT Systems for Knowledge Integration*

The existence of a recent database tends to be acknowledged, as consisting of on-going and past projects from its lifetime, as results of centralisation efforts, and shared with the production facilities. However, there is strong reservations as to its functionality, for many reasons: (i) it is challenging to find time to look into it; (ii) uncorrected mistakes in older projects may turn out to be "a source of potential problems"; (iii) not much of the information was stored, from the times when the Unit was smaller; (iv) challenging to incorporate the work of outside parties. Finally, its role is the biggest constraint: it can only be useful as a starting point (reference), or for some standard solutions, but not more: "a lot of information is available, but the knowledge that is necessary for the main drivers of the design is probably up in somebody's head, some few persons – that is probably more difficult to document as well". What is more, finding the needed reference is a sinuous, informal process: "We have a lot of things to do so the database is not very good... So we just try to remember the right project. [Person's first name], he's been here from the start, so basically very often we have a talk with him *Have you done anything like it?* So maybe he can remember, but very often we try to find [the reference], and that can be quite hard."; "We might miss out [the reference project] and start a new project"; "I find [the reference] in my head. And that's of course something that's been working when we were 3-4 or perhaps 10-20, but in the process further on [...] we need to look into how we should [improve]."

*Project Routines*

There is no a clear distinction between new orders and NPD, with the exception that proposals from the newly created R&D function can be an internal source of development. Development is based on a past reference, or "from scratch". Not only "every [product] is [all in one] innovation", but also "you have to get a good design, it has to be economic, it has to be environmentally friendly, it has to be good for the customers, and it has to work". Innovation is largely incremental, but significant (usually more than 50% of the work), while a smaller functional group work on purposeful development: "half of my time goes to R&D tasks" or "I'm a creative engineer [...] I'm making a lot of strange sketches [...] futuristic or something [...] So 80% of my work is not of practical use at the time". A healthy NPD approach is given by the fact that internal and external collaborators were mentioned as being asked to get involved very early in the process. Although clients tend to be conservative, equipment suppliers can be a driver for new technologies. An attempt was recently made to implement regular R&D meetings, but under time constrains, they remained at the stage of "supposed to" happen. Depending on the scope of work, employees are involved in projects from 1h or a few weeks, to months, or years (for correlated production

consultancy). Senior employees form the initial concept team for "brainstorming", but in the end "the product sort of emerges on the hallways here", based on good communication culture: "when you think that you have a good idea, then you have to discuss it with all different departments, because very often an idea that is nice to me could be devastating for the guy next door [...]. But without people thinking freely, you will never have innovation". Team work is "essential" as one should be "Superman x 2, 3" to manage the tasks otherwise, but a good degree of independent work is required.

- Informal Learning, Competence Transfers and Losses

The interviewees generally showed a strong awareness of having developed their competence, on all the three theoretical dimensions. First, *employee-task transfers* strongly related to the technical scope of the tasks and the new roles assumed ("learning has been my work"; or "every day is an ongoing training course"). Second, learning from *interpersonal transfers between employees* is a dominant form, and it is supported by the illustrative incidents of learning situations. This happens because the customary way to work is in teams: (i) *functional project teams*, formed by appointment from the heads of functional departments, and with the team "coordinator" appointed by the top management of the Unit; (ii) *spontaneous teaming and "walk-in"* (approaching the colleagues), in solving everyday tasks. The interviewees were very appreciative of their experiences ("very-very good"; "I love to work in team"; "very good, I like to work in teams"); the discussions they have in their regular problem-solving are rewarding and a source of development (even "a privilege"). Team work values are creativity, encouraging new ideas, speaking up for one's opinions and enjoying the process ("I like very much the early stage in the process when we can discuss and try our opinions to each other, and maybe such discussions bring up new ideas"). It is believed that it is "very important [to have] open and free and information floating across the offices", and that formalism would impede on creativity and flexibility: "Being able to just rush into another office *Tell me what is that, can you explain this to me?*, the open structure that we have is helping that I'm learning from the specialists we have". But reflections on a need of more structure, formalisation were also recorded. Third, *inter-organisational learning* is vital to the development of distinctive competence, on two dimensions that contribute to product development/ improvement: (i) integrating learning from production feedback; (ii) learning from other extended social networks (professional networks activism; strong, team-like collaborations with customers, suppliers, regulatory bodies, research providers, or even competitors).

The following are independent extracts from four of the six interviews: (1) "I discuss very much [with sub-suppliers of equipment] and ask for information and ask them to come here to present their products and update us, and then we can discuss solutions together. Yes, I do that very often."; (2) "I'm supposed to start a new project [...] Maybe I know another company [...] that can support me with information about it, and I go to them and ask if we can meet"; (3) "I've been in a lot of interaction with these people [research provider connected to university], and I'm so familiar and actually friends with many of them - it's just to pick up the phone and ask for something"; (4) "I think it's very important in my job to have very close and good relationship

with the entire industry, actually. I have, I could say, good friends in [2 companies' names]. That's been very crucial to me [...]. So whenever I have a problem or something, I just pick up the phone and call somebody, both with respect to getting equipments or discussions, and also I try to utilize them in the design development. So, in this type of job, to have good connection, not only within [MNC] but also in the total industry – that's one of the main reasons for success". All the above are a comprehensive illustration of how architectural knowledge[10] is created and applied within a cluster context to enhance competence exchanges. *Competence loss* was associated with personnel turnover even in this Unit that had yet to experience it; still, transfers and promotion to more administrative roles were also seen as a source of losses, because although everyone is replaceable, there are no replicas.

- Reconfiguration and Transformation of CD

The social context is considered the greatest contributor to individual CD ("the ability to discuss with people either by meetings, or travelling, or just in the pure respect of meeting people with experiences beyond your own experience"), together with "free-roles" and committed leadership "seeing the development of people as a resource instead of a cost". The main direction of CD transformation was identified in the form of more systematised HR processes, e.g. (in the order of relevance) systematised approach to individual CD, facilitating integration of newcomers, and sometimes "cross-departmental" sharing of lessons.

### 4.4.5 Integrative Discussion: Commitments, Paths and Organisational Transformation

Based on the findings presented above, it could be said that Unit C was born as a socially embedded learning organisation. The location in the industrial cluster served well the original commitment of being a connector between productions and customers: these two commitments are strongly aligned with the distinctive competence. A potentially destructive source of tension would be from too strong commitment to the two "clients" (production facilities on the one hand, and product customers, on the other hand). Because in doing so, sources of internal growth may be neglected; efforts to mediate this situation seem to be in place as recent focus is on looking into internal development sources.

A major path dependency is the relationship with the regional MNC. First, being set up as the "child" of the MNC, Unit C also inherited its main character features: the commitments to flexible, high technology solutions (which are also its core commitments). Second, a core rigidity may result on the downside of this outer-centred approach: the designer can get "caught-up in the building process [which] is not the main goal". Third, having benefited from rather

[10] Tallman et al. (2004) take Henderson et al.'s (Clark, 1990; Cockburn, 1994) distinction between "component" and "architectural" knowledge to the level of regional clusters. Thus, architectural knowledge is "a public good within the limits of the cluster" in the form of shared tacit understandings of the "rules of the game" "developed at the regional cluster level through the routinization of the network of interactions, interdependencies and common interests among the members" (p.265). They (*ibid*., p.268) propose that "cluster-level architectural knowledge provides sustained competitive advantage to firms in the cluster by restricting the movement of component knowledge out of the cluster and by providing a unique common base of know-how for applying such technology".

"unconditioned" corporate support has two consequences: a delayed awareness on competitiveness, the economics of projects; and a lack of administrative functions, including HR (and all the directions of needed transformation in CD were identified in connection to more systematised HR management).

Another path dependency is the culture of informality. The location in the cluster obviously created a native embodiment in extended social networks, which explains the stress on the role of external relationship capital. But the very strong internal culture of working in teams, and employees being available for each other, has two main sources. The employees that started up the Unit represented a very motivated group, embracing risks and in search of challenges to stimulate their personal professional development (e.g. "I got the opportunity to be the leader of the department after only two years"). They joined the Unit because they incidentally "knew" or "found out" their qualifications were needed, and already had a colleague, friend or superordinate working there, or knew them by reputation. This created the mind-set of collaboration and openness, together with the collective need to put order into the "original chaos". Hence, the second condition has to do with the entrepreneurial roles of the first employees, who had to build this Unit without much awareness of how such a process takes place. A small group of discrete specialisations had to combine competencies, create and learn the own service delivery pattern of the Unit. This need of improvisation built a mind-set of "free-roles", empowerment and close informal collaborations that is in itself a strategic, collective asset that is very difficult to replicate. But today this focus on informality runs the risk of turning into *the* core rigidity in this Unit:

First, with the accelerated enlargement in size in the recent years, such a contact culture will prove to be of high maintenance: "even now I can go through a whole day without saying *Hello!* to everybody" - one interviewee triggers the alarm, stressing the emergence of two distinct groups. Ensuring group cohesion and fair development chances for all begins to be an issue already, especially with employees without managerial responsibilities not feeling particularly involved in decisions on adopting new policies or programs.

Second, in larger groups and/ or complex activities, a degree of structure is required for efficiency and coherence: more systems/ procedures is the main area of transformation deemed necessary by the majority of the informants. As the case of the database shows, there is already a commitment to an *a priori* dismissal of such tools, under the excuse of time unavailability and/ or limited functionality. However, zero personnel turnover does not mean competence retention cannot be an issue: "[it] happens that I'm told to make a drawing, and I've got a question from someone, and I don't know how to answer it, and I don't know who to contact to find out. And I

just have to search, [I] have to go around and ask". This change is required so as to avoid the "re-invention of the wheel", should a commitment to competitiveness be enforced. The regular informal discussions "on the hallways", the spontaneously organised problem-solving/ creative discussions are essential to the vitality of an innovative working environment and should be encouraged to continue. But in the case of the design and operability of functional project teams and NPD teams, as sensed by many interviewees, more structure is required in order to ensure efficiency. Not making this distinction works against the Unit, creating time consuming, redundant and blindfolded operational ways of going from A to B.

Finally, there is a primordial leadership commitment in Unit C to maximise competence utilisation, and a mindset that the way to achieve it is by maximising competence development. However, this has to go beyond the declarative level, and use a more systematic approach to ensure a good coverage of the competence base. While in its infant phase this "enthusiastic" Unit has mainly harvested competence sowed by competitors or partners, it is about time to leave this path and begin to learn how to develop it itself as well.

The *core domain commitments* entered by social actors in Unit C can be pointed out as follows: strategy mission - define identity and leverage assets; market (specific scope) – extreme customisation; CD integration – by collaborative culture; learning – by free-roles and socialisation, for development; CD transformation – learn to develop, by structure; HR management – by investment in CD; leadership philosophy – maximise competence utilisation. This commitment profile of Unit C is under an *affective transformational commitment* of "enthusiasm".

# Chapter 5. Cross-Case Discussion

## 5.1 Introduction

This chapter of the thesis is divided into two main discussion sections: First, learning from the individual sub-cases is integrated through commonalities and compared by divergences to add further depth to the understanding of the role of CD as a critical capability for knowledge intensive deliveries in dynamic markets. Second, a final, cross-case discussion is conducted of the role of competence, paths and commitments to successful business transformation.

## 5.2 Cross-Case Discussion of CD as a Critical Capability

With the individual case explorations confirming the criticality of the capability to develop and transfer competence, an integrative approach is taken next. This discussion is organised in three sections that reflect the most relevant findings to a cross-case perspective: (i) the perception of time and change induced by the dynamism of environments; (ii) some of the consequences that high specialisation had for the CD in the three Units; (iii) some points on communalities in investments and commitments in CD and transfers.

### 5.2.1 Dynamic Markets and the Induced Perception of Time and Change

At the moment of the interviews, the industry in which the Units operate was just about to slow down after having reached the peak of a boom cycle. And in all three Units the lack of time due to high workload was considered the main restraining factor to competence development. Dynamic markets put strain on the perception of time, but the consequences and the way in which this pressure is resolved, was very specific in each Unit. In Unit A, time is stolen by necessary evils such as "routine things" or too high work load; more time would allow more focus on knowledge creation and innovative processes that require employees to "ask", "look for", "think things through" and "see if there could be a better solution". In Unit B, lack of time due to high work load is restricting competence development, including individual study and colleagues' availability. In Unit C, scarce time due to high workload leads to compromising, errors and restrains on individual study. To resolve the time pressure, Unit A has a mature approach, whereby the need of a certain balance between pure knowledge creation and work structure is embraced. Permitted by a strong, already acquired advancement in expertise, the occasional lack of time does not affect the quality of the service delivery other than that it could have been even better. This is in contrast to solutions in the other two Units, which are also strong opposites: in B, routines and standards are suggested as mediating organisational efficiency, quality and the creation of more time availability; in C, informality is maximised

by a mindset of adversity to structure, also in terms of knowledge preservation. All the three approaches are path dependent, but with the exception of Unit A, they are potentially dysfunctional: in B, by consequences of formalism; in C, by work processes redundancy which can be costly exactly in terms of time availability. Regardless of the type of organisational mediator used by the Units, time perception is also altered at individual level, with the *ability to prioritise and manage time* scoring constantly lowest of the self-assessed meta-competencies. The multi-role approach in B seems to add further strain on the time perception of the managers in this Unit. But a stronger perception of time pressure, correlated with successful past experiences (in managing market fluctuations, or building up the Unit) seem to have raised the confidence in *change manageability* in Unit B and C, compared to the calmer transitions lived by Unit A.

### 5.2.2 Consequences of High Specialisation for CD

The higher the specificity of assets, the more difficult it is for competitors to imitate them, but also the more difficult it becomes for organisations to replicate them internally. The three sub-cases seem to illustrate variation in the technical and organisational specificity of their competence base, with some consequences for the organisational and managerial process of competence development and transfer. These were addressed under the independent exploration of each sub-case Unit in the chapter sections on the competence profiles, but some cross-case remarks pertained.

The Unit with competencies of the highest technical specificity is by far Unit A, a moderate level is noticed in Unit C, and a somewhat lower task specificity is observable in Unit B. An important first consequence of high technical specialisation is that it is conductive of collective competence synergies - mediated by the combination of expertise from discrete, unique tasks in Unit A; or a work culture of membership and social relationships in Unit C. More moderate specialisation is regulated in Unit B in a more straightforward approach, by interaction in formal teams and apprenticeship. The greatest benefit of synergetic competencies is that they are a real source of competitive advantage as the social context cannot be replicated and therefore such competencies cannot be integrally recreated. What is more, for Unit C these synergies are extended to external social networks.

Second, although great focus has been in the literature on the information solutions for knowledge management, storing and preserving knowledge is extremely challenging in all three Units. Databases of past knowledge are useful, at most, as a reference source in the design work of all the three sub-case Units. This has two reasons: (i) each product is unique

and a new solution needs to be created each time; (ii) the way to achieve this task is by combining tacit knowledge from different human competence holders, in a social context.

Third, it is suggested that the higher the technical specificity, the less availability of acquisition and development of relevant competence on the external market (Nordhaug, 1993). This resulted for Units A and C in creating a hybrid form of training purchase: customised services from expert providers in various fields (e.g. project management; innovation). The hybridism of such formal competence development is double: it also serves as a management initiated process to enable CD integration by acculturation to a common understanding of work related concepts/ processes.

Fourth, significant learning is expected of newcomers, which explains the focus on the systematised or un-systematised integration of newcomers in all Units. The self-assessment of technical, engineering skills shows a clear *de-learning/ new-learning* process in direct relation with the time spent in the organisation. Employees with less than 1 year of employment in the Unit are confident in their technical abilities (6.0); their confidence decreases quite a bit in the next 5 years (to 5.32), it builds again in the next 10 years (5.80); to finally reach the highest confidence with the employees having more than 15 years of seniority (6.33). At the time of their employment in their Units, the engineers feel they have strong technical skills, but these skills tend to be standard, industry specific or maybe unique to other firms. After the introductory first year, their confidence decreases suggesting they discover elements of high specificity in the tasks they perform for the particular Unit. A new learning process begins, which culminates with highest levels of confidence in the technical, engineering skills after 15 years in the Unit, at the peak of the specialisation process.

Not least, high task specificity tends to require employees to favour a professional development of "specialist", with focus on related competencies, over investments in other roles. In the Unit with the highest status of expert, competencies in using and developing unique technologies seemed to take precedence over meta-competencies. However, either due to lower specificity, multi-role approaches or extensive socialisation, in Units B and C the differences between managers and the employees without managerial responsibilities are rather insignificant for this category of skills and abilities. According to Nordhaug (1993: 61), such a competence profile for the employees is a solid foundation for human assets to flexibly embrace organisational and strategic changes, and deal with complex business environments. However, the highest scoring items tend to be those deemed crucial to innovative engineering, showing good aptitudes alignment: *ability to learn and transfer knowledge* (5.77), *problem solving skills* (5.70), and *ability to be creative, to innovate* (5.47).

In terms of intra-organisational specificity, a fair degree of new learning is required of new-comers in Unit A, but Units B and C demand more stressful processes of adaptation. In B, because more systems and standards need to be learned, while in C because the tacitness of the social context has to be assumed.

### 5.2.3 Cross-Case Discussion of Investments and Commitments in Competence Development and Transfers

Being under pressure from their dynamic environments, and having a service delivery that can only be accomplished by combining tacit knowledge in relation to advanced technical skills, all three Units are committed to gearing their investments in competence towards both a static and a "dynamic fit".

*Best Match, Fast*

The best possible match between newcomers and their tasks and roles is aimed at through recruitment, but due to the high task and firm specificity, supplementary tools are needed in all three Units. A first commonality is that the competency gap in technical knowledge is the most stringently addressed, through courses and formal education, available in the region or abroad, from external providers. Shortage of industry specific and/ or specific advanced competence in the labour market is the normal driver for this approach. A good role match (project management; customer relations; innovation) is developed with hybrid, customised deliveries from expert external providers, or internally, in the case of the intra-MNC business school for promising managers. The higher the specificity of the delivery, the higher the participation in conferences, seminars, academia, trade-fairs and hybrid training. Even participation to unrelated events is encouraged in Unit C, in the logic of stimulating creative thinking via external networks, so representative of this Unit. By internal means, the dominant form of ensuring a good match is on-the-job training by doing and by observing, and by work-method instruction from colleagues or superordinates. Most likely as a result of the small size (less than 30 employees), competency gap identification is not systematised, and at large, individual assessments to be correlated with succession and career planning do not exist. However, in all Units employees believed the leadership had a pro-development attitude and their personal initiatives within competence development were usually facilitated.

*By Doing, By Socialising, By Combining*

The strongest commitment to CD practice is for employee-task transfers in Unit B, interpersonal exchanges in Unit C, and a combination of the two in Unit A. Commitment to

exchanges between project teams (sharing lessons learned) is absent. This is usually under the excuse of time shortage or of an informal, everyday awareness of each other's work due to collocation (hallways, coffee pot, lunch room, walk-in, are all often referenced). However, sharing lessons learned routines could be a common mediator for the need for transformation that appeared to be the most necessary in these units: competence loss in Units A and B, and the increasing loss in group closeness in Unit C. The confidence in, and use of, information systems for knowledge preservation is moderate. This is due to the inability to convert tacit knowledge to relevant explicit knowledge (externalisation), and an *a priori* belief that the design process takes place only by conversion of tacit knowledge into tacit knowledge, via social interaction. Thus, all Units reflect a strong path dependency to informality that originates in the nature of work. The only Unit that makes somewhat more concentrated efforts to formalise this processes is Unit B, but it cannot be concluded that this is caused by: (i) having reached its size limitations for informality to work well, (ii) a combination of lesser specificity and a commitment to efficiency, that resulted in commitment to formalism; (iii) organisational culture not supportive enough of informal collaboration.

*Phoney HR Friends*

The HR function does not make exception from the path dependency of phoney reliability on corporate administrative functions in all three Units. As a result, HR management is un-systematised (therefore unreliable), with limited practices and solutions, and even reactive in nature. The dominant commitments to human capital activation are: (i) by interesting work scope for experts, in Unit A (ii); by performance in flexi-roles, and seniority, in Unit B; (iii) by a culture of socialisation and leadership by personal example, in Unit C. Units A and C, being very young as autonomous entities, benefited from the advantage of having a fresh start with a base of human capital and enthusiastic and motivated employees. In Unit B, some of the core group of people that established the Unit are still present, but a large intake of people took place over the years and made human capital activation more challenging.

*Committed Human Capital*

In spite of making use of very different methods, all Units have good levels of *affective commitment*, which is the strongest and most desirable form of commitment. Benefiting from its recent start-up as an organisation, and with its development being a success, Unit C has the most favourable employee commitment profile, and the highest AC. According to Allen and Meyer (1996: 263; 269), AC is associated with "psychological comfort" that the employee feels throughout work experiences, and an enhanced sense of competence (approachable managers, potential for promotion, challenging tasks, feedback etc.). The highest normative

commitment also correlates with Unit C, which has the highest acculturation, and recently rewarded employees with managerial roles. The next high obligation is in Unit B, which correlates with a combination of higher involvement in policy making and good performance-based rewards systems. The lowest feeling of obligation to reciprocate is in Unit A, where the performance is least rewarded by promotion, and where experts may have a higher bargaining power. In Units C and B lower levels of continuance commitment are determined by the abundance of employment opportunities, while in Unit A there is a more reduced availability of exit avenues. The above summarised investments and commitments shaped organisational structures favourable to a good knowledge-sharing capability, with the most dominant characteristics across the sub-cases being: low centralisation, strong social networks, high interest in personal development, and fairly strong performance-based systems. Independent of this structure, it is other factors (e.g. task discretion; culture) that determine whether exchanges actually take place regularly.

Next, competence, paths and business transformation are integrated in a cross-case discussion.

### 5.3 Comparative Discussion on Commitments, Path and Business Transformation

By introducing core domain commitments, an integrated radiography of dynamic capabilities and commitments, and a definition of the organisational character were facilitated, as presented beneath in *Table 5.1*. To give depth to the overview, the Positions (core design resources) building block of the model is added for an understanding of the distinctive service delivery. Each of these key resources is defined based on their degree of specificity as: *unique* (high firm-, high task- specificity), or *enabling* (moderate level of combined specificity).

| Core Domain/ Core Commitments: | **The Tip of the Iceberg** (Unit A) | **The Efficiency Ruler** (Unit B) | **The Enthusiastic Builder-Friendly** (Unit C) |
|---|---|---|---|
| - *Strategy Mission* | Turn Excellence Into Marketable Products | Securing Business | Define Identity; Leverage Assets |
| - *Market Mission* | Expert Customisation | Competitive Customisation | Extreme Customisation |
| - *CD Integration* | Training & Informal CD (walk-in; pop-up) | Rules & Flexi-Roles | Collaborative Work Culture |
| - *Learning/ Transfers* | Informal – for Innovation Capability | By Doing & Mentorship – for Efficiency | Free-Roles &Socialisation – for Development |
| - *CD Transformation* | Integration of Two Functions/ Cultures | Competence Retention | Learn to Develop, by Structure |
| - *HR Management* | Foster Expertise | Static Fit; Seniority based | Investment in CD |
| - *Leadership* | *did not pertain* | Operational Management | Maximise Competence Utilisation |
| TRANSFORMATIONAL COMMITMENT | CONTINUANCE | NORMATIVE | AFFECTIVE |

| Distinctive Delivery/ Core Strategic Assets: | Unique Expertise in Research and Design Solutions | Competitive, Reliable & Flexible Engineering Solutions | Flexible, Builder-Friendly Engineering Solutions of High Technology |
|---|---|---|---|
| - *Technological* | unique | enabling | enabling |
| - *Human Capital* | unique | enabling | unique |
| - *Reputational* | unique | enabling | enabling |
| - *Other Intellectual Capital* | enabling | unique | unique |
| - *Locational* | enabling | enabling | unique |

Table 5.1 Radiography of Capabilities, Commitments and Distinctive Identity for Units A, B, and C

The selection of the three sub-case units is rich in insights both in the form of commonalities of CD practice and very distinct evolutions and commitments conditioned by past performance and future strategies.

First, Unit C is an illustration of how a firm can be started up in a dynamic, highly competitive environment: directly as a learning organisation, or even "organism" in keeping with the cluster analogy suggested by one interviewee. Benefiting from internal and external synergies as the core development capability, Unit C was established and developed based on an aggressive strategy of extensive competence acquisition. Eight years later, in the second growth stage of its evolution, the Unit has a dominant *commitment to maximising competence utilisation* and synergetic learning from internal and external networks. For this business model, competence development is a means to achieve the goal.

Second, Units A and B show how long term survival is possible in such markets, based on the configuration of core assets and their sustainability over long periods of time. Unit A is the exemplification of little erosion of the sustainable competitive advantage, due to competence accumulation effects over long periods of time. However, a series of extraordinary circumstances and a focal *continuance commitment to excellence* made it possible to build a strong distinctive competence: (i) the Unit was started-up and evolved in a very specific context, and its survival in harsher times was based on organisational relationship capital; (ii) with new focus on its segment in the industry, it emerges as an autonomous entity with a unique competitive advantage in a growing market. Unit B has the most stressful history of past experiences, since a dominant commitment to markets is not self-sufficient over a long period, and competitive advantage erodes with the fluctuation and even the decline in the industry. In its search for *re-invention* due to environmental pressure, a secondary commitment was shaped recently: to build internal sources of growth, by developing expert domain competence of high technology.

Finally, much like the human personality, organisation character is defined by anxieties and unsolved conflicts being managed daily, more or less consciously. These tend to be specific to competence and commitment profiles, and their strategic alignment, and were discussed in detail in the individual sub-case chapters. However, a commonality is the bi-polarity in internal values, or the *competence creation* vs. *competence structure* dichotomy. This occupational-specific internal fight of the designers between generating solutions and being efficient seems to have transgressed personal levels and become a characteristic of the Units' culture. As exemplified by Unit A, a good balance between the two may be the mediating CD strategy, regardless of its specific tools (collaborative culture, rules and/ or synergic work). Collective and synergetic competencies are after all *the* key strategic resource in dynamic markets of high paced technological change.

*Intra-MNC Learning Network: Role and Benefits*

The competence profiles of the three Units have a good potential for learning benefits from the internal corporate network, for several reasons. First, each possesses unique technical competencies that can improve the delivery of the other. Second, the diversity in their organisational and managerial practices can be a mutual source of learning. Third, the informants are very well (Unit B) or fairly well equipped to deal with multicultural experiences (see *Appendix 8*), and all speak English. However, this competence network is sub-optimally utilised: fairly limited collaborative work takes place. The most connected Unit is C: by the start-up of a development project with Unit A; as a client for some of the service delivery of Unit B. The first example has very good potential for reinforced learning benefits for both Units because it combines the unique deliveries of each, and the Units can play the role of enhancers for each other. Unit C is identified by Unit B as a potential source of learning, but space and time distance, and the customer-supplier type of relationship, whereby Unit B is just a server subsidiary, does not help learning processes.

A strategic intent exists for the intra-MNC to learn from the deliveries and business models of each Unit, but this was not in place at the time of the study and it was not reflected in good communication/ embracement of MNC values, norms or strategic intentions to/ by the Units. One path dependency that may not be supportive of these intentions is that, an important lesson Units A and B have learned from their long experiences with corporations is that they should not risk their autonomy.

# Chapter 6. Conclusions and Implications

## 6.1 Introduction

This is the final chapter of the thesis and concludes on the achievement of the research aims and on implications for research, methodology, and management practice.

## 6.2 The Relevance of the Selected Multi-Case Study for the Frame of Dynamic Capabilities, Competence and Commitments

*Dynamic Markets in Regimes of Technological Change*

The core delivery within the scope of engineering solutions for industrial design is extremely pertinent to this study of dynamic capabilities as every client delivery of the Units turned out to be a form of new product development. An acknowledgement is noticeable in all their strategic missions that competitive advantage can only be maintained by keeping the pace with, and even anticipating, rapid technological changes. Unit A is committed to maintaining its frontrunner position, while Units B and C learned to leverage external developments into core resources. Either primordial (part of the original unique positions), or secondary (induced by the pressure to adapt), research activities are a core asset and delivery in each Unit. All in all, the Units create value in a Schumpeterian environment of innovation-based competition.

But technology is not the only source of environmental change: markets function on the logic of demand and supply, and all Units experienced influences from the cycles of boom and recession in the global economy. There are two main reasons for this: (i) their markets are, by and large, global; (ii) the final products of the industry are sensitive to oil market evolutions. One of the most fluctuating commodities of today, oil is at the same time of strong present and future focus, and this perpetuates stable demand for the Units' service delivery.

Thus, the findings for the three Units, both together and at the level of their individual developments provide a good frame for the exploration of "the ability of firms to achieve new and innovative ways of competitive advantage" (Teece et al., 1997) in response to rapidly changing environments. First, each sub-case turned out sufficiently individual in its path dependent business re-invention to allow cross-case comparison of distinct approaches to otherwise closely related service deliveries. Second, their affiliation to the same MNC provided the ground for an exploration of the role of the internal learning network and the distinct organisation relational assets in shaping distinctive competence.

*The Central Role of Competence and Commitments*

The proposed research model was built on the assumption that, for the selected case: (i) the competence base was *the* core resource, and (ii) the capability to build, integrate and reconfigure the competence base was critical. This approach is strongly supported by the findings: when asked what the vital resource was in their Unit, 100% of the interviewees returned answers describing the competence base. These answers ranged: from plain and simple "people", to human resources as carriers of competencies, to competence specificity ("specialist", "experienced", "competent" people) and configuration (varied competencies; aligned to strategic commitments), or even competence to learn and utilise other parties' competencies. Technological assets were considered only enabling even when they were unique, while reputational, organisational and locational capital assets were acknowledged in relation to their role in building the competitive advantage.

In the process-based perspective of organisational definition and transformation, commitments were identified that explained both the configuration of assets and capabilities, and their alignment to the distinctive delivery. As the mediators between past dependencies and future opportunities, commitments were found to be at times in conflict. These areas of strategic tension were identified as the ones in need of transformation for successful business continuance or re-invention. Thus, the role of commitments was central for the chosen frame, and distinct commitments were identified in each Unit.

## 6.3 Implications for Research, Methodology, and Management Practice

*Implications for Research*

The integrative research model that was employed satisfied well the questions that the study intended to answer. First, it allowed for the exploration of the organisations' developments, positions and service deliveries, and facilitated a comprehensive understanding of the business models and their factors of influence. Several path dependencies and core domain commitments were identified, together with core rigidities and commitment conflicts or misalignments. The identification of the commitments for each of the self-defined core domains of strategy and competence development was very useful in sketching a radiography to enable comparative discussion. Second, the in-depth exploration of the organisational and managerial capabilities added to the understanding of formal and informal learning in deliveries of stickiness. The stress on reconfiguration and transformability in CD supported the understanding of the dynamics of these processes, rather than just a checklist of existing structure.

Recent concerns were voiced (Fosstenløkken, 2007) that the focus on competence present in literature and society in general, remains just that: "low priority of CD and little actual interest in enhancing CD" (p. 314) is specific of managers and employees in professional service firms. The findings of this study confirm that very few systematic processes are in place for CD. However, at declarative level CD is prioritised, and even acknowledged as the only source of competitive advantage, independent of its expert, collaborative or synergic architecture, intra- and inter- organisations. It can be suggested that the lack of systematisation may simply give the impression that CD is overlooked, which is in turn a path dependency enforced by the high degree of stickiness of the knowledge embedded in each delivery. Very match specific forms of human capital activation and of creating knowledge-sharing capability are utilised for CD: by interesting work scope for experts; by performance in flexi-roles, and seniority; by a culture of socialisation and leadership by personal example. These "systems" create specific commitment profiles, both at the individual level (combination of high or low, affective, normative and continuance commitments); and at the level of the organisation (core domain commitments). Thus, an affirmation is observed of the central role of commitments as mediators between: (i) positions and capabilities, (ii) path dependencies and distinctive competence.

At the micro-level, firm- and task- specificity and the adaptation of the resulting taxonomy to competencies in subsidiaries of MNCs helped in interpreting the competence profiles of each Unit, their commonalities and divergences in competence development and transfers. The selection of organisation structure and culture elements as determinants of learning further explained the context in which capabilities activate, from centralisation and formalism to actual measurement of knowledge-sharing capability effects.

It is hereby suggested that this thesis accomplished the research aims to contribute by a multi-case approach to further understanding of the competence development and transfer processes, as the critical capability to deliver knowledge-combination intensive services in dynamic environments. The thesis contributes yet another empirical exploration of process-based transformation in firms, through another application of the theoretical frame and model that Butler suggested for the integration of a behaviourist perspective to dynamic capabilities. Further understanding the phenomena requires further research, including studies that would address cases of only one nationality, as in cross-border cases there may be influences from national cultures.

*Implications for Methodology*

The semi-structured interviews were an appropriate tool for the largely exploratory investigation, and returned comprehensive insights. The decision to measure a selection of competencies, structural and cultural elements of organisational character, and the three-component commitments by means of a survey was an appropriate way to anchor interview findings in objectivity. Overall, findings from interviews and surveys complemented each other well. Besides the limitations of these approaches as discussed in the methodology chapter, an important constraint was the manageability of data. From data collection, to analysis, and then several rounds of synthesising, the process is sinuous, and demanding; then, justice could not be made by reporting the rich data in its full complexity. This is why it may be appropriate for research papers, but unappealing in managerial practice, as discussed in the next section. However, perhaps the most interesting learning related to methodology is that the employees know what sort of transformation is needed. It is only for the management to ask them; it took just a very small number of interviews to identify the potential areas of transformation and compile them into a survey question. Confronted with these options, the respondents as a group identified the area in need of prioritising.

*Implications for Management Practice*

The integrative theoretical framework and research model provide comprehensive, in-depth insights in organisational and managerial practices, including constraints (from resource endowment to cultural features, for example), facilitators (such as commitments and human capital activation systems) and investments in competence development and transfers. To this end, the concept of competence base is useful. But on the downside, the approach is largely unpractical due to the long time for designing customised research tools, and for data collection and interpretation. However, one of the research intentions of this thesis was to offer a base for the identification of main areas of managerial intervention for this particular case study. This aim was met in at least three directions: (i) cross-Unit learning effects from the general handbooks of business and practice, since the Units behave as fairly independent entities; (ii) the assessment of competencies allows for competence gaps to be identified and for the initiation of coordinated CD planning; (iii) by having identified general and specific direction of needed transformation.

## References


Alavi, M. and Tiwana, A. (2003) Knowledge Management: The Information Technology Dimension, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 104-21

Allen, N.J. and Meyer, J.P. (1996) Affective, Continuance, and Normative Commitment to the Organization. An Examination of Construct Validity. *Journal of Vocational Behaviour,* 49: 252-76

Argyris, C. (1990) *Overcoming Organisational Defences. Facilitating Organisational Learning.* New Jersey: Prentice Hall, Inc.

Barney, J.B. (1991) Firm Resources and Sustained Competitive Advantage. *Journal of Management,* 17(1): 99-120

Barney, J.B., Wright, M., and Ketchen Jr., D.J. (2001) The Resource-based View of the Firm: Ten Years After 1991. *Journal of Management,* 27: 625-41

Becker, H.S. (1960) Notes on the Concept of Commitment. *The American Journal of Sociology,* 66(1): 32-40

Birkinshaw, J. (1998) Corporate Entrepreneurship in Network Organizations: How Subsidiary Initiative Drives Internal Market Efficiency. *European Management Journal,* 16 (3): 355-64

Brown, J. and Duguid, P. (2002) Local Knowledge: Innovation in the Networked Age. *Management Learning,* 33(4): 427-37

Bryson, J.R, Daniels, P.W., and Rusten, G. (2004) Design Workshops of the World: The Production and Integration of Industrial Design Expertise into the Product Development and Manufacturing Process in Norway and the United Kingdom. Working paper. Bergen; Birmingham: Institute for Research in Economics and Business Administration; The University of Birmingham (UK)

Butler, T. (2002) Building IT Resources in Post-Industrial Organisations: Cases on the Development and Application of IT Competencies. Unpublished PhD thesis. University College Cork, Ireland (http://afis.ucc.ie/tbutler/PhD.htm)

Butler, T. (2005) Integrating Dynamic Capability and Commitment Theory for Research on IT Capabilities and Resources. Paper 90. ECIS 2005 Proceedings

Butler, T. and Murphy, C. (2007) Understanding the Design of Information Technologies for Knowledge Management in Organisations: A Pragmatic Perspective. *Info Systems*, 17: 143-63

Caroll, J.S., Rudolph, J.W., and Hatakenaka, S. (2003) Learning from Organisational Experience, in M. Easterby-Smith and M. A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 575-600

Cohen, A. (2007) Commitment Before and After: An Evaluation and Reconceptualisation of Organisational Commitment. *Human Resource Management Review*, 17: 336-54

Cornuel, E. (2009, March 09). Co-operations and Alliances Between Companies: The Hybrid Organisations. Lecture. Paris: HEC School of Management

Davis, F. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3): 319-40

De Holan, P.M. and Phillips, N. (2003) Organisational Forgetting, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 393-409

Dewey, K. (1938) *Experience and Education.* New York: Macmillan

Dibella, A.J. (2003) Organisations as Learning Portfolios, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 145-60

Døving, E. and Nordhaug, O. (2002) Learning Firm Specific Knowledge and Skills: Conceptual Issues and Empirical Results. Working Paper no. 20/02. Bergen: Institute for Research in Economics and Business Administration (SNF AS)

Eisendhardt, K.M. and Martin, J. A. (2000) Dynamic Capabilities: What Are They? *Strategic Management Journal*, (special issue), 21(10;11): 1105-21

Fosstenløkken, S.M. (2007) Enhancing Intangible Resources in Professional Service Firms. A Comparative Study of How Competence Development Takes Place in Four Firms. Series of dissertations 2/2007. Oslo: BI Norwegian School of Management

Gooderham, P. (1995) [untitled] Review of Human Capital in Organisations: Competence, Training and Learning. by Odd Nordhaug. *Administrative Science Quarterly*, 40(3): 528-30

Gooderham, P.N. and Nordhaug, O. (2003) *International Management: Cross-boundary Challenges*. Malden: Blackwell Publishing Ltd.

Grant, R.M. (1997) The Knowledge-based View of the Firm: Implications for Management Practice. *Long Range Planning*, 30(3): 450-54

Grønhaug, K. and Nordhaug, O. (1992) Strategy and Competence in Firms. *European Management Journal*, 10(4): 438-44

Hamel, G. (1991) Competition for Competence and Inter-Partner Learning Within International Strategic Alliances. *Strategic Management Journal*, 12: 83-103

Hamel, G. and Prahalad, C.K. (1996) Research Notes and Communications: Competing in the New Economy: Managing Out of Bounds. *Strategic Management Journal*, 17: 237-42

Hayes, N. and Walsham, G. (2003) Knowledge Sharing and ICTs: A Relational Perspective, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 54-77

Hayes, N. and Walsham, G. (2001) Participation in Groupware-Mediated Communities of Practice: A Socio-Political Analysis of Knowledge Working. *Information and Organisation*, 11: 263-88

Henderson, R. and Clark, K. (1990) Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly*, 35(1): 9-30

Henderson, R. and Cockburn, I. (1994) Measuring Competence? Exploring Firm Effects in Pharmaceutical Research. *Strategic Management Journal*, 1563-84

Hildre, H.P., Mork, O. J., and Æsøy, V. (2008) *The Design Factory. From Single Products to Design of Effective Product Families - Experience Scientifically Adapted to New Methodology*. AAlesund: Aalesund University College

House, R., Javidan, M., and Dorfman, P. (2001) Project GLOBE: An Introduction. *Applied Psychology: An International Review,* 50(4): 489-505

Hsu, I-C. (2006) Enhancing Employee Tendencies to Share Knowledge - Case Studies of Nine Companies in Taiwan. *International Journal of Information Management,* 26: 326-38

Kim, S. and Lee H. (2006) The Impact of Organizational Context and Information Technology on Employee Knowledge-Sharing Capabilities. *Public Administration Review*, May-June: 370-85

King, W.R., Chung, T.R., and Haney, M.H. (2008) Knowledge Management and Organizational Learning, *Omega*, 36(2): 167-72

Klein, J.H. (2008) Some Directions for Research in Knowledge Sharing. *Knowledge Management Research and Practice*, 6: 41-46

Kogut, B. and Zander, U. (1992) Knowledge of the Firm. Combinative Capabilities, and the Replication of Technology. *Organization Science*, 3(3): 383-97

Kolb, D.A. (1984) *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, N.J.: Prentice-Hall

Lave, J. and Wenger, E. (1991) *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press

Lenney, P. and Easten, G. (2009) Actors, Resources, Activities and Commitments. *Industrial Marketing Management*, 38: 553-61

Leonard-Barton, D. (1992) Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development. *Strategic Management Journal*, (special issue), 13: 111-25

Levitt, B. and March, J. (1988) Organisational Learning. *Annual Review of Sociology*, 14: 319-40

Li, S-T. and Tsai, M-H. (2009) A Dynamic Taxonomy for Managing Knowledge Assets, *Technovation*, 29: 284-98

Løwendahl, B.R. and Revang, Ø. (1998) Challenges to Existing Strategy Theory in A Postindustrial Society. *Strategic Management Journal*, 19(8): 755-73

Løwendahl, B.R., Revang, Ø., and Fosstenløkken, S.M. (2001) Knowledge and Value Creation in Professional Service Firms: A Framework for Analysis. *Human Relations*, 54(7): 911-31

McGrath, R.G., MacMillan, I.C., and Venkataraman, S. (1995) Defining and Developing Competence: A Strategic Process Paradigm. *Strategic Management Journal*, 16: 251-75

Meyer, J.P., Allen, L.N., and Smith, C.A. (1993) Commitment to Organizations and Occupations: Extension of a Three-Component Conceptualization. *Journal of Applied Psychology*, 78(4): 538-51

Meyer, J.P. and Herschovitch, L. (2001) Commitment in the Workplace. Toward a General Model. *Human Resource Management Review*, 11: 299-326

Mowday, R.T. (1998) Reflections on the Study and Relevance of Organisational Commitment. *Human Resource Management Review*, 8(4): 387-401

Nonaka, I. (1994) A Dynamic Theory of Organisational Knowledge Creation. *Organisational Science*, 5(1): 14-37

Nonaka, I. and Konno, N. (1998) The Concept of "Ba": Building a Foundation for Knowledge Creation. *California Management Review*, 40(3): 40-54

Nonaka, I. and Takeuchi, H. (1995) *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press

Nonaka, I., Toyama, R., and Konno, N. (2000) SECI, *Ba* and Leadership: A Unified Model of Dynamic Knowledge Creation, *Long Range Planning*, 33(1): 5-34

Nordhaug, O. (2007, September 27). Competencies in MNCs. Lecture. Bergen: Norges Handelshøyskole (NHH)

Nordhaug, O. (1993) *Human Capital in Organisations. Competence, Training, and Learning*. Oslo: Scandinavian University Press

Oliver, P. (2008) *Writing Your Thesis* (2nd Ed.). London: Sage

Padula, G. and Dagnino, G.B. (2007) Untangling the Rise of Coopetition. The Intrusion of Competition in a Cooperative Game Structure. *International Studies of Management and Organisation*, 37(2): 32-52

Plaskoff, J. (2003) Intersubjectivity and Community Building: Learning to Learn Organisationally, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management*. Oxford: Blackwell Publishing. pp. 161-84

Polanyi, M. (1966) “Tacit Knowledge”, in Prusak, L. (ed.), *Knowledge in Organizations*, Boston, MA: Butterworth-Heinemann. pp. 135-46

Porter, M. E. (1998) Clusters and the New Economics of Competition. *Harvard Business Review*, 77-90

Porter, M.E. (1980) *Competitive Strategy*. *Techniques for Analysing Industries and Competitors.* New York: Free Press

Porter, M. E. (1990) *The Competitive Advantage of Nations*. Worcester: Billings and Sons ltd.

Roberts, J. (2000) From Know-how to Show-how? Questioning the Role of Information and Communication Technologies in Knowledge Transfer. *Technology Analysis and Strategic Management*, 12(4): 429-43

Rusten, G. and Bryson, J.R. (2005) Understanding the Production and Consumption of Design Expertise by Small Medium-Sized Firms: Some Evidence from Norway. Working Paper No 32/05. Bergen: Institute for Research in Economics and Business Administration

Selznick, P. (1957) *Leadership in Administration: A Sociological Interpretation*. New York: Harper and Row

Siemsen, E., Roth, V.A., and Balasubramanian, S. (2007) How Motivation, Opportunity, and Ability Drive Knowledge Sharing: The Constraining-Factor Model. *Journal of Operations Management*, 26: 426-45

Simon, H.A. (1991) Bounded Rationality and Organizational Learning. *Organization Science*, (special issue), 2(1): 125-34

Sommers, M.J. and Birnbaum, D. (1998) Work-Related Commitment and Job Performance: It’s also the Nature of the Performance That Counts. *Journal of Organizational Behavior*, 19(6): 621-34

Steers, R.M., Mowday, R.T., and Shapiro, D.L. (2004) The Future of Work Motivation Theory. *Academy of Management Review*, 29(3): 379-87

Steyrer, J., Schiffinger, M., and Lang, R. (2008) Organizational Commitment - A Missing Link Between Leadership Behavior and Organizational Performance? *Scandinavian Journal of Management*, 24: 364-74

Szulanski, G. (2000) The Process of Knowledge Transfer: A Diachronic Analysis of Stickiness. *Organizational Behavior and Human Decision Processes*, 82(1): 9-27

Szulanski, G. and Capetta, R. (2003) Stickiness: Conceptualising, Measuring, and Predicting Difficulties in the Transfer of Knowledge within Organizations, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 513-34

Tallman, S., Jenkins, M., Henry, N., and Pinch, S. (2004). Knowledge, Clusters, and Competitive Advantage. *Academy of Management Review*, 29(2): 258-71

Teece, D.J. (2000) Strategies for Managing Knowledge Assets: the Role of Firm Structure and Industrial Context, *Long Range Planning*, 33(1): 35-54

Teece, D.J., Pisano, G., and Shuen, A. (1997) Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7): 509-33

Truran, W. (1998) Pathways for Knowledge: How Companies Learn Through People. *Engineering Management Journal*, 10(4): 15-20

Tsai, W. (2002) Social Structure of "Coopetition" Within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing. *Organization Science*, 13(2): 179-90

Tsoukas, H. (2003) Do We Really Understand Tacit Knowledge?, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 410- 27

Van Wijk, R., Van den Bosch, F.A.J, and Volberda, H.W. (2003) Knowledge and Networks, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 428-53

Venzin, M., Rasner, C., and Mahnke, V. (2005) *The Strategy Process. A Practical Handbook for Implementation in Business*. Frankfurt/Main: Campus Verlag GmbH.

Vera, D. and Crossan, M. (2003) Organisational Learning and Knowledge Management: Toward an Integrative Framework, in M. Easterby-Smith and M.A. Lyles (ed.), *The Blackwell Handbook of Organisational Learning and Knowledge Management.* Oxford: Blackwell Publishing. pp. 122-41

Von Krogh, G. (2002) The Communal Resource and Information Systems. *The Journal of Strategic Information Systems*, 11(2): 85-107

Wasko M.M. and Faraj, S. (2000) "It Is What One Does": Why People Participate and Help Others in Electronic Communities of Practice. *The Journal of Strategic Information Systems*, 9 (2;3): 155-73

Wiig, K.M. (1997) Integrating Intellectual Capital and Knowledge Management *Long Range Planning*, 30(3): 323-24; 399-405

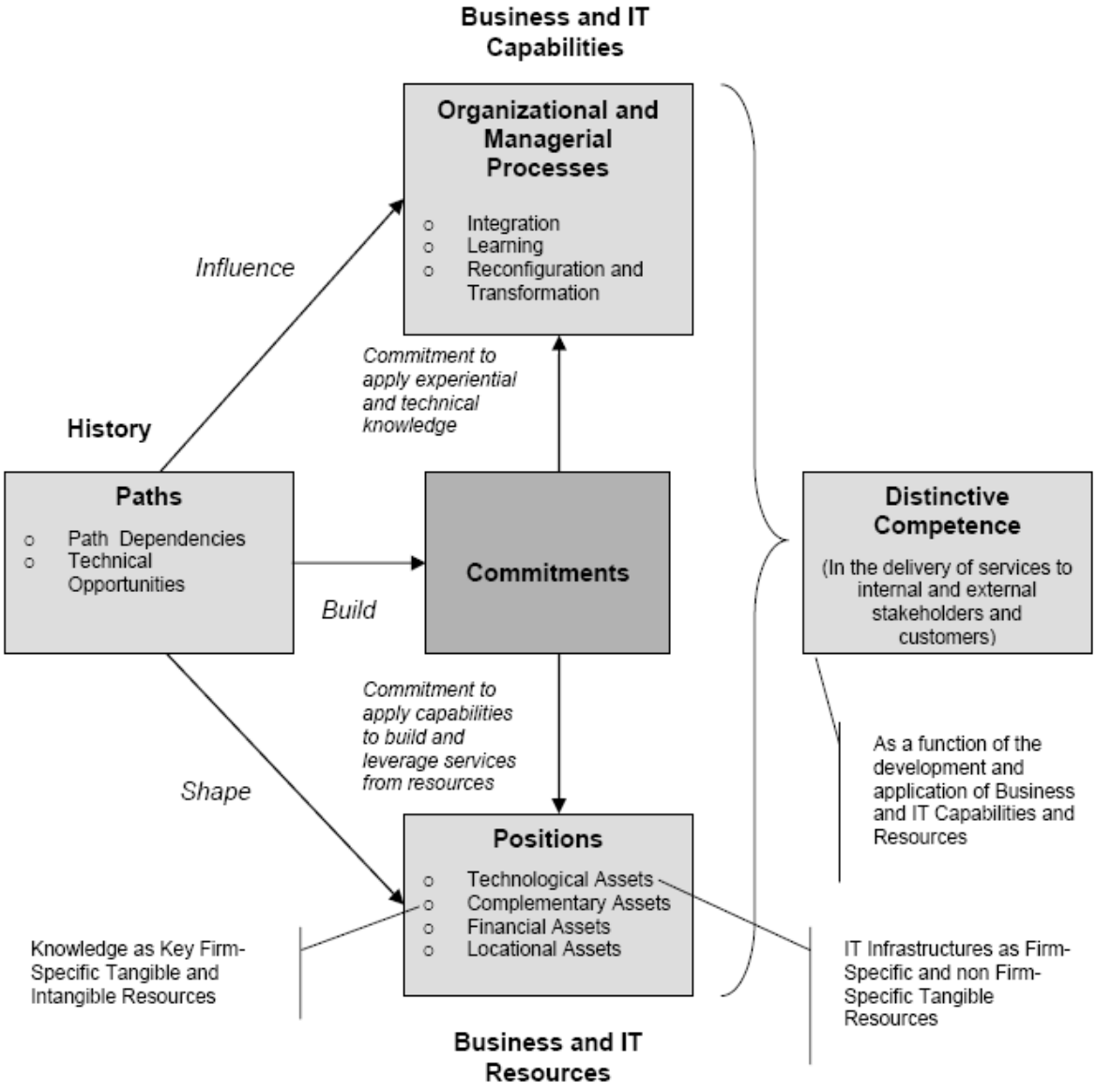
Yin, R.K. (1994) *Case Study Research: Design and Methods* (2nd Ed.). London: Sage

Zander, U. and Kogut, B. (1995) Knowledge and the Speed of Transfer and Imitation of Organisational Capabilities. *Organisational Science*, (focused issue: European Perspective on Organisation Theory), 6(1): 76-92

Zollo, M. and Winter, S.G. (2002) Deliberate Learning and the Evolution of Dynamic Capabilities. *Organisational Science*, 13(3): 339-51

## List of Figures

**Appendix 1** Original Research Model (Butler, 2005; 2002)




An Integrative Theoretical Model for Understanding the Development and Application of IT Capabilities and Resources (Butler, 2005: 6)

Appendix 2 The Interview Guide

## Step 1: Introduction

Presentation of myself, the study and its purpose. Ask if they received the information sheet for the interviewee. Reiterate about anonymity and the tape recorder. Answer questions about these issues, if any.

*Interview no*_____ : Date_____Time_____Duration_____

Venue_____ Type (face-to-face/ phone/ video call) Firm_____

NB: Firm = the Unit: A [name of Unit A], B [name of Unit B] or C [name of Unit C]

## Step 2: Personal background

q.1-4. What is your name/ job title/ age? Which department do you work for?

Name _____ Age _____

Job title _____ Dept:_____

Gender M ☐ F ☐

q.5 What is your educational background?

q.6 Did you work anywhere before your employment in this firm? Please describe briefly your career path.

q.7 When did you start working for this firm? Please describe how you were employed and why you chose to work for this firm.

q.8 Does anyone else in your family or any of your close friends work in the maritime industry?

## Step 3: Terminology clarification

q.9 Before we move on with the next line of questions, I would like to clarify the concept of *competence*, as it is used in this study:

*competence* = knowledge, skills and aptitudes (potentials, abilities) that can be used at work.

## Step 4: The Organisation

### A. History and industry

q.10 Can you tell me a bit about the history of the firm, with focus on any moments of special significance for the development of the firm?

q.12 How would you describe the industry/ business in which the firm operates?

### B. Service delivery and strategy

q.13 What is the service delivery/ product of this firm? q.14 What is special about it? Why should/ do customers come to this firm to get it?

q.15 What can you tell me about the strategy of this firm? How does this strategy fit with the overall strategy of [regional MNC name]? q.16 In your view, what are the most important challenges for this firm in the future? What about [regional MNC name]?

q.18 The following are the deliverables of [regional MNC name]: [deliverables]. Which one you believe corresponds best with your *firm* and why? q.19 What is your definition/ view of *hands-on management*?

### C. Key resources

q.20 What sorts of resources are vital in order to deliver the service/ product? Can you name and describe a few?

q.21 Can you think of any other key resources, either a) Technological, b) Human, c) Customer related, d) Locational or e) Organisational (for ex. *internal processes or systems*)? (NB: the enumeration to include the ones not mentioned by the informant in q.20)

q.22 Which ones are the most important resources?

## Step 5: Work processes (*Integration*)

**Please describe your activity/ work. What do you do?**

q.24 What types of competences are needed to perform this work? q.25 Which of these competences are specific to this firm only? Which are specific only to [regional MNC name] ?

q.26 When you were employed, how did you know what to do? q.27 What do you start with when you are assigned a new project? How long does it normally take to finalise your work on a project?

q.28 How are new products developed? In what ways are you involved? Who else has an influence and how?

q.29 What is the role of *innovation* in new product development? Can you estimate a percentage of how much of the work is *innovation*? q.30 What about *standardisation*?

q.34 In your work, did you ever feel that you just "re-invented the wheel"? Why did that happen?

q.32 Is new product development the result of team effort? How does the team work and how is it designed/ formed? q.33 How would you describe your experience with team work? What do you think about your teams' work routines?

q.35 What would you change in your activity to improve the results of your work? q.36 What do you think it can be done overall to improve service delivery?

**Step 6: Learning and transfer processes**

q.37 In your view, did you develop your competence since you are in this job? How did that impact on your work?

q.38 What was done by the firm to support you in developing your competencies? q.39 Do you take actions to develop your competence, independent of company initiatives and work situations?

q.40 Do you collaborate with other people during your work? Whom and how? (*to ask about people outside the firm if not mentioned/ to skip the question if answered at step 5) q.41 Do these collaborations contribute to your competence development? How?

q.42 Can you think of a situation when you learned something useful to you in your work? Please describe. (for ex. found out something new, or had an idea for improvement, or detected an error etc.)

q.43 Can you think of any factors that *facilitate* your competence development? q.44 Can you think of any factors that *constrain* your competence development?

q.45 What is it done to ensure that lessons learned in the course of a project are passed along to others that may need such knowledge?

q.46 Does the firm have databases to store important project information that could be of relevance in other projects? (Do you think such databases are possible to construct?) Would/Are such databases be useful to you in your work? How?

q.47 In your view, what could be done to improve competence development in this firm?

q.48 Can you think of any situation when competence loss occurred in the firm?

**Thank you!**

***Concluding remarks:*** Is there anything you would like to add to what we discussed earlier?

What do you think about the questions asked?

**Close the interview**

**Appendix 3** The Information Sheet for the Interviewee

## *Information sheet for the interviewee:*

- **What is the purpose of the research?**

- The interview is part of the research for a master's thesis in *International Business* at NHH (Norges Handelshøyskole)
- The purpose of the research is to study *competence development and transfer processes in relation to collaborative design in three units in [regional MNC name],* and my advisor is Prof. Dr. Philos. Odd Nordhaug
- The questions asked will concern the company in general, your personal background and work processes in your activity

- **How long will the interview last?**

- 60-90 minutes

- **Where will it take place?**

- Your own office or a room where we will not be disturbed/ via phone or video-call when this is not possible

- **How is the interview conducted?**

- Interview may be a too strong word: it will be just an open discussion
- In order for me not to miss important information for research, it will be tape recorded

- **What happens with the information provided?**

- The only person that will listen to the tapes is me; the tapes will be destroyed when the research is finished
- The content of the tape will be transcript with no reference to the name of the person (just subject A, B, C etc.)
- Any quotation that will be used in the thesis will be void of any content that can trace it to the person who said it (like specific activity, job title etc.)

## **Appendix 4** The Web-based Survey

Hello,

My name is Sanda-Oana Neagu, and I'm a Master of International Business and International Management student at NHH (Norwegian School of Economics and Business Administration). This questionnaire is part of my master's thesis research on competence development and transfer processes in relation to collaborative design in three units in [name of regional MNC].

My advisor is Prof., Dr. Philos. Odd Nordhaug, and almost 20 specialists from [name of Unit A], [name of Unit B] and [name of Unit C] were interviewed already (December 2008-January 2009) for the purpose of this research.

Your answers to the survey are anonymous. The only personal information you are required to specify is in which of the above mentioned [name of regional MNC] units you are employed, for how long you've been employed in that unit, and if your position involves managerial responsibilities or not.

Your feedback is very valuable in order to extend and complement the information received from the interviews to a company-wide level, and it should take only 10-15 minutes. **Please answer by the end of the month (31st of March) by clicking on the link below:**

**[**the link**]**

Thank you very much for your time and support! With best regards,

Sanda-Oana Neagu

**Personal information**

Position of managerial responsibility: YES ☐ NO ☐

Unit: [name of Unit A] ☐ [name of Unit B] ☐ [name of Unit C] ☐

Duration of employment in your unit: for < 1 year *(tick here)* ☐

for > 1 year, specify the number of years ☐

**Section A**

**1. Rate yourself on a scale of 1 to 7 (1=very weak and 7=very strong) for the following competencies:**

| | Very weak | | | Neither weak nor strong | | | Very strong |
|---|---|---|---|---|---|---|---|
| -Delivery, presentation skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Negotiation and sales skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Project management skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Prioritizing, time management | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Technical, engineering skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Communication and interpersonal relationship skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Ability to perform in a team setting | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Problem solving skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Ability to be creative, to innovate | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Ability to learn and transfer knowledge | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -Ability to manage change and transition | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**2. Rate the following statements, from 1 to 7, according to how strongly you agree or disagree:**

| | Strongly disagree | | | Neither disagree nor agree | | | Strongly agree |
|---|---|---|---|---|---|---|---|
| -I believe people from other cultures/ countries can be strange | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -I adapt easily to other cultures | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -I deal regularly with clients, colleagues etc. of other nationality than mine | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| -I travel often to clients, colleagues etc. in foreign locations | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**3. If you've been working abroad, please specify for how long (in number of months)**

☐ months

**4. Fill in the lines below with the languages in which you can, at least, have a conversation, starting with your mother tongue (**for ex**. 1.** [language 1]**; 2.** English**):**

1. … 2. … 3. … 4. ….

## Section B

**1. Rate the following statements, from 1 to 7, according to how strongly you agree or disagree:**

| | Strongly disagree | | | Neither disagree nor agree | | | Strongly agree |
|---|---|---|---|---|---|---|---|
| - I can take little action until my supervisor approves the decision | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - If I want to make a decision without consulting my supervisor I am quickly discouraged | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I rarely participate in decisions on adopting new policies or programs | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - In my unit, there is a culture where learning is hindered by trees with large shadows under which nothing can grow well | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I communicate with other employees through informal meetings | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - In my work, I interact and communicate with other people outside the organization | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I actively participate in teamwork/project work | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**2. If you should describe the working environment in your unit in only 3 to 6 words, which words would you chose:**

| | | | | | |
|---|---|---|---|---|---|
| 1)… | 2)… | 3)… | 4)… | 5)… | 6)… |

## Section C

**Rate the following statements, from 1 to 7, according to how strongly you agree or disagree:**

| | Strongly disagree | | | Neither disagree nor agree | | | Strongly agree |
|---|---|---|---|---|---|---|---|
| - I feel that employees are promoted to higher positions not for years of work but for competencies and performance | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - Individual or team-based performance is measured with fairness | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - This organization provides me with fair opportunities for advancement and rewards based on performance | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I feel that there are clear incentives or a well established rewards system designed to encourage employees to share knowledge with coworkers | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I am interested in further personal and professional development through educational activities/ training | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## Section D

**Rate the following statements, from 1 to 7, according to how strongly you agree or disagree:**

| | Strongly disagree | | | Neither disagree nor agree | | | Strongly agree |
|---|---|---|---|---|---|---|---|
| - My colleagues regularly share their know-how, information and knowledge with me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I always find useful information on the company intranet | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I regularly use our organization's databases and/or other electronic data management systems | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## Section E

**Rate the following statements, from 1 to 7, according to how strongly you agree or disagree:**

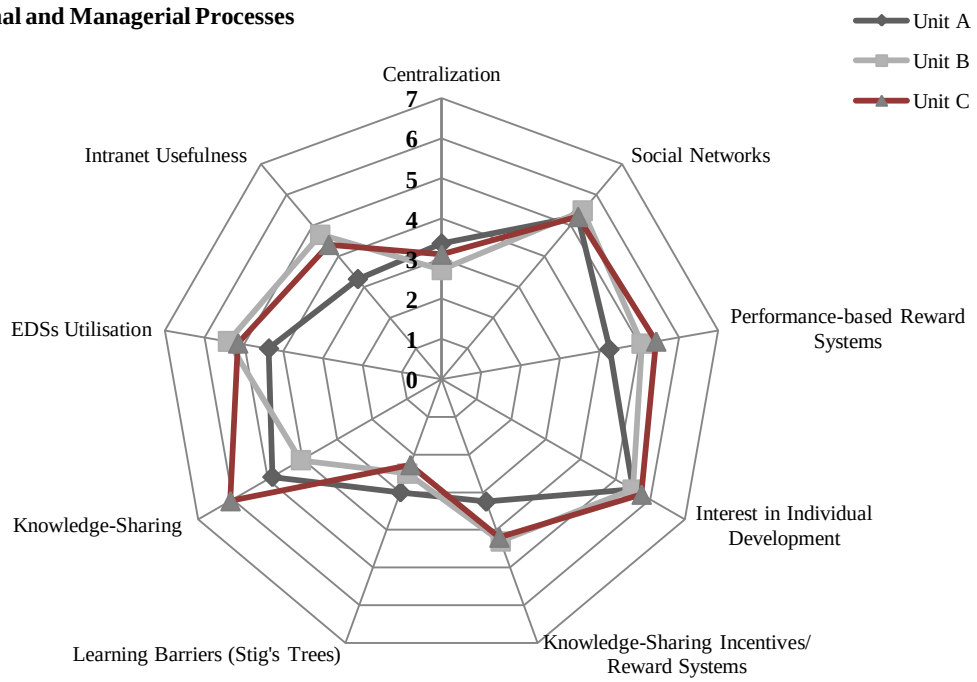
| | Strongly disagree | | | Neither disagree nor agree | | | Strongly agree |
|---|---|---|---|---|---|---|---|
| - I would be very happy to spend the rest of my career with this organization | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I really feel as if this organisation's problems are my own | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - This organization has a great deal of personal meaning for me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - Too much of my life would be disrupted if I decided I wanted to leave my organization now | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I feel that I have too few options to consider for leaving this organization. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - If I had not already put so much of myself into this organization, I might consider working elsewhere | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| - Even if it were to my advantage, I do not feel it would be right to leave my organization now | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - This organization deserves my loyalty | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - I would not leave my organization right now because I have a sense of obligation to the people in it | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

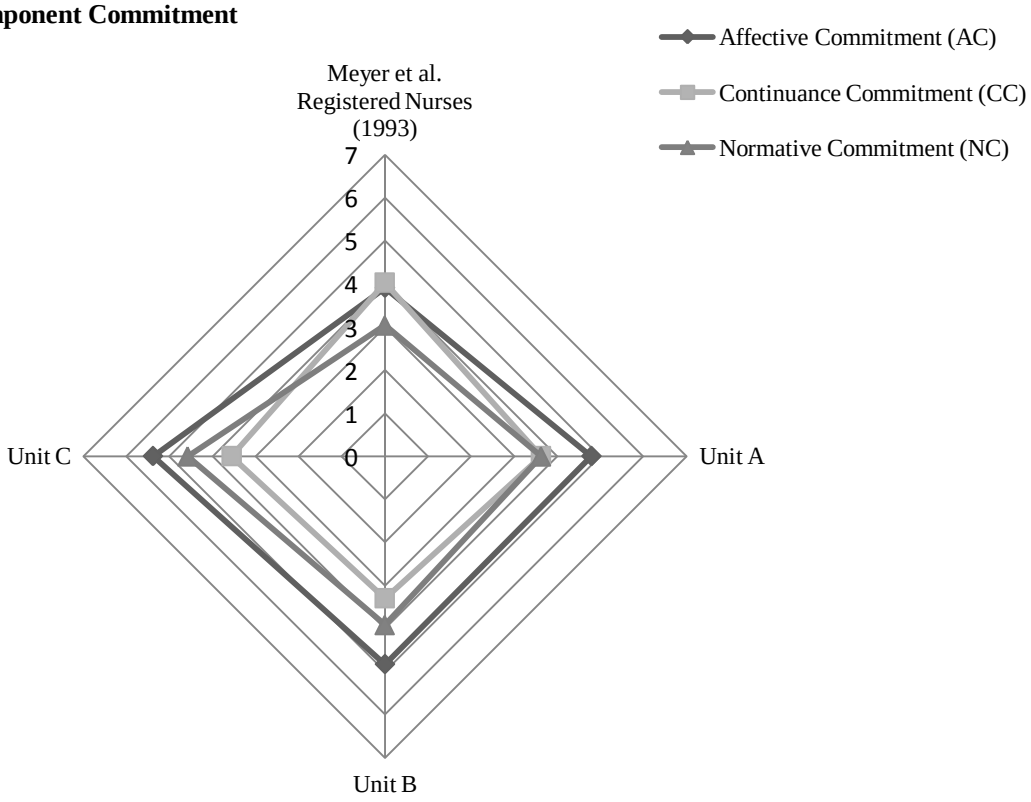
**F. In your opinion, which of the following should be made a priority in your unit:**

- Integration and mentoring for junior engineers and new employees
- Sharing lessons learned in the course of one project with others who were not directly involved in that project
- Encourage employee participation in courses, seminars, conferences etc.
- Take measures to minimize the loss of skills and knowledge associated with competent people leaving the company
- Encourage a more open environment between co-workers for sharing knowledge and helping out each other
- Have more systems/ procedures in place for work processes (team and project work, new product development, quality assurance and standards enforcement)
- None of the above

**Orgsanisational and Managerial Processes**




**Three-Component Commitment**



**Appendix 6** Work Environment Culture by Characteristic Expressions

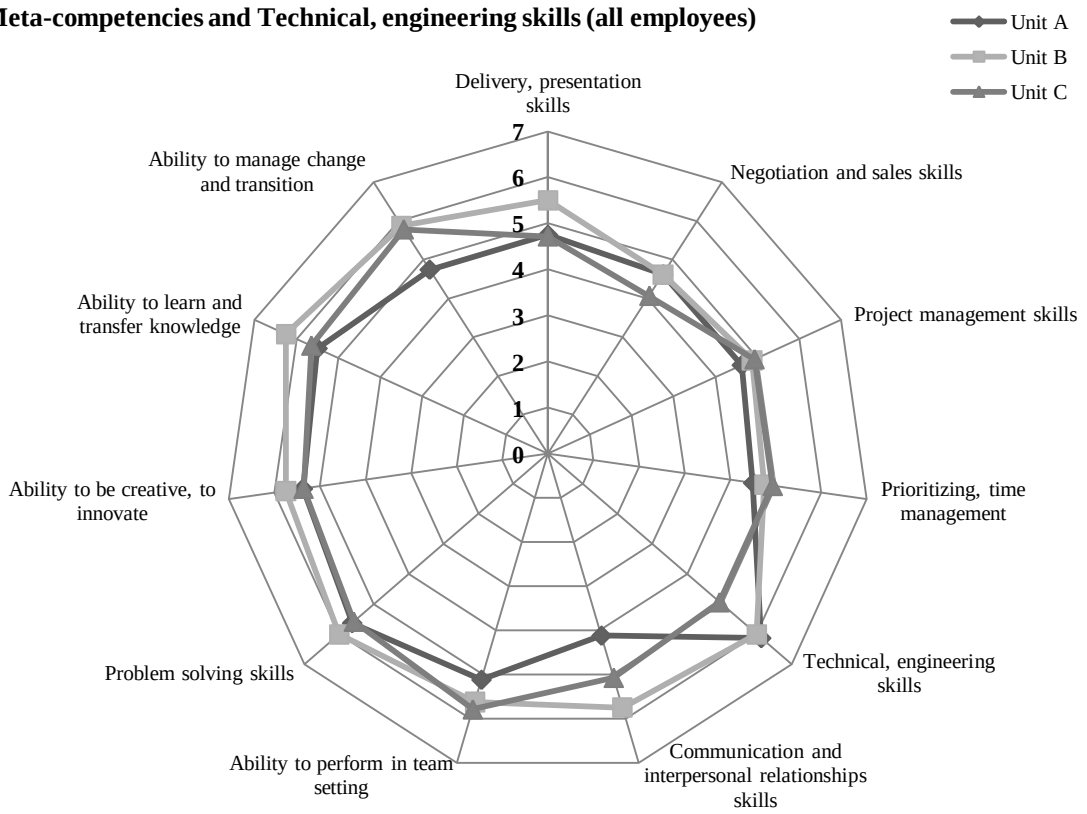
If you should describe the working environment in your unit in only 3 to 6 words, which words would you chose:

| **Unit A**<br>- words/ expressions per person: 2.88 | **Unit B**<br>- words/ expressions per person: 2.63 | **Unit C**<br>- words/ expressions per person: 3.00 |
|---|---|---|
| Challenging | Efficient | Positive |
| Busy | Interesting | Good atmosphere |
| Interesting | Friendly | Pleasant people |
| Chaotic | Innovative | Fantastic |
| Skilful | Collaborative | Customer oriented |
| Open Minded | Teamwork | Creative |
| Interesting | Good | Flexible |
| Disordered | Limited opportunity | Solution oriented |
| Challenging | Cooperation | Dynamic |
| Inspiring | Fast-pace | Engineering |
| Innovative | Teamwork | Good management |
| Sometimes shortsighted | Informative | Good teaching |
| Sometimes too market oriented | Strong | Exciting |
| Expert-oriented | Positive | Innovative |
| Problem-oriented | Open | Interesting |
| Individualistic | Challenging | Rewarding |
| Good spirit | Strong in management | Great responsibility |
| Mixed | Lack of experience | Challenging |
| Skilled | Broad | Hectic |
| Mostly remore with foreign people | Deadline driven | Effective |
| Motivated and professionally skilled people confused | Good environment with open peoples | Relaxed |
| Co-operative | | Focused |
| Non-hierarchy | | Innovative |
| | | Fun |
| | | Innovative |
| | | Hectic |
| | | Dynamic |
| | | Informal |
| | | Kind |
| | | Discouraging |
| | | Informative |
| | | Fun |
| | | Including |
| | | Good |
| | | Stressed caused by absent of planning |
| | | Busy |
| | | Friendly |
| | | Solution oriented |
| | | Youthful |
| | | Eager |
| | | Positive atmosphere |
| | | Energetic |

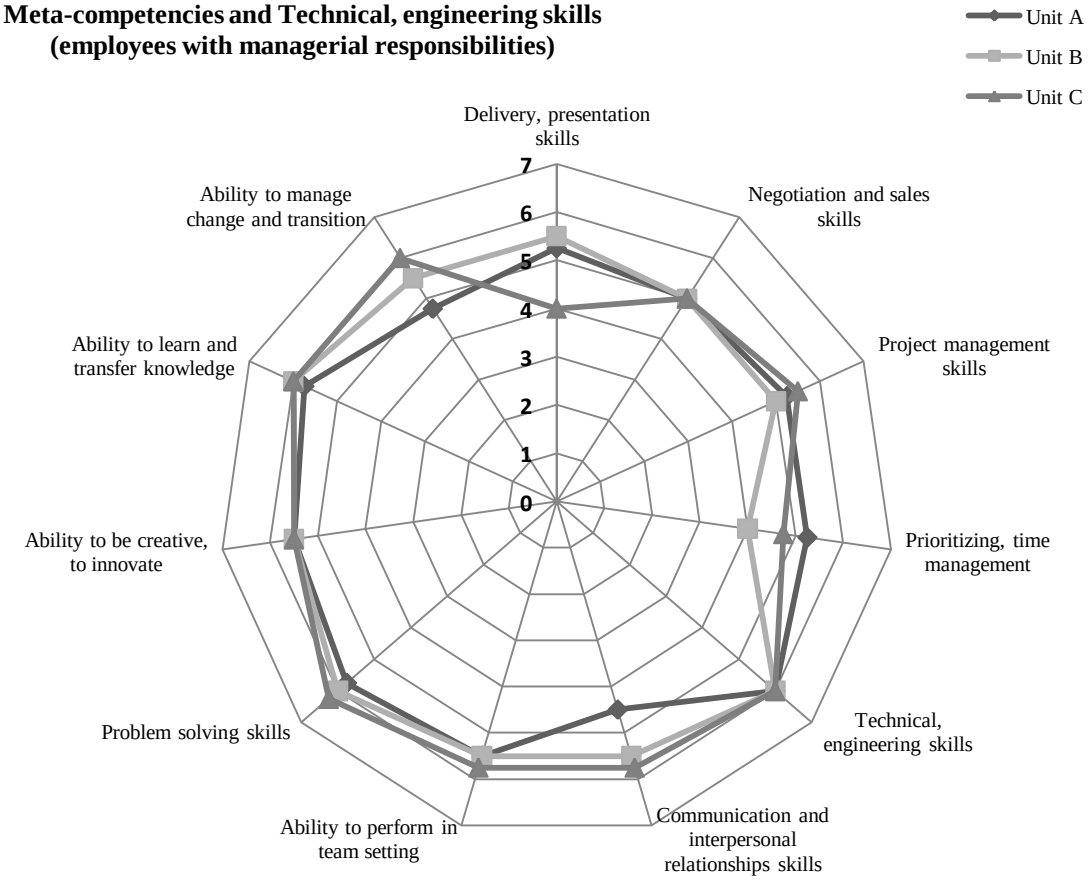
*Note*: Answers from all employees, shown in random order

## **Appendix 7** Self-Assessment of Meta-Competencies and Technical, Engineering Skills

**Meta-competencies and Technical, engineering skills (all employees)**

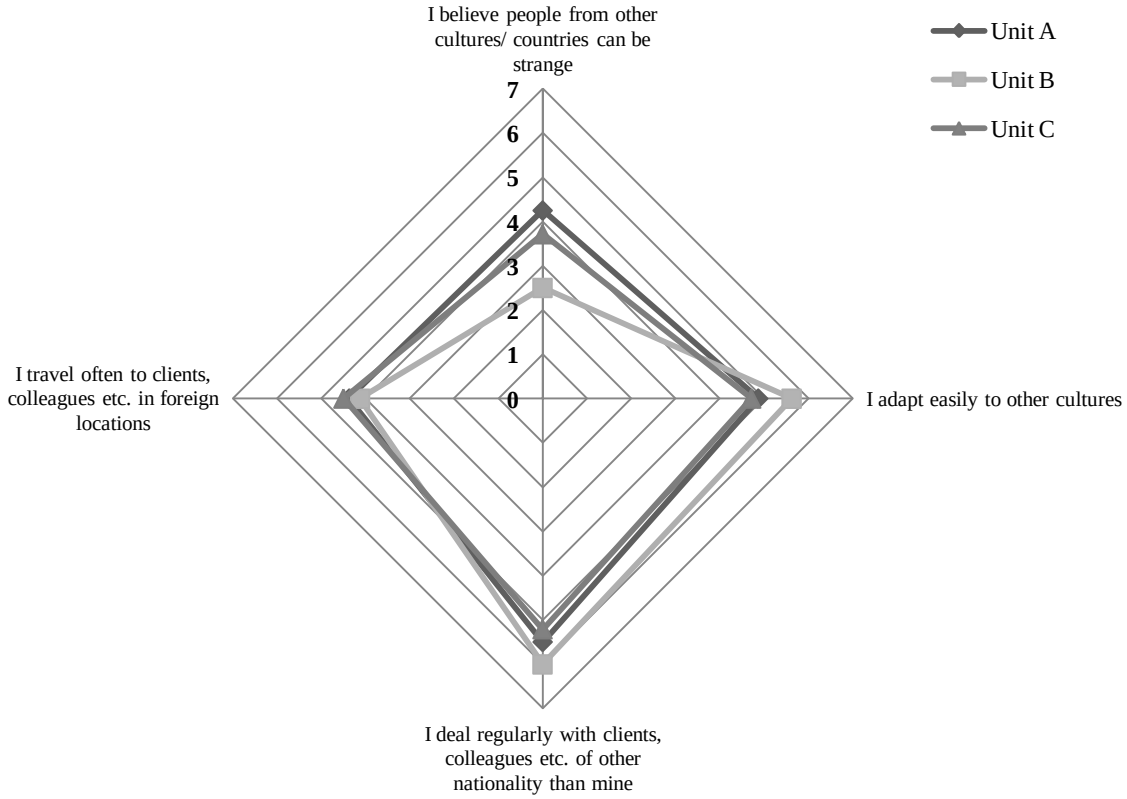



**Meta-competencies and Technical, engineering skills (employees with managerial responsibilities)**



## **Appendix 8** Cultural Diversity Openness Index

**Multiculturalism, all employees**




**Multiculturalism, employees with managerial responsibilities**