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DOCTEUR DE L'ÉCOLE POLYTECHNIQUE

Domaine: **Sciences Economiques et Sociales**

Spécialité : **Sciences de Gestion**

par

ĐOÀN CẨM TÚ

Sujet de la thèse:

**THE ROLES OF MANAGEMENT CONTROL SYSTEMS
TO IMPLEMENT STRATEGIC CHANGE: THE CASE OF
INDUSTRIAL SERVICE OPERATIONS**

Soutenue le 31/01/2008 devant le jury composé de :

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L'École Polytechnique n'entend donner aucune approbation, ni improbation aux opinions émises dans les thèses. Ces opinions doivent être considérées comme propres à leur auteur.

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ĐOÀN Cẩm Tú

Abstract

This thesis investigates how managers use the management control systems as levers of strategic change. This question is interesting both from a theoretical and a practical viewpoint.

The investigation is focused on the case of industrial service operations. The specificities of this sector - immaterial flows, heterogeneous competences, customer involvement - make its environment particularly unstable. Meanwhile, the information technology era forces the service companies to continually carry out strategic change to create a sustainable competitive advantage.

Simons (1995, 2000)'s lever-of-control framework is used as starting point. This framework proposes two extreme benchmarks to classify management control systems: interactive versus diagnostic systems depending on the degree of involvement of the top management.

This thesis develops two new ideas: firstly, that the framework of analysis could be extended to cover four dimensions: the management tool, the organizational structure, the use of control system, and the compensation system; secondly, it explores how all four dimensions interact in practice.

The tool dimension originates from the managerial literature on control systems. It emphasizes the importance of the horizontal coordination of the material flows from suppliers to customers. The organisational dimension comes from the literature on project management, which enlarges this coordination issue to new products and new services. The compensation dimension has already been introduced by Simons, though this dimension has rarely been explored in practice.

Two case studies are used to explore the relevance of this grid. The analysis covers several years in which strategic changes occurred, making explicit how these changes were translated into the four dimensions of our grid. It appears that some configurations along these four dimensions are more efficient than others. A more efficient configuration simultaneously exhibits some interactive and diagnostic features. This balanced approach, which we characterize for industrial service companies, is offered as an interesting idea to be explored in future research. Consequences in terms of the role of the controller are also discussed.

Keywords: management control systems, interactive control, diagnostic control, service industries

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GENERAL INTRODUCTION

The research question

This thesis investigates how managers use the management control systems as levers of strategic change. This question is interesting both in theoretical and practical viewpoints. Firms operate in an increasingly turbulent environment caused by technological, social, political, and ethical change. Otley (1994) called for studying management of change which relates to methods of planning and developing flexibility to cope with change. Research that investigates the dynamics of change should contribute to management control research (Covaleski et al., 1996; Luft, 1997).

Earlier research on the role of management control systems in implementing strategic change pays little attention on *how* management control systems are used in organization undergoing strategic changes (Abernethy, 1999; Shields, 1997; Langfield-Smith, 1997). It is interesting to study how change occurs, who initiates it, what constrains it, and which mechanisms should be used to facilitate it (Kelly & Amburgey, 1991).

The investigation is focused on the case of industrial service operations. More precisely, the investigation has taken place at INEO Suez, a subsidiary of the Suez group, that specializes in providing electricity and telecom services for transport networks and buildings. The specificities of this sector - immaterial flows, heterogeneous competences, customer involvement - make their environment particularly unstable. Meanwhile, the information technology era forces the service companies to continually carry out strategic change to create a sustainable competitive advantage. Consequently, a radical shift occurs in the ways they manage and measure success (Schlesinger & Heskett, 1991; Karmarkar, 2004; Heskett et al. 1994).

Industrial service companies face operational questions such as:

- How to effectively monitor projects of different size and different scope?
- How to efficiently coordinate heterogeneous competences related to technical and commercial knowledge all through a value chain that remains largely unobservable to the top management?

A study on the process of strategic change in such companies appears as an interesting area to develop new insights on the role management control systems to implement strategic change.

Main findings

Simons (1995, 2000)'s lever-of-control framework is a fruit of ten-year research after a stream of many case studies (186 semi-directive interviews) and quantitative surveys (162 companies) in different US and Canadian industries. His lever-of-control framework has strong concentration on strategic issues (Ferreira & Otley, 2003). And it opens "a useful wider framework" and gives "a complete picture of a wide range of possible controls" (Otley, 2003:317). The control systems do not only serve to reduce the divergence of interests but also communicate senior management's orientations to subordinates and thus facilitate learning. Their roles are also extended to coordinate efforts, rather than only measure performance (Berland & Sponem, 2005).

Simons provides two extreme benchmarks to classify the use of management control systems: interactive versus diagnostic. One of the main dimensions¹ for this distinction is the degree of involvement of the top management. In the interactive benchmark, top managers deeply involve themselves into the process (e.g. interpreting data by themselves, regularly challenging their subordinates) while in the diagnostic benchmark they remain at a distance (e.g. book presentation, or accountability of subordinates).

The compensation dimension has already been introduced by Simons (i.e. formula-based for diagnostic process and contribution-based for interactive process), though this dimension has rarely been explored in practice.

This thesis develops two main new ideas: firstly, that the framework of analysis of management control system should not be limited to the use of control system and the compensation system, but could be extended to cover two other dimensions: the organizational structure and the management tool; secondly, it explores how all four dimensions interact in practice. Such an interaction introduces a balanced approach combining both interactive and diagnostic features as another important benchmark.

These ideas will be discussed in reverse order.

¹ Other remaining dimensions are content of discussion, type of discussion, and involvement of operational managers.

A balanced use of control systems

A number of authors have investigated the actual use and the related benefit of interactive control system in strategy emergence, strategy implementation, innovation, organizational learning, and company performance (e.g. Obsorn, 1998; Abernethy, 1999; Bisbe and Otley, 2004; Davila, 2000). However, some drawbacks have also been identified.

Simons (1995, 2000) points out that without due care, participants in the interactive control process may feel threatened by the active interest and participation of senior managers; hence the threat of embarrassment can ruin learning. And such involvement requires the important investment (both in cost and time). Simons (1987) proposed the top management “not to usurp the decision rights of subordinates. Similar to Simons, Bibse et al (2007) put forth the need of “non-invasive, facilitating and inspirational involvement” to reduce the threat of embarrassment.

In fact, although a number of debates on the impacts of top managers’ involvement on organization performance have been initiated a long time ago, the results are often contradictory (Besson et al. 2004).

Let’s take the budget² as an example. Otley (1978) “found positive relations between emphasis [on pressure of managers] and managers’ budgetary performance” (Hartmann, 2000:454). While Hopwood (1972:161) argued that “too much budget emphasis would not only cause disagreement and conflict, but would also be ineffective”.

Effectively, “organizational and environmental variables make the measurement of performance relationship extremely difficult” (Simons, 1994:184).

It is worthwhile to observe that most empirical studies follow Simons (1995, 2000) on the separate use of control systems: either interactive control or diagnostic control. Such a dichotomy may prevent a necessary enrichment. A joint use of control system³, if used in a balanced manner, may provide a potential solution in reducing the drawbacks of interactive control.

² The budget, though often used as a diagnostic system, can be used as an interactive control system (cf. Appendix 1 – “Diagnostic and Interactive budgetary control”, Simons, 1991).

³ e.g. interactive control at top management and diagnostic control at middle one or vice versa (Haas & Kleingeld, 1999; Tuomela, 2005).

A joint and balanced use of interactive and diagnostic control systems tends to have a positive impact on company's performance in the high level of strategic change (Adebayo, 2007; Henri, 2006a). A diagnostic use of control system facilitates the application of interactive use (e.g. facilitation of strategic dialogue throughout organization) (Haas & Kleingeld, 1999). A joint use provides a possibility for trade-off between contradictory tensions (Marginson, 2002).

Henri (2006a) proposed some following hypotheses. The positive effects of interactive use may vanish due to insufficient use of diagnostic control to set boundaries and to highlight effectiveness issues, or due to excessive diagnostic use which constrains innovation and risk taking. A balanced use can create a dynamic tension which ensure and intensify positive effects of interactive control on capabilities such as innovativeness, organizational learning, entrepreneurship, market orientation. Such a use also fosters organizational dialogue, enhances creativity, and focuses organizational attention, thus becomes an important lever of strategic change. The result of Henri (2006a)'s quantitative study confirms his hypothesis only for firms in high environmental uncertainty. But once again he did not provide a pattern of a balanced use of control system in strategic change.

Other authors have indeed argued in that direction, but their arguments are often elusive in terms of what is actually meant by "balanced" use (Adebayo, 2007; Haas & Kleingeld, 1999; Henri, 2006 a, b; Marginson, 2002).

To foster a more articulate definition of balanced use we shall explore the literature on project management. Project management, and in particular the management of project portfolio, has gone through an internal revolution that shares the same starting point of the management control literature: the inadequacy of traditional accounting systems (Johnson and Kaplan, 1987). The specificities of the industrial service sector make this detour particularly attractive. It will provide substance for the roles of organisational design and how the managers (from top to middle) and interface actor involve themselves into the process. Our case studies will then demonstrate the validity of this enriched framework.

A three-dimension grid for the analysis of management control systems

Ponssard & Saulpic (2006) extended Simons' framework by making explicit the Tool dimension. Simons (1995, 2000) often emphasized that the only difference between the diagnostic control and the interactive control situates in the use of control system, not in the tool that they rely on. Ponssard & Saulpic suggest that an interactive process would more

naturally rely on a customized tool and a diagnostic process on a generic tool. Their arguments are based on a review of the actual management tools that have appeared in the recent past (such as Balanced score cards, EVA, ABC costing).

The compensation dimension has already been introduced by Simons (i.e. formula-based for diagnostic process and contribution-based for interactive process), though this dimension has rarely been explored in practice.

As already mentioned, the literature on project portfolio management reveals the key role of organizational structure to understand the interaction between the top manager and the project teams.

As a result, we suggest analyzing the roles of a management control system in the implementation of strategic change through a four-grid dimension: use of control system, management tool, compensation system, and organizational structure. Our case studies will then demonstrate the validity of this enriched framework.

Role of the actors in the use of management control system

Our results also lead to a proposal to clarify the role of the different actors in the use of Management Control Systems according to the type of use and to the type of issue at stake when the system is used interactively.

According to Simons (1995, 2000), for a diagnostic use of control system, the main actors are the gatekeepers (like accountants, sales planners, engineers, and quality control expert management controllers), who are in charge to focus the attention of the line managers on the negative variances; and for an interactive use, the main actors are operational managers (down to three or four levels in the organization). Although he also stressed the important roles the middle managers, he did not much indicate the patterns of motivation and behaviour necessary for middle managers to fulfill these expectations.

The recent research project management literature exhibits a new function – PMO (project management office) – when there is a need of coordination between different projects. In one of our case studies, a new position was created in a context where the main stakes were to coordinate different entities and to implement strategic changes. We thus suggest differentiating between three situations:

- A diagnostic use, where the main actor has a role of identifying the important variances in order to save managerial time while guaranteeing the implementation of planned strategy. According to Simons, this role is usually fulfilled by a gatekeeper,
- An interactive use, when the main issue is a vertical dialogue on strategic uncertainties. In this case, the main actor has a role of communicating and interpreting the results on one main strategic uncertainty. According to Simons, this role is fulfilled by line manager.
- A balanced use, when the main issues are coordination and strategic governance. In this case, the main actor has a role to coordinate some key decisions between operational entities and interpret strategy and search for strategy implementation. According to the project management literature, this role must be fulfilled by a specific function of PMO actors. In our case study, it was fulfilled by an actor which was hierarchically dependent from the CEO of the different entities, but had no hierarchical power on these entities. Let's name this actor as an interface actor, who manages the interfaces between top management and operational management, and among functional services, or among different entities.

It is interesting to draw from the recent research on PMO actors in the project management literature to explicit the new roles of these interface actors. It suggests giving the interface actors a function of strategic governance (through a legitimate power) to make them become a facilitator. Actually, most researches consider an interface actor at best as only a coordinator who does not have a function of strategic governance.

This dual set of functions, according to Thiry & Deguire (2007), consists of 1) strategic governance and coordination (i.e. interpreting strategy and offering the means to reformulate, update, and implement strategy), and 2) administrative governance (i.e. collecting data, optimizing efforts, setting standards and procedures, consulting, training). The actual researches on interface actors emphasize on their administrative functions and mostly ignore their functions relating to the strategic governance and coordination.

The positions of interface actors, that is actors that play a role similar to the one we defined, are often so delicate that their implementation often fails or has only a short life (Kendall & Rollins, 2003; Mottis, 1993; Moisdon & Weil, 1992). Some frequent causes of failures are: 1) they fail to demonstrate their tangible value; 2) other employees perceive interface actors as information hunters for top management; 3) the formula-based compensation systems

aggravate the negative regards on interface actors because the latter are seen as a threat – most often too authoritative; 4) interface actors locate too low in the organization structure; or 5) interface actors neglect the interests of top management.

PMO's often locate at the position of middle managers, thus they can use their advantages to have positive impacts on the joint use and then significantly contribute to strategic change. Huy (2001) pointed out some strengths of middle managers such as having value-adding entrepreneurial ideas, leveraging the informal networks, and managing the tension between continuity and change, which helps to avoid chaos or inertia. In our own formulation:

- Interface actors can have value-adding entrepreneurial ideas about how to grow and change a business. Because they are close to day-to-day operations, customers and frontline employees, but far enough away from frontline work that they can see the big picture, which allows them to see new possibilities, both for solving problems and for encouraging growth.
- Interface actors can be better than most senior executives at leveraging the informal networks at a company that make substantive, lasting change possible. In addition to their powerful webs of relationships, interface actors can explain the radical changes in language of his people would understand, thus “sell” the idea of change in a friendly way. Sometimes, barriers to change are senior managers. Interface actors, closer to ground, understanding outside market pressures as well as internal capabilities and sensitivities, can evaluate feasibility and relevance of proposed change.

Interface actors can influence on the implementation of the balanced approach of management control system. In addition to the administrative tasks, they also search for interpreting strategy, implementing it, facilitating dialogue and learning in the organization functions. Neither too close nor so far to top management and front-line management, the interface actor can analyze the daily issues in both viewpoints, thus give a boost on collective interests.

The question of whether these roles (strategic governance, coordination, and administrative tasks) must be fulfilled by different actors or whether a single actor can have three different roles remains to be better studied.

Thesis structure

The thesis consists of a general introduction, four chapters and a general conclusion. The general introduction and the general conclusion recapitulates the main findings and provides avenues for future research. Chapter 1 gives a general presentation of the current state of research on the use of management control systems for implementing strategic change. Chapter 2 revisits the management project literature from our research perspective. Chapter 3 describes our investigation process. Chapter 4 provides an extensive discussion of our two case studies.

Chapter 1 studies the relationship between the strategic change and the management control system. In this chapter we give our definition of strategic change, review the literature on interactive control systems and the diagnostic control systems, and as well as what have been said on their joint use.

We define the concept of strategy through three different aspects: strategy content (Porter, 1980, 1985; Miles & Snows, 1978, 1986), strategy-making process (Mintzberg, 1978, 1985, 1987), and strategy implementation. Despite their interdependence, our study emphasizes the strategy implementation, in particular the roles of top managers and middle managers (Huy, 2001a, 2002b; Porter & Lorsch, 2004) and the management control systems (Burns & Vaivio, 2001).

To study how the managers use the management control systems as levers of strategic change, we select the Simons (1995, 2000)'s concepts of interactive and diagnostic control system. An analysis on the different works of Simons through the framework of Bibse et al. (2007) and of Ponsard & Saulpic (2006) is done. The result of this clarification enables to have a new look on a joint use of control systems, and then advance towards a balanced joint use. The comparison of three case studies (Simons, 1994; Tanguy, 1989; and Tuomela, 2005) illustrates the theoretical concepts and opens a new perspective to formulate the concept of "a balanced use". This perspective will be confirmed and further elaborated through the following chapters.

Chapter 2 focuses on a limited part of the project portfolio management literature. We analyze the frequent challenges faced by the new management control approach as applied to a project oriented organization. They involve the organization of horizontal interaction among experts, the monitoring of heterogeneous activities by top management, and the roles of controller to capitalize the knowledge (Mottis, 1995; Demeestère et al., 2002). The findings indicate that

the project-based organization often deals with such challenges through customized and generic tools (Sanchez, 1995; Wheelright & Sasser, 1989; Wheelright & Clark, 1992; House & Price, 1991), a special mode of use of control systems (Bowen et al., 1994; Takeuchi & Nonaka, 1986), a specific type of organizational structure (Nonaka, 1988, 1994; Ackoff, 1989), and a compensation system oriented toward intrinsic motivation (Mahaney & Lederer, 2006; Raghu et al., 2003). A new actor, namely as PMO actor (Thiry & Deguire, 2007; Dai & Wells, 2004), is created to facilitate the horizontal and vertical interactions.

Chapter 3 presents our framework resulting from the two preceding chapters. A four-dimension framework used to analyze the management control system in strategic change comprises use of control system, management tool, compensation systems, and organizational structure. The investigation process will be detailed through 6 steps (Yin, 1984, 1994, 2003; Einsenhardt, 1989): getting started, selecting cases, crafting instruments and protocols, entering the field, analyzing data and reporting data, and reaching closure. We discuss how the problems of cooperation were overcome.

Chapter 4 presents our two case studies – Hi-Tech and Electra. Both of them are subsidiaries of INEO Suez and experienced strategic changes (in 2002 and 2006 for Hi-Tech, and in 2003 for Electra) after the arrival of the new top managers. Both managers were under the important pressure of performance improvement, searched for facilitating the interactivity and the communication, but had implemented the strategic change by different manners. While the Hi-Tech's top manager intensively involved in the project management, the Electra's peer preferred to take a moderate involvement in the commercial process. Although both searched for exploiting the advantages of vertical and horizontal coordination, one employed a matrix structure (i.e. Hi-Tech), another created a new position – an interface actor (i.e. Electra). Both created some new customized tools to facilitate the interactivity. And the compensation systems are also varied: mainly objective, formula-based for Hi-Tech (2002-2006), but mainly subjective, compensation-based for Electra. Consequently, the results of strategic change of two case studies are also different.

In conclusion, these analyses confirm the relevance of our four-dimension analysis grid. And they also demonstrate the interaction of four dimensions, which in turn makes explicit a pattern of a balanced approach.

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Chapter 1:
REVIEW OF THE
MANAGEMENT
CONTROL LITERATURE

Introduction of the chapter 1

The chapter One reviews the relationship between management control systems and strategy following the suggestion of Johnson & Kaplan (1987). These authors indeed recommended that the strategy process be (re-)positioned at the heart of management control, for the relevance of this discipline.

The objective of this chapter is twofold. First, it defines the essential dimensions to form a diagnostic control system or an interactive control system (i.e. properties of control systems) A system can be only considered as interactive or diagnostic if it owns all dimensions. Such a definition aims to avoid the confusion of system identification and enable to have a better distinction between the interactive control system and diagnostic control system.

Second, it also demonstrates the important roles of the joint use of diagnostic control system and interactive control system, especially in strategic change. In fact, most actual researches following Simons (1995, 2000) focus on the separate use of control systems, thus ignore their potential interdependence and articulation. The positive effects of the joint use are only revealed recently by Henri (2006a). Our objective is to study how the interactive control systems and diagnostic control systems are articulated and interdependent.

The structure of the chapter One is as follows. The section 1 provides a synthesis of the management control evolution since the early attempts to “renovate” management control theory and practices that took place in the 1990s (Kaplan, 1994; Otley, 1995, 2003). This literature can be classified into two broad categories. The first one, which is the dominant one, studies the new accounting techniques (such as Balanced Scorecard, Economic Value Added, Activity-Based Cost), while the second one studies the use of management control (like levers-of-control of Simons, 1995, 2000). According to Otley (2001), the first approach emphasizes too much on “accounting”, “control” and “strategy formulation”. Again, management control faces the risk of irrelevance. The second approach thus concentrates more on “management” and strategy implementation”. This chapter will focus on one dimension of the relationship between management control and strategy: the one that occurs when organizations face a strategic change. It builds on the approach developed by Simons on the use of management control systems.

The section 2 briefly reviews the notion of strategic change. The strategy concept will be studied through three viewpoints: strategy content, strategy-making process, and strategy implementation.

The section 3 analyzes in details Simons's concepts of interactive control and diagnostic control. It will be argued that the differentiation between interactive and diagnostic control systems, as originally defined by Simons, remain somewhat ambiguous, in particular relative to the characteristics of the tools and/or the compensation schemes that support each system. This triggers the need of further research. Another issue relates to the separate use or the joint use of interactive and diagnostic control systems. Simons suggests a separate use whereas some authors suggest a joint use. They argue that the system may be used interactively by the middle managers and diagnostically by the top management (or vice versa). The open questions in the section 4 will end up this chapter.

The remaining of this introduction provides an overview of the chapter.

Strategic change

Strategic change is usually defined as change in strategy (Ginsberg, 1988). It consists of the change in strategy content or strategy-making process at the corporate or business level. Huy (2005) extended the Ginsberg's (1988) initial definition on strategic change. He included the changes in structure, systems, and personnel, which are nominated as "the implementation of strategy".

The content of strategy means the company's generic strategy as cost leadership, differentiation, or focus (Porter, 1980, 1985), or its strategic positions as Prospector-Defender-Analyzer (Miles & Snow, 1978). Mintzberg (1978, 1985, 1987) pointed out different strategy-making processes through the concepts of deliberate strategy and emergent strategy, and of strategy as 5P. The top management and middle management actively contribute to implement a strategy. Management control systems also play a key role to drive organizational transformations (Chenhall & Euske, 2007). The role of management accountants is also changed from a simple "controller", "scorecard keeper" to a "business support" or "internal business consultant" or "hybrid accountant" (IMA, 1999 ; Coad, 1999 ; Grandlund and Lukka, 1997, 1998a).

Concepts of Interactive versus diagnostic control systems

While many researchers look for tool modernization, Simons focuses his research on how senior managers can use control systems to implement and develop business strategy.

His lever-of-control framework has strong concentration on strategic issues (Ferreira & Otley, 2003). And it opens “a useful wider framework” and gives “a complete picture of a wide range of possible controls” (Otley, 2003:317). The control systems do not only serve to reduce the divergence of interests but also communicate senior management’s orientations to subordinates and thus facilitate learning. Their roles are also extended to coordinate efforts, rather than only measure performance (Berland & Sponem, 2005).

On the basis of Bisbe et al. (2007)⁴ and Simons (1995, 2000)’s, the interactive control systems may be characterized through three following dimensions:

- intensive, frequent and personal attention and involvement of top managers. Despite its intensive implication, subordinates/middle managers in interactive control systems have much more reduced autonomy than those in diagnostic ones. Their main roles are to collect information (up, down or sideways). It provides a balance between active attention of top managers and decision rights of subordinates,
- face-to-face debate, dialogue and challenge,
- concentration on strategic uncertainties.

On the other side, the diagnostic control systems consist of:

- attention-conserving for top managers, except for goal negotiation, management-by-exception. Subordinates are accountable for results and have the freedom to choose how to achieve them,
- no direct frequent discussion, or only document presentation,
- concentration on critical performance variables.

Ponssard & Saulpic (2006) propose to focus on involvement of management, tool design, and compensation systems. Given the essential roles of tool design (Otley, 2001; Ponssard, 1994; Tanguy, 1989; Tuomela, 2005) and compensation systems (Simons, 1995, 2000; Ponssard &

⁴ We would like to express our profound gratitude to Professor Robert Simons and Professor David Otley for their precious helps. Professor R. Simons recommended us to take into account the result of the paper of Bisbe et al. in our analysis, and Professor D. Otley sent us the preliminary version of this paper in 2005.

Saulpic, 2006), we employed these two dimensions, in addition to the use of control systems, to characterize a control system in strategic change.

Outcomes of separate use or joint use of MCS

A management control system, in Simons's viewpoint, is used either diagnostically or interactively, not both. The research literature is more open on this point.

Most of researchers focus on a separate use of diagnostic control and interactive control (Simons, 1990, 1994; Abernethy & Brownell, 1999; Davila, 2000; Bisbe & Otley, 2004), only some researchers stress a joint use of diagnostic control and interactive control (Haas & Kleingeld, 1999; Otley & Ferreira, 2005; Tuomela, 2005; Henri, 2006; Adebayo, 2007).

In the viewpoint of the separate use, the interactive control systems, according to Simons (1995, 2000), allow facilitating strategy emergence and organizational learning, while the diagnostic control systems help to communicate and then implement intended strategy. Others extended the roles of interactive control systems. Interactive use of control systems may:

- Favour innovation in low-innovating firms but reduce innovation in high-innovating firms. But the style of use of management control systems influences the impact of innovation on performance both in low- and high-innovating firms. The interactive control helps to translate creativity into effective innovations and enhanced performance (Bisbe and Otley, 2004),
- Convert emergent strategies into useful action thanks to the combination with semi-formal information (Osborn, 1998),
- Influence on organizational performance. It is highest when a diagnostic (/interactive) use of budgets is matched with low (/high) levels of strategic change (Abernethy & Brownell, 1999).

In the viewpoint of the joint use, the latter means the same control system can be simultaneously used diagnostically at a higher level, but interactively at a lower level or vice versus (Haas & Kleingeld, 1999; Tuomela, 2005). A joint use may help:

- to implement contradictory tensions within the organization (Marginson, 2002)
- on one side, through an interactive implementation at the lower level, to intensify positive effects on innovativeness, organizational learning, entrepreneurship, market orientation (Henri, 2006a),

- on the other side, through a diagnostic implementation at the higher level, to enhance the interactive implementation at the lower lever (Haas & Kleingeld, 1999),

Simons (1994)'s case study will be compared with Tanguy (1989)'s and Tuomela (2005)'s to illustrate the different styles of use and their outcomes.

Simons illustrate how diagnostic and interactive control systems complement each other to implement a strategic change over time. Strategic change, always associated with the appointment of a new CEO, may differ in the mandate for change perceived by the manager: a “strategic turnaround” if the CEO is under significant pressure of performance improvement, a “strategic evolution” if the CEO has to continue pursuing the precedent success of the company.

In a strategic turnaround, the CEO may openly declare the failure of past strategies; they sequentially implement new beliefs, boundary, diagnostic control and interactive control systems. The two first systems enable to overcome the organizational inertia, while the diagnostic systems allow creating credibility through accountability. The interactive control systems help the CEO to capture the organizational attention and loyalty.

However, in a strategic evolution, as the CEOs are not supposed to openly criticize past strategies, diagnostic control is used as an initial step to promote change, then interactive control is introduced to implement the change all through the organization, beliefs systems and boundary systems are barely used. The manner to change over time from diagnostic to interactive control is demonstrated. The issue of vertical coordination between the top manager and the subordinates is dominant, while neither the horizontal coordination issue nor the need to elaborate a customized tool is mentioned.

Tanguy (1989) provides another way of management control use in strategic change. It concerns a strategic turnaround in a company operating in the Champagne sector. The company faced difficult coordination problems due to major uncertainties concerning both its outputs and its inputs. The new CEO triggered the creation of a customized tool. This tool facilitates the elaboration of strategies that would be both feasible (*i.e.* it would allow to bypass the climatic variability and be consistent with the regulatory constraints of the Champagne sector) and profitable. However he did not directly participate in the discussion with his subordinates, in particular as long as feasibility was concerned. His implication focused on the profitability of the proposed feasible strategies. The face-to-face meetings – to elaborate the feasible strategies - were only organized among cross-functional teams.

The involvement of the top management is neither as distant as typical of diagnostic control nor as intensive as typical of interactive control. It will be qualified as “moderate”. The involvement of the middle managers is typical of interactive control. Altogether, this case study illustrates the benefit of a use of management control system that simultaneously draws from diagnostic and interactive involvement of managers. Such a use can be qualified as “joint use”. The joint use of the new customized tool by all managers gave the same reference scenario for all actors; it facilitated dialogues, both vertically and horizontally. In this case study it will be seen that the management controller was legitimate to support this management control system.

The Tuomela (2005)’s case FinABB presents the interplay between interactive and diagnostic control. The *3K Scorecard*, a customized tool, was used interactively at top management’s level, but diagnostically at lower levels. The diagnostic control enables to clarify the goals, strategies and relevant key success factors, while the interactive control allows learning about all of them and searching for the ways to implement them. The roles that the business controllers played, either as a reporting accountant or coordination, are dependent on the willingness of operational managers.

Although such use of the *3K Scorecard* encouraged strategy emergence, learning and discussion, some resistances remained. The threat of embarrassment and time-consuming were the main challenges. The incentive systems were oriented toward intrinsic motivation – to encourage the desire of learning and discussion.

While Simons’ case study focused on studying top management level, Tanguy and Tuomela extended their research to lower levels. Simons argued that in the context of strategic change, one interactive control system is only used after diagnostic control systems. And the vertical coordination between the top manager and the subordinates is dominant, while neither the issue of horizontal coordination nor the need for a customized tool is mentioned.

Tuomela’ case study illustrated the possibility to use the same customized tool interactively at top management level, and diagnostically at lower level. Whereas Tanguy’s case study gave an inverse example: interactively at lower level and moderately at top management. Both researchers emphasized the essential roles of horizontal coordination and customized tools. The roles of management controllers, in both cases, are reinforced as the main coordinators, not as scorekeepers. They translated the intentions of top management to middle one, selected

the subject of discussion, animated the debate, and then transferred the results to the top management.

A new element of incentive systems implicitly appeared in Tuomela: intrinsic motivation – desire of learning and discussion. However, the interactive control provides a better visibility of actions, reduces the maneuvers of operational managers, and thus threatens them. And it requires an important investment in time and costs which is not easily supported by the organization. It seems that the joint use of a control system at different hierarchical level has not yet provided a satisfied lever of strategic change.

Henri (2006) argued that a balanced use of both diagnostic and interactive control systems allows amplifying the positive effects of both systems while reducing their negative effects. The key issue is to create a balanced use. What is the nature of such a use? The actual researches, in particular three above-mentioned case studies, have not yet provided the response. This will be one of our research objectives.

1. Evolution of Management control before and after Kaplan and Johnson (1987)

Management Control is often considered as “young” in comparison with other disciplines of management sciences (Zimnovitch, 1999; Malo & Teller, 1999; Hoper, 2001) even though “historians have demonstrated that accounting reports have been prepared for thousands of years”⁵ (Johnson & Kaplan, 1987:6).

⁵ Johnson & Kaplan (1987), in their book "Relevance Lost" regarded as an influential book concerning management accounting and control systems published to date (Ezzamel et al., 1990; Noreen, 1987), presented historical monographs on the evolution of management accounting systems.

- In the early 19th century: industrial accounting systems, as a consequence of the Industrial Revolution, had been born to support the profit-seeking activity of entrepreneurs by focalizing on conversion cost.

- 1880-1900: the scientific management movement created standard costs. Great advances in transportation and communication required an efficient coordination between logistical, conversion, and distribution activities of enterprises, so new measures like gross margin were created to motivate and evaluate the efficiency of internal processes.

- In 1920s, due to coordination problems between the diverse activities of vertically integrated and multidivisional organizations, DuPont Powder and General Motors "devised budgets to coordinate and balance the internal resource flux from raw material to final customer", and "developed a new measure, Return on Investment, to compare performance in the firm's diverse parts with performance of the whole" (Johnson & Kaplan, 1987:64). "By 1925 virtually all management accounting practices used today had been developed: cost accounts for labour, material, and overhead; budgets for cash, income, and capital; flexible budgets, sales forecasts, standard costs, variance analysis, transfer prices, and divisional performance measures"(Johnson & Kaplan, 1987:12). The 1980s saw the obsolescence of management accounting systems.

After a brief definition of management control, the reasons of emergence of “new” control systems will be discussed as a reaction towards the decline of pure accounting systems. This synthesis of the evolution of management control provides an overview of our research motivation.

Definition of “management control”

R.N. Anthony conceptualized Management Control Systems in 1965. His intention is to “broaden the scope of information being considered beyond just accounting information” and to bring “issues of managerial motivation and behaviour into view” (Otley, 1999:364-365).

“The management control process is the process by which managers of all levels ensure that the people they supervise implement their intended strategies” (Anthony & Govindarajan, 2004:4).

This definition, according to Berry et al. (2005), reflects Anthony’s current views on management control systems, which have some continuity with his original approach, but abandon some elements like:

“Management control is primarily a process for motivating and inspiring people to perform organization activities that will further the organization’s goal. It is also a process for detecting and correcting unintentional performance errors and intentional irregularities, such as theft or misuse of resources” (Anthony et al., 1989).

Strategy formulation, management control and task control have a distinct and hierarchical relationship.

“Management control fits between strategy formulation and task control in several respects... Strategy formulation focuses on the long run, task control focuses on short-run operating activities, and management control is in between” (Anthony, 1998:6).

Management control, hence, “rests very firmly in the domain of accounting” (Berry et al., 2005). The dynamic interplay between planning and control processes is ignored (Lowe & Puxty, 1989). Until 1985, the research on management control systems had been widely developed in financial accounting, particularly conventional cost accounting and in behavioural and organizational accounting (Otley, 2001).

Decline of pure accounting systems

Johnson and Kaplan (1987:1-15) pointed out a paradox: management control practices no longer provided information relevant for managers' planning and control decisions, while ironically "many senior managers began to believe they could run their firms 'by the numbers'". The last 60 years have been characterized by the decline of pure management accounting and the rise of financial accounting. Some main reasons are:

- There is divergence between the firm's performance and its performance indicators,
- The environment of the firm has become more and more turbulent. "Continuous change requires continuous adaptation" (Otley, 1994:292). But the traditional approach of management control systems fails to reply to the new requirement of organizational change. Since this approach "emphasized stability, control and efficiency and productivity of isolated machines, workers and departments. Budgets, standards and variance reporting were the primary tools to promote cost control" (Kaplan, 1994). Consequently, management accounting systems are thus "irrelevant to contemporary organizations, or even counter-productive to good management decision-making" (Otley, 2001),
- In spite of the increased attention to the relationship between management control and strategy, its theoretical models have evolved little since the Anthony's definition of management control in 1965 (Simons, 1987).

To make management accounting systems more relevant, Johnson and Kaplan (1987) proposed "management accounting systems can and should be designed to support the operations and the strategy of the organization" (p.17). It means that the strategy should be repositioned at the heart of the firm's management.

Emergence of new management control

The 1990s marked the continual attempts to "modernize" or "renew" management accounting theory and practices (Kaplan, 1994; Otley, 1995, 2003). A common thread of this research is a growing interest in the relationship between Management Control systems and strategy.

This "innovative" research can be roughly grouped in two inter-related strands. The first focuses on new techniques, while the second concentrates on the use of accounting techniques.

Concerning the first approach, the researchers focus on finding “new” accounting techniques or practices. Activity-based cost (ABC) management, Economic Value Added, and Balanced Scorecard have been developed and ‘advertised’ as the symbol of “new” management control systems.

Balanced Scorecard is "a set of measures that gives top managers a fast but comprehensive view of the business. The Balanced Scorecard includes financial measures that tell the results of actions already taken. And it complements the financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities - operational measure that are the drivers of future financial performance" (Kaplan & Norton, 1992).

The Balanced Scorecard, putting strategy and vision, not control, at the center, illustrates a new tendency of management control research. It helps to pull people toward an overall goal and improve decision-making process (Kaplan & Norton, 1992; Kaplan, 1994).

However, “much management accounting research has lost its way” by paying too much attention on “accounting” and “strategy formulation”, but not enough on “management” and “strategy implementation” (Otley, 2001: 243). Otley proposed to move from “measurement” of performance to “management” of performance (Otley, 1999, 2001, 2003).

“Performance management concerns the formal processes [more than the traditional management accounting practices] that organizations use in attempting to implement their strategic intent, and to adapt to the circumstances in which they have to operate” (Otley, 2001:250).

This point of view reflects the second strand of research that is, the way managers use a control system. This is the cornerstone of Simons’s (1995) levers of control.

In fact, the research on the use of management and accounting information systems was initiated by Simon H. et al. (1954)⁶, but was not much developed by other researchers until Simons (1987). Simon et al. (1954) interviewed more than 400 executives in seven

⁶ H. Simons was rewarded a Nobel Memorial prize in Economics "for his pioneering research into the decision-making process within economic organizations" (1978). He is the founding father of bounded rationality.

companies: more than half of these were operating executives⁷, and the remainder were accounting executives⁸. Three kinds of use of accounting information were identified as:

- Score-card use: “Am I doing well or badly?”⁹
- Attention-directing use: “What problems should I look into?”¹⁰ It is closely related to what is usually called “the principle of exception”. For an effective attention-directing service, the controller’s department needs to “develop direct and active channels of communication with the operating executives at those points in the organization where operations are being measured” (Simon et al, 1954:3).
- Problem-solving use: “Of the several ways of doing the job, which is the best?”¹¹ :occurring primarily in administrative units for making analyses or special studies, for use by general management¹².

“The same item of information may be an attention director for one executive but primarily a score card for others, or it may have both score-card and attention-directing use for the same person” (Simon et al., 1954:23). The first two types of use are apt to be more frequent than the problem-solving uses at all levels of management.

Burchell et al (1980) addressed similar categories but in different terms: answer machine, learning machine, and ammunition machine. Or Vandenbosch (1999) classified the use of management information system as score keeping, problem solving, and attention focusing. And three roles of performance measurement, according to Atkinson et al. (1997)¹³, are coordination, monitoring, and diagnosis. Simons (1995, 2000), focusing on managers’ attention, distinguished the diagnostic and interactive use of control systems. Henri (2006b)

⁷ Like district sales managers and factory general foremen.

⁸ From company presidents to supervisors of accounting sections.

⁹ For example, “the total department variance from standard or from budget” (Simon et al., 1954:p.3).

¹⁰ “To the factory manager, the cost variance of individual departments would be attention-directing items” (Simon et al., 1954:p.3).

¹¹ For example, production cost comparisons (choose efficient ways of making the product), pricing and product profitability (setting prices and price policies), efficient marketing procedures (allocating sales and advertising expenditures), inventory policy, and labor negotiations (evaluating the effects on costs of pay increase).

¹² “This study indicates that *further development of staff and facilities for special studies is a more promising direction of progress than elaboration of periodic accounting reports*” (Simon et al., 1954:p.4).

¹³ “The coordinating role refers to the use of [performance management systems] to direct and focus decision maker’s attention on the primary and secondary objectives of the organization. The monitoring aspect is associated with the measurement and reporting of performance in meeting stakeholders’ requirements. Lastly, the diagnostic role refers to the assessment of the cause-and-effect relationships among process performance, organizational learning and organizational performance” (Henri, 2006b:p.80).

hence proposed four types of use: monitoring, attention focusing, strategic decision-making and legitimization.

All these researches, despite their differences, focus on the use of management control systems. They all recognized the key role of management control systems in strategy implementation and in facilitation of learning. Simons (1995, 2000) also added another role of interactive control systems, which is to facilitate the emergent strategy.

2. Strategic change

“The term ‘strategic changes’ evokes irresolvable controversy regarding the importance of the change that occurred” (Ginsberg, 1988:560). What is the boundary between strategic change and strategic adjustment? Mintzberg (1987:14) has pointed out that

“One person’s strategies are another’s tactics - what is strategic depends on where you sit” and when you sit: “what seems tactical today may prove strategic tomorrow”.

Ginsberg (1988) proposed “strategic change” means “change in strategy”. The strategic change implies the change in strategy content or strategy-making process at the corporate or business level. Huy (2005) extended the Ginsberg’s (1988) initial definition on strategic change¹⁴ by adding structure, systems, and personnel. The latter is nominated as manners of strategy implementation.

So what is strategy? We are going to study “strategy” concept from three aspects: content of strategy (§2.1), the strategy-making process (§2.2), and strategy implementation (§2.3).

2.1 Strategy content

Generic strategy of Porter: cost leadership, differentiation, and focus

Porter (1980, 1985) introduces a simple but powerful tool to analyze the task of strategic positioning, namely as three generic strategies: cost leadership, differentiation, and focus. They are defined along two dimensions – strategic scope and strategic strength. Strategic scope looks at the size and composition of the market the firm intends to target; while strategic strength looks at the strength or core competency of the firm.

¹⁴ Radical change is often confused with strategic change. “Radical change is a qualitative alteration of an organization’s rules of organizing – the fundamental rules that members use to interact cognitively and behaviorally with the world around them” (Miller and Friesen, 1984; Greenwood and Hinings, 1996; cited by Huy, 2002:31).

The cost leadership strategy emphasizes the efficiency. The firm produces high volume of standardized products in an attempt to take advantages of economies of scale and experience curve. The product is often at a relatively low cost and available for a very large customer base. Such a strategy often benefits from process engineering skills, close supervision of labor, tight cost control, quantitative target-based incentives.

The differentiation strategy involves creating a product perceived as unique by its customers. The unique feature is supposed to provide superior value for the customers, thus the firm can increase the price, incur addition cost in R&D, and have better margin. To sustain this strategy, the firm should have: strong R&D skill, strong engineering skills, incentives based on subjective measures, and clear and strong communication on the differentiating product characteristics.

The focus strategy (or “niche” strategy) is used when a company focuses its efforts and resources on a narrow, defined segment of a market. A company can use either a cost focus or a differentiation focus.

The author also points out the danger of “stuck in the middle”. Some commentators criticize this point. Miller (1992), for example, claims that there is a viable middle ground between strategies. Many organizations, such as Toyota, succeed to produce high quality and original autos at low costs, but sell them at high prices. Others claim this tool lacks of specificity and flexibility. However, its simplicity and richness – like all great breakthroughs – provide the deep insights of competition issues.

It is critical to distinguish “operational effectiveness” from “strategy” because the failure to distinguish them and/or the replacement of strategy by operational effectiveness “leads to the mutually destructive competition and the fact that management tools have taken the place of strategy” (Porter, 1996).

“Operational effectiveness means performing similar activities better than rivals perform them. Operational effectiveness includes but is not limited to efficiency [...] In contrast, strategic positioning means performing different activities from rivals’ or performing similar activities in different ways” (Porter, 1996:2)¹⁵.

¹⁵ Operational Effectiveness is necessary but not sufficient to guarantee a sustainable advantage. Two other conditions are:

- Choosing unique and valuable strategic positions which emerge from three distinct but not mutually exclusive sources: variant-based positioning (i.e. the choice of product or service varieties rather than customer segments),

“Strategy is creation of a unique and valuable position, involving a different set of activities. Strategy is creating fit among a company’s activities” (Porter, 1996). “Strategy is the route to competitive advantage” (Porter, 1985:25). Many companies fail to have a strategy and/or let the operational effectiveness supplant strategy because:

- Operational effectiveness is concrete and actionable. “Over the past decade, managers have been under increasing pressure to deliver tangible, measurable performance improvements. Programs in operational effectiveness produce reassuring progress, although superior profitability may remain elusive”.
- “Trade-offs are frightening, and making no choice is sometimes preferred to risking blame for a bad choice” (Porter, 1996).

Defenders, Prospectors, and Analysts (Miles & Snows, 1986)

Miles and Snows (1986) point out the close relationship between three generic strategies of Porter (1980) and their Prospector-Defender-Analyzer typology (Miles & Snows, 1978).

Relating to differentiation strategy, Prospectors are often the creators of change and the first-to-market. Their products or services often using innovative technologies differentiate from their competitors. The organizational structure is flexible. For example, autonomous workgroups or product divisions in which planning and control are highly decentralized.

Relating to cost leadership strategy, Defenders provide a stable and limited product line. Top managers ignore the development outside of their domains. Functional structures are dominant and accompanied with centralized decision making, vertical communication and integration, and high degree of technical specialization.

Relating to focus strategy, Analyzers imitate and improve upon the product offerings of their competitors. The top managers observe their competitors closely for new ideas and adopt the

needs-based positioning (i.e. serving most or all the needs of a particular group of customers), and access-based positioning (i.e. segmenting customers who are accessible in different ways like customer geography or customer scale),

- Strategic fit: “rather than seeing the company as a whole, managers have turned to ‘core’ competencies, ‘critical’ resources, and ‘key’ success factors... The most valuable fit is strategy-specific because it enhances a position’s uniqueness and amplifies trade-offs”. Three types of fit are simple consistency between each activity (function) and the overall strategy, reinforcement of activities, and optimization of effort (“coordination and information exchange across activities to eliminate redundancy and minimize wasted effort are the most basic types of effort optimization” – p.11). The fit among activities substantially reduces cost or increases differentiation.

most seemingly promising ones. Matrix structures are widely adopted by Analyzers. The control must trade off between efficiency and effectiveness.

The strategy, structure, and process evolve together. Successful organizations achieve “strategic fit” among their strategy, structure and management process; while less successful ones exhibit the poor fit externally and/or internally (Miles & Snow, 1984).

2.3 Strategy-making process

“Strategy is an elusive concept” (Dent, 1990:4). Mintzberg and his followers search for how strategies form in organization. Strategy is defined as “a pattern in a stream of decisions”¹⁶. Mintzberg draws a distinction between *intended* strategy and *realized* strategy (1978), between *deliberate* strategy and *emergent* strategy (1987).

Deliberate strategies are the strategies realized as intended; while emergent strategies are realized patterns or consistencies despite, or in absence of, intention (Mintzberg & Water, 1985). A strategy is perfectly deliberate when the intentions are:

- precise and articulated in a relatively concrete level of detail,
- organizational and common to all the actors,
- and realized exactly as intended. The environment must have been either perfectly predictable, or else under the full control of the organization.

The strategies are perfectly emergent when the environment directly imposes a pattern of action on the organization, thus there is the complete absence of intention.

In reality, hardly does it exist pure deliberate or pure emergent strategy. The real-world strategies fall along on the continuum of deliberate and emergent strategies. In order to define their tendencies (rather deliberate or rather emergent), we can use three following dimensions:

- Leadership intentions: more or less precise, concrete and explicit, more or less shared,
- Central control over organizational actions: more or less firm, and more or less pervasive,
- Environment: more or less benign, more or less controllable and more or less predictable.

¹⁶ Mintzberg, 1972, 1978, Mintzberg and Waters, 1982, 1984; Mintzberg et al., 1986; Mintzberg and Mc Hugh, 1985; Brunet, Mintzberg and Waters, 1986.

A good deal of the confusion has been existed in the definition of Strategy concept. Mintzberg (1987) has attempted to remove some of this confusion by defining strategy as 5Ps – Plan, Ploy, Pattern, Position, and Perspectives¹⁷.

- As Plan, strategy is made in advance of the actions to which they apply, and developed consciously and purposely. It can be named as “Intended strategy”. How do leaders try to establish direction for organizations, to set them on predetermined courses of actions? What do intentions really mean? It is not necessary that all “Intended strategies” may be feasible or realized. Only the “intended” strategy which is realized is named *deliberate* strategy.
- As Ploy, strategy is a specific “maneuver” intended to outwit a direct opponent or competitor in a competitive situation (e.g. “Competitive Advantage” of Porter, 1980). Hence, the process of strategy formation is in its most dynamic setting, despite the strategy concept itself rooted not in change but in stability.
- As Pattern, “strategy is *consistency* in behavior, *whether or not* intended” (Mintzberg, 1987:12). Defining strategy as a plan is not sufficient, so is strategy a pattern in a stream of actions. Contrary to plans which may be unrealized, patterns are realized though developed in the absence of intentions. It is the “emergent strategy”.
- As Position, strategy becomes a “fit” between organization and its competitive environments. A “collective” strategy, that is, “strategy pursued to promote cooperation between organizations, even would-be competitors” (Mintzberg, 1987:15), may be developed in this context.
- As Perspective, strategy is a “character” of an organization *shared* by its members, through their intentions and/or by their actions. We are entering in the realm of a collective mind.

By using five definitions of strategy, we may be, according to Mintzberg (1987), “enrich our ability to understand and manage the processes by which strategies form” (p.21).

¹⁷ Except for “Ploy”, Simons (2000) employed others for his four-lever-of-control framework, in particular, “Plan” for diagnostic control system and “Pattern” for Interactive control system.

2.2 Strategy implementation

2.2.1 Roles of top managers and middle managers in strategic change

Either in strategic change literature or management accounting one, omnipresent is the research on top management as a key stimulus in strategic change¹⁸. Much less attention is on the key role of middle managers in strategic change (Huy, 2001a, 2002b) or a negative perception on their role (Biggart, 1977; Tushman & Romanelli, 1985; Noer, 1993). The role of top management in strategic change is undeniable, but middle management also plays a crucial role.

After a brief analysis on frequent problems faced by newly-appointed CEO, we introduce the essential roles of middle managers in strategic change.

Challenges for newly-appointed CEOs

The *mandate for change* perceived by newly-appointed managers defines two main clusters of change. The first one is strategic turnaround: the managers, under the significant pressure to improve performance, perceived their roles as driving force for fundamental, revolutionary change. The failure of past strategy provoked such a mandate. The second one is strategic renewal: the mandate of the managers was to continue a trajectory of profitable growth. Simons (1994) expected that the managers hired from outside organization had a tendency to implement strategic turnaround, and the Insiders to implement strategic renewal. But this expectation was not supported by the results of his study on 10 newly-appointed managers.

The newly-appointed CEOs often face four common challenges as follows (Porter et al., 2004).

Firstly, the CEOs were trained to run the internal business, now have to deal with external pressures (e.g. shareholders, analysts, politicians, industry groups). They must simultaneously manage the dual roles of Mr. Inside and Mr. Outside. The CEOs cannot be personally involved in all decisions or oversee every facet of complex and large organization. Some feel as if they loss of control. But they need to resist the illusion of self-importance, omnipotence, and omniscience. Their greatest influence transfers from direct to indirect means. For instance, they need to communicate a clear strategy, to institutionalize an appropriately designed structure and a process to guide, inform, and reward.

¹⁸ Simons, 1990, 1994, 1995, 2000; Sandino, 2004; Tuomela, 2005, Henri, 2006; Chenhall, 2004; Modell, 2001.

The second challenge is the side effects of the CEO's orders. "Ironically, by exercising his power to give orders, the CEO actually reduces his real power, saps his energy and his organization's, and slows down progress" (p.65). Only by empowering others, the CEO can expand his power. The CEO's signals, already subject to misinterpretation or distortion, are often differently responded by different audiences. A simple, clear message illustrated by stories is often recommended to the new CEO.

Ex: Threat of embarrassment caused by a direct order and then an over-intensive involvement of the CEO

The newly-appointed CEO was asked to approve a marketing campaign which had been prepared for a year by a division manager and his team. The latter assumed that the CEO's approval was largely a formality.

But the CEO, despite his positive impression on the quality of the campaign, felt that the advertising lacked of originality, thus required a new advertising plan. He hoped to send a clear message on the changes he intended to introduce. He did not well forecast the consequences of his order at that moment.

His calendar came to bottleneck: all executives losing confidence on their comprehension of the CEO's expectations rushed to get his approval before proceeding on anything. The organization progress slowed down. The new CEO was present in all meetings and saw it as an opportunity to communicate his new strategy. He only recognized the negative impact of his intensive involvement when the division manager responsible for marketing campaign decided to leave. Although the CEO tried his best to persuade the division manager to stay, the latter felt too demoralized, overruled, and undermined to continue to work with the CEO.

The CEO openly admitted his precipitations on the marketing campaign in the meetings of all his top managers. He identified the areas of strategic changes and the issues on which he wanted to be consulted. A task force was created to review the issues requiring the early involvement of the CEO input such as budgeting, planning, performance evaluation, recruiting key employees, and so on. He confirmed his willingness to share power and trust his subordinates.

The third challenge is that reliable information is rare because all information coming to the top is filtered with/without good intentions. Because human has a natural instinct to protect himself and certainly his career, in particular before his leader, the information is often colored. Surprisingly, the CEO can find reliable sources of information through: 1° external feedback (customers, partners, or peers), 2° independent advisers who could tell the truth and criticize the CEO, 3° and most importantly, periodic face-to-face conversations with people at different levels and in various parts of the company.

Ex: A CEO invites a group of ten employees to have lunch with him weekly. The participants are volunteers but not allowed to attend with their direct superiors. Although not everyone can speak frankly, the informal conversations reduce the barriers of communication.

Ex: The CEO of a poorly performing joint venture searched for the reasons of continually decreasing revenues but increasing costs. His subordinates placed the blame on the JV partner, which was not the real cause as estimated by the CEO. The CEO discussed this issue with senior managers of the JV partner, who were not directly involved in JV's operations. Finally, he recognized that the root cause was the lack of clear objectives on JV.

Fourthly, the CEO, instead of reporting to one boss, now has to report a board of directors, including about ten or 12 bosses. The board needs to be regularly informed but the information should be easy to understand. And it often takes more time than expected for the CEO to garner the confidence and the support of the bosses. Although the latter have the right to fire or to hire the CEO, the ultimate goal of the CEO is not to please shareholders (i.e. immediately increasing the shareholder value). The critical matter is the long-term profitability of the company. The CEOs should expect that their strategies take time to be understood or accepted.

In brief, an involvement of the top management is a delicate issue. Undeniably, their roles are critical in the strategic change, but the side effects of their intensive involvement, their signals, and the quality of information sent to them are not easy to solve. In addition, under the pressures of their direct bosses (i.e. shareholders), it is not evident to privilege the long-term profitability of the company.

Who are middle managers?

Middle managers are two levels below the CEO and one level above the first-line supervisor (Floyd & Woolridge, 1996; Kanter, 1983). In decentralized and large organization, there are often senior middle managers and junior middle managers (Uyterhoeven, 1989). One senior middle manager could be in charge of 200 to 5000 front-line workers, while a junior supervise a number of line supervisors overseeing professionals and workers. The senior middle manager has hierarchical authority over the junior (Huy, 2005).

For example, INEO Suez, our case study, has five hierarchical levels: President (who is also CEO), directors of operational unit/business units (who are also Executive Vice-President), delegation directors, profit center managers, and business supervisors. Business supervisors are in charge of front-line workers. According to this definition, President and Vice-Presidents can be considered as top management. Delegation directors and profit center managers are middle

managers, in which the former are senior and the latter are junior. Business supervisors are front-line supervisors.

This definition did not take into account the relation between the parent companies and their subsidiaries. A manager may be a senior middle manager regarding the structure of his parent company, but a top manager regarding the structure of his company.

Let's take the strategic changes of our case study – Hi-Tech an example. Hi-Tech is a direct subsidiary of INEO Suez and also is, in juridical aspects, an independent company. The director of Hi-Tech, if based on the above-mentioned definition, can be considered as senior middle manager. While, he can also be considered as top manager if we take into account only the juridical structure.

What are the roles of middle managers in strategic change?

In the traditional literature, middle managers proactively contribute to organizational innovation mainly in incremental change contexts (Burgelman, 1983; Kanter, 1983). They can mediate both vertically between the strategic and operational levels (Westley, 1990) and horizontally by facilitating diffusion and integration of knowledge across departments and locations (Barlett & Goshal, 1987). However, in planned strategic change, middle management's roles and contributions are seen as much weaker (Tushman & Romanelli, 1985), or even often considered as the primary organizational group that resists strategic change (Biggart, 1977). They are deenergized and emotionally stricken in the face of the overwhelming power of turnaround executives.

Huy (2001 a, b), based on his six-year study of middle managers, advocated that “the middle managers [...] make valuable contributions to the realization of radical change at a company – contributions that go largely unrecognized by most senior executives” in four major areas:

- having value-adding entrepreneurial ideas: creative ideas about how to grow and change a business because they are close to day-to-day operations, customers and frontline employees, but far enough away from frontline work that they can see the big picture, which allows them to see new possibilities, both for solving problems and for encouraging growth. “Middle managers’ ideas are often better than their bosses’ ideas¹⁹” (Huy, 2001:74).

¹⁹ “The senior executives “know” middle managers are inherently resistant to change, they pretend to listen to them. Middle managers, in turn, learn that they won't be listened to, so they take on the role of compliant child.

- being better than most senior executives at leveraging the informal networks at a company that make substantive, lasting change possible. In addition to their powerful webs of relationships, middle managers can explain the radical changes in language of his people would understand, thus “sell” the idea of change in a friendly way. Sometimes, barriers to change are senior managers. Middle managers, closer to ground, understanding outside market pressures as well as internal capabilities and sensitivities, can evaluate feasibility and relevance of proposed change.
- staying attuned to employees’ moods and emotional needs, thereby ensuring that the change initiative’s momentum is maintained,
- managing the tension between continuity and change, which helps to avoid chaos or inertia.

A middle manager can be an effective change agent if he has five following criteria (Huy, 2001:75):

- Early volunteers participating in change initiatives,
- Having positive and constructive critics,
- Having informal power with their social capital,
- Being versatile: voluntarily adapted to major changes,
- Having emotional intelligence, much better indicator of social influence and success than IQ (Huy, 1999, 2000): aware of their own emotions and those of others.

Middle managers, with these qualities, become “intrapreneur”, “to build something that could improve the organization’s effectiveness and leave a lasting monument” (Huy, 2001:75).

In a word, middle managers play at least as important role as senior managers in strategic change. Since middle managers, thanks to their intermediate position neither so far nor so close to the ground, have value-adding entrepreneurial ideas, informal power, know how to ensure their subordinates, and keep change and continuity in balance.

They hide all their efforts to create change, knowing they will be penalized if they fail, and they don’t push senior managers to pay attention” (Huy, 2001:74).

2.2.2. Relation between Management control systems and strategic change

Atkinson et al. (1997) highlight the interrelationship between Management accounting change, organizational change, structure change, environmental change and decision-making change:

“[H]ow management accounting information can help an organization identify the need for, and the way to, change, and how exogenous changes in the environment affect the nature of information required for effective management (Armitage et al. 1994)... Organizations alter their structure as part of their change [of] management strategy. Changing structures imply changes in the information needed, and the way information is used to measure and motivate performance... Both environmental and organizational changes imply changes in the type of information and the use of information for decision making” (p. 80-81).

Burns & Vaivio (2001) introduced an overview of the evolving role of management control systems including its potential to drive organizational transformations (Chenhall & Euske, 2007). Three perspectives on management accounting change are:

- Perspective 1: the epistemological nature of change,
- Perspective 2: the logic of change,
- Perspective 3: the management of change.

The first perspective concentrates on studying the definition of change, role of management accounting change on organization's performance²⁰, and the dichotomy between *change* and *stability*²¹. A debate underlines the question of whether change can be studied as a distinct, observable *episode* or an *ongoing* phenomenon²². Another debate studies whether management accounting change is a disruptive *revolutionary* phenomenon or an *incremental* evolutionary chain of development²³.

Regarding the second perspective, management accounting change is presented as a *managed, formal* and *linear* organizational event, or an *unmanaged, informal*, and *nonlinear* elements²⁴.

²⁰ Change is a progress (Hopwood, 1987) or a regression (Scapens and Roberts, 1993; Argyris and Kaplan, 1994; Ezzamel, 1994; Kasurinen, 1999; Granlund, 2001)?

²¹ Granlund (2001); Grandlund & Lukka (1998).

²² Burns (2000).

²³ Scapens (1994); Burns & Scapens (2000).

²⁴ Grandlund (1998); Vaivio (1999); Hopwood (1987).

Is management accounting change actively steered towards a specified and explicit objective or ambiguous goals? Can the motivated actors who initiate and take responsibility for management accounting transformations be identified? Another approach is to study whether management accounting change follows a *functional* or *political* logic. In a functional logic, “management accounting change is good, serving the economic rationale of the organization. Change has most intended, overtly stated effects”²⁵ (p.395). While in political orientation, “management accounting change is rarely consensual, neutral activity”. Power and resistance are involved²⁶.

Concerning the last perspective on the management of change, change can be seen as a *centrally* or *locally* driven effort. In the former case, the top management, recognizing the need to change, plans, organizes and oversees the change, thus plays a key role. Other actors, at lower level, “are only in a secondary position, assisting and implementing a centrally initiated, comprehensive top-down effort” (p.395). However, in larger, decentralized structures, local actors are often the real architects and mobilizing agents of change through a bottom-up process. Change becomes an “emergent” organizational phenomenon²⁷. Or other researchers study whether change plays an *active* or *passive* role in the transformation of organizational culture²⁸. The changing role of management accountants is also studied from a simple “controller”, “scorecard keeper” to a “business support” or “internal business consultant” or “hybrid accountant”²⁹. Traditional accountants highly emphasize on external financial reporting and internal control. The hybrid accountants place high emphasis on collaboration with, and giving advice to, general managers involved in decision processes (Coad, 1999). The hybrid accountants actively participate in cross-functional and process-oriented teams (Burns & Baldvinsdottir, 2005).

The Burn & Vavio (2001)’s framework on research in management accounting change is quite useful to give an overview on the actual literature review³⁰. Our research can be

²⁵ Kaplan & Norton, 1996.

²⁶ Hopwood, 1983, 1987; Knights and Collinson, 1987.

²⁷ Mintzberg, 1990; Mintzberg et al., 1998.

²⁸ Dent, 1991.

²⁹ Coad, 1999; Grandlund and Lukka, 1998a.

³⁰ That’s the reason why we choose to use their framework. Some other researchers (such as Chenhall & Euske, 2007, Atkinson et al. 1997, Burns & Scapens, 2000) also attempted to propose a framework to study management accounting change.

positioned in the third perspective, focusing on the change driven by top managers and middle managers.

3. Simons's typology

3.1. Overview of four levers of control

The lever-of-control framework of Simons was born after a long period of pregnancy. Especially, interactive control systems and diagnostic control systems have spurred a number of researchers' attention. This section aims at replying two questions:

- How has the lever-of control framework been constructed?
- And why do we select only two levers of control – interactive control and diagnostic control – for further study?

The evolution of this framework will be rapidly scanned and preceded a brief presentation of the four levers. We also explain why the concepts of Interactive control and Diagnostic control merit a profound insight.

3.1.1 Evolution of Simons's lever-of-control framework

The Simons (1995)'s lever-of-control framework is a fruit of ten-year research after a stream of many case studies and surveys in different US industries, so a study on the evolution of this framework is necessary and interesting.

Simons (1987a), in an attempt to understand *how planning and control systems are used in a well-managed company that competes in multiple and uncertain environments*, carried out in-depth interviews with sixteen senior managers of Johnson & Johnson together with direct observation of the planning and control process in action and the examination of internal provided documents. The findings of this research indicate a critical role of formal planning and control systems in large companies operating in uncertain environments, hence distinguish two types of control use: *programmed* (renamed later in 1991 as *diagnostic*) and *interactive* control. The latter was only on the first stage of conceptualization in which “managers' attention” was used as research object, but its relationship with strategy was not explicit.

Studying the *link between strategy and control*, Simons (1987b) through quantitative research on 76 manufacturing Canadian firms confirmed that high performing Prospector firms seem to emphasize on forecast data in control systems, frequent reporting and setting tight budgeted

goals. Meanwhile, Defenders, particularly large ones, are likely to use their control systems less intensively than Prospectors and focus on bonus remuneration based on the achievement of budgeted targets. Although Simons (1987b) said that his result was in accordance with the previous researches, particularly those of Miles & Snow (1982) and Porter (1980), Langfield-Smith (1997) argued that “[Simons’s] findings are not consistent with [these authors]” (p.218). For instance, Miles & Snow (1978) characterized control systems of defenders are likely to be centralized, very detailed, focusing on problem solving (i.e. tight budget and intensive use); while those of prospectors may focus more on problem finding, result oriented and be decentralized.

Simons (1988) refined the above-mentioned result by investigating the relationship (1) between tight budget goals and firm performance, and (2) between tight budget and competitive strategy. Using survey method with a sample of 86 Canadian firms from 19 industries, the result showed a positive relationship between tight budget and firm performance (ROI), but a non-significant relationship between budget participation and firm performance. While Prospectors reported tighter budgets than Defenders, the latter reported a strong positive correlation between budget tightness and budget participation.

Simons (1990), conducting over 70 in-depth interviews with top managers of sixteen firms, studied “*how*” competing firms organize their management control systems at top management levels. He found out that:

“All large, complex organizations have similar types of management control systems... there are distinct differences in the way that management control systems are used at top management levels in different firms... [H]ow and why top managers choose to personally monitor certain management control systems and to delegate other aspects to subordinates” (Simons, 1990: 135).

Based on four concepts – limited attention of managers³¹, strategic uncertainties, interactive management control³², and organizational learning³³, Simons (1990) proposed an interactive management control process model, which can be used to manage emergent strategy³⁴.

³¹ Simon, 1957; Mintzberg, 1973b

³² Simons, 1987b. Signalling (Spence, 1974; Meyer, 1979), Surveillance (Feldman & March, 1981) and Decision Ratification by top managers (Mintzberg, 1973b:87; Bower, 1986:64)

³³ Argyris & Schön, 1996; Fiol & Lyles, 1985; Hedberg, 1981

³⁴ Emergent strategy in Mintzberg’s (1978) definition (Simons, 1990:136)

Simons (1991) investigated *how top managers in competitive markets decide which of their control systems to use interactively*. After carrying out 90 two-hour interviews with top, policy-making managers of 19 US health care product industry companies, Simons advocated that top management vision is the essential ingredient for interactive control systems. Three factors influencing the design and the choice of interactive control systems are “Technological dependence”, “Complexity of value chain”, and “Ability of competitors to respond to product market initiatives” (which is named later as “Ease of tactical response” by Simons, 1995). Simons (1995) added the fourth factor “Regulation”. And five types of systems often used interactively are program management systems, profit planning systems, brand revenue budgets, intelligence systems, and human development systems.

1994 saw an official apparition of levers-of-control framework including beliefs systems, boundary systems, diagnostic control systems and interactive control systems. Simons (1994) continued broadening his research with a new research question: “*How do top managers use formal control systems to formulate and implement new business strategies?*” After 18-month longitudinal study accompanied by semi-structured interviews with ten newly-appointed top managers, Simons showed two different processes by which strategic turnaround managers and strategic evolution ones have used at least two levers – diagnostic control and interactive control. But similarly, senior managers in both clusters diagnostically use all control systems in the first year and then selected one interactive control system in the second year, once intended strategy was well carried out³⁵.

The book “*Levers of control*” published by Harvard Business School together with the paper published in Harvard Business Review in 1995 were a milestone of Simons’s research. The concept of these levers is also represented in Simons’s second book “*Performance Measurement and Control systems for implementing strategy*” in 2000. More generally, Simons’s series of case studies contribute to a theory of “how senior managers can use controls to implement and develop business strategy” (Langfield-Smith, 1997: 223).

And the fact that R.N. Anthony (1998) reintroduced the Simons’ concept of “interactive control systems” in his ninth-edition book “*Management control systems*” demonstrates its value. Besides, since 1998, a number of researchers have continued the perspective opened by Simons.

³⁵ A detailed analysis and description of Simons (1994)’s case study will be carried out in the section 4.1.4. “Simons (1994): Use of control levers in strategic turnaround and strategic renewal”.

In summary, Simons has constructed the lever-of-control framework, especially “Interactive control systems”, through practice-based observations and in an inductive manner. The next section will provide a more detailed description on the four levers, and then underpin the necessity for further study on diagnostic control and interactive control systems.

3.1.2 Four levers of control: beliefs, boundary, diagnostic control and interactive control

Management control systems, in Simons’s definition (1994, 1995 and 2000), are:

“the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities ” (Simons, 1995, 2000).

They include four levers of control: beliefs systems, boundary systems, diagnostic control systems and interactive control systems.

Beliefs systems are often considered as missions, or target market, or core product categories.

Beliefs systems are “formal systems used by top managers to define, communicate, and reinforce the basic values, purpose, and direction for the organization. Beliefs systems are created and communicated through formal documents such as credos, mission statements, and statements of purpose” (Simons, 1994:170).

Example: for a global expansion strategy, the mission was “to firmly establish its brands as the world’s undisputed leader in its various markets”. Or diversification opportunities must build on our existing strengths and/or hold the potential for near-term profitability” (Simons, 1994:177).

Boundary systems often define types of behaviors no longer allowed.

Boundary systems are “formal systems used by top managers to establish explicit limits and rules which must be respected. Boundary systems are created through codes of business conduct, strategic planning systems, and operating directives provided to business managers” (Simons, 1994:170).

Example: “profit – not volume – will be our creed”, or “we will no longer offer period-end promotions to boost volume” (Simons, 1994:177).

“Formal performance measurement is the realm of diagnostic and interactive control; these two systems are seen as operating on the same set of formal information, but using it in different ways” (Berry et al., 2005).

“Diagnostic Control Systems are the formal information systems that managers use to monitor organizational outcomes and correct deviations from preset standards of performance” (Simons, 1994, 1995, 2000).

Simons (1995:60-61) argued that “virtually all writing on management control systems refers to diagnostic control systems”, and “profit plans and budgets³⁶ are the most pervasive diagnostic control systems in modern business firms”.

Based on two hypotheses: “competitive pressure is a catalyst for innovation and adaptation” (Simons, 1995:91) and “there are limits to the volume of information you can use intelligently” (Burt, 1992: 62, cited by Simons, 1995:92), Simons proposed:

“Interactive Control Systems are formal information systems managers use to involve themselves regularly and personally in the decision activities of subordinates [...] Interactive Control Systems focus attention and force dialogue throughout the organization” (Simons, 1991:49, 1995:95-96, 1994:171).

“Interactive control systems are used to guide the bottom-up emergence of strategy” (Simons, 1995:98).

For example, Simons (1991:61) suggested that profit planning (i.e. budget), “when used interactively, can be a proactive and dynamic tool to gather information and stimulate discussion in decentralized business”.

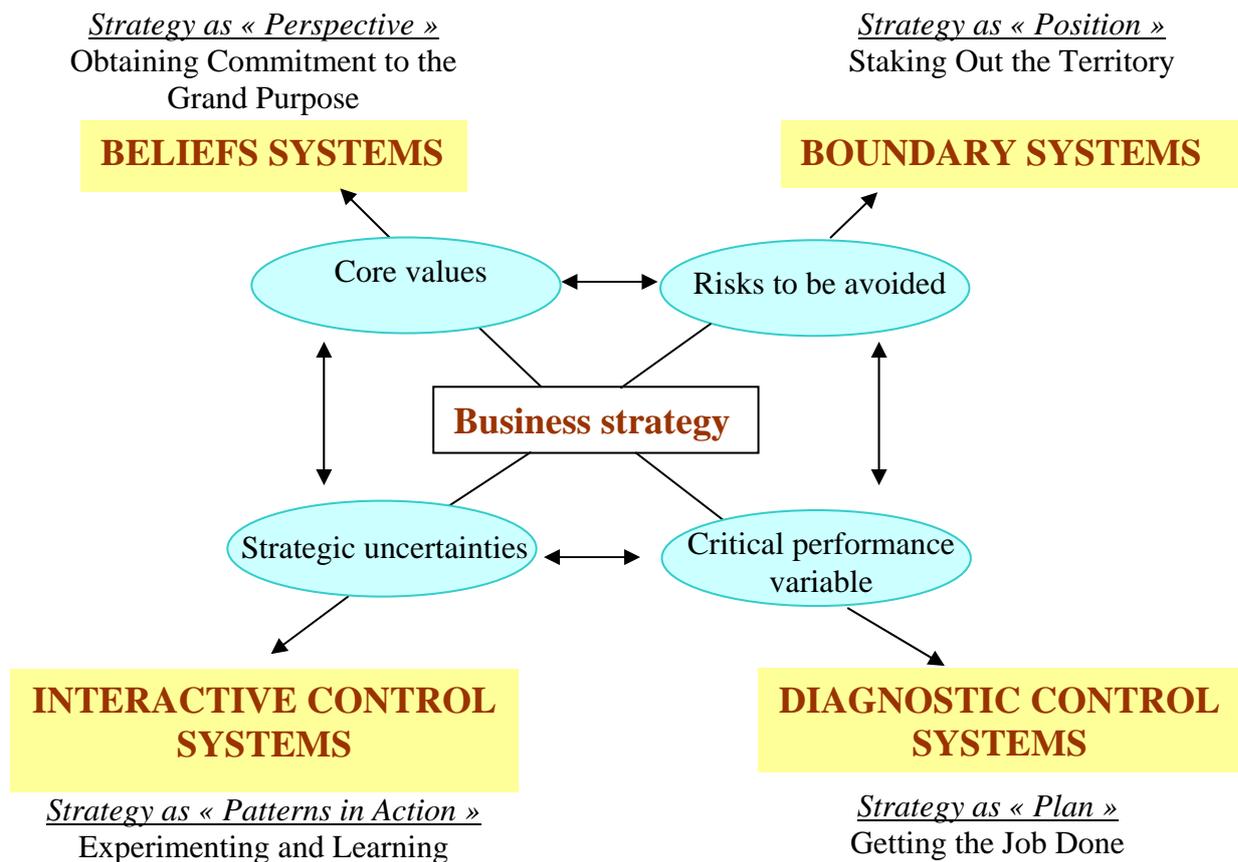
These systems reinforce and complement each other. While beliefs and interactive control systems stimulate opportunity-seeking, innovation and encourage the formulation of new strategies, boundary and diagnostic control systems give limits and force organization to implement intended strategies. If the four levers of control – beliefs systems, boundary systems, diagnostic control systems, and interactive control systems - were properly used, they would, according to Simons (1995, 2000), help top managers combine the opposing forces (like creative innovation versus predictable goal achievement, empowerment versus control, reward versus punishment) in managing a company, particularly in effectively implementing its strategies and encouraging the emergence of new strategic initiatives.

What make the interactive control systems distinguished from diagnostic control ones are their relationships to emergent strategy and managerial and organizational attention. Simons

³⁶ They are implicitly ex-post monitoring and management-by-exception. For example, see the definition of management control done by Merchant (1985:1-10).

(1995:114) has integrated strategy as “Patterns in Action” in management control systems through the concept of “interactive control systems”, while the diagnostic control systems are to implement successfully the intended strategy. And the diagnostic systems allow management-by-exception, so reserve scarce management attention; while the interactive control systems are attention enhancers.

Figure 1: Levers of control³⁷



Source: Simons (2000:305)

The interactive control lever is particularly interesting for:

- The research object is original. While many researchers are seeking for tool modernization, Simons focuses his research on the rare resource – “managers’ attention”,

³⁷ This figure is different from that of Simons (1995) by demonstrating the relations between the levers and different types of strategy as defined by Mintzberg (1987). Simons (2000) did not include the fifth P – strategy as Ploy.

- The lever-of-control framework opens “a useful wider framework” and gives “a complete picture of wide range of possible controls” (Otley, 2003:317),
- « Control systems are used for multiple purposes: monitoring, learning, signalling, constraint, surveillance, motivation, and others” (Simons, 1990:142). “As Arrow (1964) underlined, Simons reminds us that control instruments do not serve solely to reduce the divergence of interests but also to make known to subordinates senior management’s orientations and to help in learning [...] Accounting data does not serve solely to measure effort in order to line up the performances of the different actors in the organisation. They also serve to coordinate efforts by enabling managers to be implicated in everyday management” (Berland & Sponem, 2005:20).

But the concept “interactive control systems” still remains ambiguous³⁸, and the boundary between Interactive and Diagnostic control systems still blurs.

3.2. Concepts of Interactive and Diagnostic Control Systems

The research object of Simons, which is “managers’ attention”, is particularly original, important, but still ambiguous, and difficult to be objectively evaluated. The definition in 1995 of the concept “Interactive control systems” has attracted a particular interest of researchers due to its originality: emphasis on the way operational managers (not only controllers) involve themselves in the implementation of the systems, and its promising positive effects.

“Managers can use the interactive control process to guide the search for the new opportunities, stimulate experimentation and rapid response, and maintain control over what could otherwise be a chaotic process” (Simons, 2000).

Bisbe et al. (2007) argue that Interactive Control concept is one of “ambiguous constructs” (p.7). This concept, developed through the observation of practical managerial applications, comprises a number of theoretical properties³⁹. Each researcher has a tendency to interpret

³⁸ “Different researchers have examined slightly different subsets of the Interactive control systems construct domain”, so leading to “some inconsistencies and contradictory findings” (Bisbe et al. 2005:2-6, 2006)

³⁹ “For example, the properties of Interactive control systems share meaning with other constructs (e.g., intensity of communication), tightness vs. looseness (Merchant, 1985; Van der Stede, 2001), double-loop learning (Argyris & Schön, 1996), mindful patterns of attention (Langer, 1989) and autonomous behaviour (Burgelman, 1991). They also have parallels in several theoretical frameworks (e.g., communication theory, psychology, organizational learning and strategic management)”(Bisbe et al, 2007,7-8).

them under his point of view, which may cause a serious misspecification problem⁴⁰, and then the confusion between diagnostic control and interactive control. Our objective is to attempt to clarify the difference between the two systems. Citations of Simons's original versions on the framework of Bisbe et al. (2007)⁴¹ are chosen as a method.

This section is structured as follows. After analyzing the properties of the Interactive control and diagnostic control according to the Bisbe et al. (2007)'s framework, we would present the framework of Ponsard & Saulpic (2006). The first one attempts to clarify the interactive control concept, while the second one attempts to extend it.

3.2.1 Use of Management Control Systems according to the framework of Bisbe et al. (2007)

Simons argued that the distinction between diagnostic and interactive control systems was solely *the way* that managers use existing control tools, not their technical designs (Simons, 2000).

“A diagnostic control system may look identical to an Interactive control system” (Simons, 2000:208). “Any diagnostic control system can be made interactive by continuing and frequent top management attention and interest” (Simons, 1994: 171).

The properties of Interactive control systems⁴², according to Bisbe et al. (2006), consist of: “(1) an intensive use by top management; (2) an intensive use by operating managers; (3) a

⁴⁰ If “a narrow and incomplete set of indicators [or dimensions] were captured” (Bisbe et al. 2006:11).

⁴¹ The authors proposed a pattern to study this concept: “either (a) properties of interactive control systems (b) implications of interactive control systems for strategic uncertainties, or (c) strategic outcomes at the firm level” (p.8). Such a pattern is based on Marginson's (2002) results. Simons conceptualized what management control systems should comprise in order to direct managers' strategic activities, thereby leading to desirable strategic outcomes at firm level. We focus on two of three dimensions of Bisbe et al (2006) – properties and strategic outcomes to characterize diagnostic control and interactive control.

⁴² We do not employ the framework proposed by Sponem (2003, 2004) because it emphasizes on budgetary procedure, which seems too restraint for our study objective. In fact, Sponem searched for measurement instrument for the concepts “diagnostic/interactive budgetary control”. 276 questionnaires were collected from management controllers and Chief Financial Officers in France. As a result, the author proposed a 13-item scale and suggested five dimensions characterizing interactive (*vs diagnostic*) control systems:

- Dimension “Implication”: constant (*vs by exception*) implication of managers in budgetary process (negotiation, reprevision, and control),
- “Action plans”: strong (*weak*) links with budget,
- “Participation of subordinates” in budget construction: rather bottom-up (*top-down*) and strong (*weak*) participation,
- “Reprevision”: many (*few*) reprevisions during the year and rather flexible (*rigid*) budget,
- “Incitation”: weak (*strong*) link between objective achievement and performance evaluation.

pervasiveness of face-to-face challenges and debates; (4) a focus on strategic uncertainties; and (5) a non-invasive, facilitating and inspirational involvement”. Given that the first dimension and the fifth are closely related, we combine both of them in one dimension.

As a result, we employ four dimensions to clarify and compare diagnostic control systems and interactive control systems: 1) content and nature of communication, 2) use by top management; 3) use by operating managers; and 4) type of discussion.

1st dimension: Content and nature of communication: critical performance variables for diagnostic control, strategic uncertainties for interactive control

Using the different types of control systems, the actors focus their attention on different subjects. Critical performance variables are for Diagnostic control systems, while strategic uncertainties are for Interactive control systems⁴³.

*Critical performance variables*⁴⁴ are “those factors that must be achieved or implemented successfully for the intended strategy of the business to succeed” (1995:63, 2000:209). The variables, financial and/or non-financial, will be identified after the firm’s intended strategy and the specific goals associated with that strategy are analyzed.

The top managers invest their attention in diagnostic control systems in:

- *“Setting and negotiating goal:* to ensure the achievement of business strategies, managers must personally negotiate performance goals with subordinates... Managers know *ex ante* what quantities and types of output are desired ... The goal-setting process ... can be restricted to short periods of management attention [annual or longer cycle].
- *Receiving updates and exception reports:* monthly or quarterly updates and exception reports... Short quarterly review meetings may be scheduled to review progress against preset goals.
- *Following up on significant exceptions:* if a critical performance variable is off target, managers must devote the necessary attention and resources to bring the variable back in line” (Simons, 1995: 70-72).

⁴³ The boundary between strategic uncertainties and critical performance variables is not clearly separated and “these uncertainties are not necessarily the essence and focus of interactive controls” (Lindqvist, 2003:25)

⁴⁴ Critical performance variables may be called by others like “key performance indicators”, “key success factors”, “critical success factors”.

Simons (2000:211) advocated “managers must personally ensure that goals are appropriate both in terms of desired direction and level of achievement” and then added two more instances:

- Aligning performance measures which truly reflect strategic goals and priorities.
- Designing explicit, formula-based incentives as a way of powering up, or motivating, goal achievement.

The output of diagnostic control systems is measurable, so the “changes in business culture” are not appropriate to Diagnostic control systems. That’s why an interactive control system is necessary.

“*Strategic uncertainties* are the uncertainties and contingencies that could threaten or invalidate the current strategy of the business” (1995:94). Simons (2000) replaced the first definition by “Strategic uncertainties are the emerging threats and opportunities that could invalidate the assumptions upon which the current business strategy is based... [They] relate to *changes* in competitive dynamics and internal competencies that must be understood if the business is to successfully adapt over time”(2000:213-215).

For example, strategic uncertainties of Pepsi are the changes in customer tastes that could weaken the attractiveness of their products. Or those of Turner Construction Co. are the changes in owner psychology, loss of reputation in the trade, balance of the risk and conservatism in the financial management of projects, and the mix and quality of staff.

“Like critical performance variables, strategic uncertainties are uniquely determined for each business based on its current business strategy and the strategic vision of its senior managers”. Yet, strategic uncertainties are in a “constant state of flux and, therefore, cannot be programmed and monitored on management-by-exception basis” (1995:94). Unlike critical performance variables driven by staff analysis, strategic uncertainties are driven by top management perception.

“The critical performance variables enumerated in Balanced Scorecards or other Diagnostic control systems are determined by analysis and embedded in plans and goals. Strategic uncertainties, by contrast, trigger a search for new information and meaning, rather than a cursory checkup to ensure that plans are on track. Strategic uncertainties focus on questions rather than answers” (Simons, 2000:216).

Simons did not mention about the action plans of Diagnostic control systems. The proposition of Simons concerning action plans of Interactive control systems is varied from 1995 to 2000.

While “a control system must trigger revised action plans” (1995:108), “Interactive control systems must generate new action plans to adjust emerging strategy on a real-time basis” (Simons, 2000:220-221).

The information contained in Interactive control systems must be simple to understand and everyone have faith in its accuracy (Simons, 1995:108; 2000:220-221). “Senior managers challenge subordinates to explain any unforeseen changes in their business or suggested actions plans and the assumptions that underline their analyses” (Simons, 1995: 97-98). Interactive control systems must collect and generate information that relates to the effects of strategic uncertainties on the strategy of the business. “What are we going to do about it? How can we respond to these threats or exploit these circumstances?” Interactive control systems must require the reforecasting of future states based on revised current information. What has changed and why? (Simons, 1995:108).

2nd dimension: Use by top management

The top managers invest their attention in diagnostic control systems only in five instances: setting and negotiating goal, receiving updates and exception reports, following up on significant exceptions (Simons, 1995:70-72), aligning performance measures, and designing explicit, formula-based incentives (Simons, 2000:211).

“Diagnostic control systems act as attention-conserving devices for senior managers”.

While interactive control systems are “attention enhancers” (Simons, 2000:226).

In interactive control systems, the top management⁴⁵ is responsible for the interpretation of data which belongs to the role of operating managers in diagnostic control systems. But the frequent exchange between top management and their peers, subordinates is necessary.

“Senior managers assume primary responsibility for interpreting the data contained in these systems. The interpretation of data in Interactive control systems is not delegated. Staff groups are used primarily as facilitators in the interactive process” (Simons, 2000:226).

The subordinates often try to look at the same direction of their superiors, that’s why

⁴⁵ Bisbe et al. (2005:36) argued that the dimension “intensive use of top management” comprises the following indicators: (1) personal attention from senior managers, (2) intensive, frequent and regular attention from senior managers, (3) top management’s involvement with subordinates, (4) recurring agenda addressed by top management, (5) contrast with management by exception. But the authors also pointed out that it is not obligatory to have the presence of all indicators to form the dimension “intensive use of top management”.

“By choosing to use a control system interactively, top managers signal their preferences for search, ratify important decisions, and maintain and activate surveillance throughout the organization” (Simons, 1995:102).

A new information system is created to serve for interactive control systems.

“Senior managers must encourage continuous search activity and create information networks inside the organization to scan and report critical changes. Individuals must share information with others” (Simons, 1995:92).

An example of intensive use of top management: “Senior managers make the control system interactive by their continual personal involvement in establishing new programs and milestones, monthly reviews of progress and action plans, and regular follow-up of new market intelligence. Information from these meetings triggers new projects and long-term reviews of current product lines” (Simons, 1995:96). “Top managers pore over reports as soon as they are received and the later use the information to challenge the thinking and action plans of subordinates” (Simons, 2000:216).

A suitable manner in the use of interactive control systems is necessary.

An “interactive control does not usurp the decision rights of subordinates; it involves senior management at critical phases in the decision process to ensure that decisions are being made within a defined framework and to obtain information necessary to manage personal commitments” (Simons, 1987:353).

But Simons (1995, 2000) did not go further in clarification of how “not usurp the decision rights of subordinates”. Simons proposed a strong hypothesis on the manager rationality. They never have been influenced by power game or personal ambitions. Only strategy and strategic uncertainties are their guides (Sponem, 2004a). Moreover, as noted by Gray, “it seems curious that the interviewees [...] did not report any resistance to strategic directives created by inertial forces and vested interests in the status quo” (1990:147). And the control over organization actions is rather tight, not loose.

3^d dimension: Use by subordinates

Diagnostic control systems allow maximum autonomy: subordinates are held accountable for results but have the freedom to choose how to accomplish desired ends. The main actors of these systems are critical functionaries and gatekeepers (such as accountants, sales planners, engineers, and quality control experts) (Simons, 1995: 85). They have significant impacts on these systems.

“As they have ability to correct deviations from standard, “diagnostic control systems are appropriate only for processes that organizational participants influence significantly. [Moreover], participation by subordinates can allow more reasonable goals and the perception of reasonable goals” (Simons, 1995: 70-72-74).

Ex: “Staff groups receive authority from senior managers to maintain and operate diagnostic control systems [...] and monitor the accuracy of the data supplied by business managers” (Simons, 1995: 85).

An interactive control system must be used not only by senior managers but also by managers at multiple levels of the organization.

“The [interactive control] system may remain interactive down three or four levels in the organization, until subordinates are too junior to be directly involved with the system ... Middle managers are especially important in making the interactive control process work effectively” (Simons, 1995:102-121-122).

But the roles of operating managers are likely to reveal concerns of top management, collect information, interpret the data, and make interactive dialogues.

“All subordinate managers will engage in the interactive dialogue to the extent demanded by their position” (Simons, 1995:102). “In preparation for these meetings, participants learn to call on their own peers and subordinates to help interpret the changing patterns revealed in the data. In this way, participants build their own information systems that inform them of changing patterns and allows them to respond with new action plan” (Simons, 1995:97-98).

“Middle managers are key nodes of the information network that reveals senior management’s concerns and moves newly collected information up, down, and sideways in the organization” (Simons, 1995:102-121-122).

4th dimension: Type of discussion: presentation for diagnostic control, but negotiation and discussion for interactive control

Simons (1995, 2000) did not precise on the type of discussion of diagnostic control. The Osborn (1998)’s results demonstrate that managers in diagnostic control approach have a tendency spending more meeting time presenting material, while the dominant activities of managers in interactive control approach are negotiation and discussion.

More concretely, “interactive debate and dialogue take place at all levels of the organization as new information is studied and analyzed... The discussion surrounding

interactive control systems are always face-to-face, involving operating managers directly. Meetings are used to brainstorm and use every possible piece of data to collectively make sense of changing circumstances. The debate focuses on new information, assumptions, and action plans” (Simons, 2000:217-218).

“The top managers use the information to challenge the thinking and action plans of subordinates” (Simons, 2000:216). “Interactive control systems focus attention and force dialogue throughout the organization. They provide frameworks, or agendas, for debate, and motivate information gathering outside of routine channels” (Simons, 1995:96).

In brief, the distinction between diagnostic control and interactive control is more clarified. But a new issue emerge. Even though diagnostic control and interactive control are complementary, can a management control system be used either interactively or diagnostically or both?

3.2.2 Extended frameworks at conceptual level: Ponsard & Saulpic (2006)

The framework of Ponsard & Saulpic (2006) is going to be presented. The authors reveal the key roles of specialized tools in interactive control use and the need to simultaneously study all dimensions – involvement of managers, management tools, and incentive systems.

Ponsard & Saulpic (2006), based on the frameworks of Otley (2001)⁴⁶, Bouquin (2004)⁴⁷ and Simons (1995, 2000)⁴⁸, propose to characterize management control systems through three dimensions:

- the nature of the involvement of operational managers (top and middle managers),
- the degree of customization of its management tools⁴⁹. Are they generic⁵⁰ or customized⁵¹?

⁴⁶ Otley (2001) classified contributions in renovating management control systems into two categories: strategic vision of information systems (like ABC or BSC), and value based management (like EVA).

⁴⁷ Bouquin (2004) proposed to make a clear distinction between: control tools, the role and function of controllers, and management control process.

⁴⁸ They focus on studying Diagnostic control systems and Interactive control systems.

⁴⁹ Management tools, in the authors’ point of view, comprise of performance indicators, format, processing systems, provision of data.

⁵⁰ Generic: “Can they be easily transposed from one firm to another?” (Berland et al. 2005)

⁵¹ Customized: “Are they based on strategic concerns specific to a particular firm?” (Berland et al. 2005).

- and the degree of subjectivity of its incentive systems⁵². Are they objective⁵³ or subjective⁵⁴?

Two ideal-types were identified: “the diagnostic systems rely on generic tools, arm’s length involvement of managers, and objective link between measurement and objective assessment procedures; whereas interactive systems reply on customized tools, continuous attention of managers to facilitate dialogue, and more subjective assessment schemes” (Ponssard & Saulpic, 2006:19).

The authors argue that the school of thought on “strategic vision of information systems” is likely to be interactive systems, while the value-based school is akin to diagnostic systems. The intrinsic limits of each system are demonstrated. The first school assumes that “once the strategy has been explained and new indicators have been defined, managers will be naturally inclined to implement it”, thus ignores the incentive dimension (p.15-16). The second assumes that “if incentives between managers and shareholders are correctly aligned, managers will naturally find the right strategy”, thus omits the tool dimension (p.15-16). They suggest a complementary use of both schools to minimize the limits of each system taken in isolation.

The three-dimension grid of Ponssard & Saulpic (2006) is particularly interesting because it provides a framework to operationalize the concept of interactive control systems. It also opens a wider view to renovate management control systems. Although many practical case studies are used to justify a dimension of this grid, the latter needs a case study which can provide an overview of three dimensions: involvement of management (distant versus intensive), tools (specified versus generic), and compensation systems (formula-based versus contribution-based).

However, the authors did not take into account all dimensions of properties of diagnostic control and interactive control, but studied only one dimension “involvement of management”. We propose thus to replace the dimension “Involvement of management” with “Properties of control system”. The latter include five dimensions as analyzed in the second section.

⁵² Incentive systems, broadly speaking, include evaluation of individual performance, systems for disciplinary action and rewards (Berland et al. 2005).

⁵³ “Do they comply with outside standards?” (Berland et al. 2005)

⁵⁴ “Are they related to qualitative criteria whose appreciation may depend on the subjective judgment of the superior?” (Berland et al. 2005)

On the other hand, Ponsard & Saulpic (2006) made explicit what Simons vaguely mentioned. In fact, Simons (1995) said that the senior managers and subordinates must create their own information systems to report the critical changes. In the terms of Ponsard and Saulpic, it is the customization of the tool⁵⁵. The tools are often generic in diagnostic control, while, they are often specific in interactive control⁵⁶.

The important roles of “Incentive systems” dimension are recognized by Simons (1995, 2000), Sponem (2004 a, b), Ferreira & Otley (2003, 2005) and Ponsard & Saulpic (2006).

The power of incentives is recognized in stimulating individual initiative and opportunity-seeking. Rewards can be both economic (like salary, cash bonuses, or stock options) and non-economic (like praise or recognition). Promotion brings economic benefit, recognition, and prestige.

“Diagnostic control system incentives tend to be based on explicit formulas, which provide objectivity, define the outputs desired, and require the least amount of management attention... Many incentives are simply linear payouts based on a percentage of performance outputs” (Simons, 1995:79). According to Merchant (1989)’s study of incentive systems, eleven of twelve firms explicitly tied incentives to ex ante diagnostic targets.

Advantages of the diagnostic control system incentives are:

- “Objectivity provides motivation and clear direction for effort” (Simons, 1995:79-80),
- Free management attention,
- The use of diagnostic control systems to measure an individual’s performance and adjust rewards can lead to innovation.

However, some drawbacks of these systems are:

- “Bonus incentives are tied to specific goal achievements to increase short-term motivation and ensure the achievement of important goals” (Simons, 1995:79).

⁵⁵ For further analysis, see the section 4.2.3 – “Tanguy (1989) and Ponsard & Tanguy (1990): a customized tool used interactively by middle management and moderately by top management”.

⁵⁶ We should distinguish the characteristics of the tools from the content of communication (which is the first dimension of the properties of control systems). The characteristics of the tools describe the tools (e.g. components, actors). The use of these tools can generate different outputs. The outputs can become one of the content of communication.

- The problem may be insolvable: “how to measure and separate an individual’s marginal contribution from the overall marginal product of the firm?” (Simons, 1995:80),
- “The absolute level of rewards may be less important than a comparison of rewards relative to peers” (Lawler, 1972, cited by Simons, 1995:81)

Ex: The company Dun & Bradstreet’s Credit Services Division systematically sold more units than clients actually used because targets focused on increasing unit sales (if the number of subscription units declined from one year to the next, rewards were reduced).

Or the Sears’s managers were given repair quotas and rewards for meeting them. As a result, repairs were made even if not required. The car quality of General Motors continued to decline due to the change of measurement scale in defect scores (from a scale of 100 to 145).

Meanwhile, “Interactive control systems are associated with subjective, contribution-based rewards” (Simons, 1995:117), which encourage innovation and organizational learning.

- First, the subjective rewards, based on the personal judgments of superiors, allow them to recognize innovative behavior, and “provide the necessary flexibility to acknowledge the contribution and effort expended in creative search behavior, testing new ideas, and sharing information throughout the organization ... Creativity is the outcome that is valued” (Simons, 1995:118).
- Second, contribution-based rewards stimulate organizational learning. “Because rewards are not tied to environmental conditions beyond the control of participants, the rewards encourage information sharing, new action plans, and learning” (Simons, 1995:118). And information biasing is reduced since rewards are not mechanically tied to uncontrollable events (Simons, 2000: 225). Participants attempt to make their efforts visible to superiors by communicating emerging problems, opportunities, solutions (Simons, 1995, 2000).

“Control systems *cannot* be used interactively if incentives are linked by formula to fixed, *ex ante* goals” (Simons, 1995:118). “To assign subjective awards equitably, superiors must have a sound understanding of the business environment, decision context, array of possible alternatives, and potential outcomes of actions not taken...Strong business experience brings additional benefits” (Simons, 1995:118-119). This “condition also reminds us why most rewards in organizations are based on preset formulas” (Simons, 2000:225).

As a result, a control system should be studied under three dimensions: its properties, its tool, and its compensation systems.

4. Outcomes of management control systems

We are going to study the outcomes of the separate use and the joint use of diagnostic and interactive control systems. In each situation, we also present some case studies to illustrate the use of control systems in strategic change. Before presenting these outcomes, we define “the separate use” and “the joint use”. A management control system can be regarded under two viewpoints: as a whole and as a composition of different sub-systems.

Concerning the first viewpoint, a separate use of a control system is considered either interactive or diagnostic if it satisfies three above-mentioned dimensions (properties of management control, tool, and compensation system). The joint use means a control system has the characteristics of both interactive control and diagnostic control. This possibility is mostly ignored by Simons and his followers.

With regard to the second viewpoint, the main criterion to distinguish the separate use and the joint use is the number of control systems used at the studied moment. Although Simons (1995) said that diagnostic control system and interactive control system are complementary, he defended the separate use because at least two control systems - one for interactive control and another for diagnostic control – are simultaneously but separately used (Adebayo, 2007). The joint use mentioned by Has & Kleingeld (1999), Tuomela (2005), and Adebayo (2007) signifies that only one control system is used in different manners at different hierarchical levels. For example, interactive control at the top management but diagnostic control at the local management.

Most of relating researches follows the approach of separate use⁵⁷. Recently, some authors defend the joint use of control systems⁵⁸ but only in the second viewpoint (a control system is a composition of different sub-systems). Both approaches pay a particular attention on studying the effects of the use of management control systems on the performance of company.

⁵⁷ Simons, 1990, 1994 ; Abernethy & Brownell, 1999; Davila, 2000; Van der Stede, 2001; Bisbe & Otley, 2004; Sponem, 2004; Obsorn, 1998; Marginson, 2002; Lindquist, 2003; Berland & Sponem, 2005.

⁵⁸ Haas & Kleingeld, 1999; Otley & Ferreira, 2003, 2005; Tuomela, 2005; Henri, 2006a; Adebayo, 2007.

4.1 Outcomes of separate use of control systems

The approach on a separate use of diagnostic and interactive control systems is rather abundant. The two control levers are complementary, and

“If the organization has n control systems [...], one of those systems will be used interactively and $(n-1)$ systems will be used diagnostically” (Simons, 1995).

Clearly, a management control system, in Simons' viewpoint, is used either diagnostically or interactively, not both. In his case study (1994)⁵⁹, Simons explained that top managers, in the context of strategic change, used diagnostic control systems in the first year to implement intended strategies. The interactive control systems were only mobilized in the second year for emergent strategy⁶⁰.

4.1.1 Deliberate strategies versus emergent strategies

The diagnostic control systems are used as levers to “monitor the implementation of intended strategies...Without diagnostic control systems, managers could neither communicate nor implement strategy effectively in large complex organizations” (Simons, 2000:208-209). More concretely, diagnostic control systems ensure “an explicit top-down linkage of intended strategies to lower-level goals and the coordination of resources and action plans [so] “do constrain innovation and opportunity-seeking” (Simons, 1995: 90-91).

In fact, management control systems have been often viewed typically as management-by-exception tools for implementing intended strategies. An influential researcher for this traditional view is Anthony (1965, 1998) who proposed to separate strategy formulation, management control and task control.

“Management control fits between strategy formulation and task control in several respects... Strategy formulation focuses on the long run, task control focuses on short-run operating activities, and management control is in between” (Anthony and Govindarajan, 1998: 6).

Roberts (1990) advocated that the control mechanism encourages efficient and effective implementation of the current strategy. The control mechanism is characterized by the regular

⁵⁹ See the section 1.4.1 for more detailed description and further analysis.

⁶⁰ A further analysis on this remark will be made in the next section in which we argue that the boundary between interactive and diagnostic control systems is not so clear, even in Simons (2004)'s case study.

management meetings together with extensive budgetary controls, detailed cost reports and extensive market information. The authors supported that this control system enables the managers to solve the conflict between accounting controls and strategy, but fails to assist in developing new strategies.

Yet, the dichotomy between strategy formulation and strategy implementation resulted in a false one (Mintzberg, 1978) or an artificial dichotomy (Simons, 1990). Due to the new research tendency on employee empowerment, “the artificial boundaries between operational, managerial and strategic control, as initially described by Anthony (1965), may no longer hold” (Langfield-Smith, 1997:209). Because managers often excessively focalize on accounting financial data and ignore the strategy formulation (Otley, 1999). This separation is no longer necessary thanks to the four levers of control (Bouquin, 2005:40-41).

As a result, Gabarro (1987) and Simons (1990, 1991, 1994, 1995, 2000) argued that management control could encourage not only strategy implementation but also new strategy emergence. Simons (1995:114) has integrated strategy formulation⁶¹ in management control through the concept of “interactive control systems”.

Deliberate strategies represent the top-down plans developed by traditional strategy formulation, while emergent strategies⁶² arising from daily activities of business often represent unexpected, bottom-up ideas (Osborn, 1998). Diagnostic control systems are to implement intended strategies. Meanwhile, through interactive control systems, the relationship between formal strategy formation and strategy implementation is reversed: “they become a means for surfacing and acting upon emergent strategies” (Osborn, 1998:488).

“[The interactive] model illustrates, moreover, that emergent strategies can be influenced and managed – serendipity can be guided by top managers who use formal process to focus organizational attention and thereby generate new ideas, tactics and strategies” (Simons, 1990: 137; 1995, 98-100).

⁶¹ It is important to note that strategic planning systems, despite their focus on strategic uncertainties and the personal involvement of senior managers, “cannot be used as interactive systems” for “long-range planning systems are not used throughout the organization and are not linked to revised action plans” (Simons, 1995:114). Thus, strategic planning is a system for implementing strategy, so it can be used as Diagnostic control systems; whereas new strategic initiatives or strategy formation are developed through interactive controls.

⁶² Mintzberg (1985, 1987, 2001) has suggested that strategies may be regarded as both deliberate and emergent. However, in reality, hardly does it exist pure deliberate and/or pure emergent strategy. Mintzberg (1985) proposed three dimensions to distinguish deliberate from emergent strategies: leadership intentions, central control over organizational actions, and controllability of environment

The interactive control systems stimulate not only emergent strategies but also learning and innovation.

“The [interactive] control systems stimulate search and learning, allowing new strategies to emerge...[S]enior managers use Interactive control systems to build internal pressure to break out of narrow search routines⁶³, stimulate opportunity-seeking, and encourage the emergence of new strategic initiatives” and “...innovation” (Simons, 1995:91-93-101).

It seems that Simons (2000) took more caution on the role of Interactive control systems. Interactive control systems are used to “provide a lever to fine-tune and alter strategy as competitive markets change”; thus “*emerging strategy* can be an indirect result of bottom-up action plans and experimentation” (Simons, 2000:208-217).

More generally, “managers can use the interactive control process to guide the search for the new opportunities, stimulate experimentation and rapid response, and maintain control over what could otherwise be a chaotic process” (Simons, 2000:218).

4.1.2 Innovation, performance, and strategic change

The concepts on diagnostic and interactive control systems have attracted a particular interest from other researchers. Although firms in all selected case studies were in the period of strategic change, they were varied and located in different industries and countries (cf. Appendix 2). While Simons’s researches were dominated by qualitative and longitudinal methods, most of other researchers chose quantitative survey methods.

Abernethy and Brownell (1999) used Simons’s (1990) interactive/diagnostic classification of management control systems to investigate “how accounting can be used as learning machine in the formulation and implementation of strategic changes” (p.189). The highly rigorous statistical analysis of the data, collected from Chief Executive Officers in 63 Australian public hospitals, confirmed that interactive style of budget use could mitigate the disruptive performance effects of the strategic change process. Organizational performance is highest when a diagnostic (/interactive) use of budgets is matched with low (/high) levels of strategic change. The result supports Simons’s (1990) assertion that “the effective implementation of strategic priorities does not necessarily influence the importance of accounting controls, but

⁶³ “Successful adaptation in competitive markets requires organizations to break out of limited search routines (Cyert and March 1963: 123-125)” (Simons, 1995:92).

rather, influences the manner in which these controls are used” (p.199). These results enrich understanding on the link between performance effects of aligning the use of management control system with the degree of strategic dynamism in an organization. However, “they do not explain why top management actually uses management control system in particular ways, not how the use of management control system is related to the strategic direction of the organization” due to the use of strategic change and use of management control system as exogenous variables (Gil & Hartman, 2006:23).

Davila’s (2000) study investigates “the design of management control systems to understand how companies adapt their systems to particular characteristics of new product development” (p.384). To understand how project managers use management control, Davila visited 12 Business Units in seven companies both in Europe and the United States. During these visits, he interviewed in each unit five managers on the average (one or two project managers, the marketing manager, the R&D manager and the general manager). Thanks to these case studies, the research hypotheses were developed and then tested by 56 responses of project managers. As a result, the relevance of project uncertainty and product strategies to explain management control systems design is supported. Better cost and design information have a positive association with performance but time information has a negative effect.

Bisbe and Otley (2004) aimed at clarifying the effects of interactive use of management control systems on product innovation. The survey results on 58 medium-sized, mature manufacturing Spanish firms did not support the Simons’s postulate that an interactive use of management control systems favors innovation. In fact, interactive use of control systems may favor innovation in low innovating firms but reduce innovation in high-innovating firm. And the impact of innovation on performance is moderated by the style of use of management control systems. The theoretical analysis is well-structured and well-argumentative. However, the questionnaire is too simplified to well adapt for the research questions which is very interesting but much more ambitious.

These researches focused on studying the strengths of interactive control systems. They provided some evidences on the relationship between Interactive control systems and innovativeness (Davila, 2000; Bisbe and Otley, 2004) and/or strategic change (Abernethy & Brownelle, 1999) and/or organizational performance (Obsorn, 1998; Abernethy & Brownelle, 1999; Bisbe and Otley, 2004; Davila, 2000). To what extent were the managers’ actions in the use of control levers visible in improved performance? Simons recognized that

“organizational and environmental variables make the measurement of performance relationship extremely difficult” (Simons, 1994:184).

4.1.3 Drawbacks of separate use of control systems

The risks of diagnostic control systems are (1) measuring the wrong variables, or (2) building slack into targets, or even (3) gaming the systems by altering the timing and/or recording of transactions to show better performance (“smoothing”) or by reporting only good news or hiding or downplaying bad news (“biasing information”) or violating laws or organizational policies (“illegal acts”) (2000:214). Moreover, “staff specialists may tend to overemphasize management errors and failures” (Simons, 1995: 87).

The interactive use of control systems, despite its undeniable strength, may theoretically provoke some following risks (Simons, 1995, 2000):

- In economic terms, the interactive control systems are costly because they require frequent attention and personal involvement of top managers and their subordinates.
- The decision makers suffer from information overload leading to the superficial analysis, a lack of perspective, and potential paralysis,
- The paperwork and forms become more important than face-to-face dialogue and action planning,
- The participant may feel threatened by the active interest and participation of senior managers. The threat of embarrassment can subvert learning.

Consequently, there are three main reasons to choose only one Interactive control system: economic (for management attention is a scarce and costly resource), cognitive (for avoiding information overload⁶⁴), and strategic (to activate learning about strategic uncertainties and generate new action plans) (Simons, 2000:224).

To summarize, the interactive control systems allow facilitating strategy emergence and organizational learning, while the diagnostic control systems help to communicate and then implement intended strategy. The potential drawbacks of interactive control lever are expensive cost, information overload, paperwork, and threat of embarrassment of subordinates. Diagnostic control systems may lead to over-emphasize management errors and

⁶⁴ “Except during periods of organizational crisis, during which top managers will make *all* control systems interactive for short periods to help redefine strategy” (p.224)

failures or system gaming. The boundary between desirable outcomes (or positive outcomes) and undesirable (or negative) outcomes is rather blur. How to ensure and amplify positive outcomes? And how to avoid or reduce negative outcomes?

4.1.4 Simons (1994): Use of control levers in strategic turnaround and strategic renewal⁶⁵

Simons (1994) investigated *how* and *why* the newly-appointed top managers use formal management control systems as levers of strategic change. After 18-month longitudinal study accompanied by semi-structured interviews with ten newly-appointed top managers, Simons confirmed the importance of formal control systems as levers of strategic change. The managers often spend the first several months (3 months conduct in-depth economic analysis) which may help them to understand the strengths and weaknesses of the business (like business opportunities, competitive advantages, strategic options), and hardly made changes in the design and the use of formal control systems in this period.

He also found out that the different *mandate for change* perceived by top managers create two strategic clusters – strategic turnaround and strategic renewal. Although the distinctions among the levers of control as well as the chronological order were not very clearly identified in Simons's (1994) paper, we made an attempt to classify them.

Strategic turnaround

The role of the turnaround manager was to act as a driving force for fundamental, revolutionary change. The managers can openly declare the failure of past strategies and are under the pressure of performance improvement⁶⁶ (cf. Figure 2). They formulated the new turnaround strategies, and then formalized new mission statement for business (namely,

⁶⁵ Simons (1994)'s case study perfectly satisfies our criteria of separate use of control systems. When the top management used the control system as diagnostically in the first year, the interactive control has not existed yet. Thus, it is the separate use. When a control system was interactively used in the second year, the remaining systems were diagnostically used. This use, despite its simultaneity, is also separate. They do not have an interaction or interdependence between them. Each system exists and operates separately. That's why I propose to classify this case study in the separate use of control system.

⁶⁶ "If short-term problems were not successfully overcome, they would not survive the long-term" (Gabarro, 1987:51).

“beliefs” systems⁶⁷) and specified risks and types of behaviors no longer allowed (namely, “boundary” systems⁶⁸) in order to overcome organizational inertia⁶⁹.

Six months later, when the strategy is clearer, the implementation of strategy becomes more important than ever to build credibility and confidence from superiors and shareholders. Hence, diagnostic control systems are used to justify the new strategies, to communicate agenda of turnaround managers to their superiors, and to demand accountability from subordinates. Their goals were quantitative, but not necessarily financial (e.g., financial targets, market share targets, new business targets).

Ex 1: One manager presented goals that increase net profit percentages from 12% to 16% and monitored the critical performance variables by requiring monthly operating income reports by business, cash flow statements, and related variance reporting, etc.

Ex 2: Over 4-year period, business would break into new geographical markets. Sales increase from \$375 millions to \$1billions, net profit range from 12% to 15%.

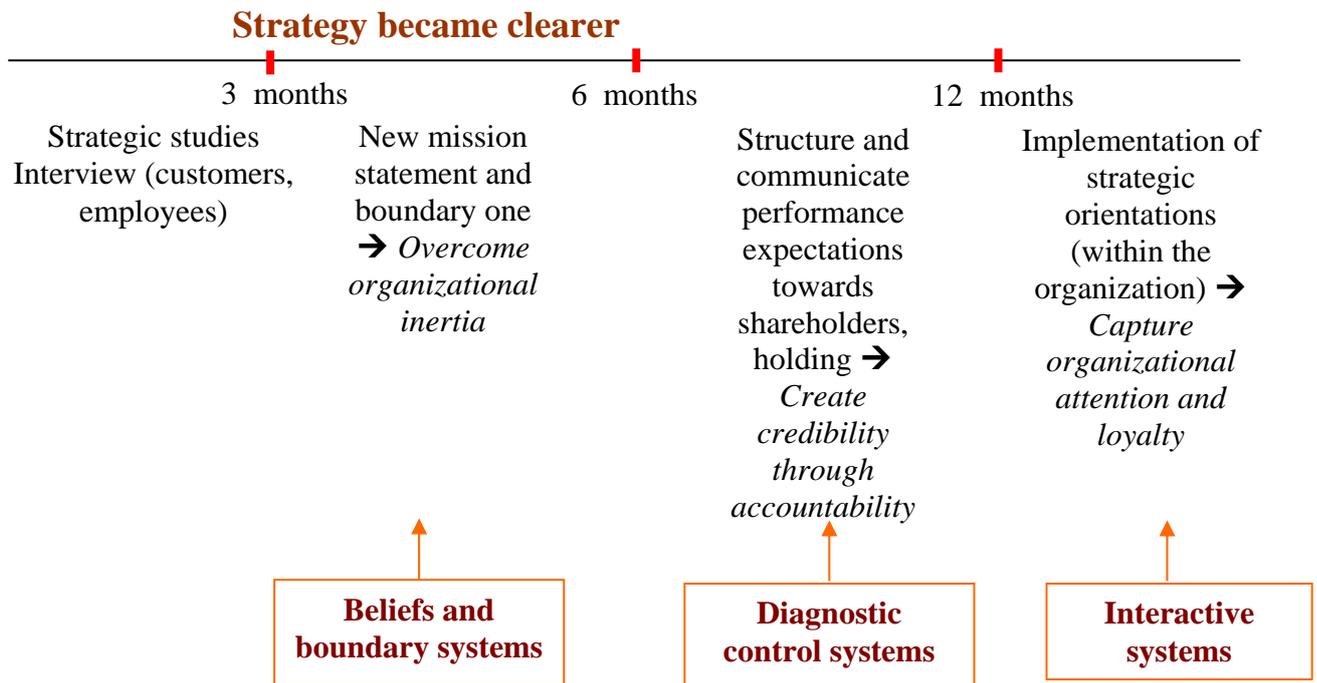
⁶⁷ The missions concentrated on core beliefs, target markets and core product categories. Example: for a global expansion strategy, the mission was “to firmly establish its brands as the world’s undisputed leader in its various markets”. Or diversification opportunities must build on our existing strengths and/or hold the potential for near-term profitability”(Simons, 1994:177).

⁶⁸ “Profit – not volume – will be our creed” or “We will no longer offer period-end promotions to boost volume” (Simons, 1994:177).

⁶⁹ Two ways to overcome of organizational inertia, which hinders the engineering of revolutionary strategic change, are (Miller & Friesen, 1984; Hannah & Freeman, 1984; Nelson & Winter, 1982; Argyris, 1985; Tushman et al., 1987):

- Replacing key individuals whose behaviour patterns do not fit the new strategy (Tushman et al., 1987),
- Using “beliefs systems and boundary systems to actively create impetus for the new, emerging agenda and to demarcate the domain for new strategic initiatives” (Simons, 1994:176).

Figure 2: Use of four control levers in strategic turnaround



Source: Synthesis of Simons (1994)

To ensure the commitment to the new agenda, new managers increased significantly base salaries and bonus incentives of the remaining key subordinates. The bonus incentives were linked explicitly to the critical performance variables associated with the new strategy (i.e. objective-based incentives).

Ex 3: “If you don’t hit your strategy - even though you hit your budget – you will be penalized”.

And in the twelfth month, 50% of bonus was changed from quantitative, formula-based, objective measures (an attribute of diagnostic control system) to subjective evaluation (an attribute of interactive control systems).

In the second year, the managers, based on their vision for the future, decided the strategic uncertainties and hence chose a control system to use interactively.

Ex 4: The previous CEO had used brand revenue system as interactive control by requiring weekly detailed reports on worldwide product shipments and prices together with a debate and dialogue throughout the organization. The new top manager wanted to invest more innovation in the firm’s product offerings, hence demanded using the new (?) profit planning systems interactively and monitoring the brand revenue system in the diagnostic way. “Through the debate, new strategies would emerge” (p.180).

Table 1: Change of Interactive control systems at health aid company

	Before (previous CEO)	After (new top manager)
Strategy	Mature product markets.	More innovation in the firm's product offering and marketing programs.
Interactive control	Brand revenue system.	Profit planning system.
Actions	Weekly reports on detailed product shipments and prices	Monthly report on profit planning system.
What for?	Based on these data, debate and dialogue were throughout the organization in an attempt to "understand how levers of pricing, promotion, and packaging could be used to gain competitive advantage in various markets".	To understand market conditions, competitor actions, brand profitability and timing and effect of new product introductions.
How to shift?	Brand revenue reports were returned physically to sender and required to be monitored in a diagnostic basis.	Top new manager and his new chief financial official, with the help of consultants sent a very clear signal throughout the organization about what strategic uncertainties the organization should collect data on and respond to.

Source: synthesis of Simons (1994)

This example reveals how an interactive control system was changed to a diagnostic control system and how to implement a new interactive control system (cf. Table 1). However, three following points were not much developed in this example:

- How was the debate between the top manager and the subordinate conducted?
- What are the features of the "new" profit planning systems? Are they really new?
- What are new emerging strategies?

Strategic renewal

Primary concerns of renewal managers were to maintain the success and momentum of the business, and to continue a trajectory of profitable growth. As managers were not supposed to openly criticize past strategies, strong decentralized diagnostic control systems took the initial step to increase performance expectations and to create a sense of urgency. The managers established new financial control targets at more demanding levels and then verbally communicated through speeches, newsletters, and audiovisual materials.

Ex 5: The newly-appointed manager determined targets at 19% on return on capital employed (ROCE) and 9% on growth in asset base. New quantitative targets are related to accounting measures such as revenue growth, operating profit, ROCE, and asset growth.

- *introducing new planning processes (e.g. capital budgeting, strategic planning; technology planning),*
- *lengthening planning horizons to encompass additional planning years,*
- *increased emphasis on overall product market strategies and reduced emphasis on financial detail” (Simons, 1994).*

Ex 7: the managers prepared personally new planning guidelines reflecting new strategic agenda and required subordinates to develop action plans and to reply directly to top managers.

Strategic plans prepared by subordinates were too highly detailed with a lot of numbers, so often thrown away by top managers. Consequently, the later created one-to-one teaching/testing sessions where top managers repeatedly explained why plans were inadequate and what additional initiatives were required.

The management control systems were used not only to teach but also to test subordinates to “determine who was capable of the type of strategic change they valued” (p.183). Simons stressed the personal involvement of top managers in the period of teaching new strategic agenda and testing subordinates, but did not mention which type of control lever was used.

Ex 8: "I sketched out the strategic plan for the business after I realized that if I asked them for it, all I would get would be a lot of numbers. I wrote it, gave it to them, and they rewrote it and gave it back to me. So I rewrote it again. We went back and forth four times. We spent 3 months agreeing on a plan that reflected what we are trying to achieve. We went through some hell to get it right, but we finally arrived at an eight page document that I was happy with" (Simons, 1994:183).

The intensive implication of management (both top and operational managers) in the above example seems to satisfy one of five dimensions to form interactive control systems. However, this system may be also diagnostic because the discussion between the top manager and his subordinates is done by writing, not face-to-face, and the top manager may invest their personal intention in the goal negotiation. Consequently, we do not know exactly whether this lever of control is diagnostic or interactive.

In the second year, the renewal managers, like turnaround managers, used interactive control systems to focus organization attention on strategic uncertainties. The beliefs systems and boundary systems were vaguely used in this case.

In brief, this research confirmed the importance of formal control systems as levers of change and showed the remarkably similar way that managers, despite various businesses and industries, use control systems to:

- For the first 12 months: overcome organizational inertia, communicate substance of new agenda, structure implementation timetables and targets, and ensure continuing attention through incentives,
- And for the next 12 months: focus organization learning on strategic uncertainties associated with vision for the future.

Simons (1994) summarized the different ways turnaround managers and strategic renewal used the control levers. Belief and boundary systems, employed in the second quarter by turnaround managers, were nearly neglected and replaced with diagnostic control systems by evolution managers. While diagnostic control systems and then, interactive control started being implemented by turnaround managers in the second semester, interactive systems were nearly monopoly in strategic renewal company.

4.2 Outcomes of joint use of control systems

Little attention is devoted to a joint use of diagnostic control and interactive control (Henri, 2006; Tuomela, 2005, Haas & Kleingeld, 1999). The boundary between diagnostic control and interactive control in firms' practices, however, is not as clear as in theory. Even Simons (1994)'s case study leaves some points in the shadow of a doubt.

For instance, when a turnaround manager used 50% of subjective bonus at the end of the first year, can this system be considered as interactive or diagnostic?

And not all dimensions are used by Simons (1994) to identify whether a control system is diagnostic or interactive. Some recent researches explicitly justify a joint use of interactive and diagnostic control.

4.2.1 Joint use suitable for service companies and intensifying the positives effects of interactive and diagnostic control systems

Adebayo (2007) aimed at investigating whether task uncertainty⁷⁰ interacts with the diagnostic and interactive use of management accounting systems (MAS) to influence

⁷⁰ "Task uncertainty is defined as the difference between the amount of information required to perform the task and the amount of information already possessed (Galbraith, 1973)... Regarding the impact of task on information processing requirements, Perrow (1967) suggest two basic dimensions of task uncertainty: variability and analyzability, which are major determinants of information processing for an organization. Task variety is the degree of unanticipated or novel events occurring in a process, while analyzability is the breakdown of a process into formalized steps to reduce uncertainty" (Adebayo, 2007:4).

performance. Electronic survey results obtained from 211 managers⁷¹ indicate that “performance was positive under high levels of task uncertainty when managers employ low diagnostic and high interactive use of management accounting systems” (p.2). And “the service sector, with a variety of tasks, would require a combination of diagnostic and interactive use of management accounting systems to cope with different demands confronting service firms in the competitive environment” (p.16).

Henri (2006a) examines, from a resource-based perspective, the relationship between the use of management control systems (interactive, diagnostic, joint use) and organizational capabilities (organisational learning, innovativeness, entrepreneurship, market orientation). Previous research on the effects of MCS on strategy provided ambiguous and contradictory results due to “the absence of a theoretical framework founded on the resource-based view⁷² and the limited attention devoted to the dynamic tension resulting from different uses or roles of MCS” (p.548). The author postulated that “together, diagnostic and interactive uses create a dynamic tension which has two effects: (i) ensuring that positive effects of interactive use on capabilities will be achieved; and (ii) expanding these positive effects of interactive use”. The positive effects of interactive use may vanish due to:

- “insufficient diagnostic use to set boundaries and to highlight effectiveness issues”, which may lead to “a loss of direction, wasted energy and a disruption of continuity”⁷³ (p.537),
- or excessive diagnostic use, “which constrains innovation and risk taking” (p.537).

Positive effects of interactive use “are amplified by the combination of diagnostic and interactive use” (p.537) because of:

- Fostering organizational dialogue: “debate vigorously opposing positions (Chenhall, 2004)”, “provide valuable information”, “stimulate continual communication on strategic issues and promotes mutual understanding”, encourage “open and lively discussion”,

⁷¹ The managers include chief operating officers (COO), chief financial officers (CFO), chief administrative officers (CAO), and chief marketing officers (CMO).

⁷² The author argued that the ambiguous and contradictory results “can be attributed in part to the various definitions, conceptualizations and operationalizations of strategy and MCS (Kald, Nilsson & Rapp, 2000; Lanfied-Smith, 1997; Simons, 1990) ... Following the [Resource-Based view], the link between strategy and MCS may occur at the capabilities level rather than the strategic-choice level” (p.530-531).

⁷³ Cameron, 1986; Chenhall & Morris, 1995; cited by Henri (2006:537).

- Enhancing creativity: lead “organizational members to integrate seemingly opposed elements”,
- Focusing organizational attention: “make underlying issues explicit and helps groups to define their boundaries. ... Tension also fosters involvement and empowerment by providing incentives for different groups to pull together toward a common goal”.

To summarize, the dynamic tension created by the balanced and joint use of MCS ensures and increases the achievement of the positive effects of interactive use on capabilities⁷⁴. Two key hypotheses of this paper are:

- The above-mentioned dynamic tension tends to positively influence the capabilities (H1),
- And dynamic tension has an indirect effect on organizational performance (H2).

The survey results obtained from 383 top managers of Canadian firms confirm the validity of the hypothesis H1 only in the case of “firms facing high environmental uncertainty and having flexibility values” (p.546). The findings also change the second hypothesis. “Dynamic tension has a direct positive and significant impact on performance” (p.547). It means that “dynamic tension may represent a capability and a source of competitive advantage”⁷⁵ (p.547). The author also points out the necessity for further research, particularly using qualitative methodologies, on “how dynamic tension is reinforced and managed on a day-to-day basis by managers at different echelons” (p.549).

Marginson (2002) explored “how (and why) the design and use of different MCS may affect managers’ ‘autonomous strategy behavior’” (p.2). Management control systems and managers’ strategic activities interplay. Simons conceptualized, according to Marginson (2002:1020), what management control systems should comprise in order to direct managers’ strategic activities, thereby leading to desirable strategic outcomes at firm level. A case study was carried out in a U.K.’s large telecommunication firm. 26 managers from two middle

⁷⁴ “Simons’ framework leaves relatively unanswered the question why organizations combine diagnostic control interactive control” (Henri, 2006:548).

⁷⁵ “More specifically, the ability to reach a balance between two opposing uses of PMS that simultaneously try to stimulate innovation while searching for predictable achievements may represent a capability which is valuable, distinctive, and imperfectly imitable. This finding contradicts current literature tied to a resource-based view which states that control systems are not considered to be a source of competitive advantage because they are readily transferred and they lead firms to fully realize only the benefits of internal resources (Barney et al., 2001)” (Henri, 2006:547-548).

management levels were interviewed two times (12-15 month interval). A finding on the use of performance measure supported the complementarities of diagnostic and interactive use defended by Simons (1995). The author also extended these complementarities: “Top management’s use of KPIs creates tension and the possibility for trade-off between them during the implementation of innovation, i.e., during the actual development of new ideas and initiatives” (p.1027).

Haas & Kleingeld (1999) proposes “a normative framework for multilevel design of diagnostic controls”, searching for a mutual coherence of multiple control systems to create a consistent strategic dialogue throughout the organization. Two components of coherence are vertical and horizontal components. “This distinction is connected with the closed-system versus open-system approach of organization in systems theory” (p.241). A closed-system approach emphasizes vertical interdependencies, internal effectiveness, low-cost strategy, thus input-oriented and process performance indicators. An open-system emphasizes horizontal interdependencies, external effectiveness, differentiation strategy, and output-oriented and result performance indicators (Emery & Trist, 1969; Katz & Kahn, 1978). And two questions need to be dealt with to facilitate the interactive group processes: What to achieve? And how to achieve it? And they defend that “the essence of deployment is transformation of the how-question at a certain organizational level into the what-question at the next lower level in the organization” (p.245).

They defend that diagnostic use of control systems is not an end in itself. It is “a means for enhancing strategic dialogue throughout organization”, thus an interactive use (p.254).

“The interactive process of designing, i.e. the strategic dialogue, is organized in such a way that agents participate as a hinge or linking-pin in the design effort of their principals. Therefore, they have a bottom-up opportunity to contribute to the design of process indicator which will be deployed their result indicators. Consequently, diagnostic control systems of vertically interdependent constituencies become mutually coherent” (p.245).

Ex: Copytec case: a joint use of control systems

For example, Copytec⁷⁶, a large supplier of photocopier, implies a differentiation strategy. High-quality and cost-effective service performance are its critical success factors. Product Support and Field Service are sub-divisions of Copytec's Management Team.

A result indicator at higher level may become a process indicator at lower level and vice versus. The result indicators of Management Team are relative market share, the percentage of income and the percentage of cash flows. And its process indicators are the percentage of contracts renewed and the fraction of premium service contracts. Deployment of these process indicators makes them become result indicators of Product Support and Field Service. The two departments reach a consensus on (few) customer complaints and (high) customer satisfaction. The indicators "customer complaints" and "satisfaction rating" become process indicators of Field Service, and result indicators of Product Support.

This study is particularly interesting for the complementary use of interactive and diagnostic use of control systems is demonstrated.

"The process of designing and applying multiple diagnostic controls is necessary for interactive control of business strategy throughout the organization. The prerequisite of participation is evident in this respect" (p.256).

Two case studies done by Tuomela (2005) and Tanguy (1989) were selected to clarify the "joint use" concept and its impacts on the organization.

4.2.2 Case of Tuomela (2005): joint use of control systems and intrinsic motivation

Tuomela (2005), employing the frameworks of Otley (1999) and Simons (1995), carried out a four-year participative study in a FinABB company, a Finland subsidiary of ABB Group. This company was undergoing a strategic change in 1990s. It aimed for more customer-oriented and more result-accentuated objectives.

The FinABB strategy was difficult to be precisely defined because 1) "the managers defined their strategy mostly in terms of the objectives to be achieved via the strategy rather than the strategy per se", and 2) each profit center of FinABB has its individual business strategies. The intended strategy written by the previous CEO was results-oriented, but the team

⁷⁶ The case study serves only as an illustration, thus does not give a description of an empirical process in reality.

discussion dealt with the way strategic objectives would be met, thus it captured the main features of emergent strategy⁷⁷.

A customized tool: 3K Scorecard

A specific tool was created. The *3K Scorecard* was a customer-oriented performance measurement system. The latter search for improving delivery reliability and customer satisfaction expected as two main determinants of residual income and growth of activities⁷⁸. The update of the tool is annually done (through formal discussions) after the update of business strategy. *3K Scorecard* is communicated to employees via TV monitors on the factory floor and Lotus Notes via the Intranet.

Ex: “[N]ew kinds of information would be needed to further improve the control of strategic uncertainties. The measurement team decided to start developing a coherent system for anticipating changes in the market place (i.e. early warnings system). The ultimate aim of this new development exercise was to construct a collection of market indicators that would capture significant changes in the national and international economy, as well as in particular market segments” (p.304).

Involvement of management

The use of the *3K Scorecard* was both diagnostically (at the firm-level management group) and interactively (at measurement team – top management level). The diagnostic control enables to clarify the goals, strategies and relevant key success factors, while the interactive control allows learning about all of them and searching for the ways to implement them.

- Diagnostic at the profit center level: the participants of the monthly management group meetings are profit center manager, business unit managers, functional

⁷⁷ The most important outcome of “using the *3K Scorecard* has been its contribution to [double-loop] managerial learning concerning the fundamentals of the business strategy”. The development process of this tool was to implement the intended strategy. Thanks to the discussion on the way strategic objectives would be met, “it became evident that certain assumptions (cf. Burns and Scapens, 2000) had evolved over time and it was important to capture such features – the emergent strategy (see Mintzberg, 1978) – into the measurement system as well” (p.310)

⁷⁸ “Within the selected pool of measures two specific cause-and-effect relationships were assumed. First, it was reasoned that the increase in the number of employee initiatives and the improvement in time-to-market estimations for new products would lead to increased sales from new products. Second, it was believed that suppliers’ delivery reliability was a key determinant of the delivery reliability of *FinABB*. In turn, improved delivery reliability was assumed to lead to higher customer satisfaction that would filter through to increased orders received per person and higher sales from key customers. These two results of improved delivery reliability and customer satisfaction were then expected to be major determinants of residual income and growth in the number of orders received. Such alleged cause-and-effect relationships were considered to be an especially important feature of the *3K Scorecard*” (Tuomela, 2005).

managers and business controllers. They studied the results of 33 measures of the *3K Scorecard* by detecting notable variances from targets and without much discussion. Business controllers selected some measures to be studied thoroughly, and then they were responsible for presenting these results. While some controllers briefly highlight the main exceptions from target, others emphasize particular problem areas and analyze the development challenges by presenting only a few measures. “Such a use indicates diagnostic control” (p.307).

- And interactive at top level: the measurement team consists of CEO, CFO, three divisional managers, two business controllers, and the researcher. In regular meetings of the measurement team, discussions were focused on strategic metrics, assumed cause-and-effect relationships, and strategic uncertainties. Such discussions on the outputs of 3K Scorecard allowed giving the strategy more specific content, evaluating its progress and taking the concrete actions. “This represents a very *interactive use* of performance measures” (p.307).

Ex: Results of discussions on action plans emanating from 3K Scorecard

“With regard to the perspective of core competence development, a typical finding was that performance appraisal discussions and individual education plans had not been implemented as targeted. Better planning, higher commitment, and a more strict approach were presented as a means to improve these measures. Measures in the internal effectiveness perspective revealed poor performance, especially in the suppliers delivery performance. In the case of delivery speed and cycle time, it turned out that there were different views on their relevance, appropriate target levels, and the means of improvement. Customer satisfaction measures pointed out shortcomings in providing on-time deliveries. Several action plans were presented to solve the problems. The compensation systems become subjective- and contribution-based” (p.304).

On the one hand, the joint use of control system improves the quality of strategic management and increases commitment to strategic targets and visibility of actions. On the other hand, some new problems are likely to emerge. Interactive discussions of strategic problem areas increase the visibility of actions, and strengthen accountability to peers, thus make some managers feel threatened. Since such systems reduce the possibilities to protect themselves from scrutiny and questioning (Vaivio, 1995, 1999a, 1999b).

Ex: How did a manager refuse to participate in a new system?

“First, while being a member of the measurement team, the Manager for Domestic Sales stopped attending the meetings of this group at an early stage. Second, when presenting the first-year 3K

Scorecard results of his division and making conclusions, the Manager for Domestic Sales mostly wanted to discuss the specifics of the measurement system rather than the results and future action plans. He concentrated on evaluating the measures and their (in)applicability to this particular division, while the other profit centers reported on their evaluations of the results and the means for improvement for the on-going year. Third, measures for marketing effectiveness remained undefined for the first 2 years. The Manager for Domestic Sales had principal responsibility for this area, but even the use of an external consultant did not lead to defining the marketing process in such a way that it would have been possible to assign measures for it” (p.307).

Another problem is the increase of workload of participants: reporting tasks of accountants, data verification of operational managers, and time spending in meetings.

Ex: Multiplication of controllers’ tasks

“Since the managers were always busy and seldom pleased about increased reporting requirements, the business controllers often found themselves making subsequent requests to the managers with respect to the data provided” (p.312).

“In general, the business managers appeared to be frustrated at “sitting in all of these meetings and not doing what they are expected to do”. The measurement team meetings were clearly an exception in this regard – managers were enthusiastic about such meetings (with the exception of the Domestic Sales Manager)”.

Compensation systems: intrinsic motivation

Even the compensation system was also changed. The non-financial indicators were taken into account (in addition to financial performance indicators).

Ex: New non-financial indicators

“‘Number of employee initiatives’, for example, was adopted rather than ‘Percentage of useful initiatives’ in order to enhance a positive atmosphere that could encourage creativity rather than stressing efficiency” (p.305).

The author also pointed out that the top managers were “all committed to the *3K Scorecard* – even without explicit bonuses”. Is it an intrinsic motivation?

“It seems that the importance of rewards is not so relevant if managers have themselves created the measures to assist themselves in learning and strategic decision-making”⁷⁹ ...

⁷⁹ Emphasized by Tuomela.

In addition, the focus was on discussion and learning – interactive use – and there was no interest in creating a reward or punishment atmosphere” (p.311).

Implicitly, the author demonstrated the necessity of an intrinsic motivation – discussion and learning.

To summarize, the FinABB case presents interplay between interactive control lever and diagnostic control lever. The *3K Scorecard*, a customized tool, was used interactively at top management’s level, but diagnostically at lower level. The incentive systems orient toward rather an intrinsic motivation – desire of learning and discussion. Although such use of the *3K Scorecard* encourages strategy emergence, learning and discussion, some resistances still remain. The threat of embarrassment and time-consuming are main challenges. The business controllers play a role rather passive (as a reporting accountant) and dependant to operational managers.

4.2.3 Tanguy (1989) and Ponssard & Tanguy (1990): a customized tool used interactively by middle management and moderately by top management

In two articles, Tanguy (1989) and Ponssard & Tanguy (1990) provide an extensive analysis of the role of a management control system to trigger strategic change.

This strategic change concerned a recent acquisition of a Champagne company (denominated as Bullheim) by a large corporation (denominated as Cremer). The generic strategy (be number 1 in market share) and the standard reporting system (based on the declination of ROCE in profit centers through transfer prices) in place in Cremer could not be implemented in Bullheim. Champagne was characterized at that time by regulation in the upstream market and high irregularities in the annual production of grapes due to climatic variations. Strategy formulation in Champagne relied on a subtle balance between market forecasts and production feasibilities, including balance from one year to the next ones. A strategic turnaround was required since prior to the acquisition Bullheim was close to bankruptcy.

The top management decided to base its five year strategic plan on a decision tool that would allow the elaboration of consistent physical flows (availability of grapes, production of the successive stages of wines to obtain the various qualities of Champagne, inventories of bottles, sales to the various markets). This tool was later used for budgeting and reporting. The case study details the elaboration of the tool and the involvement of the managers to

operate it. This case study provides a benchmark to define interactive rationality (Ponsard and Tanguy, 1990).

Context and challenges

Bullheim, a large champagne producer, was founded in the 18th century and controlled by the family until the 1970s. Then, Cremer, an important industrial company, purchased Bullheim and Durand. The formulation and implementation of Bullheim's strategies had confronted many difficulties due to environment uncertainty, weak competitive position, and operational coordination problems.

First, regarding environment uncertainty, the climatic hazard causes unpredictability of the grape vintage quantity and quality, leading up to speculation and divergent interests of dealers. Therefore, the long-term uncertainty is conjectural (quality of the next vintage), structural (unpredictability of grape prices) and competitive (the perception of consumers on trademark quality is extremely subjective and largely depends on the promotional actions).

Second, Bullheim was in an incoherent competitive position. The good harvest in 1975-1977 had encouraged the progression of sales in Bullheim, but three consecutive vintages in deficit (1978, 1980, 1981) provoked the net stop of its growth process: sales drop due to stock rupture while the price was jumping. Thus, the new strategies focusing on the double capacity of "Purchasing" led to strong "slack" at this level due to an excellent harvest in 1982-1983. In 1983, Bullheim confronted an ironic situation: the continual increase of sales but unacceptable financial cost (because of necessary stock expansion) and regular drop of sales price (for Bullheim's trademark was not recognized as a good brand despite its high quality of champagne), thus red profit margin.

Third, concerning operational coordination problems, strategy tends to be confused with operational tasks. The possibility of financing grape purchase mainly depends on the climatic prevision. Because an important harvest makes the sales prices of champagne bottles immediately fail. Sales strategies are complicated due to wine-aged duration. And financial charges are often costly because of high stock and high raw material price but low sales prices. That's the reason why a close, dynamic, and strategic coordination is required in different services: purchasing, production, marketing and finance. However these services have their own strategies, hence have contradictory actions: purchasers searching for a long-term and privileged relation with wine-growers, technicians searching for the product quality,

while salespeople looking for increasing market share, and financial managers attempting to reduce the financial costs.

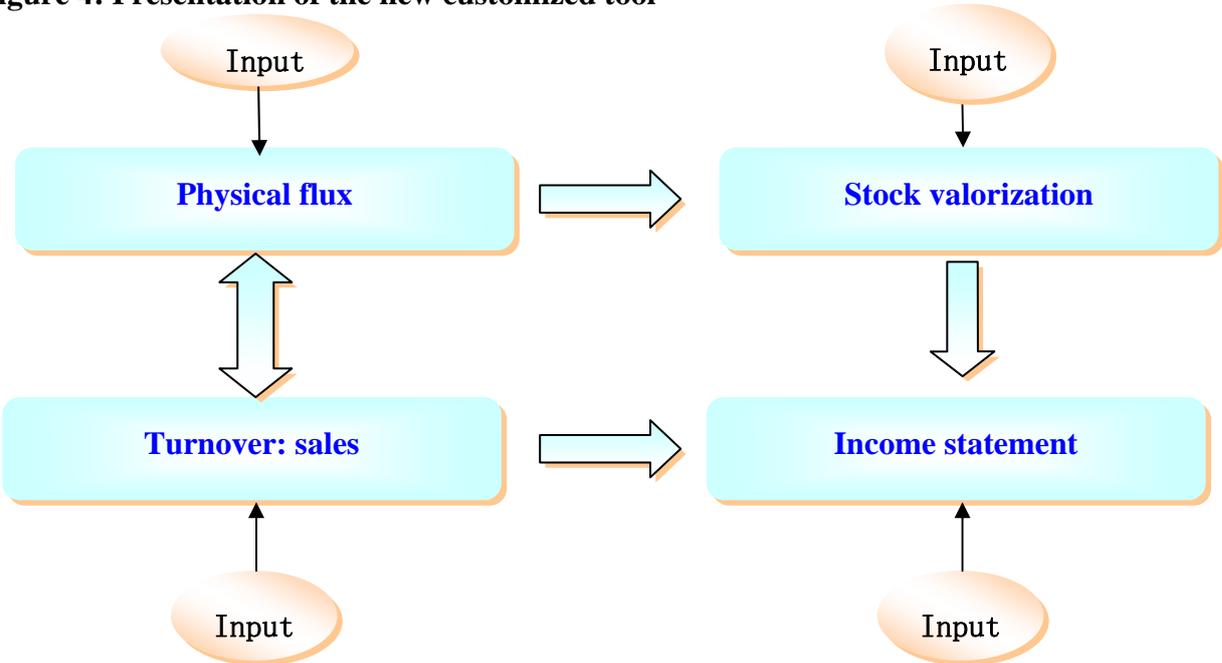
Management control systems as levers of strategic change

The general direction demanded the researchers to suggest a proposal which would allow creating the balance of internal management and keeping a profitable competitive position. After analyzing the complex characteristics of champagne industry in general, and Bullheim in particular, the research team identified two key questions: (1) how to obtain the participation of the most experienced operational employees? And (2) how to organize an effective and permanent operational coordination if the coherence of the commitments of each service is not clearly perceived by all? The proposal was to offer satisfactory answers to these questions.

Description of a new customized tool

The research team elaborated a planning model which simulates the complex interactions between financial flows and physical flows (cf. figure 4: Presentation of the new customized tool). This model operates on a simple Excel spreadsheet. It includes four tables: the first one is to simulate physical flows, so is used for purchasing, stocking and sales; the second one translates the physical purchasing and inventory flows into monetary terms; the third one simulates the turnover from sales prevision, and the last one automatically elaborates the income statements and financing table. All these simulations are done in the five-year horizon.

Figure 4: Presentation of the new customized tool



This tool requires the coherence between sales prevision and purchasing prevision, and flux mechanism (both in quantity and value). This coherence is the heart of interaction process between tool, organization structure and its perception on environment.

Highly appreciated by Bullheim's controllers and its general direction, this tool has been used for strategy formulation, strategy implementation and control. Because the tool structures a new way of communication: on the one hand, the implicit construction of global and shared representation of company's environment, and on the other hand, the meeting nodes of local management logics.

Use of control systems

The use of this tool allows the profound debate on strategy. The actors discuss and justify their choices of indispensable hypotheses of environment, which naturally leads to a debate on the construction of a reference scenario coherent with the objectives of each service.

Ex: A lack of a champagne bottle or unsatisfied financial result will lead to the modification of reference scenario, and then the adjustment on commitment. The author suggests the sales director, before modifying his sales prevision, would pay attention on the validity of new reference scenario imposed by this modification.

This model, constructed thanks to internal knowledge, offers the general direction the anticipation possibility on the structure of dialogue, which signifies, in the context of planning, the governance power. Because the operational managers have not any reason to refuse to use this tool, and the top manager confronts no difficulty to justify the use of this tool in strategic planning.

This tool could be used by the top management in two ways:

- First, the general director may elaborate by himself the strategy, the reference scenario, and decides the objectives of his subordinates (sales, purchasing). This tool is solely used to financially validate his strategy, then justify the Holding strategy, and assure the coordination of each service by the visible links between the global objective and decisions to make at all levels.
- Second, the general director lets the salespeople, purchasers, and technicians propose the hypotheses. He would directly react at the moment of negotiation. The logical structure of this tool helps the top manager to anticipate, thus orientate the reflections of his operational managers. In brief, the top manager uses this tool to guide the debate

on the different action logics and representations in an attempt to find a coherent strategy.

In reality, the general director of Bullheim uses both above-mentioned ways. A management controller directly organizes the strategic planning and plays the role of coordinator between the general director and the operational managers (like sales, purchasing, or technique). The involvement of top manager is deeply involved (as in interactive control systems) nor distant (as in diagnostic control systems). Let's call it as moderate involvement.

Ex: Moderate involvement of top manager

The Bullheim's general director, using by himself management of material flows in this tool, found out the problems of the actual strategies (like the impossibility to follow the actual purchasing politics, or disconnection of sales and stock.). Beginning having some vague ideas of new strategies (like new positioning marketing policy, new price strategy, etc.), the general manager provoked a debate at all levels, but did not directly participate in the debate. The debate objectives were to reduce sales prediction and redefine mix-products.

The modeling of interactions permitted a more complex operating evaluation on the general policies and a dynamic visualization on the availability of initial stock and on the hypotheses of the next vintage, so better realizable sales prediction. The modeling of financial results favored dialogue, and long-term performance.

If the vision of interactions is not shared among different services (because the commitment is separately created without the use of the new tool), each actor can react with his own action logics and may destroy the global strategy.

Ex: The technicians refused to supply the vendors the wine bottles due to the indicator "wine stock availability", and sent the responsibility to purchasing services, which were waiting for better prices of wine.

On the contrary, if the strategy is elaborated thanks to the use of this tool, the technicians, salespeople, purchaser, and controller discuss, make simulation (through this tool), and create their local strategies which are coherent with collective strategies. The use of this tool shows the difficulties of every service to other services, and legitimates the necessity of reporting, of information update, thus the role of management controller. Each actor has at least two principles of contract spirits: reference scenario relating to the environment and the interdependence of action parameters on a dynamic logic belonging to the company's culture.

Ex: If the commercial director decided to sell more than predicted, the technician director may assume that the former had better contract than predicted, so the latter were searching a better way to satisfy the demand of the former.

The use of this tool favors the interactivity of reasoning operational decisions which are not previously “programmed”, and encourages the coordination among the actors; hence it stimulates the organizational learning for the behaviors of actors become more comprehensible.

The new control system as used by middle management perfectly fits the five conditions of Simons (1995, 2000) to be interactive: re-forecasting of future states based on revised current information, being simple information, used by top manager and managers at multiple levels, triggering revised action plans, and relating to strategy of the business.

Based on this case study Tanguy suggested a new approach to budgeting, denominated as “interactive budgeting” (Tanguy, 1992). Instead of adding up all departments’ budgets, this approach is based on a simplified model of the actual physical horizontal flows, and (*emphasis on this and is key*) this simplified model remains consistently used for reporting and adjustments all through the year.

Interactive Rationality

Otley (2001) pointed out the development of new techniques of management such as Activity-Based Costing (ABC) and Balanced Scorecard. ABC is a technical improvement to traditional cost accounting practice and opens the door to Activity-Based Cost Management (ABCM) and Activity-Based Management (ABM). BSC is a means for performance measurement to implement organizational strategic intent. Both of them focus on horizontal coordination, but rather ignore the vertical coordination.

The need to devise horizontal⁸⁰ or cross-functional control mechanisms rather than solely vertical⁸¹ became explicit (Kaplan, 1994; Otley, 1994; Berry, 1994; Otley et al., 1995; Shields, 1997). The new environment emphasized cross-functional linkages to promote effective and efficient performance of business processes, not the individual tasks within a process (Kaplan, 1994). Some research follows this approach like the “Interactive

⁸⁰ Horizontal: “which follow the product or service through its production process until its delivery to the customer” (Otley et al., 1995:S40).

⁸¹ Vertical: “which follow the organizational hierarchy within organizational functions” (Otley et al., 1995:S40).

Rationality” (Ponssard, 1990) and CAM-I Advanced Budgeting project attempting to define the characteristics of a process-oriented budgeting approach.

We are particularly interested in the “Interactive Rationality” approach because it enriches our viewpoints on the joint use of control systems, and is developed from the Tanguy case (1989) and a series of laboratory experiments. The researchers have attempted to find a solution to the question: “how to solve the conflict between the individual behaviors and the coherence of collective action?” (Kervern & Ponssard, 1990). More concretely, this approach is searching how to use an economic model to enhance cognitive coordination rather than to identify the right decision in a prescriptive sense; hence it follows some principal theories like:

- the formalization of decision making theory where rational behavior covers search activity (to frame the problem and find alternatives) and routinized behaviors (March and Simon, 1958). Due to the interdependence of agents, the coordination is crucial between collective sessions (whose representatives are budget and planning) involving into search activity and decentralization involving into routinized behaviours,
- “bounded rationality” of Simon (1947) who devised the term “interactive” to refer to “the role of social interactions to generate the simplifying assumptions embedded into decentralized routinized behaviors” (Ponssard & Saulpic, 2005:3),
- common knowledge (Aumann, 1976) to facilitate the communication, find the focal point and encourage the organizational learning (Ponssard, 1994),
- value chain (Porter, 1987).

The company, in the interactive rationality approach, is considered as a network of actors who are searching to structure their interactions, rather than their own methods of reasoning (Kervern & Ponssard, 1990; Ponssard, 1994:171). The planning and budget are not to predict, but to take the accountability (Ponssard, 1993:78). The plan is more like a convention than a forecast: the planning is the elaboration of hypotheses destined to structure the decentralized behaviours in the company (Ponssard, 1993:76), and “we do not engage the corresponding number, but we engage the principles expressed by the relation” (Kervern & Ponssard, 1990: 9). Hence, the management controllers play a much more active role: not limiting at variance analysis, but creating a “contract spirit” respected by all actors.

A contract or a commitment should be precise enough to efficiently structure the engaged collective actions and flexible enough to authorize the local adjustments (Mottis et Ponssard, 1993). Due to the bounded rationality, the actors are not able to predict all possible scenarios

at the moment of contract elaboration, so they have to accept a “satisficing” contract with the precise “contract spirit”. It means that each actor is sensitive to the achievement of global objectives and the constraints of other actors, thus can anticipate the reaction of other actors. The “contract spirit” is elaborated by the common knowledge of the actors. How to concretize the “contract spirit”? Ponsard and his colleagues have proposed a general model of interactive rationality whose main principles are as follows:

- The company should be analyzed in horizontal vision through the coordination of different interfaces (like material flow and accounting rules) in order to modelize the interactions among the actors (Ponsard & Tanguy, 1990) and rapidly adapt to environment changes by new strategies,
- The simplicity and the transparency of knowledge models are vital to initialize the process of organizational learning (Ponsard, 1994), and to facilitate the dialogue of different actors.
- Ponsard & Tanguy (1994) postulated that the different management tools played an important role in the use of MCS. “The control tool should be a pilot tool ... so the exchange of information at the planning phase is much more important than the prediction” (Ponsard et Saulpic, 2000).
- The planning and budgetary control consist of verifying if the company is always “on track”, and discussing the realization in comparison with the strategies. The controllers should also control the realization of action plans in comparison with the “contract spirit” (Ponsard & Tanguy, 1990),
- The approach is constructivist: the model should be constantly surpassed and be only a reference of action logic (Ponsard, 1994). “We [the managers and controllers] are searching to construct the future, rather than to predict the future” (Ponsard & Tanguy, 1990).

In brief, the management control, in the interactive rationality approach, is transformed from the focus on the resources and responsibilities to the focus on the process and competences (Lorino, 1991). The interactive rationality defends that the controller, in the turbulent and unpredictable environment, should play a more active role - constructing rather than predicting the future. Thus, the new tool enabling to analyze the company in the horizontal vision through the analyses of material flows and financial flows and to encourage the dialogue among the actors should be created. The use of this tool will create the contract spirit to converge if possible the behaviours of actors.

5. Open questions

The lever-of-control framework results from Simons's field studies on 186 interviews with top managers, and two quantitative survey researches on 162 firms. Undeniably, this framework, especially interactive control lever, contributes to broaden management control research, orienting toward "management" rather solely "control". This section, based on the framework of Bisbe et al. (2005, 2007) and of Simons (1995, 2000), is structured by binominal comparison between diagnostic control systems and interactive control systems.

The interactive control systems may be characterized through three following dimensions:

- Involvement of management⁸²: intensive, frequent and personal attention and involvement of top managers. Despite its intensive implication, subordinate/middle managers in interactive control systems have much more reduced autonomy than those in diagnostic ones. Their main roles are to collect information (up, down or sideways). It provides a balance between active attention of top managers and decision rights of subordinates
- face-to-face debate, dialogue and challenge
- concentration on strategic uncertainties

On the other side, the diagnostic control systems consist of:

- attention-conserving for top managers, except for goal negotiation, management-by-exception. Subordinates are accountable for results and have the freedom to choose how to achieve them
- no direct frequent discussion, or only document presentation,
- concentration on critical performance variables,

The interactive control systems, according to Simons, allow facilitating strategy emergence and organizational learning, while the diagnostic control systems help to communicate and then implement intended strategy. The potential drawbacks of interactive control lever are expensive cost, information overload, paperwork, and threat of embarrassment of subordinates. Diagnostic control systems may lead to over-emphasize management errors and failures or system gaming.

⁸² We regroup the first dimension – "Use by top management" and the second dimension – "Use by operating management" into one dimension – "Involvement of management" in an attempt to demonstrate the exchange of top management and operating management.

Other researchers extended the roles of interactive control systems. Interactive use of control system may:

- favour innovation in low-innovating firms but reduce innovation in high-innovating firms (Bisbe and Otley, 2004). And the impact of innovation on performance is moderated by the style of use of management control systems
- convert emergent strategies into useful action thanks to the combination with semi-formal information (Osborn, 1998)
- Influence on organizational performance. It is highest when a diagnostic (/interactive) use of budgets is matched with low (/high) levels of strategic change (Abernethy & Brownell, 1999).

A control system, which is used both diagnostically and interactively in a balance manner, can create a dynamic tension. The combination use of diagnostic and interactive control system tends to have a positive impact on company's performance in the context:

- high levels of task uncertainty (Adebayo, 2007),
- high environmental uncertainty and having flexibility values (Henri, 2006a),
- high level of strategic change (Abernethy & Brownell, 1999)

The joint use should be exploited because:

- to implement contradictory tensions within the organization (Marginson, 2002)
- on one side, through an interactive implementation at the lower level, to intensify positive effects on innovativeness, organizational learning, entrepreneurship, market orientation (Henri, 2006a),
- on the other side, through a diagnostic implementation at the higher level, to enhance the interactive implementation at the lower lever (Haas & Kleingeld, 1999).

And an official definition on the joint use has not yet existed. Even though we, through the case studies of Haas & Kleingeld (1999) and Tuomela (2007), can assume that the joint use of control system occurs when the system is used interactively at higher level, but diagnostically at lower level and vice versa. The comprehension on this matter needs to be developed more. A case study employing three dimensions - involvement of management, use of tool, and compensation systems – seems promising for the enrichment of this subject.

Use of control systems

While Simons (1994) focused on studying top management level (CEO), Tanguy (1989) and Tuomela (2005)⁸³ extended their research to lower levels: from the CEO to middle levels (profit center and its functional managers) in case of Tuomela, but from the general director to front-line employees (salespeople, technicians, and controllers) in case of Tanguy.

Simons (1994) argued that in the context of strategic change, interactive control systems are only used after diagnostic control systems: diagnostic to implement the new strategy and to demand accountability from subordinates (cf. Ex n°1 and Ex n°2); interactive to capture organizational attention and loyalty (cf. Ex n°4). Yet, even the boundary between interactive and diagnostic control is not clearly distinguished by Simons. Can the frequent exchange in the form of writing, not face-to-face dialogue between top manager and his subordinates be considered as Interactive control? (cf. Ex n°8)

Although Simons formally defends the separate use of diagnostic and interactive control systems, his case studies demonstrate some preliminary possibilities for the joint use.

Both Tanguy and Tuomela illustrate the joint use of a control system at different hierarchical levels. With regard to Tuomela's case, a control system is used interactively by the top management, but diagnostically at local level. The diagnostic control is used to clarify the strategies, the objectives and the performance measures, but the interactive control is used to learn all of them, and then search for the ways of implementation. Meanwhile the Tanguy's case illustrates an inverse example: interactive at lower levels but moderate at top management.

On the other hand, the vertical coordination between the top manager and the subordinates is dominant in Simons's case, while Tanguy and Tuomela emphasized the essential and complementary roles of horizontal and vertical coordination.

And Tuomela's case confirmed the drawbacks of interactive control systems mentioned by Simons (1995, 2000). The interactive control provides a better visibility of actions, reduces the manoeuvres of operational managers, and thus threatens them. And it requires an important investment in time and costs which is not easily supported by the organization. It

⁸³ At the first view, the Tuomela's case seems to be an interactive control system. But regarding our criterion of distinction, this case satisfies perfectly the definition of the joint use.

seems that the joint use of a control system at different hierarchical level has not yet provided a satisfied lever of strategic change.

Henri (2006a) argued that a balanced use of both diagnostic and interactive control systems allows amplifying the positive effects of both systems while reducing their negative effects.

Ex: Unbalanced use of diagnostic control

“Insufficient diagnostic use to set boundaries and to highlight effectiveness issues” may lead to “a loss of direction, wasted energy and a disruption of continuity”. Or excessive diagnostic use “constrains innovation and risk taking” (p.537).

The key issue is to create a balanced joint of use. What is the nature of such a use? The actual researches, in particular three above-mentioned case studies, have not yet provided the response. This will be one of our research objectives.

Management tool

According to Simons, only the ways of using a control system make it become diagnostic or interactive (see Ex 4). He explains how an interactive control system was changed to a diagnostic control system and how to implement a new interactive control system. However, he did not much invest in the features of this control system. Simons mentioned a “new” control system, but what did he mean “new”? New ways of use or new features/natures? Even the outputs of this system were not explicated by Simons.

Whereas, both Tanguy and Tuomela demonstrate the vital need to create a new and customized tool. This tool helps to find out the actual problems, and then propose new blueprints to overcome them. In other words, it facilitates dialogue, learning, and strategy implementation. And it is crucial to deploy the interactive control use. A further study on this issue is quite necessary.

Compensation systems

While this subject is completely ignored by Tanguy (1989), it is not much developed by the others. Simons proposed a dichotomy: objective, formula-based for diagnostic control and subjective, contribution-based for interactive control. But even in his case study, he found that a compensation system whose 50% was based on subjective evaluation, another on objective and formula-based. Is this system interactive or diagnostic? A new element appeared in the Tuomela’s case, though implicitly: intrinsic motivation for the desire of learning and discussion. Intrinsic motivation, despite its key roles, is nearly ignored in management control

literature, but formally developed by experimental economists. A further study on this subject seems quite promising.

In addition, it is necessary to deepen our comprehension on the nature of the compensation system itself. What are its properties? How to manage such a system? And what are its possible outcomes?

Concluding remarks

Simons contributes to broaden management control research, orienting the discipline toward “management” rather than solely “control” (cf. Appendix 3)

The interactive control systems facilitate strategy emergence and organizational learning, while the diagnostic control systems help to communicate and implement intended strategy. A number of researches establish the nature of the relationship between control systems and strategic change. Contrarily to Simons’ original perspective, the joint use of interactive and diagnostic control appears worth considering, in particular whenever the respective roles of top and middle managers are introduced. This also opens the way to discuss further the role of horizontal coordination, customized tools and compensation systems; three dimensions appear to be somewhat neglected at first.

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Chapter 2:
REVISIT OF PROJECT
MANAGEMENT
LITERATURE

Introduction of the chapter 2

To a large extent service companies may be considered as managing projects⁸⁴.

This suggests that it should be worthwhile to explore the project management literature as regards its potential contributions to the management control of service companies. To organize this exploration the following steps are proposed:

We shall first analyze the challenges faced by the new management control approach when applied to a project oriented organization; for this purpose we rely on the detailed case study elaborated and analyzed by Mottis relative to the changes that occurred within the computer service department of a large French retail bank in the early nineties. This work was first published as part of Mottis dissertation (1993) and then further was discussed in a number of publications (Mottis et al., 1995; Mottis, 1995; Demeestère et al. 2002)⁸⁵.

The challenges that emerge from this analysis concern the organization of horizontal interaction among experts, the monitoring of a set of complex and heterogeneous activities by the top management, the reformulation of the role of the controller to capitalize knowledge;

We then review the literature on project management with the objective to identify the potential insights that could be gained to find solutions to these challenges; this means that only a small fraction of this vast literature is reviewed, special emphasis being given to the management of a portfolio of projects rather than on the techniques of project management as such.

These findings will then be incorporated into our grid to interpret our own case studies.

⁸⁴ I would like to express my profound gratitude to Professor Florence Charue-Duboc and Professor Sihem Ben Mahmoud-Jouini for their helpful commentaries on this chapter.

⁸⁵ There are several reasons for selecting this case study: it is both relevant as regards the application of management control and as regards the area of applications. As such it provides a natural link between the first and the second chapter. More importantly, it is documented and stylised enough to the point that the characteristics of a project-oriented company can be easily enhanced. As such it will appear convenient to point out the challenges for management control into a concrete perspective.

1. Challenges faced by the new management control approach as applied to a project oriented organization: a case study as a starting point

In the early nineties, the computer services of the retail bank analyzed by Mottis faces a structural change: the computerization of the traditional administrative workload is largely accomplished while numerous new internal demands emerge. While the computerization of the traditional workloads may be viewed as “mass production”, the planning of which is largely in the hands of the computer service department, the new demands are more customer oriented, they concern smaller, shorter, more specialized projects.

Mottis’s case study describes in detail two attempts: first, to improve the efficiency of the computer service department, and second, to handle this structural change through the introduction of new management control systems.

1.1 Improving operational horizontal interaction

The organizational structure of the computer service department consists of a technical division on one side, subdivided into technical services such as hardware, generic software, telecom... and of an application division on the other side, subdivided into services such as management of cash deposits, management of shares and stocks, management of liabilities.

The new projects typically require the management of multiple internal interfaces and a dependable interaction with the external customer.

Mottis’s initial idea was to transfer the “new management control” elaborated for industrial production to this computer service environment that is, “to make visible the material flows behind the financial and accounting numbers used to monitor the process” (as popularized by Chassang, 1987).

An important qualification makes this transfer problematic: the precise description of material flows for computer projects is impossible. Mottis suggested structuring the coordination among services through the interfaces of “black boxes”, that could deliver predefined functionalities based on the competences of identified experts. How a black box operates to deliver these functionalities would not be explicitly detailed. A specific management control system denominated as “the coordination through competence articulation system” was implemented.

This system allowed for creating favourable conditions to well manage the compatibility among « black boxes » and to facilitate the elaboration of common targets. The method relies on some basic principles: 1) formulation of common explicit objectives, 2) creation of transversal groups, 3) autonomous and neutral monitoring, 4) definition of global logic, and 5) interface focalization.

The insights and limitations associated with this method are now discussed along three dimensions (see chapter 1): the involvement of the operational managers, the role of the controller and the incentives to support the system.

An organizational process facilitating the involvement of operational managers

A transversal group is created consisting of members of the different services. This group is in charge of elaborating common explicit objectives to structure the collective actions (for instance, “Improvement of service quality” or “Reduction of development duration”). The global objectives, used defined, are to be linked to the operational local objectives and well accepted within the organization. The legitimacy of the group members relies on their competences rather than on their hierarchical status. The cooperation desire within the group is to be more important than the alignment with the interests of the entity each group member is coming from. The transversal group is not operational; the objective is to elaborate proposals. It should focalize on problems related to the interfaces among entities, analyze their interdependence, and propose solutions. These proposals will be discussed within the relevant traditional decision process of the department.

The group members meet regularly. The detailed agenda of two-hour and monthly meetings – a main tool of group animation - is prepared in advance and sent to all participants one week before the meeting day. The agenda includes subject selection, presentation order and previewed duration. These formal working procedures help to compensate the absence of a transversal group’s physical identity and its weak status as regards the decision process. The meeting dates are determined two months in advance.

The information, which is exchanged during these meetings, is simple and easy to understand for all group members. Otherwise, a sub-group is created until that goal is attained. The common knowledge is memorized and transferable. These rules allow imposing strict time limits to the meetings, reinforcing the credibility of the speakers, and creating confidence in sharing information.

It is worth noting that the involvement of the top management is nearly inexistent. A report is sent quarterly to the head of the computer service department but there is neither a presentation nor direct discussions with the senior managers.

In fact an autonomous and neutral monitoring is implemented. The monitoring autonomy is demonstrated by the free choice in the contents of agenda and memorandum, and the single signature of minutes, instead of the traditional double signature traditionally used in the department.

The role of the controller to initiate and monitor the process

The control division is directly attached to the head of the computer service department. A member of this division is in charge of monitoring the system⁸⁶. This controller is globally in charge of making the system work. His mission consists of four tasks: (1) synthesis, (2) “vision” development, (3) group animation, and (4) information diffusion. More precisely the controller designs the working rules of the group. He would meet with every participant before each meeting to construct the agenda. He makes sure that each meeting is productive and that proposals or way to get to proposals are clearly stated. During the meeting, he makes sure that the global objectives are kept in mind and that the participants do not focus on technical details; hence the “vision” development is progressively elaborated. After each meeting, he would quickly make a three-page minute and immediately send it (together with all presented slides and internal notes) to all participants and to the heads of the different services of the department. Finally, he is in charge of the capitalization of knowledge⁸⁷.

Incentive systems

No specific attention was given to encourage the process through a formal incentive system. Collective action was based on mutual confidence among the participants, which inspired responsibility and commitment. Participants felt that the value of their works was recognized and that seemed sufficient to sustain their motivation. Indirect benefits accrued to the members of the group. Their competences became known among a larger circle than it used to

⁸⁶ This role was played by Mottis.

⁸⁷ For example, the common information basis was in the form of a simple file, named “KIT IDG”. Classified by about 50 key words, it comprised of all agendas, memorandums, notes, and synthesis documents. After 18 months, this file collected 230 pages. All participants and their direct superiors (25 persons) possessed the same “KIT IDG”; newcomers could have it by a simple demand.

be. This probably facilitated a number of favourable adjustments or conflict resolutions at local levels.

Discussion

The implementation of this new control system has been both successful and short lived. According to Mottis, the coordination on competence articulation system allowed getting around many of the initial problems. The blockage points were identified, and solutions were elaborated (may be related to changes in technical options and or financial or human resources). In particular, the overall technical evolution of computer systems was better understood, with its implications for the development of the various applications under way. Altogether, the participants could harmonize their global vision, and better manage the interactions among infrastructure, applications and budget constraints.

The system operated for 18 months but went away shortly after the departure of the author who acted as the controller-coordinator of the process.

The failure to institutionalize a career profile for the coordinator position appears as one of the main reasons for the disappearance of the system, despite its effectiveness. It seemed difficult to design the corresponding profile to make it attractive to managers hired through the traditional recruitment process centralized by the H&R department. As for the head of the computer service department, if he had large room to recruit computer experts, he had no latitude as regards recruitment of his administrative staff.

Another reason may lie in the fact that the method provided very little room for diagnostic control by top management. The head of the department had some confidence into the persons that elaborated this system but he may have felt that this indirect control could disappear with the arrival of new managers.

So far this case study illustrates the benefit of horizontal interactivity and provides an interesting reference to construct a management control system to support this interactivity. But it also points out two limitations. Firstly, the top management had difficulties to exercise control, because of the high technicalities of the operational tasks to be performed. Secondly, the incentive system relied mostly on intrinsic motivation⁸⁸, which may be good enough to

⁸⁸ "The growth or motivators that are intrinsic to the job are: achievement, recognition for achievement, the work itself, responsibility, growth or advancement" (Herzberg, 1987).

initiate a structural change, but insufficient to sustain the new management control system in the long run.

1.2 Improving the budgeting system to monitor a complex portfolio of projects

As a matter of fact, Mottis proposed a different and independent route to restore the control of the top management on the activities of the department, through a change into the budgeting system.

The traditional system had generated inflationary budgets so that it had become extremely inefficient as well as frustrating. That process started as a bottom up procedure which ended with a demand far exceeding the envelope that the top management would be prepared to consider. Then, the top management would arbitrarily cut by some percentage the demands of the different services. This resulted in the fact that some projects in some services would be either given up or postponed without regards to what would happen in other services. These inconsistencies would only be revealed along the year, generating further delay in the timing of the projects and very inefficient resource utilization.

The avenue explored by Mottis consisted in applying the ideas of process management (Lorino, 1995; Demeestère et al., 2006). Process management can be viewed as relating the management control systems to the strategic goals of the company, and to apply the system not on the “material flows” but on the key management processes necessary to achieve these goals.

Process management

A “process” as defined in this approach combines all interdependent activities sharing significant information flux and/or materials, and aiming to bring forth an important and clearly defined output. This output is to be an essential element of the company’s value creation.

The corresponding management system relies on the following steps: 1° identifying company processes, 2° implementing strategy and defining objectives for different processes, 3° defining key performance indicators of each process, 4° identifying action levers to control the performance of each process, 5° elaborating action plans, 6° setting up a scorecard on advancement and results of these blueprints, 7° organizing regular meetings where operational managers, thanks to permanent update, can exchange their opinions and experiences.

Ex: Budgeting system in the computer service department of a large bank

This approach was applied to the budgeting system of the computer service department. The new procedure included: 1) defining main processes necessary to achieve the intended goals of the department, including transversal processes; 2) defining priorities per process according to the bank's strategies, based on three criteria: financial, commercial and technical; 3) identifying major projects (5 maximum) supporting each process and then clarifying their interdependence; 4) defining the resource allocation required for each process; 5) calculating resource envelope per process in the horizon of the five year strategic plan of the department in order to reveal and eliminate the eventual inconsistency among scenarios; 6) making short-term arbitration (annual budget and blueprints) coherent with the selected strategic plan.

The new approach did not go into the detailed bureaucratic allocation of budget by services. The idea was to allow the top management to implement its strategic priorities into the budget.

Discussion

This management control system can be seen as a way for the top management of the computer service department to recover substantial power into the orientation of its activities. Traditional budget procedures were segmented along the organizational structure while the operational activities required much interdependence across the structure. It provided a flexible enough approach to identify meaningful entities (the "processes") between the (too) many projects and the (too) purely administrative resource centres.

The insights provided by this case study amounts to the following question: how is it possible to define these entities given the heterogeneity of the elementary projects that define the day to day work load? How to synthesize the common features of these projects to provide a consistent and global view of the work being done, and how to define the technical as well as transversal processes necessary for their achievements?

An important feature in this respect concerns the tool design. The traditional result indicators are structured according to business or profit centres. The performance indicators relative to each process require a regular update from multiple sources, thus complicate the procedures of collection, analysis and communication. This considerably changes the workload of the controller. Firstly, it is much easier to monitor resources along the organizational chart than along "processes" which may not be identifiable to a specific manager in charge. Secondly the corresponding controller needs to have more technical capability to understand the underlying levers at work for each process and their eventual interdependence.

1.3 Summary of challenges

This section examined the applications of new management control systems to a project oriented department. Some important challenges emerge:

The organization structure of a project-oriented company typically involves technical services and customer-oriented services which are in close interactions; the management control system cannot be constructed along the “material flows” that usually structure industrial companies;

The efficient coordination of operational managers is limited by the incapacity of experts to meaningfully transfer their knowledge to professionals of different background; ad hoc horizontal coordination procedures have to bypass this difficulty through the design of simple information systems with high personal involvement;

Since the organizational chart is not enough to monitor the activities through resource centres, this makes difficult the monitoring by the top management; meaningful abstract entities to achieve the strategic goals need to be defined; this suggests a reformulation of the role of the controller to sustain this system;

Altogether the design of compensation policies that would encourage involvement into these processes seems much more difficult than in areas in which clear individual responsibility can be identified; the reliance on intrinsic motivation that is usually advocated does not seem sufficient to provide clear sustainability for these systems.

We now turn to the management project literature in search for possible answers and/or a reformulation of these questions.

2. What can be learned from the management project literature

We shall proceed as follows: firstly, we briefly describe the standard tools that have been developed to monitor a project as such, this can be seen as a building block of the overall management control system; secondly, we discuss the way managers, both operational and top managers, involve themselves into the process; thirdly, we discuss the role of the controllers, or more precisely, of the new support staff in charge of monitoring the process; finally, we shall come back to the compensation issue.

2.1 The tools designed for the monitoring of new project development

This section is based on the work of Sanchez and his followers⁸⁹. This work emphasizes the “modularity” and “strategic flexibility” as a rule for tool design. This principle can be illustrated by examples such as “New product development map” (Wheelwright & Sasser, 1989), “Aggregate project plan” (Wheelwright & Clark, 1992), and “Return map” (House & Price, 1991) (cf. Appendix 4 for a comparison of these tools).

These tools search for overcoming the PERT’s weaknesses such as unreliable estimation of uncertainty, high costs, lack of flexibility, lack of overall applicability, ignorance of human factor, and misleading results (Miller, 1962; Kidd, 1991; Haga & Marold, 2004).

The PERT Tool

To satisfy the need of sequence coordination, PERT/CPM tools⁹⁰ had been developed and then dominant in project management practices and research until 1980s. PERT's basic requirements include the presentation of activities on a network in sequential form with time estimates. Miller (1962) pointed out PERT, to be operational, requires network, sequence, time estimates and constant updating and reanalysis. Concerning network, all individual tasks to complete a given program must be visualized in a network comprising of events⁹¹ and activities⁹². Time estimates have three degrees: optimistic, most likely, and pessimistic. They are like a gauge of the "measure of uncertainty". PERT/CPM indicators were often financial, auditable, and regularly updated from a standard information system. The indicators were based on the general business vision, and then broken down to different profit centers.

Contrary to PERT/CPM tools focusing on task organization of a project, these tools aim at overall control of project portfolios or product family. Their objectives are to achieve 1- efficiency and effectiveness goals (such as improved coordination, improved dependency management, more effective resource utilisation, more effective knowledge transfer, and greater senior management ‘visibility’), and 2- business focus goals (such as more coherent

⁸⁹ Sanchez (1995, 1996); Sanchez & Mahoney (1996); Sanchez & Collins (2001); Leonard-Barton et al. (1994a, b); Olsson (2006); Zang (2006). Generally speaking, this concept can be briefly resumed as follows. Product architecture becomes modular when its interfaces between functional components are *specified* to allow variation in components and then *standardized*⁸⁹. The modular product architecture fosters the development of core capability, which in turn can be the main source of “strategic flexibility”.

⁹⁰ Project Evaluation and Review Technique (PERT) was first introduced in 1958 by the Special Projects Office of the US Navy, and then it has rapidly spread through U.S. defence, space industry. Meanwhile, the Dupont company also developed a similar technique known as Critical Path Method (CPM) (Miller, 1962, 1963; Kidd, 1991).

⁹¹ i.e. specified program accomplishment at a particular instant in time.

⁹² It means to represent time and resources necessary to progress from one event to the next.

communication, improved project definition, and better alignment with business drivers, goals and strategy) (Lycette et al., 2004; Clark & Wheelright, 1993).

Specificity of the tool allows a variation and a rapid adaptation to changing market and technology. Standardization allows for a common guideline, a rapid global synthetic view and a rapid interchange of information coming from different projects of different business units. Unnecessary frequent communication and coordination are thus avoided.

The New product development map creates a chart of different generations of a product family, while the Aggregate project plan maps all company's projects. The Return map makes graphics to present the estimate of the contribution of all cross-functional teams.

Similarly, they search for facilitating inter-functional cooperation, linking project objectives with strategic goals⁹³, and making managers think in term of project portfolios, rather than of isolated projects. Their designs are all simple and easily cloned in different companies. The key indicators include not only result indicators but also process indicators⁹⁴, elaborated through a generic and specific business vision. Strong is the interdependence of key indicators through decision-making of different functional departments⁹⁵. Data gathering to aliment these tools relies on specific and standard data collection procedures⁹⁶. The primary beneficiaries of the information are both top managers and operational managers so that all the managers at different levels can dialogue and discuss together⁹⁷. The top managers have a global view on the progress of all projects, while the middle managers and project teams can

⁹³ After making an aggregate project plan, the managers may recognize that some projects did not fit into any category. Some projects required substantial resources but did not present breakthrough or made little strategic sense. This recognition may trigger a re-examination of customer needs in all products.

⁹⁴ "Process measures monitor the tasks and activities throughout an organization that produce a given result" (Meyer, 1994a: 96). Ex: Aggregate Project Plan needs result indicator (like Cost) and process indicators (process change and product change). Process change includes incremental change, upgrade, next generation, new core process, and Product change consists of derivatives, addition to product family, next generation, new core product.

⁹⁵ Simply speaking, an increase of resource allocation for a project leads to a decrease for another or an investment increase.

⁹⁶ For example, the Return Map requires financial data per project, while most companies track financial data per period. Such data need a specific collection procedure: development teams must pull this data manually from the period expense reports. While the sales of distribution channels, as required by NPD Map, can be collected through a standard procedure.

⁹⁷ The reports for top managers mostly include result and financial measures, while those of operational managers mostly consist of process and non-financial measures. It is evident that such differences are due to the fact that each level has its own concern and specificity. But it causes the obstacles in the communication among different levels.

identify the position of their projects. However, there are some differences among these three tools.

Firstly, the New product development map allows tracking the evolution of product families during their different generations (cf. Figure 5). Based on two indicators – calendar time (X-axis) and product-added value (Y-axis: from cheaper to more expensive), the managers can categorize product offerings “core”⁹⁸ and “leveraged” products. The latter is then divided into “enhanced”, “cost-reduced”, “customized”, and “hybrid” offerings⁹⁹. Explicit is an overall evolution of product offerings, distribution channels, product cycles, critical skills and growing capabilities. Such a map helps to focus development projects, to limit their scopes, and to make them more manageable. Top managers frequently discuss with functional members; and functional departments frequently communicate together. Functional groups are thus motivated to develop complementary strategies. “Submaps” in each functional area (manufacturing, design, or marketing) may help to reveal the strategic issues of every function, and then tie them together as integrated with the new product development map to achieve a company’s business strategy. The cross-functional discussion and resolution of strategic issues are thus facilitated. Mapping provides a process for planning neither too much detailed (as budgeting) nor too much parochial (as functional strategy sessions).

Ex: The three-generation map of Coolidge – producer of a vacuum cleaner

The core product, the Stratovac, being a canister-type appliance with 2.5 horsepower motor, marked the first generation (1952-1968). All variations of Stratovac (2 enhanced, 3 customized, and 1 cost-reduced) were leveraged during 14 years (with a long product cycle, about 10 to 15 years). They shared similar critical skills (such as manual assembly, some flexibility; metal stamping and cutting), and growing capabilities (like electronic component design, plastic molding and components). The marketing was aggressive. The dominant distribution channel was department store (56%), while catalogs remained timidly (only 8%).

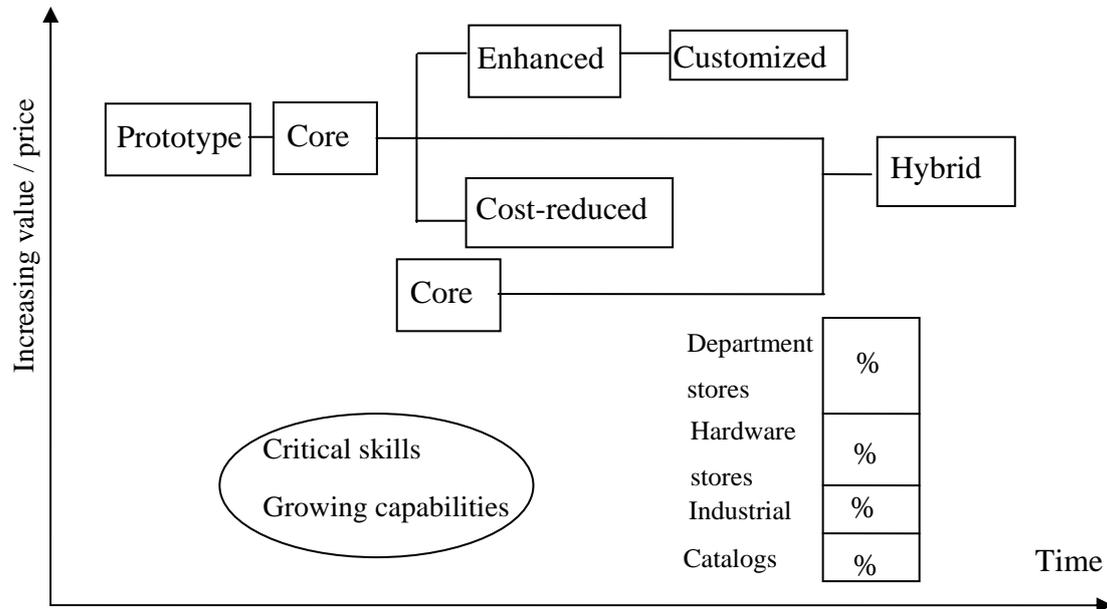
The second generation (1967-1978) had two core products (Stratovac II and Handivac) and nine leveraged ones (3 enhanced, 3 customized, 2 cost-reduced, and 1 hybrid). The product cycle was reduced to 8 or 10 years. Some growing capabilities of the first generation became the critical skills of the second (manual assembly, some flexibility, some outsourcing – Metalworking and

⁹⁸ A core product is the engineering platform upon which further enhancements are made.

⁹⁹ “Enhanced” products are developed from core product to satisfy new demands of a niche market. Products can be “customized” in smaller lots for specific channels or to give more choices. “Cost-reduced” products, having less expensive materials and lower factory costs, aim at price sensitive market. And “hybrid” ones combine two cores.

plastics – Electronic component design). While the growing capabilities were modular manufacturing and electronic controls. The financial control, instead of marketing, was aggressive. Although sales from department stores remained major (51%), those from discount channels were increasing (17% for catalogs). The main problems were its heavy weight, complete dependence on plastic components, and inappropriate distribution channels.

Figure 5: The New Product Development map Erreur !



Source: adapted from Wheelwright & Sasser (1989)

The third generation (1977-1985) had two new core products (Challenger 6000 and Helpmate) and nine leveraged ones (3 enhanced, 3 customized, and 3 cost-reduced). The product cycle was more shortened (only 5 years). And product family proliferated for all segments and channels. The critical skills are high productivity, manual and automated assembly, whereas the growing capabilities are computer-aided design and assembly, integration of design and manufacturing engineering, and quality conformance to increasingly tight specifications. Sales from department stores were reduced to 48%, while those from discount stores were increased to 25%.

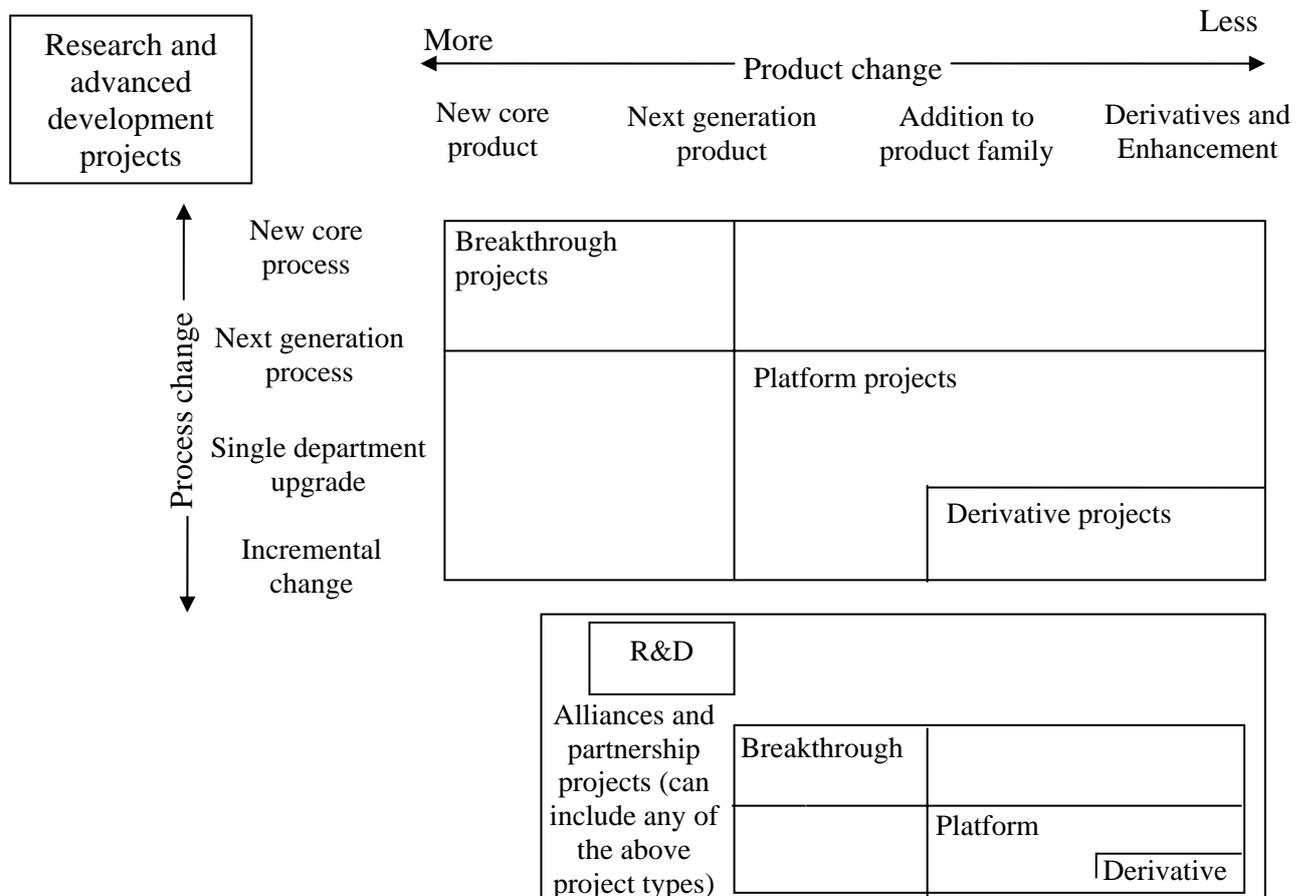
Imagine that managers gathered to consider the company’s future and the next generation of its product. The map simplifies information and generates “right discussions”. Why such an evolution towards higher value and more expensive product? Why such a type of customer? The map shows the company’s product offerings (too many enhanced products and customized ones) do not match to the important growth of discount channels. The need to bring all parts of company together – designers with marketing, manufacturing with both – becomes evident. Submaps of the marketing department positioned competitive products and customers to identify important trends in the marketplace, define targets for future product offerings, and provide guidance for developing and committing sales and marketing resources.

However, such a map has not yet gone beyond the boundaries of one period development cycle involving single products or product families, and focused on product differentiation for customer segments rather than on product changes over time (Hua & Wemmerlöv, 2006). Similarly, Meyer et al. (1997) proposed to map four-level hierarchy of product family (product family, product platforms, product extensions, and specific products) for targeting different (complementary) markets. The fact that the market segments are plotted both vertically by price/performance tiers and horizontally by platform leverage opens broader perspectives even for non-assembled products and the design of services (Wang, 2006).

Secondly, the Aggregate project plan mobilizes two dimensions - process change and product change - to map different types of projects (cf. Figure 6). Management categorizes projects based on the amount of resources that projects consume and on how projects contribute to the company's product line. Five possible types (in increasing order of change) are derivative projects, platform projects, breakthrough projects, R&D projects, and partnership projects¹⁰⁰. The authors figure out eight steps to make an aggregate project plan: 1) define project types as either breakthrough, platform, derivative, R&D, or partnered projects; 2) identify existing projects and classify by project type; 3) estimate the average time and resources needed for each project type based on past experience; 4) identify existing resource capacity; 5) determine the desired mix of projects; 6) estimate the number of projects that existing resources can support; 7) decide which specific projects to pursue; 8) work to improve development capabilities. Managers can use the Aggregate project plan to allocate resources, sequence projects, find the existing gaps in development strategy and build critical development capabilities. This framework can also be used to identify the gaps in the portfolio, or potential resource shortages (Reyck et al., 2005).

¹⁰⁰ “*Derivative projects* range from cost-reduced versions of existing products to add-ons or enhancements for an existing production process”. *Platform project* “entail more product and/or process changes than derivatives do, but they don’t introduce the untried new technologies or materials that breakthrough products do”. *Breakthrough projects* “establish significant changes to existing products or processes” thus may create new core products or processes. “*Research and development* is the creation of the know-how and know-why of new materials and technologies that eventually translate into commercial development”. *Alliances and partnerships* “can be formed to pursue any type of project – R&D, breakthrough, platform, or derivative” (Wheelwright & Clark, 1992: 73-75).

Figure 6: Five types of development projects



Source: Wheelwright & Clark (1992)

The aggregate project plan of the PreQuip company

Consider the PreQuip case (a large scientific instruments company). In 1989, PreQuip, in spite of the existence of official guidance emanating from annual business plan, saw a rash of late projects, increasing budgets while declining completed projects, and many projects not adapted for the market’s needs. After compiling a list of all existing projects, senior management discovered project quantity exceeding manufacturing capacity, lack of focus on critical projects, and waste of time on nonproject-related work.

Using five project types, PreQuip’s management team arrived to map their 30 projects, thus the uneven distribution of projects became explicit. Some projects that did not fit into any category attracted a particular attention of management. For example, mass spectrometers require substantial resource for developing new products but at best reach only incremental sales. Consequently, a re-examination of customer needs in all products was triggered. They also employed the experience-based estimation on the average number of engineering months for each type of projects. And available resources were then allocated to the desired mix projects (50% for

platform, 20% for derivative, and 10% for breakthrough ones). As a result, PreQuip's management, after mapping, decided to have a portfolio of 11 projects (3 platforms, 1 breakthrough, 3 derivatives, 1 partnership, and 3 basic R&D projects).

Such a map makes management no longer think about projects in isolation; breakthrough projects defined the new platforms, which shaped derivatives. It also develops the sequencing decision to a strategic responsibility of senior management. PreQuip planned a new platform, followed by two or three derivatives; the latter can be served as a transition for a new platform. When a team finished a platform, part of this team can be assigned to derivative projects. Later, as a new team would form to work on a new platform, some members having worked for previous generations may join in this team¹⁰¹. This encourages knowledge transfer and a more rapid, systematic resource development.

The Return map graphically presents the contributions of all team members in term of time and money, and the moment when a project breaks even¹⁰². Time is divided in Investigation, Development, and Manufacturing and Sales. Teams focus, thanks to the Return map, on changes from "who is responsible" to "what needs to get done". Four performance indicators are defined: Break-Even-Time, Time-to-Market¹⁰³, Break-Even-After-Release¹⁰⁴, and Return-Factor¹⁰⁵. The map enables the top management to track the development process and take corrective action in real time. It also facilitates dialogue among different functions. But it is time-consuming¹⁰⁶ and requires great commitment. Missed forecasts are inevitable and accepted.

The three above-mentioned tools are not unique, but typical for project portfolio management. The authors of these tools concentrate on the tool design, and do not pay much attention on the tool use. They recognize the essential role of frequent and intensive use of top managers and operational managers but do not clearly describe by which manners the managers should

¹⁰¹ Such sequencing strategy is one of strategic rotation forms.

¹⁰² Through an indicator "Break-Even-Time" "defined as a time from the start of investigation until product profits equal the investment in development" (House & Price, 1991:95).

¹⁰³ Time-to-Market is "the total development time from the start of the Development phase to Manufacturing Release" (House & Price, 1991:96).

¹⁰⁴ Break-Even-After-Release is "the time from Manufacturing Release until the project investment costs are recovered in product profit" (House & Price, 1991:96).

¹⁰⁵ Return-Factor is "a calculation of profit dollars divided by investment dollars at a specific point in time after a product has moved into manufacturing and sales" (House & Price, 1991:96).

¹⁰⁶ Because they need "to get the forecast data out and to track the actual costs, sales, and profits against those forecasts" (House & Price, 1991:100)

use the tools. The actual involvement of the managers into the management control process is addressed by a different stream of literature.

2.2 The use of a control system by the managers: both interactive and diagnostic

The project management literature tends to demonstrate that a control system of project management is used both interactively and diagnostically. The control system will be scanned through four dimensions (i.e. involvement of top managers, involvement of operational managers, content of communication, and type of discussion).

Top managers pay a personal attention to define a guiding vision, dictate a strategic goal, and jointly create a project charter with project leaders. But a management-by-exception is still dominant to assure the efficiency of project teams. It would be worthwhile to analyze further this form of involvement, possibly through a complete reformulation of Simons (1995, 2000)'s grid.

After defining what vision means, we study how the top managers use this vision as materials to interact with the operational managers. The literature argues that a moderate intervention of senior management and a suitable autonomy of operational management can create a dynamic tension favorable to the efficiency of the organization (Henri, 2006 a, b).

Vision is a future that does not yet exist. Effective leaders can see this future and frame it into terms that can be translated into action-oriented tasks for project members. Three ingredients of vision - business, project and product - mutually reinforce and guide team members.

Ex: The different visions of HP Company

Bowen et al., (1994 a, b, c, d) illustrate this idea through a series of case studies. Let's take the HP company as an example. The HP company defined in 1985 a product vision for its Vancouver division as "to develop a low-cost and high-quality laser printer". Ink-jet technology offered a high quality but it was expensive and reserved for professional customers.

The HP's business vision is to become a player in the retail end of the computer-printer market which is a new market segment. Three capabilities which need to be developed to assure the product development success are low-cost manufacturing, ink-jet simplification in retail market, better understanding on retail customers and dealers.

The vision of product is a printer offering an extensive resolution of a high quality laser printer, ease of use, and low cost.

The senior managers, thanks to their vision, can guide their subordinates in project selection to resist short-term pressures (Wheelwright & Clark, 1992; Prokesch, 1993). Or, together with

middle management, top management divides customers into segments determined by their needs and the technology required to satisfy them and sets a project team in each segment, letting those teams decide what to design in cooperation with their customers (Prokesch, 1993). Senior management can also help a team to obtain cooperation for the projects from other functional departments in the firms, which is critical to implement innovative ideas or plans (Kanter, 1988).

Many authors advocate that a moderate monitoring of senior management is a key aspect of project team's success¹⁰⁷. Senior managers should create the strategic context to teams (or even dictate strategic goals and vision), provide guidance, money, and moral support, but seldom get involved on a day-to-day basis. Top managers remain informed of the project advancement and interfere with the teams only when self-regulating forces cease to work properly.

By giving the autonomy to teams, top managers build in instability and tension favourable to achieving challenging goals. A truly empowered team must play the lead role in designing its own measurement system. Since a team is responsible for a value-delivery process that cuts across several functions, it must create new measures to track this process.

The composition of project teams can influence their effectiveness. A team needs complementary skills consisting of technical or functional expertise, problem-solving and decision-making skills, and interpersonal skills (Katzenbach & Smith, 1993). Thus, the cross-functional teams are often selected as a solution. Membership heterogeneity can increase team performance due to the necessity of diverse competencies for diverse or disjunctive tasks, and the leverage of organizational learning¹⁰⁸. Cross-functional teams are often expected to reduce

¹⁰⁷ For example, Takeuchi & Nonaka (1986); Cooper & Kleinschmidt (1987); De Brentani (1989); Dean & Susman (1989); Mueller (1994); Meyer (1994 a, b); Varela & Benitor (2005). This idea has origin from the "Subtle control" concept. It means "members of successful project teams maintain a balance between allowing ambiguity, such that creative problem solving can flourish at the project team level, and exercising sufficient control, such that the resulting product fits with overall corporate competencies and strategy" (Brown & Eisenhardt, 1995:362). Project teams are autonomous, but not uncontrolled. "Management establishes enough checkpoints to prevent instability, ambiguity, and tension from turning into chaos" (Takeuchi & Nonaka, 1986: 143).

This statement should be, however, relativised. Sethi et al (2001) hypothesized that "new product innovativeness will be highest when project monitoring by senior management is moderate" (a nonlinear - inverted U - relationship between monitoring by senior management and innovativeness). Contrary to the authors' expectation, they found a positive, significant, and linear effect of monitoring by senior managers on innovativeness. They explained that such effect should be "studied jointly with those of the type of monitoring or control (behavioral versus outcome) exercised by senior management (Hendersen & Lee, 1992; Olson, Walker, and Ruekert, 1995)" (Sethi et al., 2001:82).

¹⁰⁸ Hoegl et al., (2007); Campion (1994).

cycle time, create knowledge, disseminate organization learning, and improve coordination and integration (Tarondeau, 2004; Nonaka, 1991; Clark & Wheelwright, 1993; Clark & Fujimoto, 1990; Cusumano & Nobeoka, 1992).

Heterogeneity may complicate the coordination due to little mutual understanding among members. Each member has a competing social identity and obligation to its original functional department. Cross-functional teams are often temporary and under abundant pressure and conflict. Too much information needs to be ingested and frequently updated.

Generally speaking, a joint use of diagnostic and interactive control seems to be the rule. On the one hand, the senior managers have a moderate involvement, neither too intensive nor too distant. They dictate strategic goals and intervene only in critical issues¹⁰⁹ and in "out-of-bounds" reviews (i.e. an attribute of diagnostic control). At the same time, the top managers personally formulate a vision that closely structures the boundaries of the projects and exchange facilitates a face-to-face discussion with his subordinates (i.e. an attribute of interactive control). On the other hand, the operational managers have also a moderate autonomy. They can design their own performance measurement and decide their methods of project advancement (i.e. important autonomy or an attribute of diagnostic control), but they have to accept the strategic vision of top management (i.e. reduced autonomy or an attribute of interactive control).

A particular form of organizational structure may favours the joint use of diagnostic and interactive control system.

2.3 Organizational structure that favours both coordination across hierarchical lines

The concepts of "top-down" and "bottom-up" management are widely spread in management accounting research. Both concepts ignore the dynamic interaction across distinct hierarchical lines and the need for horizontal communication (Nonaka, 1988, 1994; Kusunoki et al., 1998).

The management project literature emphasizes two different approaches that precisely focus on such interactions – the "middle-up-down" organization of Nonaka¹¹⁰ (1988, 1994) and the

¹⁰⁹ Such as project selection, appointment of a right person for project team, or definition of customer segment.

¹¹⁰ The origin of the "middle-up-down" concept is the "subtle control" concept of (Takeuchi & Nonaka, 1986).

“circular organization” of Ackoff (1989). These unconventional organization modes are now described.

Middle up down

All the members of the organization work together horizontally and vertically. Middle managers serve as team leaders at the intersection of the vertical and horizontal flows of information. Every employee who works in association with middle managers is the main knowledge creating individual. The middle managers synthesize the tacit knowledge of both frontline employees and top management, make it explicit, and incorporate it into new technologies and products. Hypertext organization has been proposed as a concrete method for middle-up-down management.

Hypertext organization allows a problem to be viewed from many angles by switching between the various contexts of knowledge creation. The three main layers of hypertext organization are "knowledge-based" layer¹¹¹, "business system" layer¹¹², and “top” layer¹¹³. Members circulate through the three layers. Based on the corporate vision of top managers, members of project teams will be chosen to engage in knowledge creating activities with other project teams. Once their tasks are completed, they move "down" to the bottom layer - knowledge-based to make an inventory of their acquired and created knowledge. Then, they come back to the second layer - business systems - and engage in the routine operation until the next call for another project.

Circular organization

In the circular organization, every team makes decisions by consensus. Every hierarchical level should have boards made up of their immediate superiors and subordinates to create a circularity of responsibility and accountability. The precise form of such boards varies from organization to organization.

The boards are responsible for: planning, policy making, give decision rules, coordinating the plans and policies of the next lower level, integrating its own plans and policies with lower

¹¹¹ It is the bottom of layer which its members embrace tacit knowledge (like organizational culture, procedures), and explicit knowledge (document, computerized database)

¹¹² They are normal routine operations by a formal, hierarchical, bureaucratic organization.

¹¹³ Multiple self-organizing project teams create knowledge.

and higher levels, decision making regarding the quality of working life, and evaluating the performance of the manager whose board it is.

The managers as such have no responsibility for supervising their subordinates or managing their actions. They are in charge of creating an environment and conditions under which the subordinates can do their jobs as effectively as their capabilities allow. The managers also manage the interactions within their units, and between their units and the rest of the organization and its environment.

The key role of knowledge capitalization

Both approaches – middle-up-down and circular organization - facilitate knowledge capitalization in the organization by creating redundant information in the organization (knowledge creation) and accumulating knowledge through a specific process.

Firstly, redundancy means “conscious overlapping of company information, business activities, and management responsibilities” (Nonaka, 1994:28). The two ways to build redundancy are 1) adopting an overlapping approach and internal competition in product development, and 2) using strategic rotation. In the first way, the product development team is divided into competing groups, working different approaches to the same project and then discussing strengths and weaknesses of their proposals. Such a rivalry encourages the team to look at a project from multiple perspectives. In the second way, a rotation can be made between different areas of technology and between functions such as R&D and marketing. This helps members to understand business from a variety of perspectives.

Redundancy promotes mutual trust between members and helps individuals to recognize their location in the organization, thus increase the sense of control and direction of individual thought and behaviour. Redundant information can reduce the impact of managerial hierarchy, thus providing a vehicle for problem generation and knowledge creation.

Secondly, knowledge capitalization in project management takes a specific form: "At the beginning of the project almost everything can be done but almost nothing is known; at the end, everything is known but almost no possible choices remain" (Midler, 1993). This leads to a three-phase approach: exploration, setting the key parameters, production. Hasty decisions, leading to wrong track, should be avoided during the exploration phase. Once exploration is completed, all parameters need to be frozen to move towards production. The knowledge capitalization is expected to enhance the efficiency of all three phases (Charue-Duboc and Midler, 1998; Mahmoud-Jouini et al., 2007).

The essential role of middle management in capitalization of knowledge appeared so essential in the project management literature that it led to the elaboration of a new role in the organization: the Programme Management Office.

2.4 A new support function for capitalization of knowledge in the organization: the Programme Management Office (PMO)

In traditional management control systems the controller is in charge of designing and monitoring the systems. To a large extent he keeps track of the standard procedures and routines in use in the organization. The project management literature suggests that this role should be given to a new support function that we now describe (cf. Appendix 5).

PMO is a governance structure for organizational project management. This structure has a dual set of functions. The top one consists of interpreting the strategy and offering the means to reformulate it. While the bottom one consists of optimizing effort and gathering data as well as setting standard processes and procedures. Most academic researches on PMO currently focus on the second aspect (Dai & Wells, 2004; Thiry & Deguire, 2007). According to this literature PMO should be in charge of:

- developing and maintaining project management standards and methods,
- providing project management consulting,
- providing project administrative support,
- providing or arranging project management training,
- developing and maintaining project historical archives.

Kendall & Rollins (2003) identify key success factors for implementing a PMO. The PMO must have enough influence on scheduling and decision-making across all projects and an involvement of the most senior of the executive team. But the PMO should not play the role of referee in the evaluation of the projects.

These two authors, using two major themes – cost containment and throughput improvement-, propose four value models of PMO's:

- Project Repository Model: PMO serves as a source of information on projects, methodology and standard, but lacks of accountability for bottom-line results.
- Coach Model: this model is an extension of project repository model. The PMO primarily acts as trainer, consultant, or mentor to share best practices across functions,

mostly in project setup and post-project reviews. But without the top managers being the primary customers of PMO, PMO becomes an easy target for the next budget cut.

- Enterprise Model: PMO has central control of all major projects by identifying bottlenecks that hamper all projects. Most PMO's do not have a direct link to the CEO or business unit head nor immediate bottom-line expectations. But in this PMO, there are senior project management expertise and execution.
- "Deliver Now" Model: this model has a sponsorship at very high executive level (CEO or Vice President) during a short time (about 6 months). It aims at throughput, delivery acceleration and selection of right project mix, aligning with strategic planning.

The four models demonstrate the positive link between senior managers' involvement and PMO's legitimate power.

The literature also identifies the main reasons for failure (Kendall and Rollins, 2003):

- the PMO did not demonstrate its tangible value;
- the PMO was perceived as administrative score-keepers or information providers to fulfill the senior management need for information.
- The PMO was too low in the management reporting structure, thus it spent most its time collecting data.
- The PMO focused on the project management community *only*, and excluded the interests of senior managers.
- The project managers only reported to the PMO. The line managers, considering this as a loss of control and a reduction in authority.

This discussion points out that the research in this area remains tentative.

2.5 The compensation policies

Some project management researchers (like Mahaney & Lederer, 2006; Raghu et al., 2003) have explicitly recognized the essential role of intrinsic motivation for project success. The role of intrinsic motivation has been studied through employees' preference, team tenure, self-organizing teams, or open and supportive communication¹¹⁴. After a brief definition of

¹¹⁴ Cummings, 1981; Hackman & Oldham, 1980, Katz, 1982; Brown & Eisenhardt, 1995, Susman, 1990; Takeuchi & Nonaka, 1986, Gmetch & Miskin, 1984.

intrinsic versus extrinsic motivation, we come back to the use of intrinsic motivation in project management.

Intrinsic motivation is often considered as the motivation existing in the job itself. It includes achievement, recognition for achievement, pride in doing a good job, empowerment, autonomy, challenge, or praise from superiors and peers. Extrinsic motivation, on the other hand, refers to motivation that comes from outside of the individual. Examples are pay, fringe benefits, promotion¹¹⁵, or social status (Mahaney & Lederer, 2006; Herzberg, 1987).

Gottschalg & Zollo (2006, 2007) point out that governance-based theorists focus on extrinsic motivation to control opportunist behavior, while competence-based researchers emphasize the role of normative intrinsic motivation to develop knowledge transfer or generation¹¹⁶. The authors put forth the joint use of the two systems and add a missing piece - hedonic intrinsic motivation. An individual would then be motivated by: 1) types of resources to stimulate his behavior (i.e. extrinsic motivation like financial rewards), 2) the need to integrate into social community and comply with the existing norms and value (i.e. normative intrinsic motivation), and 3) sensitivity in task characteristics comprising of the inherent joy, the freedom of action, and the potential for personal development (i.e. hedonic intrinsic motivation). The two motivations – extrinsic and intrinsic – must be taken into account and in a balanced manner (Frey, 1997).

The project management literature, which mostly follows a competence based approach, addresses the issue of compensation mainly through intrinsic motivation. We have seen that senior managers should not monitor a project either too closely or too distantly. This leaves room for innovativeness rewarded by a sense of pride among team members and for building enthusiasm and excitement toward the project (Kanter, 1988; Van de Ven, 1986; Herzberg, 1987).

The conditions often considered as enhancers for the effectiveness of teams are as follows:

- Communication is open and supportive,

¹¹⁵ Other researchers consider promotion as rather effective incentive device than an attribute of extrinsic motivation. For example, in line with the results of Benabou & Tirole (2003), Van Herpen et al. (2006) found that promotions can be used to increase « intrinsic motivation » because they are signals of trust and lead to empowerment. In addition, they also found that extrinsic motivation is high with the expectation of promotion but falls back once the promotion has occurred.

¹¹⁶ Frey (1997) said that the economists (in principal-agent paradigm, theory of contracts, property rights, organization theory and modern institutional economics) exclusively focus on “extrinsic motivation” and disregard “intrinsic motivation”.

- Commitment to team goals is supported by all team members,
- Decisions are reached by consensus and disagreements are resolved constructively,
- Conflict and controversy are viewed as positive,
- Responsibility is shared,
- Team members listen to one another and are not afraid of a dominating supervisor.

These conditions clearly reflect a bias towards intrinsic motivation. Team tenure may be an important factor (Katz, 1982; Brown & Eisenhardt, 1995) that follows the same line of thought. A team with a short tenure tends to have a short history together, leading to lack effective patterns of information sharing and working together. In contrast, a long tenure may lead to be inward focused and neglect external communication (Katz, 1982). A moderate level of team tenure seems to optimize the performance.

Contrarily to intrinsic motivation, extrinsic motivation, through either objective formula-based or subjective contribution-based incentives, is almost ignored in this literature.

Concluding remarks

The project management literature provides three interesting contributions to the challenges identified from our preliminary analysis (cf. section 2.3):

- a corner stone for the information system is the project itself, which may not correspond to a resource centre in the organizational chart; the tool itself to monitor the portfolios of the project is both standardized and customized to allow respectively for the consolidation of global and synthetic information and for the heterogeneity of projects;
- the horizontal and vertical coordination is supported by original organizational procedures characterized by team work involving cross functional members coming from different levels of the hierarchy; this allows for a decision process which combines both interactive and diagnostic styles of use of control system;
- a new support function is in charge of monitoring the whole process and to capitalize the knowledge generated by the projects; this support function, called the Programme Management Office, is to replace the role attributed to the controller in more traditional organizations; research on this area remains tentative.

While the project management literature provides an important contribution to these three challenges, it does not offer much as regards the compensation issue. An interesting bias

emerges relative to this issue, the project management literature seem to implicitly rely on intrinsic motivation, while the management control literature gives more attention to extrinsic motivation.

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Chapter 3:

METHODOLOGY

Framework

This chapter aims at making a synthesis of the two preceding chapters in terms of framework to analyse management control systems in use and of propositions related to our research question. It also justifies and details the methodology we followed to study the relevance of this framework, that is a case study.

In Chapter 1 we have seen that the analysis of management control system should include: use of control systems (diagnostic or interactive or joint use), the type of management tool (generic or specific), and the compensation systems (with two polar possibilities, formula-based or compensation-based). In the chapter 2, we have shown that the interactions between the top management and project teams are not only structured by the management control system, but also by specific organizational structures that interact with the control systems. As a result, we suggest analysing management systems using a four-dimension framework: organizational structure, use of control systems, management tool, and compensation systems.

Methodology

We chose to conduct a case study even before having defined the research question because we believe this methodology is relevant to study the existing questions about the use of management control for which the knowledge has not yet structured. This choice is in line with the calls of Hopwood (1983), Kaplan (1986) and Otley (2001) for a greater commitment to more in-depth (case-based) research.

On the basis of Yin (1984, 2003)'s and Eisenhardt (1989)'s propositions¹¹⁷, we follow a six-step process to carry out our research: 1° getting started, 2° selecting cases, 3° crafting instruments and protocols, 4° entering the field, 5° analyzing data and reporting case studies, 6° reaching closure. And the final section is reserved for the cooperation problems of case studies.

¹¹⁷ Eisenhardt (1989) proposed the eight-step process to build theory from case study research: getting started, selecting cases, crafting instruments and protocols, entering the Field, analyzing data, shaping hypotheses, unfolding literature, and reaching closure. While Yin (1984, 1994, 2003) suggest a six-step process: designing case studies, conducting case studies: preparing for data collection, conducting case studies: collecting the evidence, analyzing case study evidence, and reporting case studies.

Step 1: Getting started

A research focus is important to avoid becoming overwhelmed by the volume of data. The definition of a research question within a broad topic enables to specify the organization to be approached and the kind of data to be gathered (Eisenhardt, 1989). The case study strategy is most suitable for “how” and “why” questions (Yin, 1984, 1994, 2003).

We decided to work on the question of "**How do managers use their management control systems as levers of strategic changes?**" because of three main reasons. Firstly, the works of Simons (1994, 1995, 2000) on the use of management control systems in strategic turnaround situation seemed both stimulating from an academic point of view and had some echoes with our correspondents in the company. Secondly, the need to study further on this subject is clearly pointed out in academic papers (Atkinson, 1997; Simons, 1994; Langfield-Smith, 1997). And thirdly, this question seemed to fit with the methodology we had chosen because only the case study research, according to Langfield-Smith (1997) and Shields (1997), offers the potential for the study of the dynamic interactions between management control and strategy, and for that of dynamics of change, which cannot be inferred in quantitative research.

We tried to gain as much feedbacks as possible on our research question and our findings during our research by attending to the doctoral seminars of Essec, Ecole Polytechnique, and Nanterre University, and by presenting our research at Management Center of Ecole Polytechnique and in different international conferences.

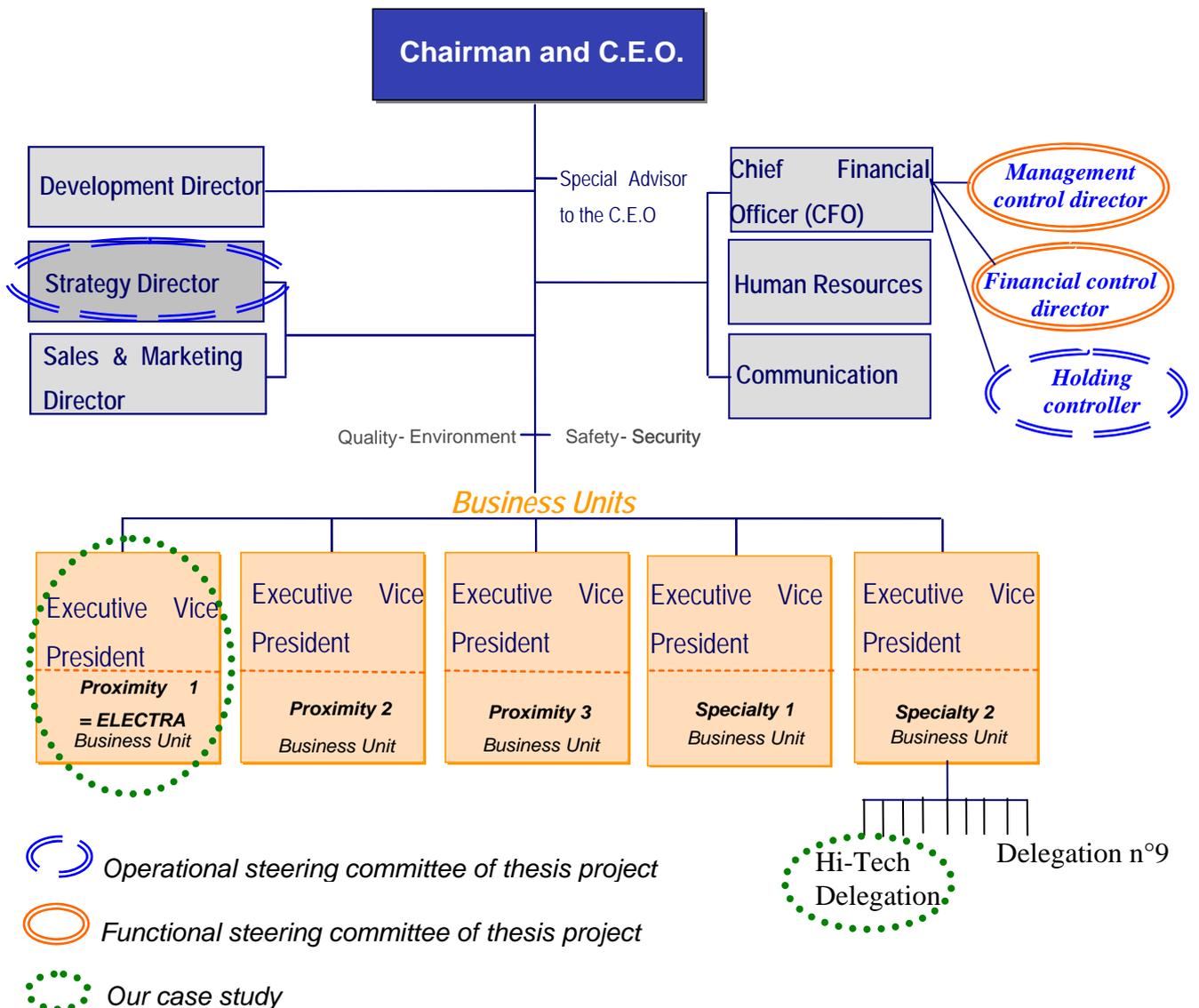
In order to ensure a good coherence between the academic goals and the operational ones, and to assure the validity of the research (Silverman, 1997), a dynamic interaction between academic world and enterprise world was organized. A sort of two steering committees of the thesis project was created: one is the functional committee, another is the operational committee. The first was created in Dec. 2002 and consisted of the management control director and then the financial director (since June 2004). The second was created in Dec. 2005 and consisted of the Strategy director (who is also Vice Executive President) and Holding management controller¹¹⁸ (cf. Figure 7 and Table 2). In addition to the formal meetings, the informal exchanges were also done by the participants through emails and discussion.

¹¹⁸ The Holding management controller has a double attachment: one with the management director, another with the Executive Vice-President.

Table 2: Two steering committees of the thesis project

	Operational committee (created in Dec. 2005) = Strategy director + Holding management controller	Functional committee (created in Dec. 2003) = Management control director + Financial director
Two thesis supervisors and PhD student	Quarterly (3 meetings in total)	Twice per year (10 meetings in total)
PhD student	According to the demand of PhD student (6 meeting observation, 1 formal meeting, and a number of informal exchange)	According to demand of PhD student (10 in total)

Figure 7: Position of two steering committees and our case studies in the INEO Suez's organizational structure in 2006



Step 2: Selecting cases

Ferreira & Merchant (1992) pointed out that there are two main types of sample selection: purposive or non-purposive. The purposive selection means that "field researchers often look for companies that would appear to be "outliers" in a large database study, and hope to learn something new from them" (p.13). The non-purposive means the sample is opportunistic and precedes the research questions.

In fact, the choice of our field was both non-purposive (for the selection of INEO Suez) and purposive (for the selection of Hi-Tech and Electra) since the research question was defined after we had started working at INEO Suez and investigated more in depth the management control literature.

The choice of INEO Suez was opportune. In 2002, the PhD candidate had just accomplished her Research Master¹¹⁹ in "Strategy and Management" and searched for a scholarship for a PhD study and a professional experience. A job salon in Grenoble offered her an occasion to meet the recruiter of INEO Suez looking for an intern of management control department. After the first interview with the recruiter in Grenoble, the second interview was done with two management controllers in Malakoff – Ile de France. Their approval enabled the signature for a six-month internship contract, which was then prolonged one time (in total one-year duration, from Feb. 2002 to Feb. 2003).

Once at INEO Suez, we decided to study the link between management control system and strategic change because INEO Suez owns rich, original and recent experiences in strategic changes (cf. Appendix 14)¹²⁰. As explained above (in the Step 1), the study of this subject may contribute to both theoretical and practical aspects.

Once the research question was chosen, the selection of Hi-Tech and Electra case studies was rather purposive. Indeed, we chose cases that could fit our question in which:

- There had been a real strategic change. It means the change in strategy content or strategy-making process at the corporate or business level (Ginsberg, 1988) or a fundamental change in strategy implementation (organizational value, structure, systems, and personnel as mentioned by Huy, 2005).

¹¹⁹ In 2000-2001, it was named as "Diplôme d'Etude Approfondie" in French.

¹²⁰ See the section 3 – "Description of INEO Suez" for more details. Briefly, three strategic changes occurred in five years (2001-2006) in INEO Suez. The diversification of its strategic segmentations and business sectors makes its strategic turnaround become more challenging.

- Together with our thesis supervisors, we decided that the change was neither too recent nor too far in comparison with our research. Too recent, the results of the change have not yet been rooted and visibly emerged. Too far, the results can be distorted and it is difficult to find good informants who are able to inform necessary information.

These two cases were also selected because they were situated at two different hierarchical levels: Hi-Tech at delegation, one level lower than Electra at business unit level.

Hi-Tech was selected after 6 interviews and 5 meeting observations¹²¹, while Electra was selected after only 3 interviews¹²², because the strategic change in Electra was much more evident than that of Hi-Tech and the success of Hi-Tech welcomed our entrance in Electra. Their selections were all validated by the two steering committees of thesis.

Step 3: Crafting instruments and protocols

Our four main sources of evidence are interviews, direct observations, archival records, and documents. In addition, the informal exchanges with my colleagues and observations of daily life in INEO Suez also provide me an important source of evidence. All of them are interdependent and complementary. More concretely,

The first source comes from 79 interviews. Five main types of interviews were: 1° business discovery (9 interviews), 2° selection of case study (9), 3° Hi-Tech case (20), 4° Electra case (21), and 5° report on thesis advancement (20). Four types of informants are: top managers (8), middle managers (27), front-line (15), and management controllers (29).

The second source is the direct observation of 168 meetings:

- 153 meetings of management control department from 2003 to 2005, including the annual meetings (3) between Holding controllers and operational controllers, the communication of new management control principles (6), and weekly meetings (144).
- five meetings on strategic plans
- three meetings of elaboration of project budget which helped me to select a case study later.

¹²¹ See "Investigation process" of Hi-Tech in the Chapter 4 for more details.

¹²² See "Investigation process" of Electra in the Chapter 4 for more details.

- five commercial meetings in Electra
- two meetings in Hi-Tech.

And the final sources of evidence are archival records and documents (2.5 Go¹²³). They include the analyses of the company's situation at the moment of strategic change, organizational charts, budgets, medium term planning, presentation of annual meetings, financial results of realized or realizing projects and description of functional departments. The analyses of these sources were used to have the preliminary comprehension on informants' entities before the interviews.

Our sources of evidence were structured through the common protocol mainly based on the framework defined in the first section of this chapter. In general, the main sections of the protocol¹²⁴ are as follows:

- Strategic changes (or change of strategy): business activity, manners of strategy formulation, strategic activity segments and strategic customers, key success factors,
- Change of organizational structure,
- Change of use of management control and project management (involvement of top management, involvement of operational management, content of communication, and type of discussion), its impacts on the implementation of strategic changes,
- Change of management tools: arrival of new tools, description, function, input, output, its impacts on the implementation of strategic changes,
- Change of compensation systems: main indicators, method of performance evaluation, relating actors, its impacts on the implementation of strategic changes,
- Evaluation: strength and weakness of the precedent and actual systems, and recommendations for improvements,
- Proposition of documents and contact persons for further investigations.

Especially for the interviews, a brief presentation of our research opened our interviews (e.g. research question, research objectives, and the position of the investigator in the company).

Also, we employ the use of multi-investigators because of their two advantages. First, the complementary insights of investigators enrich the data, thus enhance the creative potential of

¹²³ The historic documents in paper version (like strategic planning in 1995, or company presentation in 1980) do not take into account.

¹²⁴ Up to our demands of precisions, their contents are slightly different in each case study.

the study. Second, the convergence of observations builds the confidence in findings (Eisenhardt, 1989). Multi-investigators consist of one or two thesis supervisors and the PhD candidate. Due to the time constraint, the interventions of multi-investigators were carefully selected. More concretely,

- First, the protocol of research, most of questionnaires, and the analyses of sources of evidences were done by the PhD candidate, and then discussed with and validated by two thesis supervisors (through face-to-face meetings, email, phone conference),
- Second, two supervisors were all present in the steering committees of PhD thesis.
- Third, one supervisor was present in the final interviews to validate the analysis and the findings of case studies: one interview with the Hi-Tech director and two interviews with the Electra director. In these three interviews, the PhD student presented the analysis and the findings of case studies, and the supervisor directly discussed with the informants.

Step 4: Entering the field

As recommended by Bruns & Kaplan (1987) and Yin (1984, 1994, 2003), we carefully prepared our interviews. The preparation is indeed essential to gain confidence with the interviewee. Indeed, it is not evident to present the position of a researcher being at the same time employed by the company at the holding level. If I presented myself as someone who had worked in Holding management control department, the informant would think of the image of “police”¹²⁵. If I presented myself as someone sent by his superior of the informant, he would consider me as an “auditor” of his works. If I presented myself as a student, he would consider me as an “outsider” of their business difficulties. That is the reason why, according to my experience, the best way to gain confidence is to present myself as a researcher and to guarantee the anonym of their answers. It allows emphasizing on the academic objectives of the research. To know much about the operational questions that the interviewees faced, I thus prepared as much as possible all concrete information related to informants and my research questions (characteristics of their projects – from financial results to general description, evolution of their entities, or their position).

We applied overlapping data analysis to take advantages of “flexible data collection” as defined by Eisenhardt (1989). The questionnaire was adapted to the characteristics of

¹²⁵ The controllers in the company were often considered as the police.

interviewees, in terms of responsibility level for instance, and the need of information exploitation. It was also adapted during the process since part of each interviews were devoted to the validation and enrichment of information collected in precedent interviews. In other words, the analyses of precedent interviews, observations, archival records, and documents are our main sources of the next interviews. Even all interviews are based on the same protocol, but the questionnaires of each interview are varied and adjusted.

Another key point is the bias of interviews. Naturally, people prefer discussing success (in particular, theirs) to failure. A careful preparation of questionnaire (e.g. precedent results of interviews, financial results of the entity), a deep comprehension of the entity, and an experience of investigators may facilitate a balanced and frank discussion on success and failure.

This principle requires a suitable time difference among interviews; but another pitfall is to adapt our schedule with the schedules of informants. We require the time difference between two interviews is two hours minimum.

To avoid the waste of time, we carefully selected our potential informants before any contact on the basis of their length of service in the studied entity and their roles in strategic change. Our privileged target is an informant who has worked in this entity before and after the moment of strategic change and actively participates in the change process. We of course also based our choice on the recommendations of precedent interviewees.

All interviews were recorded with the permission of interviewees. As the transcription takes “enormous time and energy” (Yin, 2002: 92), we employed a simplified process. After the interview, we took note the fresh information and our impression as soon as possible; and then a throughout listening to the interview records helps to complete the important missing points in the case study protocol. This process helps to significantly reduce the transcription time (from 6 hours to 2 hours for one-hour interview). And finally, we push our thinking by asking the questions such as “What am I learning?”, “How does this interview differ from the others?”, “Which are precedent analyses validated?” Which ones need further information?”

Step 5: Analyzing data and reporting data

Data analysis is one of the most important process, but the least developed and the most difficult (Yin, 1984, 1994, 2003; Eisenhardt, 1989).

A case study database was created, including case study notes (minutes of interviews and analyses), case study documents (such as its budget presentation or financial analyses, annual reports, balance sheet, minutes of observation meetings), and recorded interviews. We used this database to carry out within-case analysis and cross-case analysis.

Regarding within-case analysis, we begun with the general description of our cases, and then simplified it in a teaching case (cf. Appendix 7). We employed the time-series analysis (Yin, 1984, 1994, 2003). The main events (based on the four-dimension grid¹²⁶) are structured through simple time series: before and after the strategic change¹²⁷.

The simplified version (with some financial models) facilitates our discussions between the thesis supervisors and the PhD student, and between the researchers and the company representatives. Because it assures the same language, the shared and validated comprehension, and time-saving method for all actors. It is considered as a tool for communication.

Once the preliminary comprehension had been validated, we completed and enriched the simplified version to create a new version. This version has been written up many times, after the discussions, the feedbacks of researchers and of key interviewees. Two different forms of presentation were one for academic world (i.e. Word document), another for practical world (i.e. Powerpoint document). But they contain the same main content. Such analyses helped us to discover the subtle events of the case studies, which were helpful to analyze the strengths and the drawbacks of the systems, and the interaction of our propositions on four dimensions

Regarding cross-case analysis, the data of both case studies is displayed according to the unique framework. And a comparison of similarities and differences is also made. This juxtaposition helps us to break the simplistic frames and leads to more sophisticated understanding and go beyond the initial impression.

¹²⁶ Organizational structure, use of control systems, management tools, and compensation systems.

¹²⁷ Hi-Tech confronts two strategic changes: one in 2002, another in 2006. The first one relates to its strategy content leading to the strategy implementation, while the second one relates only to the strategy implementation (use of management control systems, tools, and compensation systems).

For both types of analyses, we make a frequent comparison between our findings and the conflicting literature and then similar one. It appears that some configurations along these four dimensions of one case study are more efficient than those of another case.

We tried our best to respect four principles defined by Yin (1984, 1994, 2003) to assure the quality of analysis by: 1° showing all possible evidence of case study, 2° addressing all major rival interpretations, 3° addressing the most significant aspect of the case study, and 4° demonstrating the investigator's prior, expert knowledge.

Step 6: Reaching closure

Three important issues which enable to reach closure are when to stop adding interviews, when to stop adding case studies, and when to stop iterating between data and theory¹²⁸. The answer is the saturation (Yin, 1984, 1994, 2003; Eisenhart, 1989). The saturation means the incremental improvement to the theory and to learning is minimal. And due to the time constraint, we selected only two case studies.

The validity of data gathered through our case studies is ensured through:

- The permanent validation of information gathered in one interview by other interviewees,
- The analyses of our case study database,
- The triangulation of data coming from different sources such as archival records, documents, interviews, and direct observations (Yin, 2003),
- The writing of a synthesis of each case studies which were reviewed and validated by key informants with the presence of thesis supervisors and by the steering committees of the research project.

Altogether Ferreira & Merchant (1992) and then Merchant & Van der Stede (2006) imposed five conditions for a field research:

“1) The researcher has direct, in-depth contact with organizational participants, particularly in interviews and direct observations of activities, and these contacts provide a primary source of research data. 2) The study focuses on real tasks or processes, not situations artificially created by the researcher. 3) The research design is

¹²⁸ Eisenhardt (1989) proposed two issues: when to stop adding case studies, and when to stop iterating between data and theory. We suggested adding the third issue.

not totally structured. It evolves along with the field observations. 4) The presentation of data includes relatively rich (detailed) descriptions of company contexts and practices. 5) The resulting publications are written to the academic community" (Ferreira & Merchant, 1992:4)

As above illustrated in details, our case studies satisfied these conditions. Five years as employee in INEO Suez provided us direct contacts with organizational participants. 79 interviews and 168 direct observations of activities remain our preliminary source of evidence. The study focuses on the real processes of management control in the context of strategic changes. The research design has evolved with the results of field observations by continual interactions between two worlds: practical one and academic one. The description of company contexts and practices plays an important role in our presentation of data. And the resulting publications are written to academic community, firstly under the form of doctoral thesis.

A balanced joint use of thesis project to overcome cooperation problems

The research has been conducted in the frame of a CIFRE convention¹²⁹, that is a 3 year convention between INEO Suez, the Econometrics laboratory of Ecole Polytechnique and the PhD Student. This convention was signed in February 2003 after one year internship at Ineo Suez in the management control department. Because the research was not over after three years and Ineo was satisfied of the job done, it decided to lengthen the contract for another 15 months (even though INEO no longer received the subvention from the government). We recognize that such prolongation is not frequent.

Altogether, starting in February 2003, I spent two years full time working for the company¹³⁰, one year half time and the other half at the laboratory, and then the last year full time on the research.

The PhD was supervised at the Holding level by the Management Control director (/and Financial director) and the Strategy Director (cf. Figure 8 – Position of two steering committees and our case studies in the INEO Suez's organizational structure in 2006).

¹²⁹ Industrial convention for training by research (in French, CIFRE stands for « Conventions Industrielles de Formation par la REcherche »). In such a convention, the company pays the PhD student and receives annually 14.635 euros – 17.000 euros from the French Research Ministry. The duration of CIFRE is three years, and can not be prolonged with the Ministry.

¹³⁰ Except for one day per week for academic seminars.

Of course we had to face the problem of cooperation of actors on the field underlined by Ferreira & Merchant (1992). We give here some details on the way we tried to overcome these problems.

We tried to overcome the problem of their scarce time by convincing our key interlocutors in INEO Suez of the relevance of our research question for the company. This was not an easy task since, in addition to the barrier of culture and of language; the company is large (13.000 employees, 220 profit centers in France), has heterogeneous activities, had recently experienced a number of fusions or splits resulting in multiple hierarchical authorities. For that purpose, the first two years (one year of internship and first year of the PhD) during which we worked full-time inside the company were crucial. They allowed us to discover the various business of the company, study its management control systems that provided us a general comprehension on the company and on the classical evolution of management.

They also help us gain credibility by being recognized as efficient and reliable and to create a relation strong enough with many entities of the companies to access the different silos. It appeared that one of the best ways (if not the best) was to work directly with these managers. The operational works of management control (like consolidation), which did not have much value for my thesis, actively helped me to create and develop the relation with all management controllers.

One management controller, eager to help students and convinced by the potential of our research objective, integrated me into the Strategy team directly working with his superior - Strategy director of INEO Suez (who is also Executive Vice President). That resulted in a mission with the Strategy team (in June 2004) which helped me to gain confidence of the Strategy director who in turn became a key contact. Both of them became our sponsors and formed an operational steering committee for our research. They helped us to “publicize” our research objective to their peers and their subordinates. The top and middle managers were in fact convinced one after the other.

At this stage, the issue was to devote more time to research and less to operational work, thus to convince the strategy director of the relevance of our research question for the company. For that purpose, we organized several meetings with the operational that evidenced the common and interesting issues for both. The managers sharpened and confirmed our research problems for the company.

The Strategy director even gave us the “carte blanche” to access to his twenty-year archival documents. Being also as Vice Executive President responsible for the business unit Specialty 2, he allowed us to contact on his behalf all his direct subordinates (i.e. delegation directors).

A rare privilege! As a result, we were able to selected Hi-Tech delegation for in-depth study. When we needed another case study, the Strategy director recommended us another business unit, namely Electra, which seemed interesting for our research question.

In other words, the thesis project is carried out in the style of the balanced approche at different interfaces:

- Relation between thesis supervisors and PhD candidate: the thesis supervisors regularly debate with the PhD student through face-to-face meetings, informal exchanges, or email. Their involvement can be characterized as moderate: intensive enough to favour learning and creativity but distant enough to avoid the threat of embarrassment for the student. The main tool is the analysis written by the student. The motivation is largely intrinsic: desire for learning and for working together, and a satisfaction of thesis accomplishment.
- Relation between company representatives and researchers (i.e. thesis supervisors and PhD candidate): frequent meetings allow exchanging the academic and practical viewpoints. The results of interviewees are often the main source of discussion. Once again, the motivation is largely intrinsic: desire for learning (through confrontation between two different worlds) and for helping others.

A close and frequent relation with the different actors (both researchers and company’s actors) helps to overcome the frequent issues of cooperation. And a deep comprehension on the company is an efficient filter on the bias of semi-directive interviews.

INEO Suez

INEO Suez defines its value through “Respect, Demands, Solidarity, Enthusiasm”. Each entity has its own strategy.

Formed in 2001 through the merger of three long-established former competitors, the Group Ineo SUEZ becomes one of the leading French groups in electrical solutions, information and communication systems. Its main clients are industrial and building services. It is a direct

subsidiary of the Energy branch of SUEZ in 2006¹³¹. SUEZ employs more than 160,000 people with €40.7 billion of turnover, while Ineo SUEZ employs 13,500 people, mainly in France, with €1.5 billion of sales in 2004 and pre-tax profits of €29.4 million.

We now present Ineo Suez's activities, its structure, its history, and the three strategic changes it experienced since its creation in 2001. We also point out the position of Hi-Tech and Electra, our two case studies in the Group INEO Suez.

Activities of INEO Suez

INEO has six activities such as defence, energy networks, industry, telecommunication, tertiary, transport systems and catenaries, and local authorities. They are regrouped in seven business sectors such as Defence, Energy, Industry, Tertiary, Telecommunication, Transport, and Local authorities. These sectors formed six operational units of INEO Suez.

- Defence: specialized in fixed and mobile, civil and military communication systems as well as to navigation aid equipment used in Civil Aviation or Defence applications,
- Energy: present in electricity (in power distribution and cogeneration power plant construction fields), nuclear power (integrated propositions as the result of INEO's control over the interfaces between its various disciplines: electricity, instrumentation, automated control systems, mechanical engineering, taps and valves, pipes and air conditioning) and renewable energies (wind turbine operations),
- Industry: specialized in providing high-added value services, of supplying engineering services, of producing electrical, mechanical or air conditioning engineering solutions. In oil gas, INEO specifically works on major refinery sites and chemical sites where its specialist teams carry out tasks on electrical systems, on sensors, on programmable logic controllers and supervisors,
- Telecommunication: specialized in providing a global response for the entire value chain in the telecoms field: negotiations with operators, technical liaison between their networks and the companys networks, voice/data, telephony, home automation, multimedia, IT, security devices, access control,

¹³¹ Cf. Appendix 1: Evolution of INEO in SUEZ 2002-2006

- Tertiary: specialized in following up and deploy powerful human and material resources, thanks to our media and to our site management methods and also post-site support via GTC and maintenance contracts,
- Transport: specialized in providing innovative solutions that meet challenges such as the increased levels of traffic in urban environments. INEO Suez offers global solutions that combine expertise in infrastructure works, general electrical installations, fluids systems and information systems, all requiring close collaboration with transport infrastructure operators, specialist engineering companies and equipment manufacturers. Having comprehensive know-how used to implement a variety of infrastructure projects: catenaries, toll systems, passenger information and operational assistance systems (SIV), emergency call networks (including the SONO system for the partially sighted), monitoring systems of centralised motorway, runway lighting or railway signalling, lighting and power distribution in airports and stations.
- Local authorities: offering solutions to select technologies, guarantee procurement, save on energy resources or source funding, which are suitable to the needs of local community.

The INEO Suez's market is competitive and has some important competitors (cf. Appendix 15). Its sectors can be classified in "proximity" and "speciality" which are strongly complementary:

- Proximity activities comprise three business sectors – Industry, Tertiary and Local authorities. They are characterized by simple and easy-to-imitate activities. The entry barriers of proximity activities consist mainly in the confident relationship historically loomed between the clients and locally implemented contractors¹³². Proximity activities are considered a strong marketing and sales driver to speciality activities. Because their customers often have the demands which combine both proximity characters and specialty characters. And the positions of proximity customers are much more extended than specialty ones.
- Speciality activities consisting of Transport, Telecommunication, Defence and Energy allow a strong enhancing of proximity offer. They are characterized by sophisticated

¹³² Management presentation of INEO Suez's Business Units, 7/3/2003.

activities. Their entry barriers are mainly based on technical skills and/or important investments in tangible assets.

Structure of INEO Suez

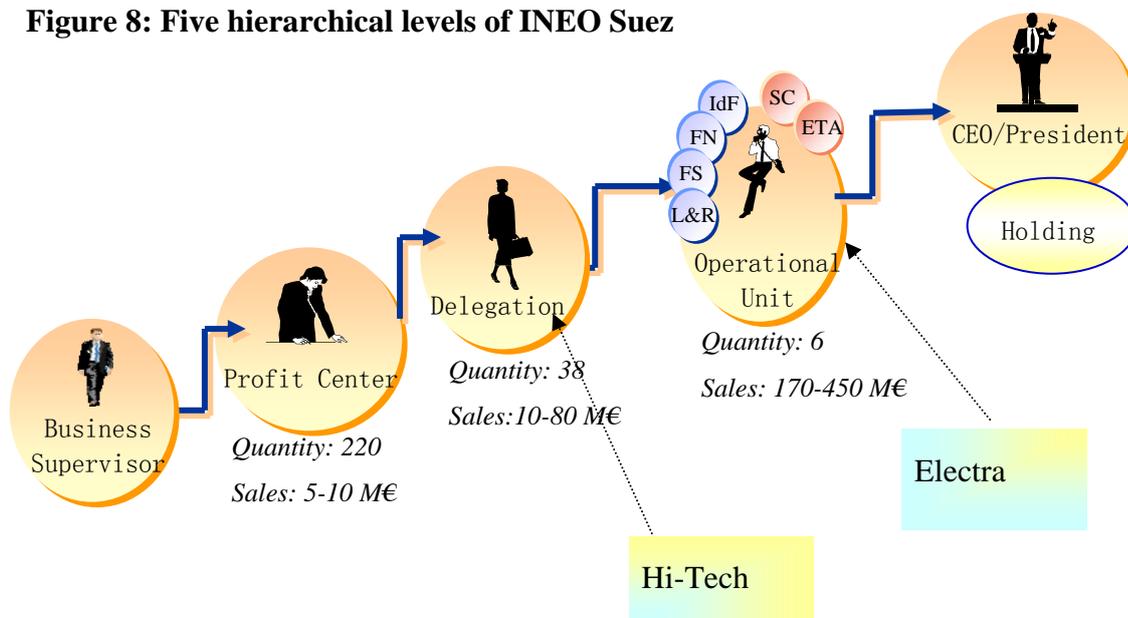
Ineo SUEZ comprises 220 profit centers. They are classified in 38 delegations of six operational units (named as “Pôles” in French). The operational units in June 2006 consist of:

- four units organized in geographic proximity: Ile de France, Networks-Public Lighting, Northern, Southern,
- and two units organized in specialty activities: Communication System, and Energy – Transport - Audiovisual.

INEO SUEZ is organized on the principles of decentralized management and conducts its business through operating subsidiaries (profit centers and delegations) which are, for the most part, integral, autonomous operations.

This organization leads to five hierarchical levels: business supervisors, profit centre managers, delegation directors, operational unit directors (Pôle Directors) and CEO/President (cf. Figure 8). The profit centers are exented in all regions of France (cf. the Appendix 16). Their average turnover varied from €5 to 10 millions. INEO has 38 delegations with 10-80 M€turnover, and 6 operational units with 170-450 M€turnover.

Figure 8: Five hierarchical levels of INEO Suez

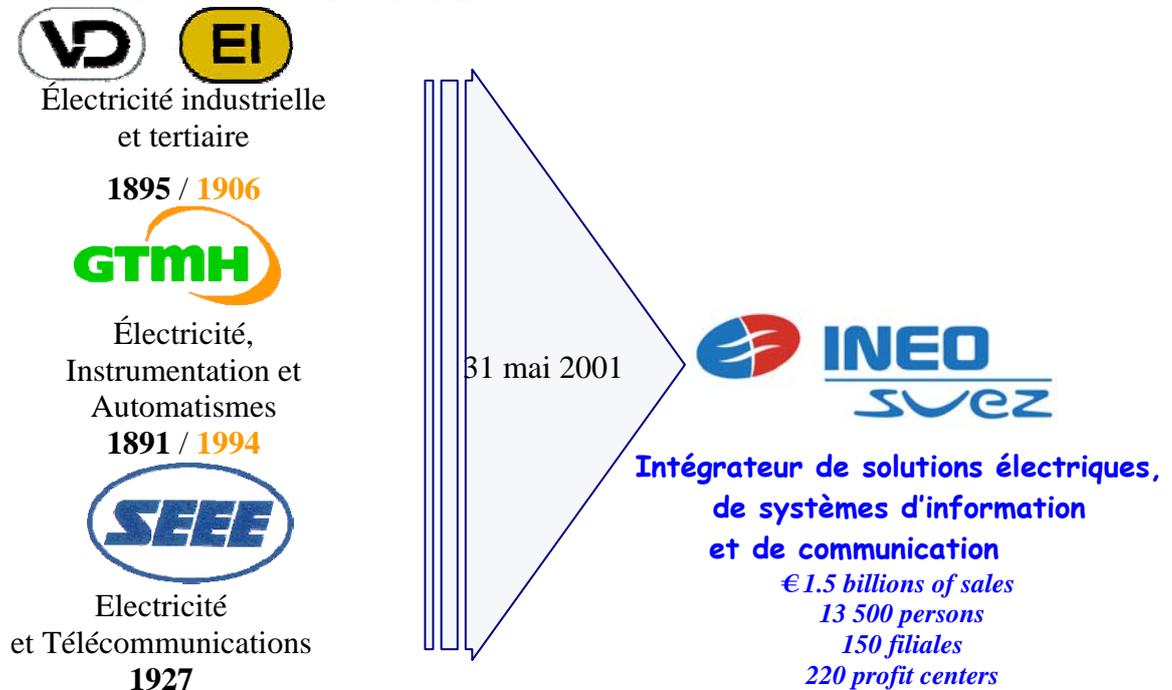


Our two case studies are located in two different operational units: Electra in geographic proximity, while Hi-Tech in specialty (see the Figure 1). Hi-Tech is a delegation, while Electra is an operational unit.

History of INEO Suez and its strategic changes

INEO Suez is formed through the merger of EI-VD, SEEE and GTMH, which were established respectively in 1921, 1927 and 1974 (cf. Figure 9).

Figure 9: Milestone of Ineo Suez evolution



- INEO results from the merger in 2001 of EI-VD, SEEE and GTMH, three independent companies which were established respectively in 1921, 1927 and 1974. December 2002: At the end of 2002, due to the necessity of SUEZ to reduce its debts and reorient its activities, its top managers had intended to turn over its shares in Fabricom. However, in June 2003, SUEZ managers finally decided to put an end to the sales of Fabricom,
- December 2001: integration of SEEE in INEO (INEC sold SEEE's stocks to INEO)
- August 2001: INEO rejoined Group Fabricom, a subsidiary of Tractebel (Energy Business Unit of SUEZ)
- July 2001: INEO, a new name of group GTMH-EI,
- May 2001 : official merger of GTMH SA and EI SA (absorption of EI by GTMH),
- June 1999: Takeover Bid (Offre Publique d'Achats) of EI by GTM, and the merger process of GTMH-EI started.
- 1994: establishment of GTMH (GTME was absorbed by Herlicq),
- 1980: l'Entreprise Industrielle takes over Verger Delported.

The objective of the INEO Suez creation was to “promote the entrepreneurial spirit of these companies and create a truly integrated and network group” (Guy Lacroix, Chairman and Chief Executive Officer, 2003, Corporate Outlook, Business Link). This merger was supposed to be beneficial to:

- its customers, in term of reactivity and adaptability to meet demands of customers with an increased professionalism and reinforced synergies in their business,
- its employees, in term of sharing experiences, know-how and career evolution,
- its shareholders, in term of performance optimization and security.

Since 2001, it is possible to delineate three strategic periods and the corresponding strategic changes:

- The period from May 2001 to December 2002 is a transition period during which the main goal was to integrate the three companies which used to be competitors. The integration process involved defining Group’s value, harmonizing three different managerial cultures, harmonizing three different information systems, and so on. During this period, the focus being on the integration, the financial objectives seemed less emphasized.
- The period from December 2002 to December 2004 is characterized by “Financial pressure”. A new CEO was appointed at Ineo SUEZ’s direct shareholder level, Fabricom. At that time, had just called it off it project to sell off Fabricom, including Ineo SUEZ and SUEZ had a strong pressure coming from the financial market on debt reduction. This context led to an increased pressure on Ineo SUEZ’s financial commitments. “You know that Suez decided to keep us in the Group and we have two years to succeed restructuring Fabricom”, said Fabricom’s delegate Administrator. Finance department, Management Control department and Accounting department were reorganized in June 2004, Finance department being responsible for treasury and financial reporting (consolidation of accounting and of budget), and Management Control department specialized in operational and managerial activities.
- 2005-2006: fusion between Endel, Ineo SUEZ, and Axima to form an Energy branch in SUEZ.

Such strategic changes led to the profound change in INEO Suez’s management control systems (cf. Appendix 17) and significantly influenced on its subsidiaries (such as Hi-Tech or Electra).

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Chapter 4:

CASE STUDIES

Section 1. Hi-Tech case

1. The context

Hi-Tech is specialized in implementing management systems of public transport networks (tramways, bus, metro, and so on), road signalling systems (information on traffic network flows), and toll systems. These systems of different sizes and complexity require specialized competences in computer science and telecommunications. The installation of these systems also necessitates the ability to monitor infrastructure works (construction of public works).

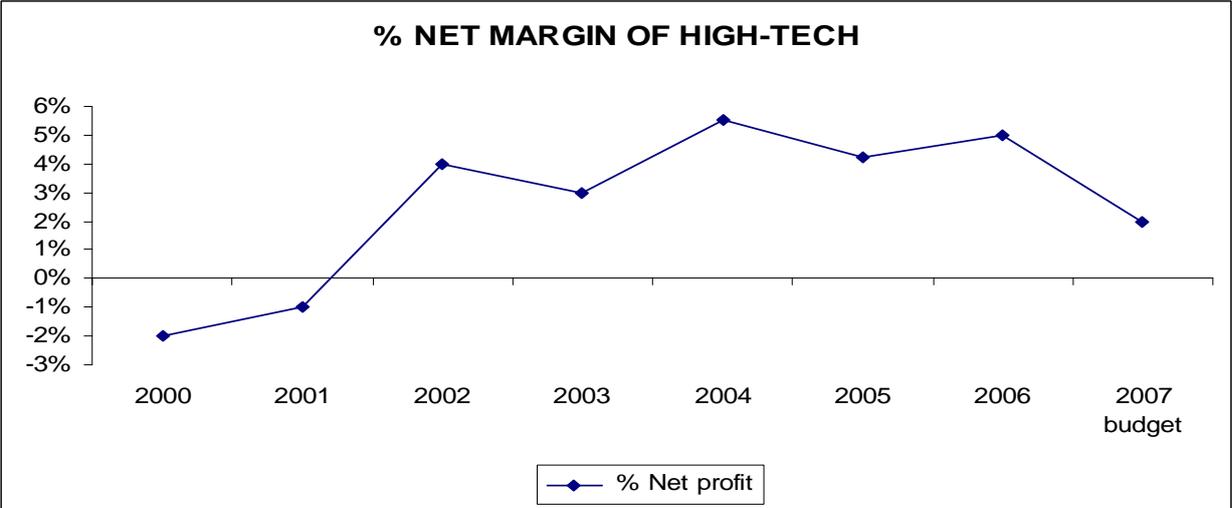
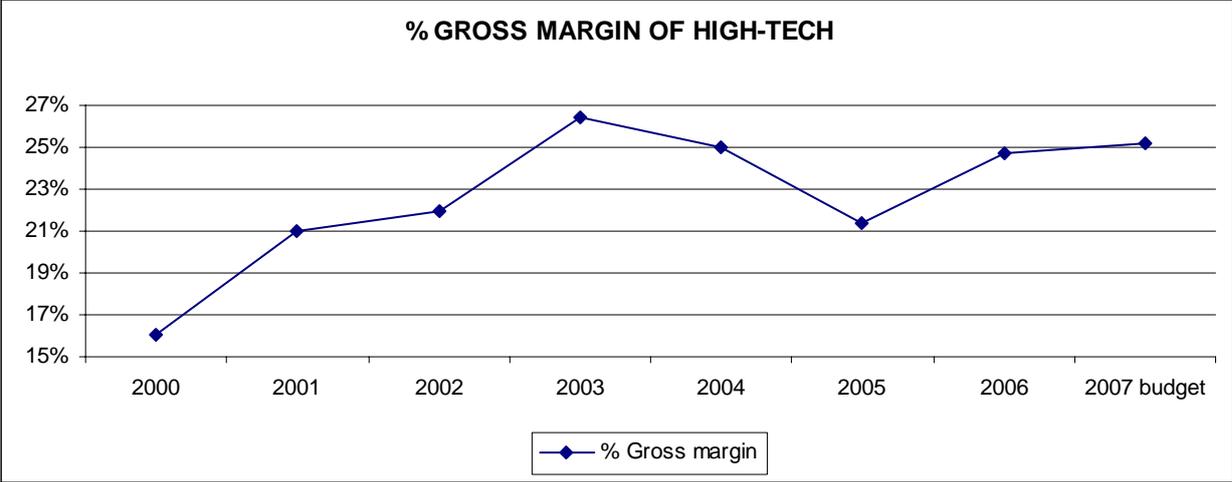
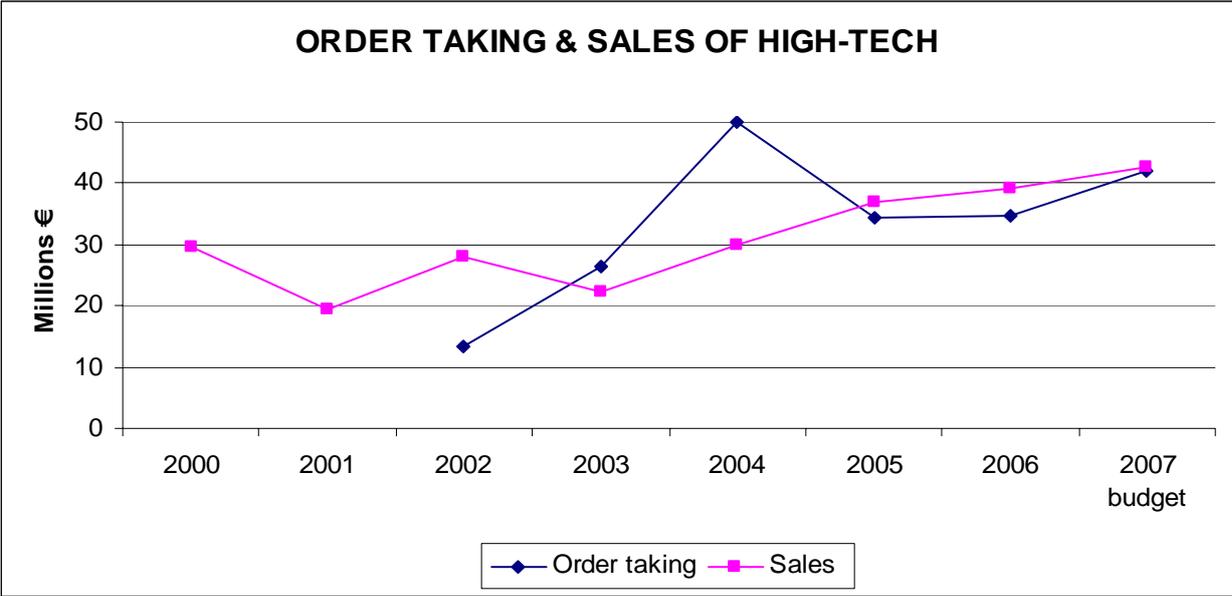
Initially, this market was very fragmented by local areas and the projects were given to small companies that had developed good working relationships with the local authorities (municipalities, local public companies...). At the beginning of the 90s, this sector became more technical and a double concentration took place: public companies decided to centralize their decision process and the municipalities decided to delegate the management of their operations to national engineering firms that had more competence than local entrepreneurs.

The case study covers the period from 2000 to 2007. It illustrates how a company organizes itself to expand from a small firm consisting of a handful of projects to a medium size one managing quite a large portfolio of projects. The changes that occurred along these years are suggestive of some key issues that need to be solved to efficiently manage a service company in which its capabilities rely more and more on its technical excellence as well as on its ability to promptly satisfy customer demands.

Three milestones highlight the Hi-Tech's evolution: before 2002, 2002-2006, and after 2006. Each period is accompanied with changes in organizational structure, use of control systems, management tools, and compensation systems. The way in which these four dimensions interact during each period is discussed in details. This illustrates how they can complement each other to implement a strategic change.

Prior to 2002 the company may be seen as a collection of independent projects that need only financial consolidation. 2001 saw the significant decline of sales (-35%), while the net result was still negative (-1%) despite an important progress (+71%) in comparison with those of 2000 (cf. Figure 6: "Evolution of financial results of Hi-Tech in 2000-2007").

Figure 10: Evolution of financial results of Hi-Tech in 2000-2007



The period from 2002 to 2006 is a growth period in which the efficient monitoring of a service company becomes crucial. In that respect, the strategic change that occurs in 2002 seeks more efficiency internally, in particular in the use of technical resources related to high-skilled engineers and technicians and to build excellence in the market place. Sales and net margin of 2002 considerably progressed +46% and + 650% respectively with regard to those of 2001. Except for an increase of 20% of gross margin and 95% of order taking, 2003 saw a reduction of sales (-21%) and net margin (-36%). After a peak in 2003, the gross margin continued to degrade until 2005, which signaled the need of new change (see the Figure 6).

The third phase, starting in 2006, achieves these goals through a control systems specifically adapted to the service activity of the company. This control system builds on ingredients identified in the preceding chapters:

- an organizational structure that favours simultaneous interactions on the operations, i.e. the monitoring of the projects,
- a number of management tools that are dissociated from the accounting report system to better encompass the specificity of the activity, and to sustain the interaction among managers,
- a compensation system that moves away from the objective individualistic approach typical of diagnostic systems to better encourage team work and organizational learning,
- as the company evolves more and more towards a high technology service company, the top management gets more involved to entertain an appropriate involvement of the different departments.

Two main sections structure the description and analysis of Hi-Tech case. The investigation process describes the particularities of Hi-Tech process, including method of sample selection, data collection, and challenges. The second section presents three periods of Hi-Tech strategic changes through the above-mentioned grid (organizational structure, use of control systems, management tools, and compensation systems).

2. The investigation process

In this section, we present only the elements of our investigation process of Hi-Tech case study which differ from the general process presented in Chapter 3.

Method of sample selection

As mentioned in chapter 3, the selection of Hi-Tech case study was purposive (Ferreira & Merchant, 1992). Once the executive Vice-President of INEO Suez responsible for Energy-Transport-Communication business unit, and his management controller confirmed the interests of our research question for the company, they gave us a free hand to select one (or more) case study. To facilitate our investigation, they recommended us four delegations who had recently experienced a strategic change, thus were suitable for our research objective.

We carried out six semi-directive and recorded interviews in these four delegations (i.e. with four delegation directors, one Holding controller, and one operational controller, thus 14 hours of interviews), and six meeting observations (three on strategic planning, and three on budget elaboration).

The results of interviews and observations demonstrated that only one company (namely, Hi-Tech) satisfied our selection criteria (the nature and the moment of strategic change), thus was potentially interesting for our study. Our meeting with the Vice-President and Management controller allowed validating our selection.

Data collection

Regarding Hi-Tech's source of evidence, we rely not only on interviews, historic record, documents, direct observation, but also on a visit to a showroom that exhibits one example of project.

Interviews are our first source of case study information. We carried out 20 semi-directive interviews:

- 9 with middle managers (Sales, Service, Production, Technical, Installation, and Quality). The Production director and Technical director were interviewed two times due to their important roles in strategic change of Hi-Tech. Half of informants were ten-year experienced project leaders who had just been promoted to the positions of middle managers at the moment of interviews. They provided interesting points of view on the transformation of project leaders' roles,
- 8 with top managers (Delegation director, Executive Vice-President of INEO Suez and Holding controller). We separately interviewed four delegation directors. But a principle of multi-informants was applied in other four interviews. It means both the Executive Vice-President and the Holding controller were present in these interviews.

- and 3 with front-line supervisors (project leaders and installation supervisor).

The interviews lasted between one hour and three hours, representing 33 hours in total (see Figure 7: “Hi-Tech’s informant positions in organization chart”). Most of informants were open and ready to face with the challenges of interviews – explaining as much as possible in the shortest duration.

A first phase of interview (01/2005- 06/2005) aimed at validating the choice of subject matter. We carried out three interviews with the Executive Vice-President and Management Controller, and one with the Director of Hi-Tech. The Executive Vice-President was interviewed by myself and two thesis supervisors. Then I carried out 12 interviews with Hi-Tech’s middle managers and front-line employees (7/2005-12/2005). After these interviews, I wrote my understanding of the case study which I then validated by 3 interviews (two with Hi-Tech director and one with Vice-President) (12/2005-1/2006). A final interview with the Hi-Tech director carried out by one thesis supervisor and PhD student to find out the evolution of Hi-Tech and to validate some of the conclusions we had drawn from the case that we had not been able to validate before. Theoretically, once the test of saturation (Yin, 1984, 1994, 2003; Einsenhardt, 1989) was positive, that is when information is overlapped in more than three interviews and the informant did not provide us new information, we ceased our interviews and wrote a synthesis of our understanding of our case study. Due to some unpredictable challenges (cf. the next section “Challenges), at least one interview with an operational controller was obliged to be put off, though the test of saturation was not completely positive.

In addition to interviews, I visited a Hi-Tech’s showroom, which demonstrated a model of bus network management and all related hardware accompanied with this system. A project leader who actively participated in the creation of this showroom explained to me the functions of this system.

The third source is two meeting observations: one between the Strategy director and Hi-Tech delegation director on the strategic planning, another between Hi-Tech director and his peers on the cooperation of tramway projects.

And the final sources of evidence are archival records and documents. They include the analysis of Hi-Tech situation at the moment of strategic change, organizational charts, its budgets, medium term planning, presentation of annual meetings, financial results of realized or realizing projects and description of functional departments (in total 40 MB). The analyses

of these sources enable us to have the preliminary comprehension on Hi-Tech before the interview (cf. chapter 3 – Methodology).

Challenges

As mentioned in chapter 3, gaining cooperation from the managers was a key issue. In this case, though Hi-Tech Director allowed us to interview any manager, we had to face an explicit refusal to cooperate from himself later. Three months after our first interview in Hi-Tech, he sent us an email (Sept. 2005) to require a cessation of our interviews with the following reason: “Hi-Tech employees are paid to work, not to spend their time for interviews”¹³³. He said that he agreed to give us a final interview on Dec. 5th 2005.

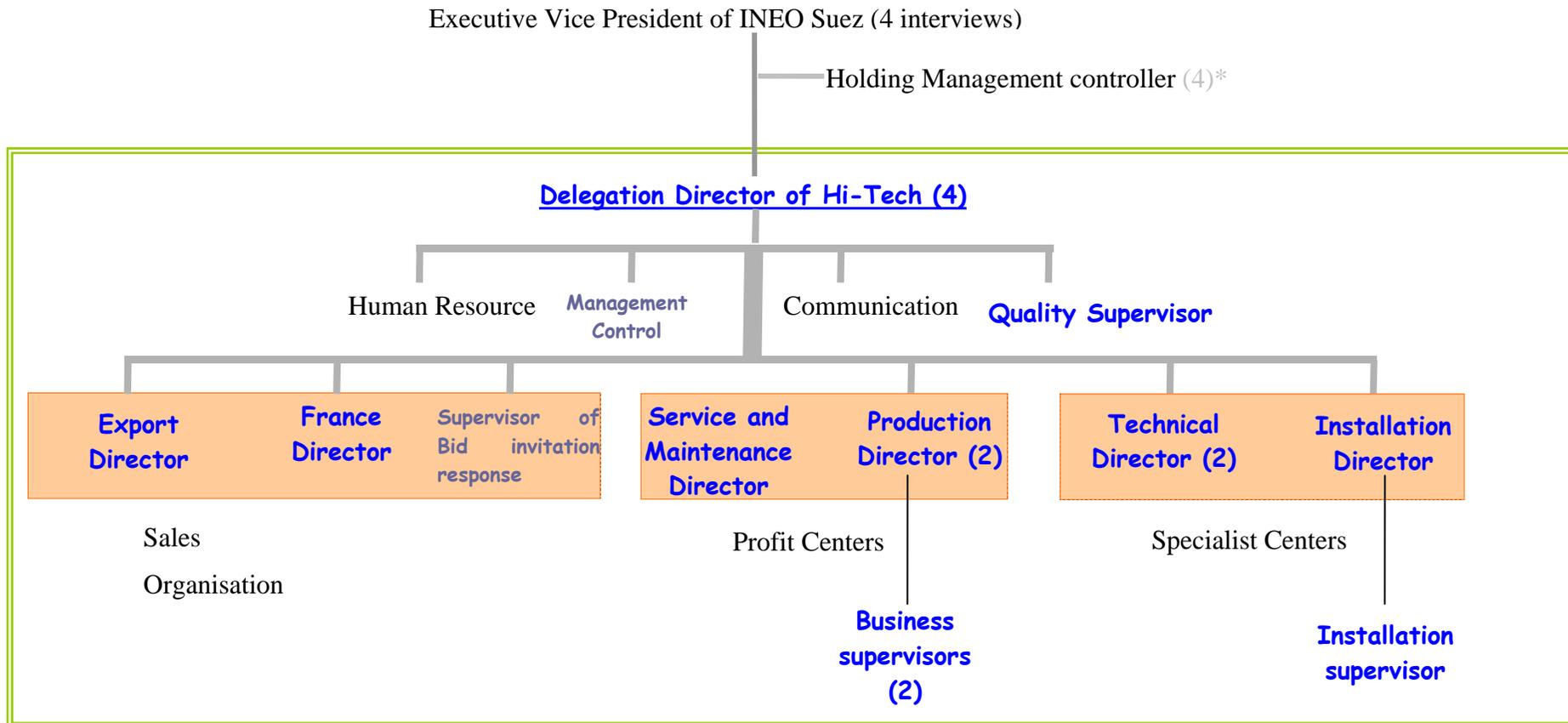
At that time we thought that we should have negotiated the number of needed interviews (and surely the interviewees) with the director at the beginning. But it may “kill” our principle of open perspective (the precedent interview is the source of the next one). Moreover, we realized later that we were dealing with some sensitive subjects of Hi-Tech: the discussions during interviews made the problems of post-strategic changes (such as over-powerful Technical department, or unmotivated project leaders) become more evident. This may certainly explain his refusal and would not have been changed by a clearer initial contract on the number of interviews.

We succeeded to overcome this problem with the help of the Executive Vice-President who estimated that our analysis on Hi-Tech was interesting and helpful for the company because it made an alarm on the Hi-Tech’s emerging problems. He directly expressed his opinion to the Hi-Tech director (by phone) in our meeting on Dec. 16th 2005 (with the presence of thesis supervisors, the Holding controller, and PhD student). He also required the Hi-Tech director meet us to discuss on our analysis as soon as possible.

Only three weeks later (Jan. 6th, 2006), the Hi-Tech director became much more cooperative. He even accepted to read our final report on Hi-Tech and to validate it in a final interview one year later (March 1st 2007) which enriched our understanding by new information on new changes.

¹³³ Although the operational controller agreed to give us an interview, the delegation director did not authorize it.

Figure 11: Hi-Tech's informant positions in organization chart



In BLUE color: informants of our interviews. In grey color: non-informants of our interviews.

Number: times of interviews

Underline: interviews carried out by multi-investigators, consisting of thesis supervisors and PhD candidate (except for three interviews with the delegation director carried out by one investigator).

3. Interpretation of the strategic changes with the proposed grid

3.1 The three phases of project management in Hi-Tech

All through the periods considered in the case study a project in Hi-Tech proceeds along three phases:

- an offer phase in which a proposal is sent to the customer,
- a production phase in which the actual project is conducted that is, the software and hardware are elaborated and implemented to be used by the customer,
- a maintenance phase in which Hi-Tech provides assistance.

The case study concentrates on the first two phases. However it should be noted that the third phase generates substantial revenues and profits because it ordinarily takes place without strong competitive pressure.

Another important remark concerns the fact that companies such as Hi-Tech build their reputation from their ability to manage complex and technically advanced projects. There are strong externalities associated with such projects that go well beyond their direct profitability.

3.2 Prior to 2002

3.2.1 The organizational structure

The top management consists of the Hi-Tech's director, Sales director, Production director, and Technique director. At the operational level, Hi-Tech has 3 departments:

- The Sales department, including 2 salesmen (one for the France market¹³⁴ and another for the Export market) and 2 offer supervisors. The former are in charge of finding and contacting customers, while the latter are in charge of making and replying offers in the name of the company (i.e. the first phase of project management).
- The Production department, consisting of 70 persons, in charge of the projects once they are signed. Its task consists in finalizing the initial studies, developing computer programs, ensuring the equipment installation, and guaranteeing the system maintenance. In other words, it is responsible for the second and the third phases of

¹³⁴ The sales director for the France market is also a Vice-Director of Hi-Tech.

the project management. This department is composed of project leaders, engineers and technicians.

- The Technical department, including 2 persons, in charge of developing modular products to be used in the projects and technical advice (if necessary).

Figure 12: Hi-Tech’s organizational structure before 2002



3.1.2 Use of control systems

The communication on the global strategy, on the objectives of the company, and on the critical problems of the company is not clearly apparent from the data that has been collected. Based on the development of the company, we may assume that the main strategic orientation from 1997 to 2002 is to conquer market share and to establish its core products on hardware and software.

The top management involves only in the critical steps such as 1) validation of offer price, 2) selection of a project leader, 3) negotiation of budget with project leaders, 4) review of out-of-bound situation.

We now concentrate on the role of salespeople, project leaders, and technical supervisors.

To reply an offer, the salespeople and offer supervisors study offers to establish the technical description of the offer, the estimated production cost and the sales prices during 30 days.

They informally require the advices of the Technical department to elaborate the necessary technical description of the offer. In most cases, the Technical department is not involved in this process. The commitment on the estimated realization cost is not made at this stage. The sales price is approved by the top management.

The offer supervisors support the salespeople. One salesperson is double-headed: France commercial salesperson and vice-director of Hi-Tech.

Once the offer is confirmed, the production director, depending on the competences of project leaders and their availability, selects a project leader, and then proposes his candidate to the top management. The sales department transfers all related documents to the project leader. There is theoretically an official meeting to make the transfer, but this meeting is often ignored. The project leader has three months to study the offer and to elaborate the initial budget. He has a direct contact with the customers and uses this contact to adjust his proposal. He has to estimate 6 parameters: 1) working hours, 2) risk provision, 3) sub-contracting costs, 4) material costs, 5) technical costs, and 6) maintenance costs.

During the realization phase, each project leader is responsible for his (very limited) portfolio of projects¹³⁵ as a manager in a small firm would be. More precisely,

First, the project leader proposes the composition of his project team (including technicians, engineers, and even the technical supervisor) to the production director. The latter can recruit new permanent members according to the demands proposed by the former. Each project leader does his best to keep his team in order to face rather unpredictable peaks of activity. The decision to transfer a person from a project leader to another one is in the hands of the head of the department, but takes place only in case of durable low activity in one area. The production director tries his best to maintain the stability of well-functioned project teams. Consequently, almost no resource mutualisation is done among projects.

Second, the project leader may recruit interim manpower if necessary.

Third, the project leader has authority to decide to buy or to produce in house.

Fourth, the project leader is responsible for the initial budget established by himself. No one in Hi-Tech has a better global view neither on the project advancement and nor on its costs than the project leaders. Weekly meetings on these issues are chaired by project leaders.

¹³⁵ One project leader is often responsible for one project during the realization of this project.

The Technical department in charge of modular development has no technician involved to realize projects. The technicians involved in the project realization directly depend on the corresponding project leaders. The technical supervisor, who is a member of Production department, plays only a support role for the project leader.

3.2.3 Control tools

At that stage of development, Hi-Tech is small organization in which project leaders control the very few projects they manage through direct supervision.

As discussed in the previous section, the top management is not directly involved in the projects. It controls the projects at some key points of time (validation of offer price, selection of project leader, budget, and review of out-of-bound situation). The overall performance of Hi-Tech is assessed globally through two main indicators “Sales” and “% of margin” (gross and net). There are no qualitative or non-financial indicators. The financial indicators are quarterly reported. The project leaders are the only ones to know the real advancement of their projects.

3.2.4 Compensation systems

The compensation systems of Hi-Tech are purely objective- and formula-based. The bonus is individual and concerns only salesmen, project leaders and direction members. The incentives for the three categories of managers are now discussed.

First, the salespeople get a bonus that is a function of the growth of total sales from one year to the other. Until 75% of objective, no bonus is given. Beyond this target, the bonus can achieve up to 40% of the annual wage.

Second, the performance indicator used to determine the bonus of a project leader is the realized gross margin of projects for which he is responsible versus the budgeted gross margin. The gross margin equals the difference between sales for the projects and their corresponding costs. The bonus varies from 0% to 10% of annual wage.

Third, the project leader has the possibility to distribute a bonus to his team. Before the beginning of a project, the project leader creates his own reserve account (about 3% of total project sales). If the project achieves its budget, the project leader can distribute the reserve to his project team. Each project leader has his own criteria for distribution, which are not visible to his peers, his superiors, and even members of his project team. This system, according to

the Hi-Tech director, facilitates agreement, but creates misunderstanding, heterogeneity of incentives, and a feeling of lack of fairness.

3.2.5 Discussion

Hi-Tech control systems seemed quite adequate as long as the firm consisted only of two or three simultaneous projects. Most of these projects were profitable and Hi-Tech succeeded to conquer new markets. In fact, the Hi-Tech control system before 2002 can be characterized as a diagnostic one. The top manager remained distant and intervened only in some critical instances. The operational managers were accountable for the results. The critical performance variables (like sales, gross margins, net margins) were dominant.

But as new types of projects, much more sophisticated and complicated, were launched, a number of limitations appeared. In comparison to 2000, the sales of 2001 significantly dropped -35%, while the net profit was still negative (cf. Table 3).

Table 3: Hi-Tech's financial results before 2002

Indicators (M€)	2000	2001
Sales	29.6	19.3
Gross Margin	4.8	4
% Gross Margin	16%	21%
Net profit	-0.7	-0.2
% Net profit	-2%	-1%

Source: synthesis of internal reports

First, a small proportion of projects were particularly bad with realized costs much higher than contracted prices. Without a rigorous and regular financial control, Hi-Tech ran into an important cash loss of €8 million (i.e. 41% of turnover 2001). Moreover, the director of Hi-Tech had no advanced warning on this situation because of his lack of knowledge about the real advancement of the various projects. Therefore, the financial problems were not discovered on time and could not be adequately solved.

Second, without common strategic guidelines, each actor (like sales directors, production director, project leaders), guided by his own stakes, was conducting different strategies and then contradictory actions. Consequently, the company strategy or the global profit could be destroyed by the individual contradictory actions.

For example, the sales director searching for increasing market share and important gross margin at the moment of contract signature had a tendency to minimize the estimated realization cost.

With such estimation, the project leader could not meet the objective related to realization costs. Consequently, the realization costs often surpassed the estimation, leading to the negative net profit.

Third, it appeared that human resources were wasted. Since the projects were conducted independently of each other, temporary overload in one project could not be compensated by temporary slack in another project. Indeed a project leader facing an overload situation would recruit interim manpower (which may also result in quality problems). Consequently the overall productivity of Hi-Tech was poor. The model developed in the Appendix 6 illustrates this point; it shows how the lack of re-coordination among parallel projects may limit the global performance.

These problems triggered a strategic change and the implementation of new management control systems.

3.3 From 2002 to 2006

In 2002, a new Director of Hi-Tech is appointed with the mission to improve Hi-Tech's performance and to develop a long-term strategy based on value-added services. This director had arrived in the company one year earlier with the position of Head of the Production department.

3.3.1 The organizational structure

The new organization is a matrix one. Besides the two existing vertical departments - sales and production, two horizontal departments are created:

- The Technical department, now comprising 120 engineers and technicians, to be in charge of the conception and installation of the software systems,
- The Installation department, comprising 40 technicians, cable-layers and assistants, to be in charge of the conception and in site implementation of the hardware systems and materials.

A new vertical department is also created – the Maintenance department (30 persons) in charge of all operations relating to guarantee and after sale maintenance.

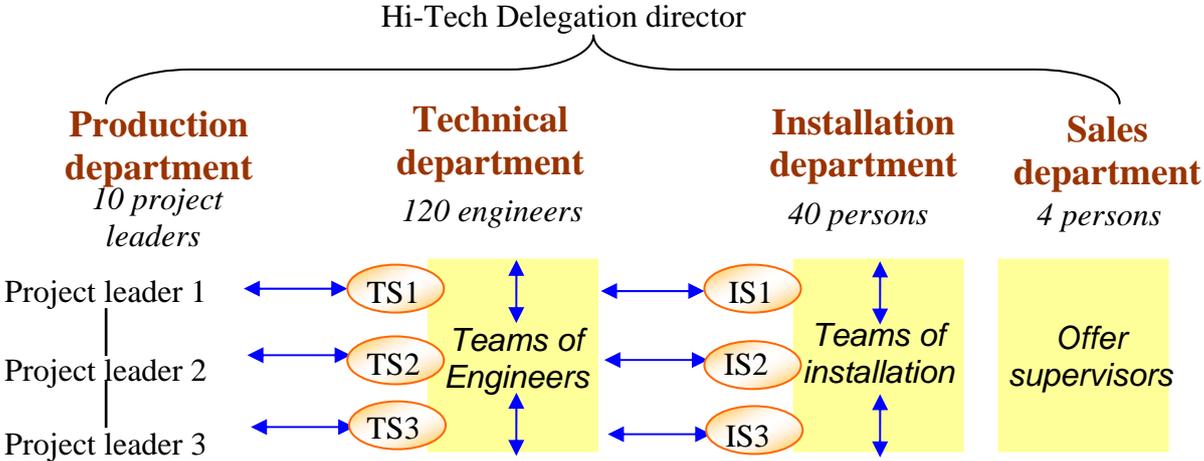
Note that the Production department is considerably reduced in size, to the benefit of the newly created departments. Its manpower has been reduced from 70 to 10 persons, consisting now only of project leaders. All engineers, technicians, cable-layers, and assistants who had

been attached to the Production department before 2002 were re-allocated in the horizontal departments and Maintenance departments.

The advancement of the projects is now controlled by the Production departments (through the project leaders) and by the technical and Installation departments (in which the overall portfolio of projects can be encompassed).

The top management now consists of the delegation director. The operational level comprises his direct subordinates (directors of sales, production, technical, installation, and Maintenance departments). The front-line management includes project leaders, technical supervisors, installation supervisors, and maintenance supervisors.

Figure 13: Organizational structure of Hi-Tech since 2002



3.2.2 Involvement of managers

Involvement of top management

The implication of the top management in the formulation and implementation of the strategy is more active and more frequent than prior to 2002. The newly-appointed director sets as a principle that all company problems, its strategy, its global objectives should be clearly communicated to all employees in the annual meeting. Moreover the monthly report on the achievements of the company objectives is sent to each employee via email and via internal news. This report includes the following indicators: quality, satisfaction of customers, commercial order taking, turnover, gross margin, offer cost, treasury, structure cost, normative net result by project, net result before taxes and participation.

The implication of top management is much more active in the daily life of project management. In addition to the same involvements as before 2002, the senior managers also involve in the nomination of offer supervisor and the strategy definition of offer responses.

The top management has weekly meetings to discuss on the general advancement of all projects in Hi-Tech. The primary objective of top management is to reinforce coordination, dialogue, and transparency in the organization. But, as will be seen later, this objective is not completely attained due to unsuitable definitions of operational managers' roles, of tool use, and of compensation systems.

Involvement of operational management

The period 2002-2006 is highlighted by the omnipresent and over-powerful Technical department, especially in both phases – offer response and project realization. The top management wanted to reinforce the roles of technicians and to weaken those of the project leaders and the salespeople, yet the used method could not keep the relating actors' roles in balance.

Relating to the phase of offer response, the salespeople and offer supervisor now have to formally take into account the technical costs as estimated from the Technical department. Contrary to its limited roles before 2002, the Technical department plays an essential role in this phase. The Sales department is no longer responsible for making the technical description of the offer and estimating technical costs, these are now done by the Technical department.

In fact, a complex and detailed procedure makes precise how the technical cost estimation is to be made. The Technical director designates a technical supervisor and a technician team to make an estimation of offer cost. All the services of the Technical department have to estimate the corresponding parts of the total cost and then negotiate with the director of the Technical department. The outcome of this negotiation gives the technical cost commitment for which each service and each technician are accountable. This estimation is quite detailed and becomes a collective commitment of the department which is confirmed by the signature of Technical director and of the corresponding technical supervisor.

There are regular meetings between offer supervisors and technical supervisors to discuss about prices, commitment of the Technical department, costs, and conditions of contracts. The technical supervisors are so powerful that it “kills” the dialogues with the salespeople and offer supervisors.

Once the offer is won, the production director proposes a project leader to be approved by the top management. The technical supervisor is no longer designed by the project leader, but by Technical director, and then also validated by the top management. Hierarchically, the technical supervisor is thus promoted at the same level as that of the project leader, or even

perceived to be in a superior position to the latter. The project leader is always in charge of budget elaboration, but the most important part of the budget – the estimation of its technical cost- has already be defined and committed in the precedent phase (i.e. offer response). The project leader now has only two parameters, instead of six as before 2002. These two parameters are: 1) his working hours, and 2) risk provision.

During the realization phase, the project leader is in principle responsible for: 1) communication with the client and external sub-contracting, 2) project coordination between horizontal departments, and 3) monthly financial project control and reporting with the production manager and the director of Hi-Tech.

The resource allocation is in fact no longer made by project leaders. The Technical department is in charge of the allocation of its workforce on the different projects for all operations relating to software, and then similarly it is the Installation department who allocates its workforce for all operations relating to hardware and materials. The horizontal departments have the right to recruit their personnel, which belonged to the production director before 2002. The latter is now in charge of identifying and analyzing the causes and the responsibility of project losses (if any).

The Technical department is also in charge of establishing the general material prescription for each project; which in turn would be concretized by Installation department. Until 2005, the coordination between Technical department and Installation department was done by a go-between – the project leader. Not a direct and formal communication has ever existed between two horizontal departments. Consequently, the Installation department may receive the Technical department's prescription too late or not complete.

In other words, the project leader is no longer a “big boss of a small firm”. The power of the project leader over the project team is transferred to the technical supervisor¹³⁶. His counterparts in the Technical department and the Installation department must report their decisions on workforce allocation of a project to him. The information relating to project advancement, workforce allocation prevision, or workload is now theoretically shared and jointly controlled by the project leader and the technical supervisor and/or the installation supervisor; before 2002 this information was known only by the project leader.

¹³⁶ The power is not much transferred to the Installation supervisor because the latter is somehow dependent on the Technical supervisor.

The status of project leader is weakened in his relation with the customers because he does not own sufficient internal information to well carry out his role.

3.3.4 Control tools

New quantitative and qualitative indicators are introduced.

No a specific management control system is created to support the role of the project leader or to facilitate the dialogue on project management. The horizontal departments have a tendency to keep information on workforce allocation and relating information on project advancement in private. If a problem occurs, they often try to solve it by themselves before delivering information to the corresponding project leaders.

To support the procedure of technical cost commitment at the phase of offer response, the Technical director develops a new tool enabling a detailed estimation of all technical costs represented in hours and in monetary value. The outputs of this tool are the main basis of the collective commitment of the Technical department. The actual outputs of this tool are confidential and not known to the sales people.

The Technical department also develops a new tool to facilitate resource mutualisation between projects within his own department. This is operational since September 2003. The technical supervisors control the monthly input of their direct subordinates. These inputs consist of the consumed expenses represented in hours and in costs. An initial standard is created and adjusted after monthly reviews. The total workload of the department, expected to optimize the use of human resources and determine the priorities of projects, is established and adjusted on the basis of these inputs. This tool is being exclusively used by the Technical department and its outputs are not known to outsiders, not even by the project leaders.

In fact, project leaders develop their own tool to make a monthly control of budget realization and production anticipation. The main inputs of this tool, essentially financial data, should in principle rely on the outputs of the tool used by the Technical department. In spite of the monthly obligatory meetings between project leaders and technical supervisors, the latter appear quite reluctant to supply the relevant information, and the former do not have much leverage to get.

Four qualitative performance indicators are also elaborated.

- “Satisfaction of core product”: the Technical department is responsible for developing and maintaining the core product. It is considered as a supplier of core product to other

internal customers (production, installation, and maintenance). To reinforce the customer-supplier relation, the customers have the right to evaluate the performance of the core product through questionnaire quarterly sent by the quality service. The latter would consolidate the result, send it to all managers and publicize it in internal journal.

- “Satisfaction of performance of the Installation department”: the Installation department situated in a different site, far from the Hi-Tech Holding and newly acquired in 2004. The customers of the Installation department are other departments (like production, technical, and maintenance), who have the right to quarterly evaluate their satisfactions with the services offered by the Installation department. Similar to the above indicator, the quality service is in charge of consolidation and communication of its results.
- “Satisfaction of collaborators”: at the end of the year, all Hi-Tech employees have to fill in a three-page questionnaire on their satisfaction relating to working conditions, ambiance, and so on. The quality service is in charge of sending all questionnaires to all employees. Once replied, the employees directly send to the human resource department of Hi-Tech’s parent company (the response rate is 50% in 2005). The latter would consolidate all results to guarantee the anonyms, and then send the final results to Hi-Tech’s quality service, who is in turn responsible for the internal communication (email, and internal journal). And based on the result, the director would look for the reasons of dissatisfaction and then the possible ways to improve the satisfaction of collaborators.
- “Satisfaction of customers”: this indicator is measured in along with the different phases of the project realization and the project maintenance. The customers are required to reply to the questionnaire addressed by the project leaders. But the response rate is rather low, and the reliability is not as high as expected. It is not rare that a project received an excellent satisfaction of customer at the configuration phase and the development phase, but the customer refused to accept the final results of the project. Because there are different interlocutors in the customer side, thus it is not evident to require all interlocutors reply the questionnaires. And the customers do not take the response of questionnaire as seriously as it should be.

However, despite the initial intention of top management, the qualitative indicators play a limited role in performance evaluation.

3.2.5 Compensation systems

An important change takes place to reinforce commitment on part of each employee and at the different levels of the company. The bonus of each employee now contains three components: individual, collective and global (respectively 50%, 25%, and 25% in total bonus payouts).

Concerning individual objectives, after an open dialogue on the objective negotiation with his/her direct superior, an individual objective is selected and becomes his/her commitment. The individual objectives are often based on the legitimate zone on which the employee may have control. For example, sales revenue for sales manager, or gross margin for project leader.

The collective objectives are the objectives of each department and can be different among the departments. For instance, the collective objectives of the Technical department relates to the technical costs committed at the moment of offer response and then confirmed at the moment of project reception. The corresponding bonus depends on the difference between the budgeted cost and the realized cost. The payout varies from 0% to 10% of the annual wages of project members. This cost commitment dominates the collective performance evaluation for the department, while the qualitative indicators (such as “Satisfaction of core products of Technical department”) are rarely used. The technical supervisors propose the bonus of their subordinates to their respective directors; the latter, in most cases, validated these propositions.

The collective objectives for the sales department and the Production department are identical to those in place prior 2002. The reserve account remains in place and is decided by the project leader. But the project leader has no longer the right to decide the bonus of his subordinates and the reserve accounts of all the projects are consolidated in a common account for the whole company. This account would be distributed to all employees in case the global objectives are achieved.

The global objectives are the same for all employees. They are established by the top management and largely communicated through the company. The most important performance indicators for the global objectives are sales revenue and net margin.

3.2.6 Discussion

The financial performance of the company is summarized in the Table 4. One of the most remarkable changes is the positive net margin from 2002. Sales and net margin of 2002

considerably respectively progressed +46% and + 650% with regard to those of 2001. Except for an increase of 20% of gross margin and 95% of order taking, 2003 saw a reduction of sales (-21%) and net margin (-36%). After a peak in 2003, the gross margin continued to degrade until 2005, which signaled the need of new change.

Table 4: Hi-Tech's financial results after 2002

Millions of Euro	2002	2003	2004	2005	2006
Order taking	13.5	26.3	50	34.5	34.7
Turnover	28.1	22.3	30	36.9	39.2
Gross Margin	6.2	5.9	7.5	7.9	9.7
% Gross Margin	22%	27%	25%	21%	21.4%
Net profit	1.2	0.7	1.7	1.5	1.9
% Net profit	4%	3%	5.5%	4.2%	5%
EBIT	1.5	0.7	1.6	1.2	1.5
% EBIT	5.5%	2.9%	5.4%	3.9%	3.7%

Source: synthesis of internal report

The organizational structure is somehow helpful to facilitate the internal coordination. But the efficiency of this coordination is not optimized due to various reasons.

The reforms carried out in the 2002-2006 period has positively impacted Hi-Tech, but it has also caused some unpredictable drawbacks.

Hi-Tech is now highly regarded in the business community for its technical excellence. But the growth of its total sales now dropped 31% in 2005, while its margin (gross, net, EBIT) did not improve as much as initially expected. Hi-Tech becomes more and more specialized, the company is often not selected for small projects, whereas on the large projects the engineers of Hi-Tech are often in direct contact with the customer and an extended technical work may go on without being taken into account in the contract. The technical design proposed by the Technical department may sometimes be too sophisticated and too expensive to fit in with customers' demands. The analysis seeks to relate these drawbacks to the control system that has been implemented.

The intention of top management was to improve efficiency in human resources through better coordination. Three main issues have hindered the successful implementation of this intention. They are: 1) lack of balance between Production department and Technical one, 2) absence of a supporting management tool to foster coordination between these two departments, and 3) over-emphasis of formula-based compensation systems.

The horizontal coordination between projects has been facilitated by the creation of two horizontal departments. Greater efficiency is observed in the management of the employees (better activity rate for the workforce and a decrease in urgently needed employees to be hired in bad terms) with a better respect on deadline and product quality. But as illustrated in the Appendix 6, the resource mutualisation is not always an efficient lever to cost reduction. In addition, the advantages of new systems are limited because the project leaders are not associated to the coordination process so that the global profitability of each project is poorly monitored; a project loss (if any), once again as before 2002, may not be discovered on time and rapidly solved.

The sales people are much more passive than before 2002. They have to accept the cost estimates of the Technical department in most cases, no matter if the prices become too high. And the time of offer response is not under their control.

The project leader has lost most of his legitimacy. He no longer receives all necessary information relating to the advancement of his/her project in time and in quality. It is not rare that the project leader discovers the “bad surprise” too late through the channels of customers or through synthetic accounting data, instead of getting it from the horizontal departments. The latter have the tendency to keep the basic information, particularly the workforce allocation. As a result, the project leader becomes less and less motivated, less proactive, and even less reactive to pilot his own projects. The new structure unintentionally makes the project leader be a financial accountant rather than a real manager.

Even the intrinsic motivation of the technicians has also dropped. The success of a project often stimulates the pride of technicians and their working motivation. The allocation of human resources to many different projects makes their contribution less visible. Their work becomes also less specialized, thus less challenging.

This does not mean that the early and active intervention of the Technical department is not useful. On the contrary, the technical cost is estimated and then committed collectively by the Technical department from the first phase of project management. This generates two important advantages:

- The information concerning the offer is diffused more easily and profoundly to the technical team, so a better offer may be proposed and the project may be started more quickly. Besides, the customer demands may be better satisfied because the technical team has a good knowledge on the offer and provides better advices to customer.

- It is much easier to transfer the commitment on technical cost estimation from the phase of offer response to the one of project realization because the commitment is collective in the Technical department, so they cannot completely reject their first estimation. Since a commitment is collective, each member tries to do his best to respect it. Therefore, the cost concerning project realization may be better respected but it clearly takes more resources to make that commitment.

The lack of coordination between the different departments is reinforced by the use of formula-based incentive systems since 2002. Recall the main characteristics of the new incentive system:

- Three objective components – individual, collective, and global – associated to the key performance indicators and clearly communicated to all employees,
- The incentive system is formula-based. It is determined thanks to financial performance indicators (like sales revenue, margins) and some qualitative indicators (like satisfaction of customers). In fact, the Hi-Tech director aimed at making a compensation which is explicit, objective, and fair for all employees. Unintentionally, he transformed even the contribution-based bonus to formula-based one on the basis of satisfaction notes and required the evaluation of the relating actors (i.e. they are evaluated not only by superiors but also by subordinates' counterparts). But not all indicators can be mathematically calculated.

Ex: For example, the indicator “satisfaction of performance of the Installation department” is evaluated by other departments (like Production and Technique).

- The justification of bonus distribution is explained by direct superiors.

The excessive concentration on the achievement of financial objectives, especially cost commitment for the Technical department causes the multiplication of slacks at the different hierarchical levels. The slack that existed prior to 2002 persists. In addition, some new problems arrive. The technical supervisors are now concerned about commitments and this generates slacks within the Technical department. The following example illustrate this happens. For example, the technical supervisor decides to increase his initial cost commitment, but impose the cost reduction for his subordinates (cf. Table 5).

Table 5: Example of slacks generated by Technical supervisors of Hi-Tech

Commitment/Phases of project management	Phase 1: Offer response	Phase of transition: higher cost than the phase 1	Cost imposed by technical supervisor and inscribed in budget commitment
Technical supervisors	40	45	47
Validation technicians	30	40	30
Embarked technicians	30	40	25
Total	100	125	100

This behavior on part of the technical supervisors generates team problems. The technicians may indulge into irresponsible behaviors through systematic refusals to respect the commitments, although the technicians’ performance is to be evaluated through the achievement of their committed cost objectives. The customer-supplier relation within the same company is often problematic. What happens if someone does not respect his/her commitment? Nothing! The mutual help among members of different project teams and among different services mostly disappears. For example, if the project A urgently needs the help of the project B, the latter always refuses although help is available. The main argument is that “This task was not anticipated, thus it is not my commitment”.

The above-mentioned problems justify the need to find a more suitable management control system in which the project leaders can play a role that balances the coordination processes in place in the two horizontal departments. This situation also illustrates that a purely financial control on part of the project leaders is not enough for them to be active players.

3.3 After 2006

A number of changes took place in June 2006. These changes seek to address the problems identified in the preceding section.

3.3.1 Use of control systems

The role of the Technical department is reduced. Regarding to the phase of offer response, the early commitment of the Technical department is called off. The offer supervisors get back their previous status as before 2002. The project leaders also get back their positions as long as the composition of his project team is concerned. But the members of the project teams continue to evolve in their respective horizontal departments. The project leaders are now “facilitators”, while the technical supervisors become “coordinators”. The latter must supply the necessary resources required by the former. And the top management will arbitrate in case that the project leader requires excessive resources.

It is the project leader who animates a fortnightly formal meeting to update the data with all relating actors of the project (even with the actors hierarchically independent to the project leader). The main participants are the director of Hi-Tech (i.e. top manager), the production director, the project leader, the technical supervisor, and the installation supervisor. The project leader no longer passively receives the information from the horizontal departments, but he can decide whether he agrees with this information or not and then discusses his decision with his counterparts.

3.3.2 Control tools

A new tool is created. It is a planning tool that is structured along the standard project tasks and interface points. Each task is clearly assigned to a defined actor (i.e. a service of Technical department or Installation department). And each interface point is also specified to facilitate the coordination among the services. The project leader is directly responsible for this tool. To make the tool operational, he needs to answer questions such as “In which manner do I organize my project in accordance with the contract demands and the available resources of the company?” Thus, the tool, which is expected to be not only a planning tool but also an organizational tool, enables the project leader to have a global vision on the project and a better anticipation on the advancement of the project.

This new planning tool is connected to the tools in use in the horizontal departments. In exchange, the technical supervisors can also consult the outputs of the tool managed by the project leaders. The interdependence of these tools is reinforced: the planning tool of project leaders gives a global view on the resource allocation of the project, while the horizontal tools facilitate coordination within each of these departments across the various projects.

3.3.3 Compensation systems

The compensation systems no longer excessively focused on “objective and formula-based”, but become much more “subjective and contribution-based” (i.e. interactive). The middle managers become the main actors deciding of the bonus of their subordinates. Each service has its own methods of performance evaluation.

Except for the unchanged incentive systems of the sales department, the Production department and the horizontal departments experience a profound change in their compensation scheme.

Regarding the Production department, its compensation scheme consists of three main equal components: 1) purely subjective and qualitative criteria: “how to make a team work?”, 2) financial indicator: gross margin, and 3) satisfaction of customers. First, each project members are encouraged to facilitate the cooperation and interdependence of the team. Their contribution to the team will be informally evaluated by both the project leader and the technical supervisors. The global performance of these actors is informally evaluated by their direct superiors. Second, the commitment of gross margin is inscribed in the budget after a discussion in the transition phase. The top management takes part in this process. Third, customer satisfaction is measured by the interviews carried out by the top manager with the customers. The questionnaire surveying customers’ satisfaction is no longer in use.

Regarding the Technical department, their detailed commitment in cost budget is eliminated. The incentive systems become purely subjective and contribution-based. And the attitude to reinforce team-working and effective coordination is particularly encouraged.

3.3.4 Discussion

These changes need time to be evaluated.

The design of the new tool seems crucial in sustaining a more fruitful interaction between the project leaders and the horizontal departments. In that respect it is important to note that this tool is now based on a well structured representation of the project and not on accounting data generated by the department. To operate the tool, each project leader needs to know the key tasks and the relevant phasing of these tasks. The technical supervisors and the installation supervisors may be more inclined to provide information now that they can understand how it translates into the profitability of each project.

The control system is different from that of 2002-2006 and advances toward a more balanced system. The involvement of top manager is more intensive: he intensively involves, even more than before, in the project management. The operational management is less tightly accountable for the financial results, and the relationship between the vertical departments and the horizontal ones advances towards a more balanced pattern. Their discussion is thus enriched, substantial, and fruitful. The critical performance variables are no longer dominant in the debates neither between the vertical and horizontal departments nor between the top management and the operational management. The compensation system is no longer focused uniquely on the objective, formula-based system but extended to subjective, contribution-based one.

The first feedbacks collected through the interview of Hi-Tech director also pointed out the reduction of tensions among team members and among functional departments thanks in particular to the new compensation system. It seems that this compensation system has created a more favorable atmosphere for organizational learning.

Section 2: Electra case

This chapter comprises three main sections. The first one is reserved for a rapid description of the context of Electra. The second section will present the evolution of Electra before and after 2003, the year of the arrival of Electra's newly-appointed top manager. Its strategy, structure, management control systems, evolution of financial results and compensation systems will be described. The third section will conclude this case study in theoretical standpoints.

1. The context

Electra, with €240 million turnover and 1,500 collaborators in 2006, is an operational unit of the French group INEO Suez.

Electra provides studies, installation and multi-technique maintenance in electricity distribution, low-current systems, and technical management for buildings and lighting. Its activities can be classified in two main categories - Tertiary and Specialty. Tertiary activities, 65% of Electra's turnover, are mainly the electric installation of low/high-current systems in the offices. The specialty comprises of (1) pure services (like multi-technique maintenance, e-safety, remote maintenance, or logistics) and of (2) infrastructure (like security in tunnels, urban video surveillance, rail road signaling systems, or lighting).

Electra operates its activities exclusively in one of the most dynamic regions in France. The number of important customers in this region is limited and the main important rivals are also countable. The market had been fragmented and full of small firms having small service offerings. But the second half of the 90s saw the wave of industry consolidation through mergers due to increasing performance pressure, gradual decline of important client demands in Tertiary sector and more fierce competition. As a result, Electra was set up in 2001 as the horizontal merger¹³⁷ of the four well-established former competitors.

Electra's activities are simple and easy to imitate; hence the barriers to entry are rather low and based on reactivity vis-à-vis clients. Customers are external. To be competitive, the

¹³⁷ *Horizontal* mergers take place where the two merging companies produce similar product in the same industry. *Vertical* mergers occur when two firms, each working at the different stages in the production of the same good, combine. *Conglomerate* mergers take place when the two firms operate in the different industries.

Specialty¹³⁸ activities need specific know-how, experiences, acknowledge and recurrent presence on the clients' sites. Meanwhile, the Tertiary activities, classified in proximity business, need the competitive price, the reactivity and the confident relationship historically loomed between the clients and locally implemented contractors. In addition, Electra is under strict tender regulations. The confidentiality of information exchanged between the company and the customers is hence essential.

Electra formally has four hierarchical levels: top manager (the Electra's director), delegation directors, managers of profit centers, and business supervisors. We concentrate on studying the coordination of three first levels¹³⁹. Each delegation has its own team of salespeople.

Every phase of projects is followed by different services – salespeople are in charge of bid invitations' responses and contract conception; whereas the business supervisors are in charge of project realization. The profit center manager is an official coordinator between salespeople and business supervisors. Our research focuses on the phase of bid invitations' responses.

After the horizontal merger of four ex-competitors in 2001, the Electra's top management concentrated on the financial consolidation and ignored to develop an internal synergy until 2003. The profit centers were in severe commercial competitions, particularly in price competition, but ignored to develop their service quality. The satisfaction of customers, market share and financial results hence decreased (Electra's EBIT was negative – see the Figure 10 – “Evolution of key indicators of Electra from 2002-2006”).

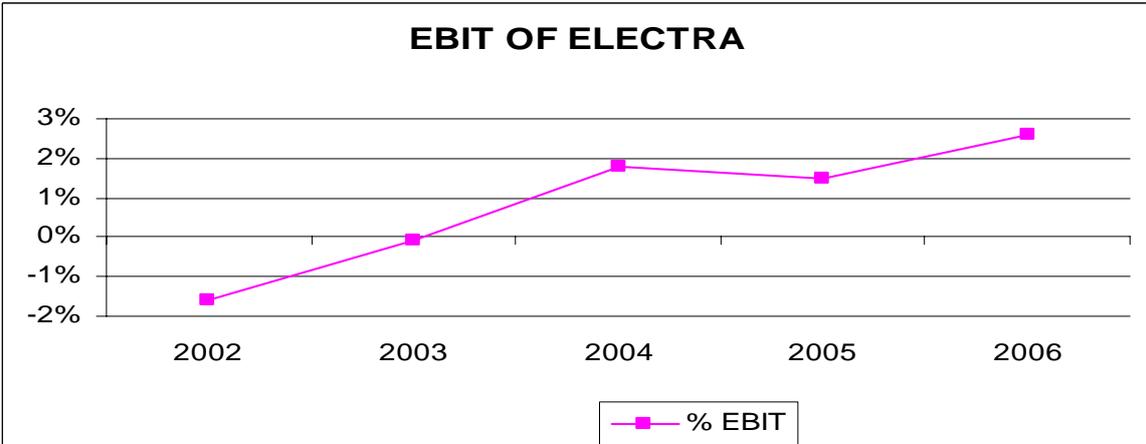
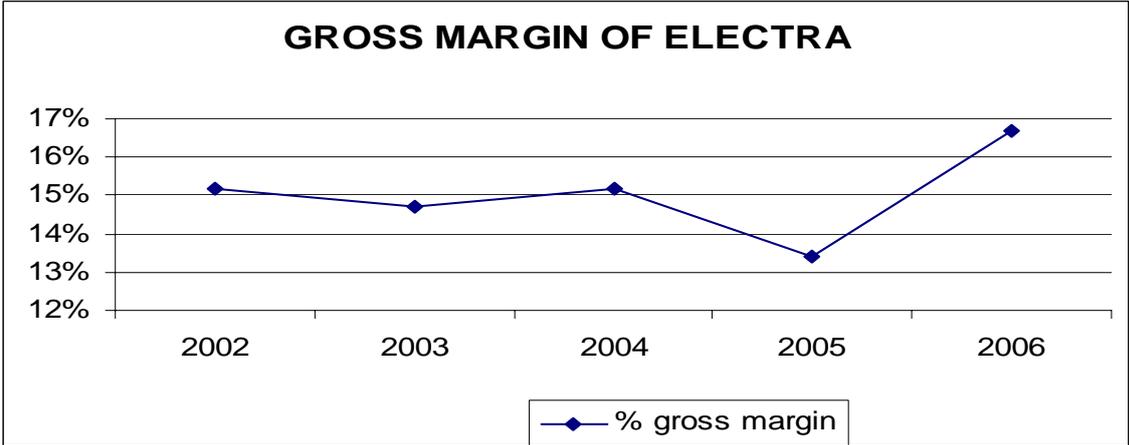
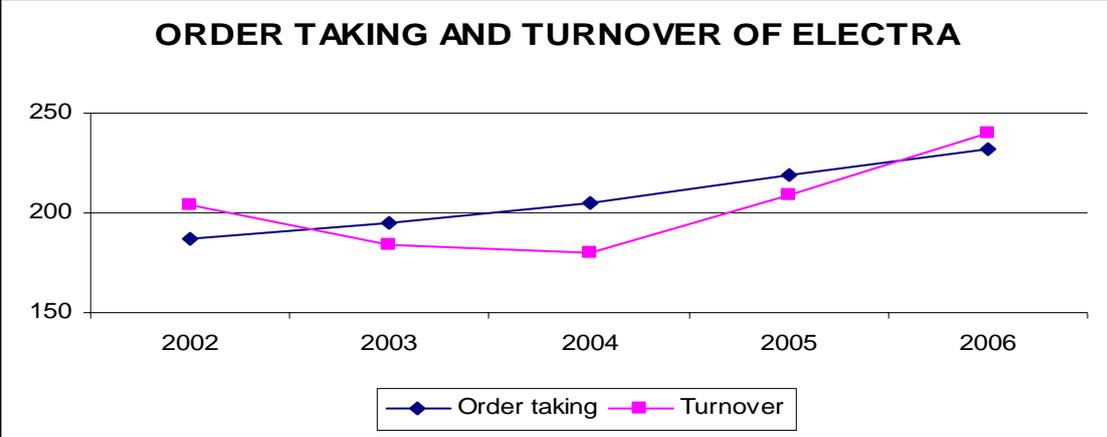
The year 2003 saw the arrival of the new director of Electra. It was time to weaken the internal competition and address internal synergy issues; Electra's director together with his direct subordinates implemented a number of radical changes. One of the breakthroughs was the creation of the two commercial tools - “Atlas” and “Lance Requête”. Many employees were skeptical for the successful implementation of the “new control systems” because these systems modified the commercial territory of profit centers, which was a delicate subject. However, after three-year implementation, about 90% of replied bid invitations have respected the Atlas rules. Unimaginable success! In our view, the origin of this success mostly comes from a particular use of the new control systems.

¹³⁸ The specialty activity of Electra is much more related to the proximity activity and different from the Specialty activity of Hi-Tech.

¹³⁹ We did not much study the level of project leaders, because the latter are not the main actors directly participating in the strategic change described in the Electra case. For more details of the lower levels, see the Appendix 4 “Commercial meetings at the delegation's level”.

This model was rewarded as SUEZ’s “Annual Innovation Trophy” in 2004, and is expanded to the Group INEO Suez.

Figure 14: Evolution of key indicators of Electra from 2002-2006



2. The investigation process

In this section, we present only the elements of our investigation process of Electra case study which differ from the general process presented in Chapter 3.

Method of sample selection

As mentioned in chapter 3, and like in the case of Hi-Tech, the selection of Electra case study was purposive (Ferreira & Merchant 1992). In addition to the same selection criteria as those of Hi-Tech (the nature and the moment of strategic change), we selected a business unit whose activities are proximity to assure the variety of case studies (Hi-Tech has only specialty activities).

Two meetings with the Management control director and Financial director of Ineo Suez actively based on our preliminary analyses on two business units (Electra and Lighting Networks) who had experienced strategic changes contributed to our decision. The interview with Electra's Management controller validated our selection.

Data collection

We carried out 21 semi-directive interviews:

- 12 with middle managers (Tertiary, Commercial, Human resource, Holding Management controller - two times with one-year difference: 23/1/2006 and 28/2/2007, 2 sales managers, 2 operational controllers).
- 8 with top managers (2 Delegation directors, 2 Presidents of delegation, Executive Vice-President of INEO Suez). Four interviews were carried out with the Executive Vice-President (27/1/2006, 27/2/2006, 21/9/2006, 15/12/2006). The last two interviews were done with the presence of a thesis supervisor.
- and 1 with a project leader.

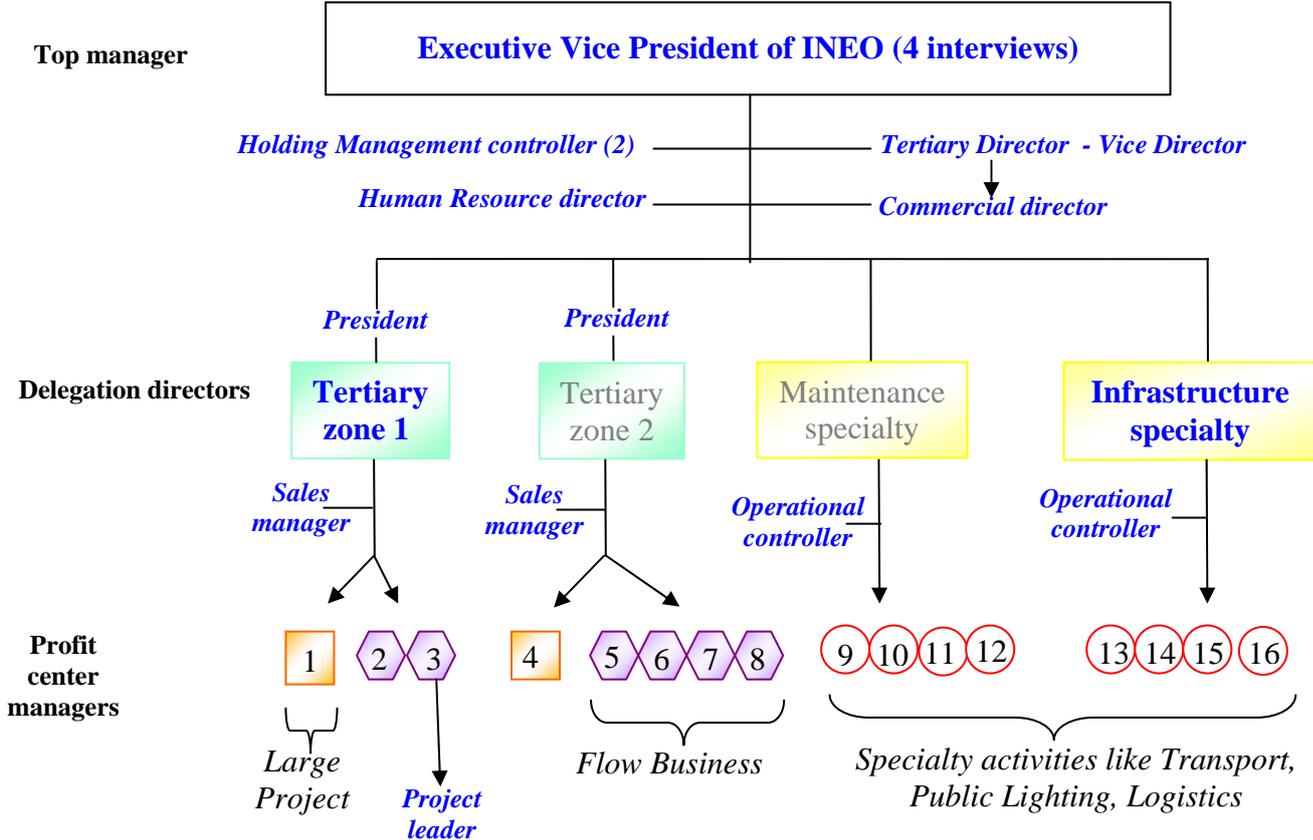
The interviews lasted between one hour to three hours, representing 45,5 hours in total (cf. Figure 13: "Electra's informant positions in organization chart").

In a first phase (01/2006), we conducted two interviews with the Executive Vice-President and Management Controller to define which operational issue could fit with our research question. The analyses and discussions with the thesis supervisors resulted in the selection of commercial issues because the latter are the key strategic change of Electra and are the most important hardship. The application of the new commercial rules was going to modify not

only the commercial territory of delegations but also their commercial manners (e.g. in maintenance of customer relationship).

We then carried out 16 interviews with top, middle managers and project leader (31/01/2006-30/3/2006). During this phase, we asked for an appointment with the Executive Vice-President to inform him of the advancement of our analysis. This appointment aimed at avoiding our precedent failure with Hi-Tech and maintaining our legitimacy in organization. It also opened other contacts for interviews. Once the test of saturation (Yin, 1984, 1994, 2003; Einsenhardt, 1989) was positive that is when information is overlapped in more than three interviews and the informant did not provide us new information, we ceased our interviews and wrote a synthesis of our understanding of our case study. We validated our analysis by 3 interviews: 2 with the top manager (with a thesis supervisor) and 1 with Management controller (9/2006-2/2007).

Figure 15: Electra’s informant positions in organization chart



In blue color: informants of our interviews

In grey color: non-informants of our interviews

All delegations have the same support functions consisting of sales, human resource, purchasing, management control, and quality-security. In this graphic, we demonstrate only our informants.

In addition to interviews, we made direct observations of five commercial meetings (Holding and Tertiary delegations) (cf. Appendix 12).

As explained in chapter 3, we also referred to archival records and documents.

Challenges

In terms of cooperation, we received full support from the Electra director. Only one delegation director attempted to prevent us from further study of his delegation. As we mentioned this problem to the Electra director and also explained why this delegation may be interesting, he directly talked to the delegation director. As a result, the delegation director changed his attitude: five interviews and two meeting observations were authorized.

3. Interpretation of the strategic changes with the proposed grid

3.1. Electra between 2001 and 2003

As mentioned earlier, Electra results from the merger in 2001 of four competitors which were established in the 1920s. According to our interviewees¹⁴⁰, the main strategic issue at that time was to conquer the market. The volume strategy was dominant, while the profit was nearly ignored. Moreover, both for motivation and for commercial reasons, the choice had been made to keep the historic brandnames of the different companies, often considered as their precious goodwill.

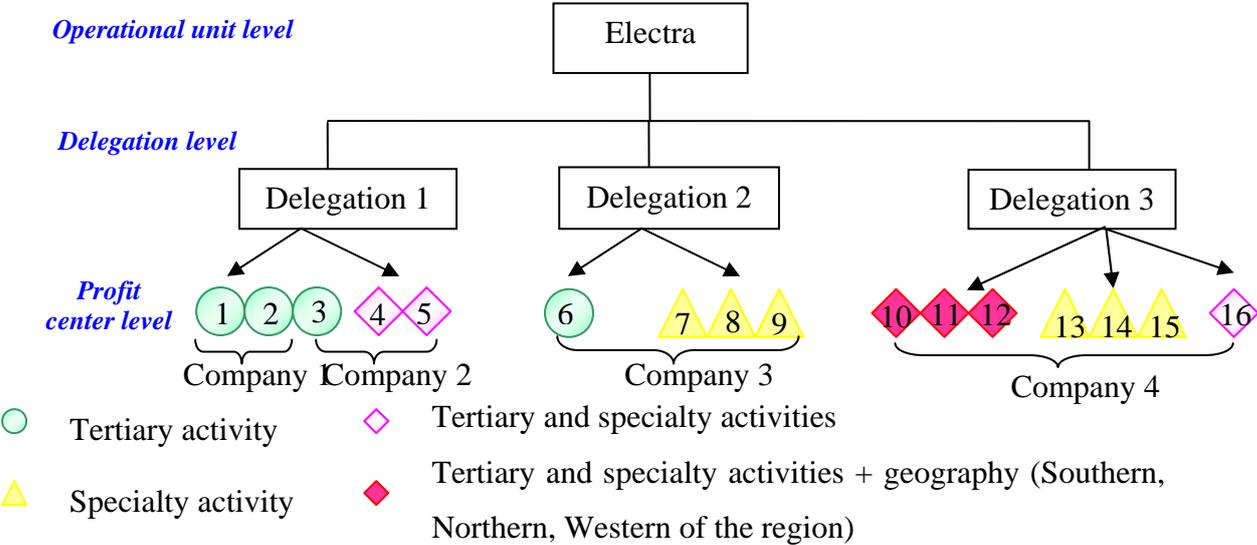
3.1.1. Organizational structure

Electra consisted of 3 delegations and 16 profit centers, which were the simple grouping of four ex-competitor companies. Two companies were regrouped in the same delegation, while two other ones were separately located in two delegations.

Profit centers owned many overlapping activities. The roles and the rights of each profit center were confused and complicated. Ten profit centers of Electra positioned on the Tertiary activity segment, but had no distinctive differentiation. Even the specialty and the tertiary segments were not clearly differentiated. It was not rare that the profit centers of different delegations did not know that they belonged to the same parent company.

¹⁴⁰ Holding management controller, Electra's director, and Tertiary director.

Figure 16: The organisation structure of Electra before 2003



The profit centers of Electra had similar business, and the same principal clients. It was thus frequent that several profit centers compete to win the same bid invitation from a customer they had in common.

3.1.2 Use of control systems

The senior managers used the systems in a management-by-exception manner. The internal communication was limited. Neither a budget negotiation nor a budget presentation was done. The budget was simply resumed in the number and sent to the Holding controller by mail. His role was to consolidate all budgets proposed by three delegations. It should be noted that Electra had not yet had an official Holding controller for two years. One Holding controller of another operational unit helped Electra to consolidate its budgets.

In addition, there was neither dialogue nor cooperation among the delegations and among profit centers, being themselves rivals. The internal conflicts, in particular among the delegations, were so important that the top manager became invisible.

3.1.3 Control tools

The key performance indicators were standard, simple and few: “order taking”, “turnover”, “gross margin” and EBIT. The information was not transparent and even distorted, said the Holding controller and validated by the Electra’s director.

For instance, the delegation director N°2 presented a false document on the advancement of an important project on Dec. 2002, leading to a lack of a credit provision up to one million of

euros. His objective was to have a maximum bonus of the year 2002 and try to save this project during 2003. Consequently, the project did not receive timely “remedy” and continued to fall down. Only one year later (in 2003), the document of this director was discovered as “FALSE”.

3.1.4 Compensation systems

The compensation systems were purely objective- and formula-based. The delegation directors and profit centre managers had an annual bonus equally based on their annual sales and margins. A bonus was given when the performance was above 100 percent of the targets and was maximum when 120 percent of the targets were achieved. The targets were based on those inscribed in the annual budget.

3.1.5 Discussion

In 2002, the commercial and financial results were really bad as shown in table 6.

Table 6: Electra’s financial results in 2002¹⁴¹

M€	2002
Order taking	187.2
Turnover	203.9
Gross margin	31
% gross margin	15.2%
EBIT ¹⁴²	-3.3
% EBIT	-1.6%

These results show that the margins are too low. Moreover the fact that the order taking is lower than the turnover signifies a real risk that the turnover would decrease in 2003.

These bad results can be linked to the fierce competition of profit centers in the same region. This competition stimulates the different profit centers to propose important outbidding and even margins that are often extremely narrow, or even at a loss. Besides, this competition leads to multiply the responses to the same bid invitations and thus to increase the corresponding study costs and commercial costs.

Widening was the gap between the real competences of a profit centre and the image perceived by its customers, resulting in a drop of the customers’ satisfaction. For instance, the

¹⁴¹ Source: Review of the budget 2006 and Enclosure document in 12-2005 of Electra.

¹⁴² EBIT: “Earning Before Interest Tax and Depreciation”.

delegation 1, after the different reorganizations, no longer possessed the competence and the necessary resources to work on the important projects. But its customers were not aware of this change and kept on inviting (and requiring) it to reply to the large projects. This delegation replied, despite its insufficient competences and resources. Not receiving the expected quality nor in time deliveries, the clients, not satisfied, often made claims.

Electra resulted from the merging of four companies that intended to create a group with a significant size in a fragmented market. For commercial reasons, the different historic brands were kept. This led to coordination problems that could not be solved nor through simplified reorganization nor through the actual control system.

Indeed, in addition to the blur boundaries between the profit centres (on their differentiation and their activities), there was not an actor who was capable to manage different interfaces – internal and external commercial interfaces. Moreover, the control system was diagnostic. The top manager had a distant involvement. And the operational managers were accountable for their results but had freedom to choose their implementation manner. The critical performance variables were standard financial indicators. The compensation system was objective and formula-based. And the coordination was dominantly vertical. This combination of characteristics led to a detrimental internal competition and bad performance.

3.2. Electra since 2003

In 2003, Mr. Dupont - a delegation director of another operational unit in the group INEO Suez - was nominated as director of Electra.

The arrival of Mr. Dupont was an internal promotion, but the activities and a network of people in each operational unit have been so different that the employees of Electra considered Mr. Dupont as an Outsider. Besides, the delegation directors, who have had at least twenty-year length of service, were confronting with the contradictory feelings: extremely proud of their historical brands but exhausted of consecutive loss and fierce internal battle.

In this context, the newly-appointed director, who could not criticize openly the precedent strategy and knew that a strategy imposed by him would certainly fail, decided to come to Electra with “a white page” of strategy, and elaborate the strategy as well as its blueprint with his direct collaborators. Mr. Dupont created a management committee whose members are delegation directors, sales directors, management control director, human resource director, and himself. So far, this committee has met every two weeks.

The result was the invention of the motto “Take over in Paris” and a new strategy accompanied with a new agenda. The goal was to orient Electra towards more long-term vision and to increase the margins. Electra now focuses on needs-based positioning to urban customers in its traditional region. The key success factors are as the reactivity in response to customers’ demands and the reduction of the internal destructive competition in Tertiary segments and the outbidding in commercial offers. For that purpose:

- The specialty activity is developed in order to better confront with economic risks, improve the profit, and bring Electra’s segment portfolio into equilibrium. Therefore, the commercial strategy is also changed: tertiary segments keep a multi-brand strategy with the historical existing brands; but specialty segments are grouped under a new unique brand (i.e. INEO).
- The decision is made to develop the “flow business” and to search for a better equilibrium between flow business and big projects in Tertiary segments.

3.2.1 Organizational structure

To implement the strategy, the decision was made to separate Tertiary and Specialty activities in different delegations. Two delegations are specialized in tertiary activity, and the others are in service specialty. In the tertiary activity, the organization is geographical: the two delegations correspond to two different areas. In the specialty activity, the organization is based on the type of service: maintenance and infrastructure.

In order to decrease the competition among profit centres, each profit centre was asked to define its core competences¹⁴³ and its strategic clients. It means to explicit and defend its competitive advantage in comparison with other profit centers and with external competitors. The privilege relation with a customer is also considered as a core competence due to the particular characteristics of Electra activities¹⁴⁴.

Ex: “Hospital” segment as a strategic one, while “General company” segment no longer strategic one

For instance, the delegation n°2, recognizing the promising potential of hospital development in the region, and after the arrival of the new commercial director – who disposes important relations in hospital, decided to develop the Hospital segment as a strategic one for all its profit centers. But

¹⁴³ A core competence is fundamental knowledge, ability, or expertise in a specific subject area or skill set.

¹⁴⁴ See the description of Electra’s activities in the section “Context”.

each profit center plays a different role in the relation with the same customer. Concerning the important client A, the profit center n°4, specialized in large projects, is designed as “Leader”, while the profit center n°5 is only “Follower”, and the profit center n°2 of another delegation (n°1) is also “Follower”. All remaining profit centers are “Outsiders”. With the customer B, only one profit center (n°6) is designed as “Exclusivity”, and the others are “Outsiders”¹⁴⁵.

Or, the segment “general company”, who is a go-between between Electra and its final customers, is no longer strategic. Because Electra considers having acquired necessary competencies to satisfy the demands of final customers, now aims at the final customers. As the result, all prior relations with the “general company” are no longer considered as core competences.

Theoretically, a profit center has to work only in an activity. It means that one company is no longer allowed to simultaneously work on two activities. The other profit centers should not develop the same core services and must transfer all relating bid invitations to the competent profit center.

Ex: the profit center n°3 of the delegation n°1 specializes on the installation of video supervision, thus becomes “Exclusivity” on this segment.

As mentioned above, there are currently two main activity segments: Tertiary and Specialty. Each has eight profit centers. The Tertiary segments are classified in the Flow business and Grand projects because the project management of these two types of project, according to Electra’s senior managers, requires different specific skills and resources. And the managers have a tendency to prefer the big projects in term of image and reputation, but the most profitable projects often come from the Flow business.

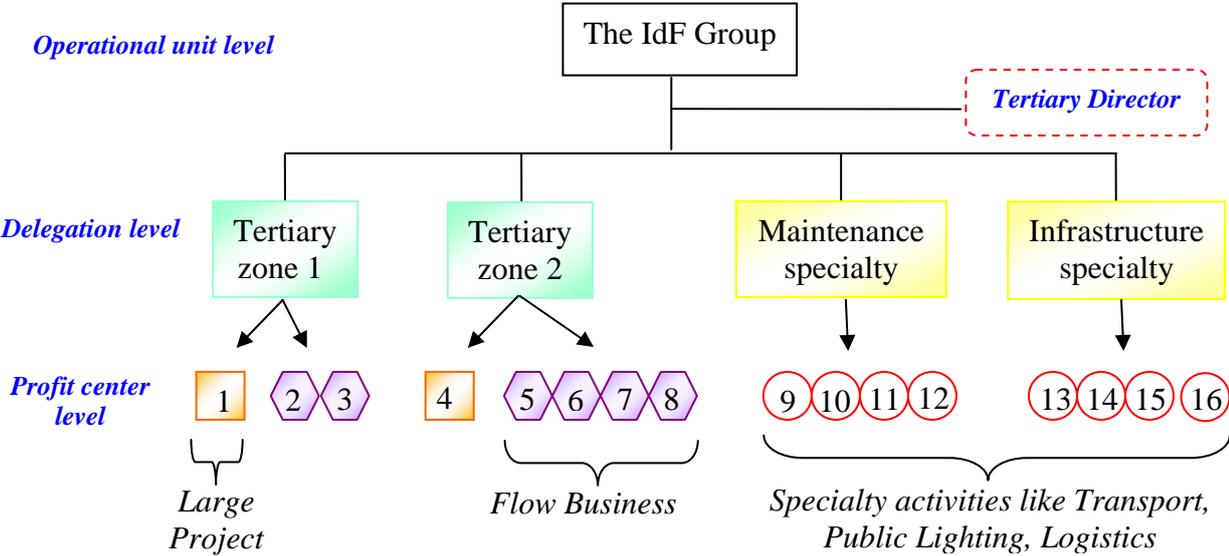
A new position is created - the Tertiary director – who is in charge of coordinating the tertiary activities. One of his roles is to coordinate the answer to bid invitation by the profit centres. For that purpose he must propose an allocation of the bid invitation between the profit centres. In case of disagreement, the arbitration must theoretically be made by the director of Electra. But though he has no direct power on the delegations¹⁴⁶, the Tertiary Director is strongly supported by the top manager and recognized as a heavyweight leader. His role is also legitimized since he has an important commercial network and has already kept key positions

¹⁴⁵ For further explication on “Leader”, “Follower”, “Outsider”, see the section “Management control systems”.

¹⁴⁶ The top manager assures the role of “the primary boss [who] manages the “solid line” accountability: the right to hire, fire, set goals, monitor performance, and allocate rewards”; while the Tertiary director, as a secondary boss, “has weaker, dotted line accountability: the right to be consulted and provide input on goal setting and performance evaluation” (Simons, 2005:127-128).

in the two ex-competitors, now becoming two Tertiary delegations. In practice, he has thus the power to make the arbitrations.

Figure 17: The organisation structure of Electra after 2003



He created a permanent cross-unit working team (i.e. commercial team) including the Electra’s sales director, the two Tertiary delegation directors, and the sales managers of four delegations. In fact, the two Tertiary delegations had much more conflicts (especially in term of customers) than two Specialty ones at the beginning. The specialty delegations operate in two separate but complementary activities – Maintenance and Infrastructure. While the Tertiary ones, despite their efforts of differentiation, have always similar activities and similar customers.

3.2.2 Management tools

The Tertiary director proposed to create two new tools called Atlas commercial rules and Lance Requête. Both of them enable to trace commercial efforts long time before the final decisions relating to the response rights of bid invitations and to justify the decision in terms of allocation of the decision right to the different profit centres.

The Atlas tool defines the important commercial rules for all profit centres of Electra. It means the commercial room to maneuver of each profit centre vis-à-vis each customer. Lance Requête is a tool in which each profit centre registers his intention to reply a bid invitation. These two tools aim at preventing that different profit centres answer the same bid invitation and at sharing information relating to customers, competitors, or market.

In addition to these tools, the control system relies on a set of financial indicators. We now describe them in details.

Atlas - commercial rules and topography of commercial positions

Atlas is the topography of the commercial positions of Electra's profit centres. It describes with which customer each profit centre has the right to do some business.

Four types of coordination are identified vis-à-vis to which a colour code¹⁴⁷ is associated in the tool and which correspond to five possible positions of the profit centres (cf. Table 7 and Appendix 9):

- Exclusivity: only one profit center has the right to do business with the client and is considered as the "Exclusive" (green). All the other profit centers are considered as "Outsiders" (red). This corresponds to 30% of the clients and 24% of total turnover in 2000-2002.
- Coordination with leader: two profit centers can have commercial relationships with the client, but one is the leader of the relationship (orange with the character "L"), and the other is called "Follower" (orange). All the other profit centers are considered as "outsiders". This corresponds to 20% of the customers and 36% of total turnover 2000-2002. The role of the Leader defined in an official document is to coordinate the commercial actions, check off the commercial information, watch out the respect of internal and external commercial rules and practices, and pursue the customers' development. The Leader has a good relation with the customer, but less than the one of the Exclusivity. Since the Leader has a legitimate role to carry out the commercial development, it is his responsibility to invest in long-term relation with customers¹⁴⁸. The Leader is often the first one knowing the arrival of the bid invitations. The Follower who does not have a legitimate role to carry out the commercial development depends on its Leader's quality and willingness. The Follower must have the approbation of the Leader before replying to any appointed customer's bid invitation, but the Leader may directly reply to the invitation. If the Follower has a good Leader who well executes the commercial development and is ready to share his bid

¹⁴⁷ Green means Exclusive, Red means Outsider, Orange with the character "L" means Leader, Orange without the character "L" means Follower, Blue means Developer.

¹⁴⁸ For example, the participation in the customers' strategy formulation or in regularly meeting with customers' top management.

invitations, the Follower’s commercial position would be extended. Otherwise, the Follower would be stuck in the obligations imposed by Atlas rules and will not take any advantage from its Leader.

- Coordination without leader: two profit centers can have commercial relationships with the client and have the same rights. They are supposed to have the same investment in the relationship and are both considered as “Followers”. All the other profit centers are considered as “Outsiders”. This corresponds to 20% of the customers and 22% of total turnover 2000-2002
- Development: the client is only a prospect.

Table 7: Example of Atlas presentation (relation between customer-profit centers) after 2003

Customers/Entity	INEO SUEZ Group			
	Electra (CEO and Tertiary director)			
	Delegation 1		Delegation 2	
	Profit center 1.1	Profit center 1.2	Profit center 2.1	Profit center 2.2
Customer (1)	Exclusive	Outsider	Outsider	Outsider
Customer (2)	Follower	Outsider	Leader	Outsider
Customer (3)	Outsider	Outsider	Follower	Leader
Customer (4)	Follower	Outsider	Outsider	Follower

For customer (1): the profit center 1.1 has the Exclusivity right

For customer (2): Coordination with Leader in two different delegations (the profit center 1.1 is the Follower, while the profit center 2.1 is the Leader)

For customer (3): Coordination with Leader in the same delegation (the profit center 2.1 is the Follower, while the profit center 2.2 is the Leader)

For customer (4): Coordination without Leader (both profit centers 1.1 and 2.2 are the Followers).

The initial positions of the profit centres were defined with the following process. The management committee including the Tertiary director, delegation directors defined four criteria to evaluate the position of each profit centre vis-à-vis his clients. The profit centres made a proposition regarding their position for their clients. Based on this proposal, and according to the global strategic objectives of the entity, the management committee established a first version of Atlas, and then sent this version to all concerning delegation directors, profit center managers, and salespersons. They had ten days to control and modify this version. All essential modifications were then discussed and approved in the commercial gatherings.

The four criteria used to define the commercial positions in Atlas are the following: 1) history of the relation with the customers, 2) competitors, 3) competences of profit centres, and 4) characteristics of projects.

First, regarding the history in the relation with the customers, for each of the existing customers and prospects the profit centres gave to the Tertiary director

- the turnover relating to these customers from 2000 to 2002,
- a first description on the historical relations between the profit centres and the customers,
- the kind of projects of the customer – Flow business or big projects, potential development, long-term or short-term relation, and so on,
- and the demands of customers which was considered as one of the most important criteria. It means that if a customer requires working with a specific profit center, the latter would be nearly automatically designed as “Leader” or “Exclusivity” in the relation with this client.

Second, the profit centres were asked to characterize and analyze their markets: evolution of the market, main competitors, and so on.

Third, the competences of profit centers are evaluated by their three-year turnover with customers, their resources (personnel, financial, and material), and their potential development.

And finally, the profit centres were asked to characterize the type of projects for each customer segment: project duration (long-time or short-time or seasonal), project size (more or less than 750,000 € per project), and particularity of the activity (about complexity, technique requirement, human competence, and so on).

Based on these data, the management committee of Electra defined global and local development objectives, strategy, and strategic customer segments. They also made a proposal of commercial position that fits with the strategic goals. More than 300 existing important customers were classified in Atlas with 13 customer segments including Industry, Distribution, Tourism, Bank, and so on.

The following observations can be made about this proposal (cf. Appendix 10):

- The Exclusive and the leader positions are often chosen for the strategic segments of a profit center.

- The longer the project duration is, the more frequently the type “coordination with leader” is applied,
- “Exclusivity” is often for Flow Business. “Coordination with Leader” is often for large customers who require long-term investments. “Coordination without Leader” is usually for less important customers or for customers the profit centers are not able to designate a Leader. “Development” is for new customers.
- The more various the number of competitors is, the more frequently the type “Exclusivity” is applied.
- Although the actions “coordination with leader” and “coordination without leader” are only allowed for about 20% of customers, the turnover generated by these customers respectively occupied 36% and 22% - the most important turnover. Thus the more important the turnover is, the more frequently the action “coordination with leader” or “coordination without leader” will be required.
- The “development” action keeps the most modest place either in the number of customers (about 3%) and in the turnover (about 0.3%).

These commercial positions were initially formally updated every six months, but are currently yearly. The daily commercial life is the main source of this update. The new customers are added. A profit center has not actively played its role as “Leader”, while the “Follower” has received much more information and gained more bid invitation. They will inverse their commercial positions in the next update of Atlas Commercial.

Lance Requête tool

Lance Requête is a software available on Electra’s Intranet tool. It aims at better coordinating the commercial actions of the profit centres among others by avoiding two profit centres to answer the same bid invitation and by giving objective elements to make arbitrations between the profit centres.

Concretely, this tool is based on the following data:

- Date of the intention to reply to a bid invitation
- Priority order of the project. Each project, depending on its potential margin, its winning possibility, and its deadline, is categorized in different order of priority. The sales manager evaluates the order of priority for each project, and then the delegation director would validate it in the commercial meeting.

- Total turnover and estimated gross margin of the bid invitation (and if possible, its budget done by the customer)
- Type of bid invitation: candidature document (restricted, negotiated, open), bid invitation (negotiated, by mutual agreement, open, restricted, on performance).
- Bid invitation state: in waiting, no information (“?”), relaunching. For example, when a sales manager does not receive any new information from a bid invitation which was replied one month earlier, he must relaunch his customer to know the advancement of the project.
- Observation: this section notes the brief remarks of related actors (like sales managers, delegation director, or profit center manager) on the advancement of the bid invitation. For instance, the position of a delegation in comparison with other competitors, or obligatory visit, questionnaire, in the course of the negotiation, in the course of the analysis, or decision date.
- The position of the profit centre in Atlas.

The intention of bid invitation response registered in Lance Requête at the delegation level is not visible at its counterparts’, but visible at its superior’s (i.e. the Operational unit’s). This diffusion rule attempts to avoid the counterfeit of commercial information among delegations. Each delegation has its own inscription tool. The information which must be registered in Lance Requête is slightly different from the one in the local tool.

This tool allows tracing and following commercial efforts of profit centers a long time before the final decisions on the response right. It makes the overlapping registrations visible and the inscriptions violating the Atlas rules visible. The information it provides is used to decide who can reply to the registered bid invitation.

3.2.3 Use of control systems

The outputs of these new control systems are used as the principal working documents in the commercial meetings at operational unit’s and delegation’s level, happening once every two weeks. These meetings aim at exchanging commercial information and at arbitrating the bid invitations that should be replied and the profit centers who may reply. Except for these commercial meetings, there is no regular meeting to analyze the commercial performance.

The Operational unit meetings and the delegation ones¹⁴⁹ organized one after another. In general, the final arbitration is often made at the Operational unit level, and then announced in the delegation meetings. The discussion at the delegation level focuses on the selection of bid invitations, capacity of profit center, response strategy and possible risks.

Content and type of discussion

On the one hand, the main working documents are similar for the operational unit’s and delegations’ commercial meetings (cf. Table 8). They include the minutes of the precedent meeting (n°1), the new commercial rules (n°2), and the advancement of bid invitations (n°3, n°4 and n°5).

Before the operational unit’s meeting, only the Tertiary director has a complete vision on all bid invitations and candidature synthesis of all delegations. He shows them on Powerpoint to all participants during the meeting.

Table 8: Working documents in the commercial meetings

No	Working documents	Owners of operational unit’s meetings		Owners of delegations’ meetings	
		Before meetings	After meetings	Before meetings	After meetings
1.	The minutes of the precedent commercial meetings	All participants		All participants	
2.	The new commercial rules (Atlas)	All participants		All participants	
3.	Candidature synthesis and bid invitation synthesis dated from the last meeting to today’s meeting (i.e. the output of Lance Requête)	The Tertiary director	Orally communicated to participants	Delegation director	All
4.	Synthesis of replied bid invitations and of coming invitations	Delegation directors and their sales managers	All	Sales managers	All
5.	Commercial Information: price, customer relation, coming business, and so on	Up to the context		Up to the context	

¹⁴⁹ Even if Atlas system determines the commercial rules for every profit center, the coordination among different profit centers needs the approval of their delegation directors. The profit center managers are not legitimate participants in the operational unit’s commercial meetings, while the delegations’ meetings remain at local level. The delegation directors play a key role in the implementation of Atlas rules and in the coordination among profit centers situated in different delegations.

After meetings, the commercial director (for the operational unit's level) and the sales manager (for the delegation's level) would do a minute. The content of the minute is similar at both levels. It comprises the following information: 1) important winning bid invitation, 2) the date of the next meeting, 3) the problems (often relating to response rights of the profit center) already solved in the actual meeting, 4) the problems to be solved in the upcoming meetings, 5) observation on the upcoming commercial events, 6) the significant one under negotiation, 7) the incoming ones, and 8) reporting to SUEZ.

It is turned around for all participants in the operational unit's meetings and the top manager. The information diffused after meetings in Atlas is not completely detailed for confidential information. In particular, the reasons of arbitration and commercial information are communicated orally but not noted in memorandums.

Presentation part of the commercial meetings at both levels

The meeting agenda is not prepared in advance but it has a common framework for all meetings (both at operational unit's level and delegation's level). The framework is the following:

- First, the participants declare their important winning bid invitations, the significant ones under negotiation, the ones under study, the incoming ones, and the general evolution of all bid invitations.
- Second, the discussion focuses on response right, selection of bid invitation, response strategy, contacts, and so on.
- Third, the participants also do post-mortem on lost bids to learn from failure.

The contents of debate and discussion of the operational unit's meetings are different from those of delegations' ones. While the former focus on the selection of who has the right to reply the inscribed bid invitation, the latter emphasize on the selection of bid invitation.

Debate part at the operational unit's meetings

The allocation of response rights requires discussion only in the cases in yellow in table 9. Most information used Operational unit meetings comes from the Lance Requête tool and participants. The debates are often frequent and active. In these cases, the Tertiary director and the participants often discuss the following issues.

First, what is the right of the registered profit centers in Atlas Commercial rules? Are they Leader, Follower, Outsider, Exclusive, or Developer?

Second, which profit center has the best opportunity to win bid invitation? More concretely, they study: who is the first one making the inscription in Lance Requête? From which source the registered profit center know the arrival of bid invitations? Who has the best relation with the customer and relating actors (like architect, research consultancy, project manager, or owner)? Which profit center is the preference of customers? Who possesses the most important commercial information relating the bid invitation?

Third, which profit center has the best competences to well realize the bid invitation? The evaluation will mainly base on the responses of the following questions. Who answers best to the technique and/or know-how requirement of the bid invitation? Who is most enthusiastic to have the response right? Who owns the necessary resources (human, material, time) to execute the project once gained? Which profit center has an adequate critical size to realize the project once gained? And who can manage well project risks?

Table 9: Arbitration zone in the operational unit’s meetings

Number of inscriptions in Lance Requête	Type of actions in Atlas	Correspondence with Atlas	Violation of Atlas
	Exclusivity	Exclusivity replies	
Only one registration in Lance Requête	Coordination with leader	The profit center who makes the registration normally will reply	
	Coordination without leader		
Two or more registrations in Lance Requête	Coordination with leader		
	Coordination without leader		
	Developer	Developer replies	
	New customers not mentioned in Atlas	The profit centre which first inscribes the invitation in Lance Requête has the response right.	

And finally, which profit center needs to reply the most? Who needs to have the project in order to avoid the insufficiency of activities? Who may have the best benefice to execute the project (for its strategy)?

Even a profit center “Outsider” in Atlas may get the response right to a bid invitation if he conducts well the commercial development with his customer, owns suitable resources (competences, human, time, material, and so on) to well execute the project once gained, and the other actors in Atlas did not receive any information about this invitation from their customers. The border between tertiary activity and service activity is so blurred that the Atlas

commercial rules are sometimes “legally” violated. To guarantee the respect of commercial effort and the flexibility of Atlas rules, no criteria are absolute in the arbitration relating to the response right.

If an agreement is not found after discussion, the Tertiary director makes the final arbitration. In some cases he decides that more discussion is needed to make a decision. A working sub-group is created with the people concerned by the project and a specific formal meeting is organized. This is recorded as “Problems to be solved” in the meeting minutes.

Beyond the decision making on response rights, the commercial meetings focus on concrete coordination actions (most frequently “who contact whom?”). They are also the place where Atlas rules are discussed and adapted. They finally provide a lever to fine-tune and alter commercial strategy.

For example, the top manager, recognizing the promising potential of hospital development in the region, determines that the hospital has been a strategic segment of Electra. This decision was translated in commercial actions of Atlas 2005 – 63% for Exclusivity, 28% for Coordination with Leader, 5% for Coordination without Leader, and 4% for Developer, which would in turn influence to operational commercial strategies. The Tertiary delegation n°2 recruited hence the new commercial director having ten-year working experiences, and owning important relations in hospital. The top manager requires each Tertiary delegation director and his commercial director to present their strategy in order to preview how to organize and coordinate their synergy with other Tertiary delegations.

Debate at the delegations’ meetings

In the delegation commercial meetings, the participants discuss on which invitation should be replied and how to reply (by which strategy, with which relation). It is very rare that two profit centers of the same delegation have the same activities or the same customer segments.

How to select which invitations to reply? The result of my interviews shows that the selection criteria are as follows:

- corresponding with Electra’s strategy and the delegation’s strategy,
- having valid and appropriate technique qualification,
- being permitted in Atlas commercial rules or having the authorization from the Tertiary director,
- the profit center having enough critical size to carry out the project once gained; otherwise, who can be a partner?

- having real possibilities to win bid invitations: having the key commercial information (e.g. customer budget), having the good relationship with the customer or with the architect, and so on.
- being expected good project (in term of turnover or margin),
- depending on the workload of the profit centers.

The Appendix 11 will provide some concrete examples on this selection process.

Involvement of top manager

In first three months, the CEO of Electra participated in the commercial meetings at the operational unit's level. Rapidly, he recognized that his presence may somehow prevent participants from naturally exchanging commercial information. Before taking a back seat, the CEO tried to make all participants clearly understand his particular attention on the implementation of new commercial rules and the legitimate power of the new actor - Tertiary director.

He has no longer directly participated in the commercial meetings, but he has pursued their rhythm and closely examined their minutes. He regularly discussed with the Tertiary director on the important issues of commercial meetings. Very hardly does the top manager make the arbitration in case of a conflict (less than 5%).

His main objective is to reserve the self-organizing capability of his subordinates and stimulate horizontal coordination.

Involvement of operational managers

The participants in the operational unit meetings are the following: the Tertiary director, the Holding commercial director, the Tertiary delegation directors, sales directors of four delegations.

The arbitrations of the Tertiary director are irrevocable and often respected because the arbitration arguments often originate from explicit shared principles and transparent discussions with all relating actors.

The participants in the delegation commercial meetings comprise its delegation director (who is also arbitrator), all profit center managers, delegation sales directors, and salespersons. The delegation director is the direct superior of all participants.

The participants, not the CEO, are the main actors who use the information collected before and after the meetings. They fix their own performance measures – the rate of success of bid

invitation response and the quality of collected commercial information. These measures would be one of the criteria of being selected and then winning the bid invitation.

3.2.4 Compensation systems

Two different compensation policies are applied in Electra: effort-based incentives for delegation directors and profit centre managers, and formula-based bonus for business supervisors. The bonus varies from zero- to four-month salary.

- The formula-based incentives for business supervisors are simply linear payouts based on a percentage of performance output. The schemes set fixed targets, which are agreed in advance. A bonus is given when the performance is above 80 percent of the target and is maximum when 120 percent of the target are achieved. The performance indicators on which the bonus is based are turnover and gross margin.
- For delegation directors and profit centre managers, the incentives schemes consist of three equivalent components: achievement of financial objectives, achievement of specific objectives (mostly associated with commercial strategies), and contribution of delegation directors and profit center managers to the success of internal projects (like project Capital). The first component is a formula-based incentives based on turnover and EBIT. The other components are based on the perception of the top manager. This system is mostly based on the efforts and the contribution of delegation directors and profit center managers. Notice that this system was in contradiction with the rules of the group from which Electra depends which required formula-based incentive systems.

3.2.5 Discussion

The financial result shows the important progress in the order taking and EBIT, thus the increase in market share and the confidence of customers (cf. Table 10).

Table 10: Electra's financial results after 2003¹⁵⁰

M€	2002	2003	2004	2005	2006	2006-2002	2006-2005
Order taking	187.2	194.8	205.3	218.9	232	24%	6%
Turnover	203.9	183.7	180.2	209.2	240	18%	15%
Gross margin	31	27	27.4	27.4	36	16%	31%
% gross margin	15.2%	14.7%	15.2%	13.4%	16.7%	1.5%	2.3%
EBIT	-3.3	-0.2	3.3	3.1	5.6	270%	81%
% EBIT	-1.6%	-0.1%	1.8%	1.5%	2.6%	4.2%	1.1%

These results can be explained by a better coordination between the profit centres. This improved coordination based on increased and structured information exchange allows decreasing commercial costs and the study costs. In particular, the new system prevents two profit centres to engage study costs for the same bid invitation. Moreover, the arbitration time is also cut down since the Atlas commercial rules have already defined the role of each actor, and the participants prefer discussing together before the meetings and agree on a solution to asking the arbitration by the tertiary director. Consequently, the operational unit's overhead costs have been reduced from 14.6% in 2005 to 12% in 2006.

The demands of customers are satisfied more rapidly and more efficiently. The profit centres better know the customers the top management expects them to develop and invest in long term, thus it can anticipate the customers' needs, understand customer preferences, and develop end-to-end/package and personalized services.

These results can be explained by the specific combination of organization, management control tools, incentives and use of management control tools implemented by the management team of the unit.

The new boundaries of delegations clearly aim at reducing the coordination problems between the delegations. However, these problems cannot be completely withdrawn in particular in the tertiary segment because of the combination of historical brands, specific competencies and commercial positions. To solve these remaining coordination problems, the new system combines:

¹⁵⁰ Source: Review Visée 2- 2006 and Enclosure document in 12-2005 of Electra

- A balanced use of control system,
- The creation of a new position of tertiary director,
- The creation of a new specific management tool,
- A move toward effort-based incentives.

The use of control system (after 2003) has feature of a balanced use. Firstly, the use of top management is moderate. Although the CEO is not directly participate in the commercial meetings, he pays a personal and frequent attention to the advancement of commercial meetings by reading and interpreting himself their minutes. He regularly discusses with the Tertiary director on the important issues of commercial meetings, but gives his arbitration right relating to commercial matters to the Tertiary director. The Tertiary director can update the daily key commercial information to the CEO. And this information is often a source of emergent strategy (cf. Appendix 8).

The delegation directors organize their own commercial meetings in correspondence with the Holding ones. Together with the Tertiary director, they exchange their commercial information, and choose the best candidate and a suitable manner to win a bid invitation. The primary subject to use this information is the operational managers, not the top manager.

Thirdly, the content of discussion comprises both critical performance variables (i.e. an attribute of diagnostic control) and strategic uncertainties (i.e. an attribute of interactive control). The critical performance variables are estimated turnover, gross margin, and customer's budget. These variables allow a rapid comprehension on the size of bid invitation, the capacity of an entity, and the relation of an entity with the customer¹⁵¹. On the other hand, they also discuss the emerging threats or opportunities (i.e. strategic uncertainties) to satisfy the need for reactivity, close relations with the customers and competitive prices.

And fourthly, the type of discussion in the commercial meetings comprises both presentation (i.e. an attribute of diagnostic control) and negotiation and debate (i.e. an attribute of interactive control). The participants make a brief presentation on the important winning bid invitation, the significant one under negotiation. The debate and negotiation focus on who has the response right, and how to best reply. And such debates are carried out not only in vertical dimension (between the delegation director and his profit center managers, and his sales

¹⁵¹ The customer's budget is legally confidential, and the customer does not have the right to reveal its budget to the companies who have intention to reply its bid invitation. If an entity has a good commercial relationship, it can have this information.

managers) but also in horizontal dimension (among the different delegations and/or among the different profit centers).

It also departs from this model in several ways. First, it involves a specific tool, namely Lance Requête. Second, the system does not rely only on the line managers nor on the management controller, but it involves a new function, namely the Tertiary director.

The need for a specific tool can be associated with the fact that the goal is to solve coordination problems since this type of problem is always specific to a business and an organization. In this case, if the boundaries of delegations were different, the coordination issues would also have been different. As a consequence, Lance Requête would probably not be suitable. The observation that the tool is specific and used rather interactively is not in itself contradictory with Simons (1995, 2000)'s statement that any tool can be used either interactively or diagnostically. Proving the opposite would require to show that this specific tool could not be diagnostically used.

As regards the new position, it can be seen as an enlargement of the control function. Indeed, the Tertiary Director has no hierarchical power on the delegations. He spends much time in processing data, and has an important role of knowledge capitalization. Although the controller needs a good understanding of the underlying activities, this requirement is even more important in the case of Tertiary Director. Moreover, his role goes beyond the traditional role of advisor often associated with the management controller since he directly makes arbitrations decisions. This is one reason why it is important that beyond the understanding of the activities, this actor also has a strong credibility.

In terms of incentives, the introduction of a significant part of effort based incentives at the delegation level was in contradiction with the group policy. It shows that it was considered an important feature of the system by the CEO. On another hand, the system involves mainly effort based incentives at the delegation level and result based incentives at the lower levels. This shows that the type of incentives is not necessary the same within an organization and depends on the specific control issues and tools at each level.

In brief, we did not argue that the Electra's system is perfect (cf. Appendix 13: Analysis of possible drawbacks of Electra's new control systems and corresponding solutions), but its configuration along our four-dimension grid demonstrates the efficiency of management control systems in the implementation of strategic changes.

GENERAL CONCLUSION

This thesis is concerned about the use of management control systems for implementing strategic change. It has developed two new ideas. The first idea is that Simons' original framework of analysis, based on the use of control systems by managers, could be extended to cover three other dimensions: the organizational structure, with an emphasis on horizontal as well as vertical coordination; the management tool, with the distinction between generic and customized tool; and the compensation system, with the distinction between formula-based and contribution-based incentives. The second idea relates to the balanced interaction of these four dimensions. Some configurations along these four dimensions are more efficient than others. A more efficient configuration simultaneously exhibits some interactive and diagnostic features. Rather than opposing diagnostic and interactive systems, a balanced approach that combines the two approaches may be an interesting reference. These ideas have been used to interpret the strategic changes that occurred in two organizations dealing with industrial service operations. It is believed that they have some general value and that they could be used in other activities.

In this general conclusion we discuss some avenues for future research.

Regarding the propositions that we can derive from our literature review, Chapter 1 has provided some evidence that a balanced use of interactive and diagnostic control systems could favour the implementation of strategic change. But this idea of balanced use (in particular, from the viewpoint of a whole system) remained unclear. Chapter 2 confirms that management of project portfolios involves some combinations between interactive and diagnostic use of control systems and its interactions with three remaining dimensions (i.e. compensation system, management tool, and organizational structure). But since the project management literature does not explicitly refer to these concepts, this literature does not help clarify how these types of control systems could combine. Our case studies illustrate a balanced approach and its key roles in the implementation of strategic change. This leads us to our first proposition: **a balanced interaction of management tool, organizational structure, use of control system, and compensation system may favour the implementation of strategic change in project-based service companies.**

In project management, this combination of interactive and diagnostic control involves organizational features. In particular, Chapter 2 has shown the importance of the interface actor function. The need for such a function maybe explained by the fact that interactivity in project management aims at improving horizontal coordination. This need for horizontal coordination is also one specific feature of the project oriented companies. However, research

on the interface actor function remains exploratory. In particular, current research on interface actor function is focused on the administrative side of this function and does not address its role in terms of strategic governance and coordination (i.e. interpreting strategy and offering the means to reformulate, update, and implement strategy). An interface actor can be a facilitator if he has the roles of strategic governance and coordination. Our case studies (in particular Electra) demonstrate the efficient roles of such an interface actor. The second proposition is thus that **such an interaction may be favoured by an interface actor - facilitator. The cross-functional team also plays an active role in this interaction.**

Chapter 1 questioned the hypothesis that control tools are generic and that all (generic) tools can be used either interactively or diagnostically. Several arguments in Chapter 2 that justify the design of customized tool to favour interactivity maybe consistent with the specificities of project oriented companies. In particular the fact that such tools are necessary when the issue is to create a common knowledge across entities and when the operational interaction between entities is a major stake. These two issues are central in project oriented companies. Both our case studies demonstrate the essential roles of the creation of a new customized tool. We suggest as proposition 3 that **the interactive use of control systems in project oriented company require the design of customized tools.**

In summary the preliminary propositions offered for future research may be stated as follows:

- P1: A balanced interaction of management tool, organizational structure, use of control system, and compensation system may favour the implementation of strategic change in project-based service companies.
- P2: Interface actors together with a cross-functional team facilitate such a balanced interaction.
- P3: A new customized tool favours the implementation of an interactive control system in project-oriented company.

This research is built through the case study methodology, the above propositions certainly need to be refined to be quantitatively tested. This is a first step in that direction.

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Appendix 1: Diagnostic and Interactive budgetary control

Criteria	Company A Diagnostic budgetary control	Company B Interactive budgetary control
Strategic planning review	Sporadic. Last update 2 years ago. Does not motivate a lot of discussion in the company	Intensive annual process Business managers prepare strategic plans for debate by top management committee
Financial goal	Set by top management and communicated down through organization	Established by each business unit and rolled up after a series of review and challenge meetings
Budget preparation and Review	Budgets prepared to meet financial goals. Budgets coordinated by Finance Dept and presented to top management when assured that goals will be met.	Market segment prepares budgets with focus on strategy and tactics. Intensive debate at presentations to top management committee.
Budget revisions and updates	Not revised during budget year	Business unit rebudget from lowest expense levels three times during year with action plans to deal with changes
Evaluation and reward	2/3 bonus based on contribution to generating profit in excess of plan. 1/3 based on personal goals (usually quantified)	Bonus based on subjective evaluation of effort. MBO system used throughout organization.

Source: adapted from Simons (1991: 133)

Appendix 2: Synthesis of other researches on Simons's lever-of-control framework

Research study	Method	Sample selected	Result
Osborn (1998) Interactive controls, semi-formal information systems and emergent strategies	Longitudinal study	Co Frito-Lay Inc: regional management teams	Confirm the positive relationship.
Abernethy & Brownell (1999) How accounting can be used as learning machine in the formulation and implementation of strategic changes?	Exploratory study (quantitative)	CEO in 63 public hospitals in Australian states	Interactive style of budget use can mitigate the disruptive performance effects of the strategic change process.
Sponem (2004) Measurement instrument for the concepts "diagnostic/interactive budgetary control"	Confirmatory factorial analyse	276 questionnaires collected from management controllers and Chief Financial Officers	Interactive budgetary control is characterized by strong involvement of top managers, strong participation of staff, and a strong link with action plans.
Ferreira (2002) – PhD Thesis Role of MACS design and MACS use in contemporary companies	Exploratory study Case study	-122 large Portuguese non-financial companies - 4 companies	"Interactive MACS use makes both a greater contribution to functional MACS use and a lower contribution to dysfunctional MACS use than diagnostic use does".
Ferreira and Otley (2003) Ways in which MACS was designed and used by using Otley's (1999) and Simons's (1995) framework	Case study	Four medium and large non-financial firms	A performance management and control framework was proposed.
M. Lindqvist (2003) Use of interactive strategy controls in new economy companies (to find the link between uncertainties and strategic controls)	Qualitative case study	Two Finish new economy companies (interview with 2 CEOs and 5 operating level managers)	- Confirm the accuracy of external characters of Simon's model. - Show the confused boundary between strategic uncertainties and critical performance variables.
T. Davila (2000) How do companies adapt their systems to the particular characteristics of each product development effort?	Case study and then quantitative research	12 BU in 7 companies both in Europe and the United States. Then 56 responses of project managers.	- Confirm the relevance of project uncertainty and product strategies to explain MCS design. - Better cost and design information have a positive association with performance but time information has a negative effect
Bisbe and Otley (2004)	Quantitative	58 medium-sized,	- Interactive use of control

Effects of interactive use of management control systems on product innovation	research (correlation, regression analysis, ...)	mature manufacturing Spanish firms	systems may favour innovation in low innovating firms but reduce innovation in high-innovating firm. - Impact of innovation on performance is moderated by the style of use of MCS.
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Appendix 3: Comparison of diagnostic control systems and interactive control systems (Simons, 1995, 2000)

Attributes	Diagnostic Control Systems	Interactive Control Systems
Involvement of top management	Management-by-exception, except: <ul style="list-style-type: none"> - Set and negotiate goal - Receive updates and exception reports - Follow up on significant exception - Align performance measurement - Design formula-based incentives 	Personal involvement. Senior management involves at critical phases in the decision process. <ul style="list-style-type: none"> - Define strategic uncertainties and type of control systems used interactively. - Interpreting the data
Involvement of subordinates	<ul style="list-style-type: none"> - Accountants, sales planners, engineers and quality control expert: Gatekeepers - Accountable for results but free to choose how to accomplish desired ends - Information: prepared and interpreted by staff, not by manager. 	<ul style="list-style-type: none"> - Down to three or four levels in the organization. - Middle managers: key nodes and facilitators. - Discussed and interpreted by all management levels. - Create information network that reveals senior management's concerns - Collect information up, down, and sideways in the organization.
Content of discussion	Critical Performance Variables (CPV)	Strategic Uncertainties
Type of discussion		Face-to-face dialogue, debate
Tool	<ul style="list-style-type: none"> - All existing tools, except the interactive one. - Related to CPV- 	<ul style="list-style-type: none"> - Use of one existing tool - About strategic uncertainties - Clear, accurate and simple to understand. - Shared with the others - Create inside information networks to scan and report critical changes
Incitation	<ul style="list-style-type: none"> - Explicit and Formula-based - Strong link b/w objective achievement and performance evaluation 	<ul style="list-style-type: none"> - Subjective and contribution-based - Weak link b/w objective achievement and performance evaluation
Desirable Outcomes	Implementation of intended strategies	Emergent and bottom-up strategies
Undesirable Outcomes	<ul style="list-style-type: none"> - Measuring wrong variables - Building Slack - Gaming the systems 	<ul style="list-style-type: none"> - Too much active interest of managers may make subordinates threatened, then subvert learning. - Avoiding intrusion of staff so that paperwork and forms do not become more important than face-to-face dialogue and action planning.

Appendix 4: Comparison on the tool design and the tool use of “New product development map” (Wheelwright & Sasser, 1989), “Aggregate project plan” (Wheelwright & Clark, 1992), and “Return map” (House & Price, 1991)

	NPD Map (1)	Aggregate project plan (2)	Return Map (3)
Definition	Mapping different generations of a product family	Mapping all company’s projects (by Resource consumption, Contribution to company’s development strategy)	Mapping/Estimating the contribution of all cross-functional teams (by Time and Money)
Objectives	Facilitate interfunctional cooperation Help focus development projects and limits their scopes, making them more manageable, and then facilitates the cross-functional discussion and resolution of strategic issues. Mapping provides a process for planning neither too much detailed (like budgeting) nor too much parochial (like functional strategy sessions).	Restructure the development process and think in terms of a set of projects in a global view. - Greater control of resource allocation and utilization. - Reveal where development capabilities need to be strong - Create a set of projects that is consistent with the company’s development strategy - Help to formulate strategy	Make team members understand the works of other functions. Focus on “what needs to get done?”, instead of “who is responsible”? A tool for project selection
Model	- Core products - Leveraged products: enhances, cost-reduced, customized, hybrid	5 NPD projects: derivative, platform, breakthrough, R&D, and partnership.	Identify the points of Break-Even-Time, Time-to-market, Break-Even-After-Release, and Return Factor
Tool nature	1) Calendar Time 2) Product added value 3) Sales of distribution channels	1) Process change (incremental change, upgrade, next generation, new core process), and Product change (derivatives, addition to product family, next generation, new core product). 2) Resource consumption	1) Sales, Profit, Investment, Cumulative cost and revenues. 2) Time (Investigation, Development, Manufacturing, Sales)

Identification manner	Based on both generic and specific business vision		
Degree of indicator interdependence	Strong interdependency of the KPI through the decisions made in the different departments		
Source of information	Data gathering relies on specific and standard data collection procedures (3): need financial data per projects (while most companies track financial data per period)		
Primary profiteers	Senior managers and Operational managers (cross-functional teams)		
Transposition possibility	Easy: other companies can easily use this tool	Easy	Depend on the possibility to get project data out.
Who is in charge of control process?	Operational managers	Operational managers	Investigation phase: marketing, R&D. Most is used in this phase to “provide a visual perspective on sales forecasts and expected profits given any number of hypothetical scenarios” Development: R&D + manufacturing But the main actor is not precise.
By which manners managers involve in the systems?	Top managers frequently discuss with functional members. And functional departments frequent communicate together.	Early involvement of senior managers, strong leadership.	- Top: track development process and take corrective actions in real times. Accept missed forecasts. Team: make team members understand the work of other functions and the interrelationship among all functions.
Where is it used? In budgeting process or other instances?		To reallocate resources and rethink the mix of projects	To analyze (track the progress of) an individual project, or a family of products. To select a project
How frequently		Not mentioned	Not mentioned

is it used?			
With what implications for top and operational managers?		Not clearly distinguish between top management and operational management. Procedure to create “aggregate project plan”: not mention “who” is responsible.	Top: management-by-exception (track progress and corrective actions) Operational: dialogue among different functions. But “how the dialogue is effectuated” is not clear.

Source: Synthesis of Wheelwright & Sasser (1989), Wheelwright & Clark (1992), House & Price (1991), and Ponsard & Saulpic (2006).

Appendix 5: Dispersed NPD study on a likely “PMO actor”

Ideal-types of project leaders: functional, heavyweight, lightweight, and autonomous teams

Leadership plays a key role in making team effective. Four patterns of leadership - Functional, Heavyweight, Lightweight, and Autonomous teams - have been described in different works of Clark et al. (1987), Clark & Fujimoto (1991), Clark & Wheelright (1993), and Bowen et al. (1994). After a brief presentation of each pattern, we analyze its strengths and its drawbacks.

In *functionally* organized projects, no one has overall responsibility for the total project. The head of functional department is often senior manager, and responsible for resource allocation and performance control. Every strength is often associated with a weakness. Responsibility aligns with authority, but development tasks tend to be subdivided and decomposed, leading to limited coordination and integration. Career paths are functional naturally, and works done in a project are sure to be evaluated and rewarded by functional managers. Individual contributions in a project tend, however, to be judged independently of overall project success. The final strength of this pattern is that specialized expertise is profoundly developed and transferred among projects. Yet each component is the best in its area of expertise rather than overall systems. This approach is best suited for stable environment and narrow expertise.

Projects with *lightweight* organizational structures a coordinator and a team of representatives from the functions operate as a support group. Functional leaders hold the real power. The project coordinator, only middle- or junior-level person, is not responsible for the overall project. He has much less status than the functional managers: having neither responsibility for the people actually doing the work nor direct contact with targeted customers. He exercises a form of diplomatic leadership that facilitates integration. Such pattern also shares the same strengths and weakness of functional pattern. In addition, the coordinator, looking across functions and ensuring individual tasks get done in time, is expected to improve coordination and communication, thus efficiency, speed, and project quality. This expectation should be moderated because the real power is still in hands of functional managers, and the lightweight project leaders are often ignored and even pre-empted. This system is fit for critical coordination or small projects.

The third approach is *heavyweight* projects. Project leader, being senior managers, "acts like a general manager and wields considerable power over the details of the program and the way in which those details, including customer expectations, are orchestrated and integrated into an effective whole" (Bowen et al., 1994:132). The project leader is supported by a core team of functional leaders. Ownership and commitment are advantages of such pattern. Heavyweight teams may, however, create potential conflict with functional departments and even with senior management's influence and control. Another merit is about better integration and integrity offered by heavyweight teams. But the lack of depth may reduce technical excellence. To overcome mentioned weaknesses, a heavyweight team needs six following elements: a project charter, a contract book, a co-located core team, heavyweight leadership, broad team member responsibilities, and an executive sponsor. This approach is suitable for major complex project in which time is critical.

The fourth pattern of leadership is *dedicated, autonomous team*¹: leaders have same responsibilities as heavyweight leader, but "get thing done without the resources or the constraints of the functional organization" (Bowen et al., 1994:133). The team often subcontracts the job to organization independent of its parent company. The merit of such pattern is its focus to project success, which tends to rapidly develop efficient new product. But they often expand the initial bounds of project definition, find new ways to get work done, invent new procedures, define new roles, and develop new business unit. The goal is often to make a technical leap.

Clark & Fujimoto (1991) recognized that few organizations have a pure ideal-type of above-mentioned four patterns of leadership. Thus, they proposed to group "autonomous team" with "heavyweight team", and then to split the lightweight category into: a lightweight and a middleweight. As a result, four new patterns of leadership are functional, lightweight, middleweight, and heavyweight.

Clark & Fujimoto (1991) observed that there was a transfer from lightweight to heavyweight in Japanese market, and middleweight seems appropriate for European markets.

"If all markets come to resemble the Japanese domestic market - with its short life cycles, seesaw battles for segment leadership, proliferation of product variety, strong emphasis on product integrity - firms without a heavyweight structure will suffer competitive

¹ It was previously called "project execution team" by Clark & Fujimoto (1991).

disadvantage. This seems to be the case in the U.S. market". "If European markets continue to emphasize functionality, longer life cycles, and strong customer loyalty, a middleweight structure may be adequate" (Clark & Fujimoto, 1991:284).

The Nissan case will illustrate how a transfer from lightweight to heavyweight pattern can help the company to improve its performance.

Ex: Nissan had suffered the weakness in product integrity, thus a crisis of market performance until the late 1970s. One of the main causes is the use of lightweight project managers, who were traditionally coordinators within the engineering function, did not have clear leadership, and lacked of significant direct contact with customers. And levels communication and coordination between engineering and production were low.

New CEO Y.Kume encouraged formal changes. Three new product management departments were created. Each specialized in a group of products that share a basic product concept and combined empowered product managers and marketing planning. Product managers played a role of external integrators who infused future customer expectation into product details. Their roles were likely to those of heavyweight product management. Overall, Nissan emphasized "stronger internal-external integration, intense information exchange, the primacy of the concept creation function and a focus on product integrity" (Clark & Fujimoto, 1991:280).

In brief, every pattern of leadership - functional, lightweight, middleweight, and heavyweight project leaders – has its own strength and drawbacks. The choice of a pattern depends on the characteristics of project environment and project requirements.

Interface actors of Moidson & Weil (1992)

In the similar point of view, Moidson and Weil (1992) recommended the creation of “interface actors”, who are able to make the connection between the layers and between the types of coordination. The interface actors may detect problems, and then analyze them in global, not local, interests with an integral view. They are able to:

- tell the debate truth and make technical problems explicit, and if necessary, end up the controversies by testing different ideas on physical supports such as prototypes or models,
- revitalize uncropped problems and also anticipate risks,
- involve as a mediator proficient in proposing marginal concessions – win-win solutions,

- integrate multiple constraints and be more available for marginal innovation susceptible to unblock situations because interface actors have less constraints of services,
- communicate car image by positioning technical debates in customer viewpoints.

“The transversal groups, by making their animators responsible on the interface questions, had a tendency to produce interface actors” (Moisdon & Weil, 1992). In turn, the transversal groups became rather an instrument available for interface actors to take into account, coordinate, and accelerate compromises-seeking on the essential issues of interfaces. The interface actors, to be protected and ensured their performance evaluation, should be attached to both service managers and project teams.

The interface actors as defined by Moisdon & Weil (1992) seem obsessed by internal coordination of different interfaces of a project. Good coordination of internal project interfaces is essential but not sufficient to achieve company’s goal.

Moidson and Weil (1992) recognized that the promotion of the interface actors’ careers is one of the most difficult issues. Traditionally, the promotion is done in technical channels – a promotion of an engineer is shown by increasing number of designers under his responsibility. “How to integrate such method for a transversal position having no direct authority / responsibility on designers or technicians?”, asked the authors, but without giving any response.

In brief, the interface actor focuses on internal coordination of a project and needs to have a suitable compensation system.

Gatekeepers or ambassadors of Brown & Eisenhardt (1995)

Because “communication among project team members and with outsiders stimulates the performance of development teams”² (Brown & Eisenhardt, 1995: 354), a gatekeeper is for external communication while powerful project leader assures internal communication.

- “Gatekeepers”³ gathered, translated external information, and facilitated the external communication of their fellow team members, leading to improved project

² The communication web perspective corresponds to two emerging theoretical themes – information processing view and resource-based view (Brown & Eisenhardt, 1995).

³ “High-performing individuals who also communicated more often overall and with people outside their specialty” (Brown & Eisenhardt, 1995:354).

performance⁴. “The frequency of external communication was *not* a significant predictor of team performance. Rather, communications strategy was germane” (Ancona & Caldwell, 1992b; Brown & Eisenhardt, 1995). Success is enhanced by a comprehensive external communication strategy, combining ambassador⁵ and task-coordination behaviours.

- Internal communication⁶ is equally essential to product development success (Keller, 1986; Ancona & Caldwell, 1992b). Powerful project leaders in matrix organizations often enhanced the quantity of internal communication but decreased its quality (Joyce, 1986). Barriers that hinder cross-functional communication may be overcome if members of project team participate in concrete tasks together, violate routines, and make fluid job descriptions in a highly interactive and iterative fashion⁷ (Dougherty, 1990).

Integrators of Dean & Susman (1989)

An integrator⁸ works with designers to enhance the producibility of their product, serving as a liaison to manufacturing. The integrator as described by Dean & Susman (1989) only focused on the horizontal interaction which is internal in the project team. Such approach is rather flexible, though there is still no opportunity for simultaneous approach. An expert is developed to keep track of new capabilities in manufacturing.

Integrators, who must equitably balance between design and manufacturing perspective, are not easy to find. Not only quite different degree programs but also two distinct hierarchical functional departments have designers and manufacturing engineers. And integrators tend to

⁴ Allen, 1971; Katz & Tushman, 1981; Ancona & Caldwell, 1990, 1992.

⁵ « Ambassador activities consisted of political activities such as lobbying for support and resources as well as buffering the team from outside pressure and engaging in impression management” (Brown & Eisenhardt, 1995:356).

⁶ Ex: teams who defined goal better, developed workable plans and prioritized work had superior performance.

⁷ “In contrast, failed products were characterized by sequential attention by functional groups such that each departmental view dominated a particular phase of the project” (Brown & Eisenhardt, 1995:357).

⁸ Clark (1987) said that “the focus of integration should be scientific understanding of the manufacturing process. Integrate operations around the information system. One cannot exploit the virtues of such systems without aiming for structural changes compatible with them: flattened hierarchies, value-added networks”. While Iansiti (1993) called integration approach in another name: “system-focused”. “System-focused companies form a core group of managers, scientists, and engineers that the earliest stages of the R&D process”. A study of 12 mainframe computer companies showed that system-focuses companies achieve the best product improvements at the lowest cost.

become auditors and mentors rather than real liaison between functions. The organization becomes dependent on one (or a few) individuals – integrators.

Different researchers agree the essential roles of “interface actor” but also recognize the difficulties to have a good interface actor and a suitable compensation system for him.

Appendix 6: Illustration on the coordination of workforce allocation before and after 2002

The objective of this section is twofold. It demonstrates how the lack of re-coordination among parallel projects may limit the global performance. But it also shows that the resource mutualization is not always as effective as we often believe. Also illustrated is how the project leaders lost their legitimacy.

The mechanism of the workforce allocation in the phase – project realization may be illustrated by the simplified project-steering model. We suppose that:

- the company has only two parallel projects (P1 and P2) whose the realization duration takes solely two semesters (S1 and S2),
- the project budget is elaborated at the commencement of the first semester (Budget Period), and then revised at the end of the 1st one (Revision Period). The realization of the budget would be done at the end of the second semester as the project is finished (Realization Period),
- and the cost of external interim hire is two times higher than the one of internal human resource recruiting (for the uncertainty of interim quality, the expenses for interim agency, etc.). To simplify, the salary payment is equal to the number of workforce.

The simplified model on workforce allocation model before 2002 (Model 1)

Let's begin with the advancement of the project N°1.

- At the budget moment, the project leader anticipated that 5 persons would be required in the first semester and 10 persons in the second one, thus the quantity of working employees is equal to that of paid employees (see Table 1.1).
- Yet, the project 1 needed only 4 persons, instead of 5 at the end of the 1st semester but the project leader had to pay the salary for 5 persons due to the non-mutualization among the different projects. The revision period estimated that the project 1 would

need two more persons, i.e. 12 persons in the 2nd semester, so the revised cost (including the one to recruit two interims whose costs are two times higher) would increase by 40% (i.e. salary equals to 14 persons). It was the project leader who recruited interims (see Table 1.2).

- Finally, to finish the project in time, the project leader had to use 14 persons in the 2nd semester, hence the real cost increased by 80% (see Table 1.3).

Now have a look on the project N°2.

- The project leader, at the prevision period, anticipated that this project would demand 10 persons in the first semester and 5 in the second one (see Table 2.1).
- Due to the retardation, the supervisor must add two more external interims for the first semester, which means increasing the cost by 40%. Meanwhile, he estimated the project at the 2nd semester required only 4 persons, but the payment estimation remained for 5 persons due to non-mutualization among the different projects (see Table 2.2).
- The end of the 2nd semester showed that the project 2 needed 5 persons as the first estimation (see Table 2.3).

In total, the real cost of the project 1 exceeded 53% of the first estimation and the one of the project 2 exceeded 27%. We are going to see that this model will be changed completely after 2002.

Table 1 & 2: Vision of project leaders on the estimation, advancement, and realization of their projects

Vision of Project Leader for project N°1				Vision of Project Leader for project N°2			
Table 1.1: At the budget moment				Table 2.1: At the budget moment			
	Working employees	Paid employees	Derivation		Working employees	Paid employees	Derivation
1 st ses	5	5	0	1 st ses	10	10	0
2 nd ses	10	10	0	2 nd ses	5	5	0
Total	15	15	0	Total	15	15	0
Table 1.2: At the revision moment				Table 2.2: At the revision moment			
1 st ses	4	4+1*	1	1 st ses	12	12+2**	2
2 nd ses	12	12+2**	2	2 nd ses	4	4+1*	1
Total	16	19	3	Total	16	19	3
Table 1.3: At the closure moment				Table 2.3: At the closure moment			
1 st ses	4	4+1*	1	1 st ses	12	12+2**	2
2 nd ses	14	12+2x2**	4	2 nd ses	5	5	0
Total	18	23	5	Total	17	19	2

*: employees who are paid, even without working, due to non-mutualized projects

** : interims recruited from the exterior (whose salaries are two times higher than the permanent employees)

The tables 3 and 4 illustrate the possibility of “jet lag” between the project advancement known by the project leaders and that known by accountants/operational controllers.

Table 3 & 4: Vision of accountants/operational controller on the paid employees

In case of updated information				In case of out-of-date information			
Table 3.1: At the budget moment				Table 4.1: At the budget moment			
	Project 1	Project 2	Total		Project 1	Project 2	Total
1 st ses	5	10	15	1 st ses	5	10	15
2 nd ses	10	5	15	2 nd ses	10	5	15
Total	15	15		Total	15	15	
Table 3.2: At the revision moment				Table 4.2: At the revision moment			
1 st ses	5	14	19	1 st ses	5	14	19
2 nd ses	14	5	19	2 nd ses	10	5	15
Total	19	19		Total	15	19	
Table 3.3: At the closure moment				Table 4.3: At the closure moment			
1 st ses	5	14	19	1 st ses	5	14	19
2 nd ses	18	5	23	2 nd ses	18	5	23
Total	23	19		Total	23	19	

The simplified model on workforce allocation model after 2002 (Model 2)

Contrary to the model n°1 in which each project leader controls his project without the coordination with other projects, the model n°2 illustrates that the horizontal departments are responsible for the workforce and material allocation of different projects (see Table 5 & 6).

Table 5 and 6: Vision of horizontal departments (Technical department and Installation department)

On the quantity of working employees				On the quantity of paid employees			
Table 5.1: At the budget moment				Table 6.1: At the budget moment			
	Project 1	Project 2	Total		Project 1	Project 2	Total
1 st ses	5	10	15	1 st ses	5	10	15
2 nd ses	10	5	15	2 nd ses	10	5	15
Total	15	15		Total	15	15	
Table 5.2: At the revision moment				Table 6.2: At the revision moment			
1 st ses	4	12	16	1 st ses	4	10+1*+2**	17
2 nd ses	12	4	16	2 nd ses	12	4	16
Total	16	16		Total	16	17	
Table 5.3: At the closure moment				Table 6.3: At the closure moment			
1 st ses	4	12	16	1 st ses	4	10+1*+2**	17
2 nd ses	14	5	19	2 nd ses	12+4**	4+2*	22
Total	18	17		Total	20	19	

*: employees transferred from other projects

** : interims recruited from the exterior (whose salaries are two times higher than the permanent employees)

The project leader would receive the general report relating to the advancement of each project at the end of the month. And based on this report, the project leader would make a financial report and prevision of his project. The vision of the project leader was significantly reduced. He no longer has the right to know the quantity of working employees. His vision is rather equal to that of accountants – “quantity of paid employees”. The table 7 also demonstrates that three possible scenarios may happen: 1) the project leader receives updated information on time, 2) he receives updated information through the channel of accounting systems, and 3) his information is out-of-date.

Table 7: Visions of project leader N°1 in three different scenarios.

SCENARIO 1: The project leader has updated information on time (thus he may react if necessary)

The project leader no longer has the right to know the quantity of working employees

On the quantity of paid employees

				Table 7.1.1: At the budget moment			
		Project 1				Project 1	
1 st ses				1 st ses	5		
2 nd ses				2 nd ses	10		
Total				Total	15		
				Table 7.1.2: At the revision moment			
		Project 1				Project 1	
1 st ses				1 st ses	4		
2 nd ses				2 nd ses	12		
Total				Total	16		
				Table 7.1.3: At the closure moment			
		Project 1				Project 1	
1 st ses				1 st ses	4		
2 nd ses				2 nd ses	16		
Total				Total	20		

SCENARIO 2: The project leader has updated information through the channel of accounting systems (it's often too late to react)

SCENARIO 3: The project leader has out-of-date information (Ignorance of the project leader)

The project leader no longer has the right to know the quantity of working employees

On the quantity of paid employees

				Table 7.3.1: At the budget moment			
		Project 1				Project 1	
1 st ses				1 st ses	5		
2 nd ses				2 nd ses	10		
Total				Total	15		
				Table 7.3.2: At the revision moment			
		Project 1				Project 1	
1 st ses				1 st ses	5		
2 nd ses				2 nd ses	11		
Total				Total	16		
				Table 7.3.3: At the closure moment			
		Project 1				Project 1	
1 st ses				1 st ses	5		
2 nd ses				2 nd ses	15		
Total				Total	20		

Let's make a cost comparison between the model n°1 and n°2. With the same scenarios described in the model n°1, the structure after 2002 allowing the resource mutualization enables to economize the payment of three persons for the project 1 (i.e. only 33% cost increase, instead of 53% before 2002), but the same expense for the project 2 (see Table 3). It

is interesting to note that the resource mutualization is not always an efficient lever to reduce the cost. The project 2 shows that the project leader in the structure pre-2002 economized the cost hiring the interim thanks to his reserve of one employee; whereas the resource mutualization post-2002 forces the project leader to recruit an interim for an un-employed worker is muted to work for another project (see Table 8).

Table 8: Comparison on the number of paid employees between the model n°1 and n°2 at the closure moment

Moment	Project 1		Project 2	
	Before 2002 (Model n°1)	After 2002 (Model n°2)	Before 2002 (Model n°1)	After 2002 (Model n°2)
Budget	15	15	15	15
Revision	19	16	19	17
Closure	23	20	19	19

Appendix 7: Hi-Tech case study for the seminar Eco 432 of Jean-Pierre Ponsard in Ecole Polytechnique

Context

Tecelec is involved in service in telecommunications and electricity of the Group XYZ. This division, which is mainly a French division, is specialized in achieving systems of management of public transports networks (tramways, bus, metro...), information systems on the state of the network, toll systems...

These systems of different size and complexity require competences in computer science and telecom. The installation of these systems requires also the ability to monitor infrastructure works (construction, etc.).

Initially, this market was very fragmented by local areas and the projects were given to small companies that had developed good working relationships with the local authorities (municipalities, local public companies...). At the beginning of the 90s, this sector became more technical and a double concentration took place: public companies decided to centralize their decision process and the municipalities decided to delegate the management of their operations to national engineering firms that had more competence than local entrepreneurs.

Tecelec originates from the merging of 3 local firms and as such is the result of this concentration process.

Organisation until 2002

At the operational level, Tecelec has 2 departments:

- The sales department, in charge of making offers in the name of the company,
- The production department, in charged of the projects once they are signed, its task consists in finalizing the initial studies, getting the computer work done, ensuring the proper in site delivery and the maintenance of the system. The various projects are supervised by a number of business managers.

Each business manager supervises its portfolio of projects as a small firm. Teams of engineers and technicians are allocated by each business manager to his own projects. The decision to transfer a person from a business manager to another one is in the hands of the head of the department, and takes place only in case of durable low activity in one area, each business manager doing his best to keep his team in order to face rather unpredictable peaks of activity.

The indicator of performance that is used to determine the bonus of a business manager consists each year in the difference between profits for the projects that ended on that year and the corresponding costs. The bonus, always greater or equal to zero, is proportional to this difference.

The sales department gets a bonus that is a function of the growth of total sales from one year to the other.

The financial results of Tecelec in the past 5 years are the following

year	1997	1998	1999	2000	2001
Total sales growth rate	5%	8%	12%	12%	10%
Margin %	10%	8%	5%	6%	2%

A critical study realized by Stratem, a consulting firm in strategy

This study showed that the financial results can be explained as follows:

- Most of the projects were profitable,
- A small proportion of projects were, on the contrary, particularly bad, with costs much higher than the contracted prices defined at the time of the offer.

The proposed idea consisted to construct a grid in order to help the sales department to make more relevant offers. Stratem proposed its services to design that grid (nature of the project, degree of complexity...)

A counter proposal

You are the new manager recently appointed to take charge of the Organization and Human Resources department of Tecelec. You are just coming back from an exciting seminar on compensation and incentives design. Eager to apply what you just learned you suggest another explanation to the observed results of the company. According to you the difference in profitability between projects hides a perverse effect similar to the one you heard about “the folly to expect A when rewarding B”.

Question 1

Elaborate your analysis thanks to what you learned in Eco 432.

The new organization from 2002

The CEO of Tecelec, after a close review of your analysis, decided to put you in charge of designing a new organization and the associated performance indicators for the different departments.

You selected a matrix organization:

- Besides the 2 vertical sales and production departments, 2 other horizontal departments were created,
- The technical department to include all engineers and technicians in charge of the conception of the systems,
- The infrastructure department to include the technicians and assistants in charge of the in site implementation of the systems

The responsibilities are now the following:

- The sales department is in charge of the offers, and elaborates the offers taking advice from the technical department.
- Once an offer is accepted, a business manager from the production department is in charge of the project, taking all responsibilities with the client;
- But it is the technical department that is in charge of the allocation of its workforce on the different projects, during the study phase, then similarly it is the infrastructure department who allocates its workforce during the in site implementation.

You were particularly sensitive to have appropriate performance indicators for the 2 new horizontal departments. The more logical to you consisted in considering them as cost centres and then in evaluating their performances on the basis of the number of persons actually employed on the projects relative to their budgeted allowances.

Under this new organization you observed greater efficiency in the management of the employees (better activity rate for the workforce and a decrease in urgently needed employees to be hired in bad terms). Nevertheless, something is now bothering you: Tecelec has now the tendency to become more and more specialized, the company is often not selected for small projects, on the large projects the engineers of Tecelec are often in direct contact with the client and an overall of technical work may go on without being taken into account in the contract.

Tecelec is now highly regarded in the business community for its technical excellence but the growth of its total sales now culminates around 5% while its margin did not improve as initially expected.

Question 2

The CEO is questioning the validity of your reasoning and has some doubts about the organizational change you implemented. Can you propose an analysis of the of the new situation ?

Question 3

What lines of action would you suggest to explore in order to maintain your position in the company?

Propositions of case study correction

Question 1

The performance indicator has a break-even point: not a bonus if the project had negative results. Supposing that the project leaders can produce a slack into cost allocation in a manner which allows concentrating all the gains on “good” projects, even getting other projects, which are “less attractive” in bonus, lost.

Question 2

The Technical department behaves as a cost center. It is going to engage qualified employees on the basis of commitment done at the beginning of the financial year.

Concerning the realization of projects, the Technical department is not motivated to reduce project costs, but remains only on its committed budgets.

Because its opinions are important for project propositions, it is able to deal with the demands directly addressed to itself. For example, the engineers privilege the sophisticated projects whose solutions are too expensive for small projects. Or in certain aspects, the quality of their realized projects is higher than the competitors, even though there was no discernible performance difference. Consequently, the project leaders do not succeed to reclaim a supplement payment from the customers.

Question 3

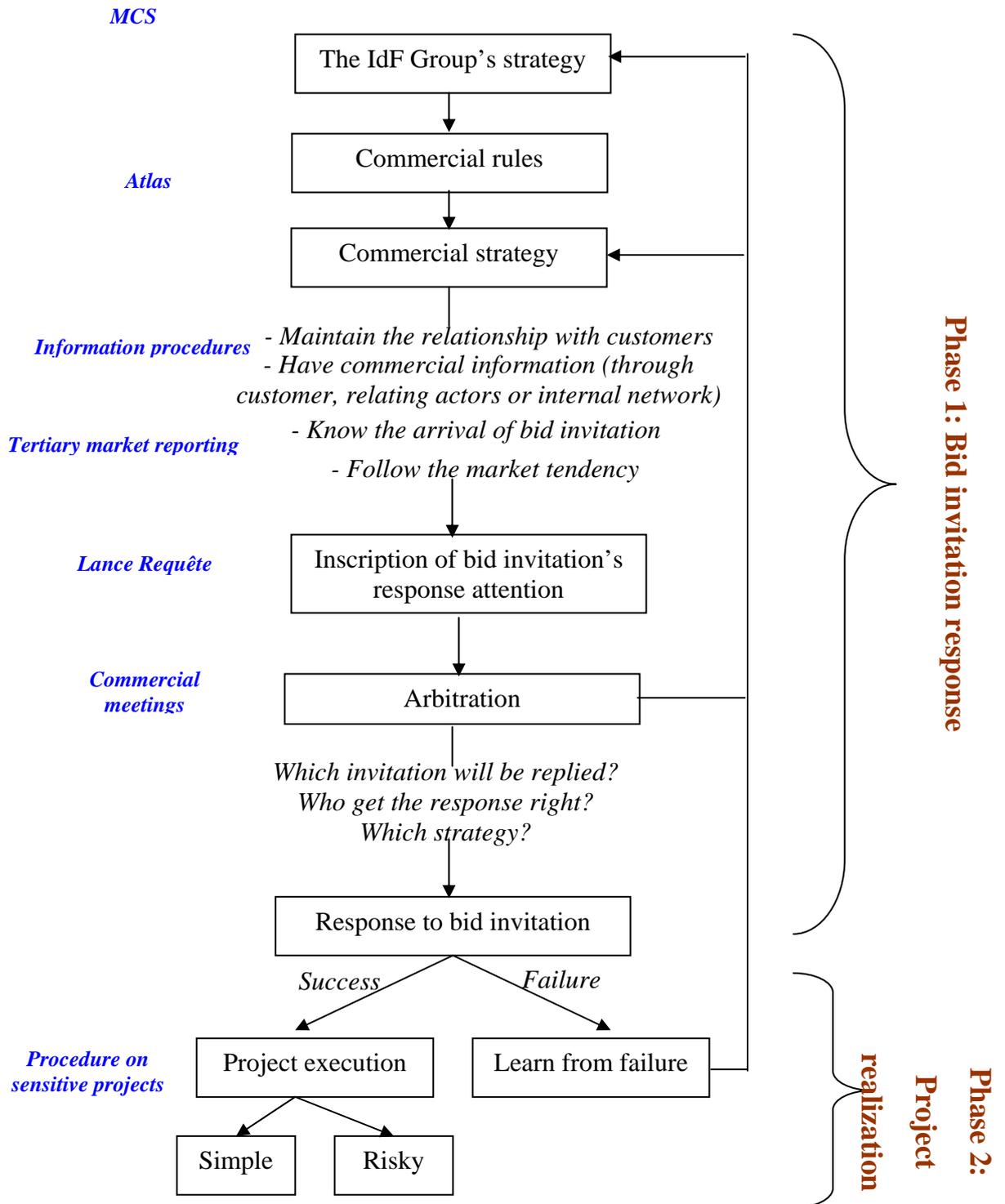
It should create a balance between the cost optimization and project profit, thus between the Technical department and Production department.

This problem is typical for matrix structure, but not easy to solve. It is possible to make frequent reporting and discussion (every three months) of a planning which combines both personal commitments and financial results, coming from a simplified budget model. As a result, each actor knows better his/her roles in the global impact of the company (likely to Champagne game). Besides, such a system allows improving the coordination process while reducing its inertia (recoordination principle).

We can also reduce the distortion of performance indicators used for the Technical department by motivating it to the global results of the company (we also reduce its control on this indicator conforming with the dilemma of control distortion, but increase the company efficiency).

We can also change organizational structure by making a distinction between small projects (only managed by project leaders) and grand projects (managed by a matrix structure).

Appendix 8: Close relation between strategy and management control systems



Appendix 9: Illustration of main commercial positions in Atlas

Exclusivity

A profit center is considered as “Exclusive” when only it has the right to reply to the appointed customer’s bid invitation because the former has close relation with this customer.

For example, the profit center 1.1 (CdP 1.1) is Exclusive in the relation with the customer (1). They have done the business together for 3 years; hence, a good acquaintance accompanied with a close relationship with customer (1) is created. Thus, it is not necessary that the customer spent much time to explain the expected work and the workplace since CdP 1.1 knows the working place by heart. As a result, both the customer and the CdP 1.1 can economize time and money in the project management.

The CdP 1.1 is usually the first one in Electra who knows the arrival of bid invitations from customer (1). And it is sure that this CdP would get the response right of this type of bid invitations. Even if the other profit center is informed the arrival of customer (1)’s bid invitation before the CdP 1.1, it is often the CdP 1.1 who gets the response right.

Coordination without Leader

The role of Follower is not defined neither in Atlas nor the other official documents of Electra. The “coordination without Leader” is often reserved for the customers who are not strategic for Electra. The profit centers designated as Followers do not need to have any approbation to reply to the appointed customer’s bid invitation. Yet, this structure is rather disordered because no one has already owned a privileged relationship with the customers. Consequently, “the Follower should know the arrival of the new bid invitation”.

For instance, the CdP 1.1 and CdP 2.2 are Followers in the relation with the customer (2). As a result, both of them are in charge of maintaining the relation with this customer and try to be the first one knowing the arrival of bid invitation and commercial information as much as possible.

If only the CdP 1.1 registers its intention to reply the bid invitation of the customer (2) in Lance Requête, it will get the response right automatically. Normally there is no discussion on this subject in the commercial meetings, but the CdP 1.1 must give frequently the information

relating to the progress of the replied invitation in the commercial meetings at delegation's level and at Operational unit's.

However, if two or more profit centers register its intention to reply the bid invitation n°1 in Lance Requête, they will exchange the information and discuss together in order to find an agreement in the Operational unit's commercial meetings. Theoretically, they cannot discuss about this subject before the Operational unit's meetings because either the CdP 1.1 or the CdP 2.2, who do not have the right to consult the registered response intention of other delegations in Lance Requête, did not know that another had been also interested in replying to the same bid invitation. In case that they cannot be in accord, the Tertiary director will make the arbitration based on the above-mentioned criteria.

Coordination with Leader

The coordination with Leader is often reserved for strategic customers of Electra. The leader is selected by the concerning profit center managers and validated by the COPOL⁹.

The role of the Leader defined in an official document is to coordinate the commercial actions, check off the commercial information, watch out the respect of internal and external commercial rules and practices, and pursue the customers' development. The Leader has a good relation with the customer, but less than the one of the Exclusive. Since the Leader has a legitimate role to carry out the commercial development, it is his responsibility to invest in long-term relation with customers (Ex: participating in the customers' strategy formulation or regularly meeting their top management). The Leader must become a natural contact point of the customer. "The leader must know the arrival of the new bid invitation" (/il doit connaître l'offre). The Leader is often the first one knowing the arrival of the bid invitations because he has the close relation with the customer.

The Follower having not a legitimate role to carry out the commercial development depends on its Leader's quality and willingness. The Follower must have the approbation of the Leader before replying to any appointed customer's bid invitation, but the Leader may directly reply to the invitation. If the Follower has a good Leader who well executes the commercial development and is ready to share his bid invitations, the Follower's commercial

⁹ COPOL comprises of the Director of the IdF Group, all delegation directors, Tertiary Director, Commercial Director, Human resource director, Management control director.

position will be extended. Otherwise, the Follower will be stuck in the obligations imposed by Atlas rules and will not take any advantage from its Leader.

If the Leader and the Follower are in the same delegation (as in case of the customer 2), it is easier and faster for the Leader (/Follower) to share its information relating to the bid invitation, and even the response right to the Follower (/Leader) since they participate in the same delegation commercial meetings and have the same patron – delegation director. Otherwise, they have to wait to the Operational unit Commercial meetings to know who is also interested in the same bid invitation and who will get the response right.

In conclusion, a new management control systems of Electra may be described as follows:

- Strategy: long-term, collectively elaborated, widely communicated, and flexible,
- Defining and communicating common explicit target,
- Creating horizontal group: among different hierarchical levels and among different vertical entities,
- Creating a customized tool – Atlas and Lance Requête- having a close relationship with the strategy. Clearly defining commitment, responsibility and positions of each profit center, but allowing the flexibility by privileging the information exchange, arbitration, and transparent decision-making,
- Formalizing an operational procedure: synthesis, vision development, group animation.
- Moderate involvement of the top manager (by regularly receiving information of horizontal groups, delegating to his direct subordinate to monitor the function of horizontal groups),
- The Tertiary director having legitimate power of arbitration and control of confidential information
- Incentives: effort-based bonus systems for key managers and formula-based for line managers.

Appendix 10: Evolution of permitted actions in Atlas 2003 & 2006

	The number of customers				Average Turnover 2000-2001-2002 (Average)		
	2003	2006	% 2003	% 2006	Average	Average/ Total	Average / number 2003
Without decision	277	484	48%	44%	28 013	18%	101
Exclusive	181	331	31%	30%	37 366	24%	206
Coordination with leader	61	145	10%	13%	55 501	36%	910
Coordination without leader	53	115	9%	10%	34 022	22%	642
Free action	11	37	2%	3%	487	0.3%	44
Total	583	1112	100%	100%	155 389	100%	267

Appendix 11: Example

All profit centers wish to work with the customer A, an important customer of Electra; hence a competition is pretty fierce among profit centers. In Atlas, we find that:

- in high-current segment, CdP 1.1 is Follower, CdP 2.1 is Leader, and the CdP 3 is Exclusive in the Lighting service; while the others are Outsiders,
- in low-current segment, CdP 2.1 is Follower, , and CdP 2.2 is Leader; while the others are Outsiders.

Customer A		Electra (General Director + Tertiary Director)				
		Delegation 1		Delegation 2		Delegation 3
		CdP 1.1	CdP 1.2	CdP 2.1	CdP 2.2	CdP 3
High-current	Lighting	Outsider	Outsider	Outsider	Outsider	Exclusive
	Others	Follower	Outsider	Leader	Outsider	Outsider
Low-current		Outsider	Outsider	Follower	Leader	Outsider

Supposing that there are three bid invitations coming from customer A.

The bid invitation n°1

On April 14th 2006, the profit center 2.1, Leader in high-current system, received a call from the customer A to announce the arrival of the bid invitation n°1, which then was immediately registered in Lance Requête.

In the commercial meeting at delegation's level on April, 20th 2006, the manager of the profit center 2.1, being Leader, uses following arguments to convince the delegation director to give him the response right of the bid invitation n°1 in high-current segment:

- The project size is important (for more than 17.000m²), so the turnover should be also important,
- The technical requirement fits the competences of the profit centers,
- The manager knows very well the customer And its project manager,
- He has an economic support,
- He has important contacts in the activities required by the customer (high-current systems).

However, the delegation director suggested that the profit center 2.1 should find a partner to reply to this invitation since:

- The administrative procedure is so complicated that it will give the profit center 2.1 a torrid time,
- It is pretty difficult to well conduct this business due to the fact that the latter locates in the occupied zone and has an important size,
- The critical size of the profit center is too limited to well execute the project once gained.
- And the project cannot advance in time.

The director proposed the Leader reply the invitation n°1 with the profit center 2.2 – the Outsider in Atlas. But the manager of the CdP 2.2 refused with the reason that this type of business never generates an interesting margin. Finally, the delegation director agreed that the profit center 2.1 would study this invitation for two weeks (until May 4th 2006), then the director and the manager 2.1 will discuss about this invitation again and choose a partner (if necessary).

One week later (on April 27th 2006), in the Operational unit's meeting, the Tertiary director found that two profit centers registered in Lance Requête their intentions to reply the bid invitation n°1. The Follower made the inscription in Lance Requête one week sooner than the Leader (April 7th 2006). In spite of its importance, the registration date is only one of criteria of candidate selection (c.f. section 3.2.2). The Tertiary director thus asked the delegation directors and their sales people the following questions about this invitation.

Invitation n°1 coming from the customer A – high current		
Questions of the Tertiary director	Response of Leader (CdP 2.1)	Response of Follower (CdP 1.1)
Who informed the profit centers the arrival of invitation n°1?	The customer itself (but not mentioning the name of interlocutor)	Giving the names of 2 customer's chiefs in charge of estimating bid invitation who phoned the Follower.
Detailed estimation on invitation	Already done	???
Historical relation with the customer	Having already executed many projects for this customer	This is the first time.
Price	Not a word	Having already received the price advice (bordereau de prix).
Budget	Not a word	Knowing the budget
Possible partners	Not a word	The customer requires that the profit center 1.1 marry with another competitor to accomplish the project

After listening to the arguments of two delegations' representatives, the Tertiary director – arbitrator first proposed another bid invitation to the Leader and then suggested giving the Follower the response right of this invitation n°1. Since the Follower, in his opinion, more enthusiastic to reply to this invitation, owns more important commercial information. In addition, it is also a good opportunity for the Follower to have a new customer. The delegation director of the Leader required the Tertiary director to give him a day to consider this proposition because the fact that he knows all interlocutors of this customer may facilitate the execution of the project once gained.

After one day of reflection, the Leader agreed to give the Follower the respond right of the bid invitation n°1.

After receiving the green light of the Tertiary director, the Follower prepares the necessary documents to reply the bid invitation. The delegation director together with the profit center manager and the salesperson made the price study as well as the project study. As a result, they decided to reply the invitation with the very low price and the expected margin even at a loss because the external competition was very fierce and the delegation is ready to win this invitation with any price.

Finally, they won the bid invitation and accomplished this project so well that the customer directly proposed them to reply the bid invitation n°2 in the low current segment, where the Follower, according to the rules of Atlas, is Outsider.

The bid invitation n°2

In the relation with the customer the customer A in low current activity segment, the CdP 2.2 is “Leader”, while the CdP 1.1 is “Outsider”. But it is the Outsider who got the response right to the invitation n°2 because the customer A, who had been so satisfied by the CdP 1.1’s performance of the project n°1, directly informed the CdP 1.1 the arrival of the invitation n°2 as well as the important commercial information. Moreover, the customer A officially required the response coming from the CdP 1.1. Given the situation, though CdP 1.1 had violated the Atlas commercial rules, CdP 1.1 got the response right.

The bid invitation n°3

In the relation with the customer the customer A in high current activity segment, CdP 2.1 is “Leader”, CdP 1.1 is Follower, and CdP 3 is Exclusive in service activities.

The Leader and the Exclusive have the weekly meetings to discuss about the coming projects and technical points relating to the customer the customer A. Surprisingly, the coordination between Leader and Follower did not happen, while the coordination between the Leader and Exclusive is regularly done. The CdP 3 had directly contacted the Leader, not the Follower in order to reply the customer A’s invitation n°3 since they had already made the coordination for other projects of the same nature; thus, it was the Leader who got the response right.

Appendix 12: Synthesis of interviews

Examples of real commercial lives

In Electra, it seems that everyone do business and are keen on searching for the new bid invitations. Say “everyone” because the commercial information often comes from the different sources – Tertiary director, sales directors at Holding and delegation, delegation directors, profit center managers, business supervisors, salespersons, or even secretaries.

Ex1: In order to pursue the diversification strategy, the directors agree that Electra should develop the small business, avoid the dependence in the large business, so have a balance between the small business and the large business. Moreover, the margin of the small business is much more interesting than the one of the large business. That’s why they did not reply some important Tertiary bid invitations which were risky and required so much investment.

Ex2: a profit center CdP 2.2 had to refuse replying a bid invitation inasmuch as its official qualification forgotten to be renewed is no longer valid.

Ex3: For a bid invitation of the hospital Foch, the delegation director suggested that the profit center CdP 2.1, despite its position as Leader in Atlas commercial rules, should not reply or should reply with another profit center, since:

- The administrative procedure of this hospital is so complicated that it will give the profit center CdP 2.1 a torrid time,
- And the project cannot advance in time.

The manager of the profit center CdP 2.1 required to have more time to consider the proposition of the delegation director. However, one week later, Electra's Tertiary director decided that CdP 2.1 could reply to this invitation.

Ex4: The customer A, an important customer of Electra, is so large that it has many different interlocutors. And all profit centers wish to work with the customer A; hence a competition is pretty fierce among profit centers in the same operational unit (like CdP 1.1, CdP 2.1, and CdP 3) and the ones in different operational units (like Ises Com). The following examples in the arbitration concerning the customer the customer A show that no criteria is absolute in the arbitration relating to the response right.

Ex 4.1: Regarding the bid invitation n°1, CdP 1.1, despite its position as "Outsider" in the relation with the customer A – low current activities, had made the inscription in Lance Requête much sooner than CdP 2.2 –"Leader". However, it was CdP 2.2 who won the response right.

Ex 4.2: CdP 1.1 received a bid invitation in which 95% is on Tertiary segment (where CdP 1.1 is "leader") and 5% is on service segment (where CdP 1.1 is "Outsider"). The amount of the service segment in this invitation is so limited that only CdP 1.1 got the response right.

Ex 4.3: Regarding the bid invitation n°2, CdP 1.1 as "Leader" in the relation with the customer Park Versailles had made the inscription in Lance Requête sooner than CdP 2.1 – Follower. Thus CdP 1.1 won the response right.

Ex 4.4: In the relation with the customer the customer A in high current activity segment, CdP 2.1 is "Leader", CdP 1.1 is "Follower", and Infra is Exclusive in service activities. Infra had made the contact with CdP 2.1 in order to reply the customer A's invitation n°3 since they had already made the coordination for other projects of the same nature; thus, CdP 2.1 got the response right.

Ex 4.5: In the relation with the customer the customer A in high current activity segment, CdP 2.1 is “Leader”, while CdP 1.1 is “Follower”. Regarding the bid invitation n°4, CdP 2.1 has a very good relation with the research consultancy, so knows before anyone the arrival date of this invitation, and then is the first one making the inscription in Lance Requête. However, it was CdP 1.1 who won the response right since it was the customer who informed CdP 1.1 the arrival of the invitation. It means that for this invitation, the customers are implicitly considered more important than the research consultancy.

Ex 4.6: In the relation with the customer the customer A in low current activity segment, CdP 2.1 is “Leader”, while CdP 1.1 is “Outsider”. But CdP 1.1 got the response right to the invitation n°5 because the customer A-Orly, who had been so satisfied by the CdP 1.1’s performance of the project n°4, directly informed CdP 1.1 the arrival of its invitation n°5 as well as the important commercial information and officially required the response coming from CdP 1.1. Given the situation, though CdP 1.1 had violated the Atlas commercial rules, CdP 1.1 got the response right.

Ex 5: In the relation with the printing house, CdP 1.1 is “leader” while CdP 2.1 is “Follower”. CdP 1.1 has executed many projects for this customer for a long time. However, CdP 2.1 possesses more commercial information relating to the invitation n°6 of this customer.

Invitation n°6 coming from the printing house		
Criteria	CdP 1.1	CdP 2.1
Who informed the profit centers the arrival of invitation n°6?	The customer itself (but not mentioning the name of interlocutor)	2 customer’s chiefs in charge of estimating bid invitation phoned CdP 2.1.
Detailed estimation on invitation	Already done	???
Historical relation with the customer	Having already executed many projects for this customer	This is the first time
Price	Not a word	Already received price advice (bordereau de prix) of low-current bid invitation and will receive the one of high-current in the next week.
Budget	Not a word	Knowing the budget
Possible partner	Not a word	The customer requires that CdP 2.1 marry with another competitor to accomplish the project

After listening to the arguments of two delegations’ representatives, the Tertiary director – arbitrator first proposed that CdP 1.1 would have the response right to another important bid invitation n°7, and then CdP 2.1 could have the response right to this invitation n°6. Since

CdP 2.1, in his opinion, more enthusiastic to this invitation, owns more important commercial information. In addition, it is also a good opportunity for CdP 2.1 to have a new customer. The delegation director CdP 1.1 required the Tertiary director to give him a day to consider this proposition because the fact that CdP 1.1 knows all interlocutors of this customer may facilitate the execution of the project once gained.

EX 6: CdP 2.1, as “Leader”, received personally the bid invitation n°8 of Meunier, but refused to reply because this client, according to CdP 2.1’s sales director, is not well-organized and the invitation is only a small business. As a result, CdP 1.1 – “Follower” got the response right to this invitation.

Ex 7: The Tertiary director gave to CdP 1.1 the commercial information concerning the bid invitation n°7 of French National Assembly (where CdP 2.1 is “Leader” and CdP 1.1 is “Follower”) in the commercial meeting. It is a very important and attractive business (45.000m2 with the possible turnover €14 millions), so the CdP 1.1 may be subcontractor or partner with another competitor. However, he thinks that possibilities to win this invitation are very thin. Anyway, he proposed CdP 1.1 to reply to this invitation since CdP 2.1 refused to reply due to the estimated risk too significant for the critical size of CdP 2.1.

Ex 8: the workload planning as well as the order taking is followed by the profit center manager and the delegation director. Sometimes, the profit center knowing nothing about the commercial information relating to the bid invitation gets the response right because it will be soon undercharged. The commercial meeting is also an occasion to explicit the possible problems and require the aid of other delegations.

Ex 9: The sales director of the delegation Maintenance Services requires the other delegations to make him in contact once knowing the arrival of any bid invitations relating to his field, because all his orders will be run out in two months.

Ex 10: CdP 1.1 replied to the bid invitation coming from Fontainebleau Hospital – new customer because CdP 1.1 wants to develop a new customer network in this region.

Ex 11: The profit center CdP 2.1 , who is defined as Leader in the relation with the hospital Kremlin-Bicêtre in Atlas commercial rules, wishes to reply to an important bid invitation of this hospital (more than 17.000m2) because:

- the manager knows very well the customer And its project manager,
- he has an economic support,

- he has important contacts in the activities required by the customer (low-current and high current systems).

However, the delegation director suggested that CdP 2.1 should find a partner to reply to this invitation since:

- It is pretty difficult to well conduct this business due to the fact that the latter locates in the occupied zone and has an important size,
- The CdP 2.1 's critical size is too limited to well execute the project once gained.

The director proposed CdP 2.1 reply this invitation with CdP 2.2, who is in the interdiction position in Atlas. But CdP 2.2's manager refused with the reason that this type of business never generates an interesting margin. Finally, the delegation director agreed that CdP 2.1 would study this invitation for two weeks, then the director and the CdP 2.1 manager will discuss again about this invitation and choose a partner (either CdP 2.2 or another profit center).

EX 12: In 2006, the customer Nexity required the grouping of CdP 2.1/CdP 1.1 to work on his project. Or on the project Hines, CdP 1.1 works on high-current part while CdP 2.2 works on the low-current part.

Ex 13: the customer M requires that two profit centers CdP 2.1 and CdP 1.1 reply to the same invitation; otherwise, they will loose their hunting field.

Ex 14: despite the interdiction position, the profit center may reply to a bid invitation if the formers do not violate the permitted activities of the other profit centers. Or, concretely, the profit center CdP 2.1 is the leader and CdP 1.1 is a mix-Follower vis-à-vis Hospital RD as defined in Atlas; however CdP 1.1 has developed such efficient commercial strategies that CdP 1.1 has had a number of important commercial information about bid invitations and has won most of the principal contracts coming from hospital RD since 6 months. As a result, CdP 1.1 and CdP 2.1 will interchange their positions in the next modification of Atlas: CdP 1.1 will become the new leader while CdP 2.1 becomes a Follower.

What are the advantages and risks of being Leader, Follower, Exclusive or "Interdictor"?

The positions regularized in Atlas commercial rules can be evolved or modified in accordance with the result of the winning bid invitations. One important rule in Atlas construction and modification is "the best wins" in order to motivate the commercial efforts. However, how to

balance between the respects of pre-defined Atlas commercial rules (to reduce the commercial costs) and the encouragement of new market conquest remains an important question.

	Advantages	Risks
Leader	<ul style="list-style-type: none"> - Have an important possibility to have the response right. - Have a good relation with the customer, but less than the one of the monopole. - Organize and animate the coordination (if any) (see EX1). - More difficult for the competitors to attack ourselves vis-à-vis the customers because there is always a Follower who is ready to take over (prendre relais). - Stimulating - Easier to meet the customers more frequently. - Motivated to keep their place. 	<ul style="list-style-type: none"> - Without doing a good commercial development, so losing its leader position to the Follower. - It must assure that the leader well coordinate with other profit centers - It must avoid that the Leader takes all bid invitations on his account.
Coordinator	<ul style="list-style-type: none"> -Very motivated to dethrone the Leader. Ex: relation CdP 2.1 and CdP 1.1 in hospital segment. - Require an important investment to become a leader. 	<ul style="list-style-type: none"> - Must inform the leader his intention to reply a bid invitation, but only in the bi-monthly Holding commercial meetings. - Having less the chance to get the response right - Not being able to reply without the approbation of the leader or the Tertiary director.
Monopoly	<ul style="list-style-type: none"> - Being sure to have the response right (98%) - Having a very close and good relationship with the customer, so understanding the customer very well. - Gaining time for the profit center as well as the customer (see Ex2). - Price study is done more rapidly, more efficiently and less costly thanks to the good acquaintance with the customer And the business (see Ex2). 	<ul style="list-style-type: none"> - Relation between the profit center and the customer so close that the latter may become too exigent (Ex: demand the important discount or free complementary services) (see Ex2). - Losing their place due to not well doing the commercial development or no longer being able to do more. - Easier to be attacked by a competitor, so easier to lose the customer into the hands of the outside competitor because Electra has only one representative at the customer. - Dependant on the limited number of customers (up to mono-client). It should create a network of recurrent customer. - The “Exclusive” may be too satisfied with his position to continue making sufficiently the commercial development.

Inter-diction	Even a profit center in the position “Interdiction” in Atlas may get the response right to a bid invitation if he conducts well the commercial development with his customer, owns suitable resources (competences, human, time, material, and so on) to well execute the project once gained, and the other actors in Atlas did not receive any information about this invitation from their customers.
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Ex 15: The salespersons and profit centers’ managers of CdP 2.1 and Infra carry out bi-monthly coordination meetings on the projects relating to the customer RATP (where CdP 2.1 is Leader, CdP 1.1 is Follower, and Infra is Exclusive and Leader in its activity). Why does CdP 1.1 not participate to these meetings?

Ex 16: CdP 1.1 is the Exclusive in the relation with the customer BHV. They have done the business together for 3 years, so a good acquaintance accompanied with a close relationship with BHV is created. Thus, it is not necessary that the customer spent the time to explain where to do what since CdP 1.1 knows the place by heart; while CdP 1.1 can also gain the time and money in research study. However, the customer has kept on requiring the complementary services without paying more and particularly demanding the discount of €20.000 on a project. It becomes extremely difficult to convince BHV a correct margin with an interesting turnover. As a result, the profit of this project is negative in 2006.

Learning from failure

Another important subject in the commercial meetings is to study why a profit center fails to win the bid invitation. The main reasons often are:

- the price proposed by a profit center of Electra is higher than the one of the competitors,
- or the profit center does not have a support (or relation) strong enough to win the bid invitation,
- or the technique document is not well prepared.

Thanks to the postmortem of the lost invitations, the participants may improve their ways of invitation response or even change the relating tools or organizational structure to fit the customers’ demands.

Ex 17: the director of the delegation Tertiary 2, after analyzing the reasons of losing the recent invitations, concluded that the price factor occupies only 60-70% of the key success factor; while the increasing importance of the technique document presentation, which is still the essential weakness of the delegation, requires the delegation to find out a solution as soon as possible. Citing an example of Cegelec - where a marketing service is specialized in the

preparation of technique document like taking photos of the construction site or of customers, archiving all relating historical bid invitations or projects, and collecting all references, so the technique document of Cegelec is perfect, the director suggested creating the same service in delegation.

Commercial Information collection at Delegation 1

Given the commercial information is precious, one delegation has formalized an information collection procedure so that the information registered in a pre-established form by business supervisors or anyone else may be rapidly available on Intranet, so shared to all directors. The information is often likely to customer, architect, volume – budget, property developer.

Appendix 13: Analysis of possible drawbacks of the new control systems and corresponding solutions

We, basing on the result of our interviews and our observations of commercial meetings, study the possible drawbacks in each issue, and then propose some solutions.

- For the first issue relating the interactive control systems, the information overload and paperwork risks are revealed (Simons, 1995, 2000),
- For the second issue, the economics theory also mentions other risks like free-rider risks (Cornes and Sandler, 1996) and organizational inertia (Moisdon & Weil, 1994; Berland & Sponem, 2005). The analysis of our interviews unfolds other risks on equity and transparency of arbitration result.
- And for the third issue, the ambiguity on the incentive systems reveals some risks.

Risks: Information overload and paperwork

The interactive use of Atlas systems, despite its undeniable strength, may theoretically provoke some following risks (Simons, 1995, 2000):

- In economic terms, the interactive control systems are costly because they require frequent attention and personal involvement of top managers and their subordinates.
- The decision makers suffer from information overload leading to the superficial analysis, a lack of perspective, and potential paralysis,
- The paperwork and forms become more important than face-to-face dialogue and action planning,

- The participant may feel threatened by the active interest and participation of senior managers. The threat of embarrassment can subvert learning.

The result of our interviews and our observations of commercial meetings reveals two of above-mentioned risks - the information overload and paperwork risks. The economics theory also mentions other risks like free-rider risks and organizational inertia. The analysis of our interviews unfolds other risks on equity and transparency of arbitration result, and on the loss of commercial networks. We are going to explain these risks and then propose some solutions to minimize them.

Simple declaration, discussion, and analysis are three principal types of actions in the commercial meetings (see 3.2.4 “Commercial meetings”). The sales director notes the declarations of participants and then makes the necessary change in the lists of bid invitations. Due to a great number of bid invitations (about 400 bid invitations), the participants hardly have enough time to discuss and exchange the information. Since many declarations concern only some participants, the others, not interested in listening to their counterparts, make casual talk or a phone call. The ambiance is rather disordered. Consequently, the information overload and paperwork are draining the useful time to make face-to-face dialogue.

Proposed solutions:

- The routine and unimportant declarations are sent (by fax, email or phone) to the sales director few days before the commercial meetings. The sales director will make a synthesis and then send it to all participants one day before the meetings. The declaration no longer fills up most of meeting time.
- The meeting agenda needs to be elaborated with much more details. The participants will propose to the Tertiary director the meeting discussion subjects on which he will base to create a specific agenda, then send to all participants one day before the meetings. This agenda will include the arbitration subjects whose details of Lance Requête inscriptions are only revealed in the meeting.

This proposition enables to have more time for arbitration explanation, face-to-face dialogue (like review on quality of commercial development or advancement of preparation of coming bid invitations), but takes more time and efforts in the meeting preparation.

Free-rider risks

Concerning to the free-rider risks¹⁰, many issues need studying like:

- First, since the Leader has a legitimate role to carry out the commercial development, it is his responsibility to invest in long-term relation with customers (Ex: participating in the customers' strategy formulation or regularly meeting their top management). The Leader must become a natural contact point of the customer. However, the notion of customers is not clearly defined – are they final customers or architects or studies departments? Given a great number of interlocutors of customers, and the Leader's limited resources (time, human, financial), the default of commercial development done by the Leader is often discovered too late. And no explicit quality control exists. The competition between Leader and Follower does not seem adequate to control the commercial development implemented by the Leader. Which criteria can demonstrate that the "Leader" carries out the commercial development as it should be? And how to know as soon as possible the default of customers' development done by the Leader?
- Second, if the Follower does not have a good Leader, he will be stuck in the obligations imposed by Atlas rules and will not take any advantage from its Leader.
- Third, two main types of bid invitations are the current bid invitations and the coming bid invitations. Contrary to the current bid invitations already officially publicized and having a response date, the coming ones are only the salespeople's prevision originated from their commercial networks. The coming bid invitations will be officially publicized six months, one year, or even beyond two years after they are inscribed in Lance Requête. As a result, the preparation of important coming invitations is often done long time before the official response. And to avoid the eventual competition, the interested profit centers must declare their intentions to invest in a coming bid invitation in an operational unit's commercial meeting; hence the Tertiary director will make the arbitration to choose which profit center has the preparation right. Nevertheless, how to control the preparation quality of coming bid invitations? Because a profit center may register very soon to reserve its response

¹⁰ Free riders are actors who consume more than their fair share of a resource, or shoulder less than a fair share of the costs of its production.

right, but then refuse to reply to bid invitation too late to allow another profit center to replace it.

- Fourth, is it possible that a delegation director gives confidential commercial information to his profit center manager in order that the latter may prepare to “pick” a bid invitation of another delegation? The top manager thinks that this risk is rather weak because the delegation directors are the essential members of general direction and their incentives are mainly based on efforts and contribution.

Proposed solutions to reinforce the quality of commercial development (the 1st and 2nd risks):

- Defining a clearer interface between Leader and Follower to improve the quality of commercial development. For example, the Leader may be in charge of the most important interlocutors, while the Follower may be responsible for the others,
- Making a frequent internal benchmark between Leader and Follower by using some indicators like “the number of replied bid invitations” and “the number of gained bid invitations on that of replied ones”.
- Doing a simple survey on the important customers’ satisfaction to reveal their perception of Leaders’ and Followers’ quality,
- Making frequent review on the actions of commercial development in commercial meetings.

Proposed solutions to control the preparation quality of coming bid invitations (the 3rd risk):

- Making a rapid briefing on the preparation advancement of coming bid invitations in fortnightly commercial meetings so as to assure that the profit centers really invest in concerning invitations.

Risks on equity and transparency of arbitration result

The arbitration result is not always perceived as equitable and transparent by the participants, let alone the profit center managers - uninvited in the commercial meetings at operational unit’s level.

One reason may be that only the final arbitration result, not its explications, is noted in the memorandum of commercial meetings due to confidentiality of commercial information. Even selection criteria about bid invitations and profit centers are not formalized and explicit in any document.

Proposed solutions:

- Assuring that the participants perceive the equity of final arbitration by clearly explaining and discussing with them the motivations. Although the top management may think it is done, it is not always the case. It is sometimes even forgotten in the meetings due to the lack of time and information overload,
- Encouraging the participants to orally communicate to profit center managers the explanation of arbitration result given in the operational unit's commercial meetings,
- Doing a survey on the perception of profit centers on the equity and transparency of arbitration result,
- Assuring that the Tertiary director is present in the delegations' commercial meetings.

Organisational inertia: opposition between delegations' and commercial departments' interests

Atlas also illustrates the traditional opposition between vertical structure (delegation-profit center) and horizontal structure (commercial department), which originates from the conflicts between the individual interests and the overall interests, between local power relating to resource allocation and global coordination relating to implementation of the decisions making in commercial meetings (Berland & Sponem, 2005). This issue may lead to the failure of implementation of new control systems if the conflicts are at the extreme.

Even if Atlas system determines the commercial rules for every profit center, the coordination among different profit centers needs the approval of their delegation directors. Moreover, the profit center managers are not legitimate participants in the operational unit's commercial meetings, while the delegations' meetings remain at local level. As a result, the delegation directors play a key role in the implementation of Atlas rules and in the coordination among profit centers situated in different delegations.

However, the results of our study show that the competition among delegations still exists, but becomes less visible than before 2003. This competition may be an obstacle for an effective coordination between delegations.

As a result, organizational inertia may occur.

- For example, a profit center A is selected to reply to a bid invitation together with a profit center B in the same delegation even though the profit center C in another

delegation should be chosen due to its better technical competences or being a natural coordination / response right as defined in Atlas.

- The delegation has a tendency to have the response rights as many as possible in spite of their real capacity,
- The information share is always a delicate and complicated issue. A delegation may mistrust on the commercial information shared by another and has the feelings that the other utilizes his information to conquest the market while he cannot exploit any information received in the commercial meetings. Moreover, there is a likely correlation between information and power. Finally, the quality of exchanged information is not completely guaranteed.
- Is the real confidence created among the entities while the turnover and the margin are perceived as the key performance indicators?

Proposed solutions:

- Centralizing the commercial services at the operational unit level. In other words, the sales departments of delegations will no longer exist, but the delegations still exist,
- And/or making the arbitration and coordination at the profit centers' level, no longer at the operational unit's. The commercial meetings at two levels – delegation and operational unit will be disappeared. The Tertiary director will directly work with the profit centers. In the new commercial meetings, the participants include the Tertiary director, the delegation directors, the profit center managers, and the salespeople,
- The historical brand names will continue being conserved and developed.

These solutions allow not only reducing the organizational inertia but also making the coordination and arbitration faster, more direct, and more transparent, thus reducing the risks regarding equity and transparency of arbitration results.

However, the first two solutions are not without problems:

- Regarding the first one, the fact that the salespeople do not belong to a delegation may make commercial information, emerged from daily commercial life, arrived to them too late and less qualifiedly. And the positive effect of competition among delegations – which may inspire salespeople to greater efforts if not too severe - may be restrained.

- Concerning the second one, the number of participants in commercial meetings is so important that the meeting duration may be interminable; and the quality of information exchange and of discussion may be degraded,

Loss of commercial networks

Another risk, which does not come from the new control system, but emerges from our interviews, is the loss of commercial networks.

The commercial networks and human relations are precious and require an important investment. If sales manager or a delegation director or anyone else leaves the company, the latter runs a risk of losing an important part of its commercial networks.

Proposed solutions:

- Creating a database in which names, addresses and phone numbers relating to the main interlocutors of customers, R&D department, architects are registered,
- Only the Tertiary director having access to this database in order to avoid the free-riders risks because the actors often associate their commercial networks with the power,
- Clearly explaining the utility of this database to all actors in Electra.

Ambiguity of incentive systems

According to the top manager, the bonus systems of delegation directors are mainly based on their efforts and contribution. However the interviewed human resource director, and Tertiary director perceived that the delegation directors' bonus is based on the achievement of financial objectives like turnover, gross margin and net margin.

The difference between the perception of the top manager and the one of his direct subordinates may emanate from the fact that:

- The formula-based bonus has existed in Electra so long before the arrival of the new director that it becomes evident,
- The effort-based incentives, however, are contradictory with the imposed rules of the parent company, hence they cannot be clearly and openly communicated in Electra,
- Only delegation directors and profit center managers directly receive the effort-based bonus, while they apply the formula-based incentives for their subordinates.

Nevertheless, the ambiguity of these incentive systems may cause the incomprehension and exploitation blockage of incentive systems' advantages.

Proposed solutions:

- The effort-based incentive systems are considered as an advanced and innovative method to motivate employees in theory, so the director should demonstrate their advantages to his superior in parent company to have legitimate rights to apply these systems,
- Clearly communicating to his subordinates the advantages and the nature of the incentive systems to avoid the ambiguity,
- The evolution of “the number of replied bid invitations” and “the number of gained bid invitations on that of replied ones” may illustrate the advantages of the new control systems.

We recognize that some above-mentioned solutions, despite their theoretical pertinence, are not easily practical. However, they may be served as a starting point to open up the discussion on the improvement of the new control systems.