

Maalouf, Malek

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HANDELSHØJSKOLEN
SOLBJERG PLADS 3
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Sustaining lean



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Sustaining lean

Strategies for dealing
with organizational paradoxes

Malek Maalouf

PhD Series 36-2013

LIMAC PhD School
Department of Operations Management

PhD Series 36-2013

**Sustaining Lean:
Strategies for dealing with organizational paradoxes**

Malek Maalouf

Supervisor:

Professor Britta Gammelgaard

Co-supervisor:

Professor Juliana Hsuan

PhD School LIMAC

Department of Operations Management

Copenhagen Business School

Malek Maalouf
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Malek Maalouf

Frederiksberg, December 2013

Abstract

Within a dynamic and changing world business order, the management of tensions and paradoxes affect the long term adaptability of the organization. The extant literature recommends that, by adopting the paradoxical perspective through the alternation of two opposing strategies for dealing with paradoxes – acceptance and resolution - companies are more likely to achieve transformation and change. As for lean sustainability, it is argued that the adoption of the paradoxical perspective can facilitate the interactions between lean and the physical, social and psychological structures of the company, which creates the necessary energy for change within the social system that facilitates second order learning and the shift in the mental models of the individuals involved in the lean initiative.

Through the identification of the paradoxes emerging during lean implementation in three case companies and mapping the strategies used for dealing with these paradoxes, this thesis contributes to lean sustainability - theory and practice - in two ways. First, this study claims that, by adopting the paradoxical perspective, companies are more likely to succeed in sustaining lean. The main argument is that, in addition to the resolution of the paradoxes which is the main focus of the rational approach, the paradoxical perspective takes into consideration the acceptance of the paradoxical tensions which entails that paradox is also seen as an opportunity for learning and for the generation of creative insights. Second, this study concludes that the process of alternation between the acceptance and resolution of lean paradoxes is more likely to be effective if it is intermediated by the reframing of the link between the two opposing poles of the paradox. Thus, reframing becomes an indicator for shifting between acceptance and resolution strategies. It is implicit in this argument that if managers move from acceptance strategy to a resolution strategy without achieving the reframing of the relation

between the two opposing poles of the paradox, then attempts for sustaining lean will be restricted.

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Chapter 1 - Introduction

The accelerated economic globalization of the world in the last years seems to place a higher standard of performance capabilities upon companies. There is a continuing fragmentation of mass markets as customers are becoming more demanding with increasing expectations. In face of increasing competition and globalization, companies have realized the strategic importance of improving efficiency and flexibility simultaneously (Kneller et al., 2012, Naor et al., 2010, Adler et al., 1999; Volbreda, 1996). Lean production has emerged as one of the manufacturing systems that can help companies improve both efficiency and flexibility. In fact the interest taken in lean by the western manufacturing community has increased dramatically after the performance gaps between Toyota and other carmakers were highlighted by the book “The Machine that Changed the World” (Womack, Jones, & Roos, 1990).

Lean manufacturing seems to involve radical organizational and process innovations that are not restricted to its Japanese origin, but has wide applicability in many different countries and industries (Smeds, 1994). In fact, Womack, Jones and Roos (1990) present lean as a universal and encompassing organizational and manufacturing model which spans the entire company from business strategy to product development and production (Womack, Jones and Roos, 1990). Hence, *“the reorganization of manufacturing according to lean principles can trigger a radical techno-organizational change towards a lean enterprise, with a new structure, strategy and culture”* (Smeds, 1994, p.67).

As a radical change associated with innovative organizational principles (Smeds, 1994), we can expect that sustaining lean to be fraught with difficulties since traditional practices and embedded routines are often very difficult to shed

(Greiner, 1967). In fact, despite the vast expenditures of companies on developing capabilities equal to Toyota, few efforts actually produce significant results (Repenning and Sterman, 2001). In his longitudinal research based on inventory trends data, Schonberger (2007) confirms the findings of Repenning and Stearman as he suggests that the *“Japanese production management may be difficult to sustain; this despite the underlying simplicity and good sense of its elements, its customer-slanted advantages, and its competitive benefits”*. Moreover, Schonberger (2007) cites some of the reasons which have affected negatively lean sustainability such as the excessive use of consultants, the inadequate depth of knowledge and employee involvement, and focus on in-plant improvement in detriment of fostering inter-company collaborations.

Moreover, attempts to spread lean philosophy to other sectors outside manufacturing - such as the service sector - have posed considerable challenges to managers attempting to adjust lean practices and sustain lean philosophy within their organizations. For instance, Radnor and Osborne (2013) cite that *“without utilization of a service-dominant logic, the Lean approach will be doomed to failure as an approach to public services reform – both as a set of managerial practices and as a theory”* (p. 266). Within the same context, Repenning and Sterman (2001) argue that successful improvement must include a significant shift in the mental model of all the participants in the improvement effort.

Based on the considerable challenges faced by organizations attempting to implement lean system, this thesis constitutes a contribution toward enhancing lean sustainability among companies. It proposes that, through the management of organizational paradoxes in lean, companies are more likely to sustain lean as they increase the depth of knowledge among their employees regarding the challenges posed by lean system, and facilitate the shift in the mental models of the

individuals participating in lean conversion. Within this context, organizational paradox “*involves contradictory, mutually exclusive elements that are present and operate equally at the same time*” (Quinn and Cameron, 1988, p.2). The core element of the management of the paradoxes in this thesis is the alternation between two opposing and reinforcing strategies for dealing with organizational paradoxes: acceptance and resolution (Smith and Lewis, 2011). The main argument is that the management of paradoxes facilitate the interactions between lean and the physical, social and psychological structures of the company (Repenning and Sterman, 2001), which creates the necessary energy within the social system that motivates change and the shift in the mental models of the individuals involved in the lean initiative (Smith and Lewis, 2011; Quinn and Cameron, 1988).

In addition to the above introductory notes, this chapter contains seven sections. The first section focuses on the emergence of paradox as a paradigm in management studies. The second section covers the management of paradoxes and its impact on organizational change and transformation. The third section presents the paradoxical nature of lean. The fourth section covers the motivation and the domain of the study. The fifth section presents the research questions. The sixth section introduces the philosophy of science adopted in the thesis and presents the case research as a method for answering the two research questions of the study. And finally, the seventh section outlines the structure of the thesis and its main contents.

1.1 The emergence of paradox as a new paradigm in management studies

Although our limitations as human beings sometimes amuse us, they also cause us confusion, frustration, and disappointment because they keep us from understanding our worlds. Thus, they challenge us to surmount them. We, the toolmakers, can attack this challenge as we have so many others, by finding or making tools that extend our capabilities. Computers are one such tool; they carry deductive logic beyond the limits of human rationality. Paradoxes are another such tool; they help us to grasp small chunks of irrationality. Paradoxes do this by being true and false at the same time.

(Starbuck W. H., 1988: 77-78)

Organization theory in the 1980s and 1990s has experienced a paradigmatic rupture as the influence of post-modern reality was projected on to the business world (Ibarra-colado, 2002; Huber 1984). According to Ibarra-colado (2002), post-modern realities imply recovering the paradoxical aspects of the condition of modernity eliminated by rationalist thought during the last two centuries as authors begin “*to point out the paradoxical character not only of social science reality at the macro and global level, but also at the level of management and organization*” (p. 167). Moreover, Huber (1984) proclaims the emergence of post-industrial organizations

which are defined as organizations whose structure and processes are well-suited to the environment known as post-industrial society. According to Huber (1984), “*post-modern societies will be characterized by more and increasing knowledge, more and increasing complexity, and more and increasing turbulence*” (Huber, 1984, p. 931). In order to reduce the possibility of unnecessary failure within this environment, post-industrial organizations will attempt to increase routine effectiveness by giving more focus to processes such as decision-making, innovation, and information acquisition and distribution. Simultaneously, companies must ensure the existence of informal or unstructured activities and the acquisition of soft information by top managers. Hence, post-industrial companies need to invest in formal and informal processes in order to deal effectively with the tensions emerging from the new business environment.

In general, the emergence of this post-modern order was accompanied by a shift from a world dominated by technical rationality toward a more human world in organizational reality where sensemaking, cultures, emotions, dilemmas and contradictions occupy a central place (Peters 1991; Schein 1985; Weick 1979; Quinn and Cameron, 1988; Peters and Waterman 1982). Moreover, researchers began to challenge the rationality as a major driver for theory building within organizational and social science (Van de Ven and Poole, 1988; Peters and Waterman 1982; Quinn and Cameron, 1988). In contrast to the traditional management theories that focused on the analysis of structures as an expression of the universalism of bureaucracy, the new paradigm was embodied by new critical theories which interpreted organizations as less universal and more locally constructed entities, where representations of the real world and human subjectivity played an

important role (Ibarra-colado, 2002; Crosier and Friedlberg 1980; Weick 1979).

Moreover, a distinctive feature of this new order is that unlike traditional theories that presented organizational phenomena in terms of discrete, bipolar categories such as loose or tight coupled, formal or informal, control or autonomy, mechanistic or organic, and differentiation or integration, the new approach proclaims a paradoxical perspective suggesting that many phenomena may fit opposing and contradicting categories simultaneously (Bobko, 1985; Peters 1991; Handy 1994). Similarly, Lewis (2000) argues that organization theory have more often stressed rationality, linearity and planning and the recognition of paradox is recent because traditional approaches have stressed singular linear rather than plural multi-dimensional perspectives.

In parallel, management scholars started to recognize the increasing importance of adopting the paradoxical perspective on advancing management theories. For instance, Quinn and Cameron (1988, preface) cite that *“becoming aware of paradoxes in organizations has led us to insights that have enriched, and often exceeded, our previous understanding...we are convinced not only that organizational paradox provides a rich metaphor for understanding organizational phenomena, but that it can lead to a more comprehensive and complex view of organizations and their management than has been previously available”*.

At the same time, the paradigmatic shift was supported by the emergence of seminal publications which contributed to the consolidation of this critical view of management theories by elevating the paradoxical nature of the

social science to the forefront of its investigations. One of the landmark publications is the book “In Search of Excellence” written by Peters and Waterman (1982). This book is a landmark in a sense that it is caused considerable appreciation and recognition of the emergence of the new paradigm. In their review of “In Search of Excellence”, Van de Ven (1983) finds that the *“central contribution of the book is a better appreciation of the paradoxes inherent in the nature of man and organization.”* Another landmark is Quinn and Cameron (1988)’s book - Paradox and Transformation: Toward a Theory of Change in Organization and Management. This book is a landmark in a sense that it contributed to incorporate paradox into mainline organizational theory. According to Berlinger and Sitkin (1990, p. 743), *“this book urges us as researchers to adopt paradoxical perspective and look for examples in which paradoxical phenomena are present”*.

More recently, Smith and Lewis (2011) have mentioned that the increasing volume of articles and publications on paradoxes is an indicator of the increasing importance of the topic in the debate regarding various organizational phenomena. In fact, scholars have investigated and found paradox in such diverse fields of organizations management as organizational effectiveness (Quinn and Cameron, 1988; Peters and Waterman’s,1982), leadership (Denison et al., 1995), theory building (Poole and Van de Ven, 1989; Van de Ven and Poole, 1988), planned organizational change (Seo, Putnam and Bartunek, 2004), knowledge management (Bloodgood and Salisbury, 2001; Knott, 2003), groups dynamics (Smith and Berg, 1987), and lean production (Adler et al., 1999; Eisenhardt and Westcott, 1988; Osono et al., 2008).

According to Clegg et al. (2002), today's business climate is defined by intricate dynamics that heighten awareness of tensions. Environmental changes, extensive adoption of information technology, shortening of product life cycles, highly educated workforce and ever-shifting consumer tastes have accentuated the impact of paradox on organizations (Cunha et al., 2002). There is evidence that changes are brought in to deal with the various challenges of the business environment as companies have realized the importance of improving simultaneously efficiency and flexibility (Volberda, 1996; Meyer, Nakane, Miller, & Ferdows, 1989). Within this challenging business environment, lean has emerged as one of the management philosophies that can help companies improve both efficiency and flexibility (Adler et al., 1999; Womack, Jones, & Roos, 1990).

However, it is also known from the literature that organizational change such as lean conversion exacerbates paradoxical tensions which require an active management (Seo et al., 2004). In fact, "*it is during times of transition that paradox will become salient, because most organizational paradoxes reflect the simultaneous pressure of characteristics associated with stability and characteristics associated with change*" (Berlinger and Sitkin, 1990, p. 743). Moreover, the management of paradoxes is particularly relevant because, as business environment become more competitive and as organizational process become more complex, paradoxical tensions become increasingly salient and persistent (Lewis, 2000), and the response to these paradoxes may determine an organization's fate (Quinn and Cameron, 1988).

Based on these introductory notes, the next section explores in more details the paradoxical nature of lean.

1.2 The paradoxical nature of lean

As an approach to organizational change, lean and just-in-time can be seen as a continuous process of creation and resolution of tensions and paradoxes (Eisenhardt and Westcott, 1988). In fact, Eisenhardt and Westcott (1988) argue that, during lean implementation and consolidation, paradoxes are confronted directly or even created and the innovation occurs through that confrontation and resolution of paradoxes. Within the same context, the seminal book of Womack, Jones, & Roos (1990) “The machine that changed the world” which codified much of the core features of lean system, presents various tensions and challenges inherent within lean philosophy. For instance, Womack and colleagues (1990) state that “*lean combines the advantages of craft and mass production, while avoiding the high cost of the former and the rigidity of the latter; toward this end, lean production employ teams of multi-skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in enormous variety*” (p. 13).

In fact, combining the advantages of craft production (flexibility) and mass production (efficiency) or producing volumes of products (efficiency) in enormous variety (flexibility) can create various paradoxes within organizations such as the paradoxes of organizing, learning and performing (Womack, Jones, & Roos, 1990; Adler et al., 1999; Eisenhardt and Westcott, 1988; Smith and Lewis, 2011). For instance, Womack and colleagues (1990) gives example of the paradoxical effects of lean on the professional career. They argue that lean calls for learning more professional skills and applying these in a team setting rather than achieving higher levels of technical proficiency in narrower area of specialization. They cite that “*the paradox is that the better you are at team-work, the less*

you may know about specific, narrow specialty that you can take with you to another company or to start a new business” (p.14).

Within the same context, Repening and Sterman (2001) cite that the paradox associated with the duality of focusing on short term results (*working harder*) versus investing in long term process improvement (*working smarter*) can get people caught in capability trap: “*just as machine operators and supervisors face a basic trade-off between producing and improving, development engineers are forced to trade off getting their assigned tasks done against documenting what they learned so that others might benefit*” (p. 75). According to the authors, this duality can ignite paradoxical tensions and get people caught in the capability trap by focusing on short term results and avoiding necessary investment in process improvement and capabilities. The authors argue that the principal barrier for overcoming the capability trap is the mental model and the beliefs that there are no resources or time for improvement and that these problems are outside of employees’ control (Repenning & Sterman, 2001).

Moreover, there are examples in the literature showing that the inadequate management of organizational paradoxes during lean conversion may reduce the long-term adaptability of the company. For instance (Lewis M.A., 2000) finds evidence that lean can curtail the firm’s ability to innovate. In fact, he observes in his empirical study a tendency that firms engaging successfully in lean production principle would inevitably see narrowing of innovative activity - innovation is defined as the number of new products released within a period of time. Even more, the focus on customers or the tight linkages with customers – core feature of lean philosophy - may present a paradox for the company. For instance, Danneels (2003) identifies a paradox associated with tight coupling versus

loose coupling with customers. While tight coupling increases the understanding of customers' needs, better services and higher customer satisfaction, loose coupling with customers maintains the flexibility needed in a dynamic environment, which enables firms to explore new opportunities or fight new threats. The paradox is created because the same process that enables companies to be efficient limits future adaptability. In other words, "*developing close links with customers is both beneficial and detrimental*" (Danneels, 2003, p. 560).

Having presented the paradoxical nature of lean, the next section introduces the key features of the management of organizational paradoxes adopted in this thesis.

1.3 The management of organizational paradoxes

An organizational paradox “*involves contradictory, mutually exclusive elements that are present and operate equally at the same time*” (Quinn and Cameron, 1988, p.2). The two opposing elements of a paradox are mutually exclusive, yet mutually reinforcing and paradoxes exist because processes and actions that tend to change some characteristics of our social world also tend to activate opposing processes and actions that affect these characteristics oppositely (Starbuck, 1988). The mutually exclusive yet mutually reinforcing characteristics of paradox suggest that the two opposing poles of a paradox coexist and reinforce each other (Smith and Berg, 1987; Quinn and Cameron, 1988).

Scholars have identified two main strategies for dealing with organizational paradoxes. The first strategy attempts at solving the paradox and is called “resolution” strategy; the second strategy recommends accepting and living with the paradox and is called “acceptance” strategy (Smith and Lewis, 2011; Clegg et al., 2002; Cunha et al., 2002; Lewis, 2000; Poole and Van de Ven, 1989; Van de Ven and Poole, 1988). Resolution strategies attempt to solve a paradox by clarifying the relationships and differences between the two opposing poles and aim at reaching a synthesis that enable individuals to deal with the paradoxical tensions. Resolution strategies also attempt to solve a paradox by taking the role of time into account as in temporal separation. For instance, one pole of the paradox is assumed to hold at one time and the other at different time. On the other hand, acceptance strategies don’t attempt to separate opposing poles of a paradox or reach a synthesis between two contradictory elements; rather they consider paradox as an opportunity for learning and assume that individuals and organizations can

learn a great deal from juxtaposing contradictions and tensions (Van de Ven and Poole, 1988).

Moreover, scholars recommend using a sequence of acceptance and resolution strategies for dealing with paradoxes (Poole and Van de Ven, 1989; Smith and Lewis, 2011). More precisely, these scholars recommend the combination of acceptance and resolution strategies and claim that acceptance of a paradox should precede the attempt of solving a paradox. For instance, Smith and Lewis (2011) have proposed a dynamic equilibrium model of organizing. This model suggests that alternating different strategies for dealing with paradox would achieve sustainability and increase the effectiveness of organizations. The authors suggest that “*acceptance provides a comfort with tensions that enables more complex and challenging resolutions strategies*”, and, by reducing defensiveness, “*acceptance lays the vital groundwork for virtuous circles*” (Smith and Lewis, 2011, p.392).

In a similar line of research, Poole and Van de Ven (1989,) state that “*a great deal can be learned from juxtaposing contradictory propositions and assumptions*” (p. 566) and that acceptance “*can serve as a preliminary step*” (p. 567) to the resolution of a paradox. Within this context, the acceptance of paradoxes is considered an opportunities for learning (Senge and Kaeufer, 2000). Through inquiry and reflection, managers are able to get the most of these learning opportunities (Argyris and Schön, 1978). While the resolution of a paradox “*remove the tension inherent in contradictions*” (Clegg et al, 2002, p. 487), the acceptance of a paradox help the researcher generates “*insights from divergent perspectives*” and “*become aware of tensions and oppositions*” which can be addressed by the resolution strategies (Poole and Van de Ven, 1989, p. 575).

In fact, the management of paradoxes - by alternating acceptance and resolution strategies - is considered itself paradoxical because the virtue of the “*holding*” approach is the vice of the “*solving*” approach (Clegg et al., 2002). By solving paradoxes, organizations tend to fall into “*simplicity traps*” (Clegg et al., 2002, p. 487) which results from removing the complications that supported their performance (Weick, 1979). The paradox emerges because, on the one hand, companies need to hold on tensions to avoid “*simplicity traps*”; yet, on the other hand, companies need to choose and explore the relationship between two extremes in order to achieve their goals (Clegg et al., 2002).

Having introduced the main elements of the management of organizational paradoxes adopted in the thesis, the next section presents the motivation of this thesis by discussing the peculiarities related to the management of organizational paradoxes in the extant lean literature. Moreover, the next section positions this thesis by outlining the study domain within the extant lean and organization literatures.

1.4 Motivation and study domain of the thesis

By reviewing the lean literature, one can identify various studies mentioning and discussing the paradoxes inherent in lean philosophy or associated with lean implementation and their management (Adler et al., 1999; Reppenning and Sterman, 2001; Eisenhardt and Westcott, 1988; Osono et al., 2008; Womack and Jones, 2003; Womack, Jones and Roos, 1990). These studies share two patterns or peculiarities in relation to lean paradoxes and their management.

First, some lean studies have associated the inherent paradoxes in lean with a source of energy that creates virtuous circles and facilitates learning and change (Eisenhardt and Westcott, 1988; Osono et al., 2008; Womack and Jones, 2003; Womack, Jones and Roos, 1990). For instance, Womack & Jones (2003) cite that the implementation of the flow approach within lean synchronizes the rate of production to customers' demand, which alerts the whole team to the need of waste removal or process improvement in order to accommodate an increase in orders. This raises the awareness of the tight connection or the tight coupling in the system, which motivates employees learning and guards against the generation of waste or "*muda*".

Within the same context, Womack, Jones, & Roos (1990) cite that lean production provides workers with creative tension that makes the work go more smoothly: "*while the mass production plant is often filled with mind-numbing stress, as workers struggle to assemble unmanufacturable products and have no way to improve their working environment, lean production offers a creative tension in which workers have many ways to address challenges*" (p. 101). Furthermore, Eisenhardt and Westcott (1988) argue that paradoxical tensions and conflicting goals create the motivation

for change and help people understand the underlying relationships among the opposing poles of paradox, which increase organizational performance: “*explicit creation of paradox in the form of multiple and ultimate goals in a dynamic context creates organizational innovation and, ultimately, superior performance*” (Eisenhardt and Westcott, 1988, p. 191).

Yet, these studies don’t elaborate on or explain the theoretical foundations of why lean philosophy would entail a *creative tension* and create the positive energy within the system. Moreover, these studies don’t mention that paradoxes can also be a source of inertia and resistance, and that the management of paradoxes is needed in order to avoid inertia and facilitate change (Quinn and Cameron, 1988; Lewis, 2000).

The second peculiarity of the reviewed lean studies is the dominance of the resolution strategy (the rational approach) for dealing with paradoxical situations, which mainly consider paradoxes as something to be solved or eliminated, rather than an opportunity for learning and creativity. For instance, Adler et al. (1999) identify and discuss how the variety of managerial actions and decisions contribute to the mitigation of tensions emerging from the paradox of efficiency versus flexibility by eliminating the impediments that hinders the resolution of the “*efficiency versus flexibility*” paradox. Although Adler et al. (1999) state that factors of the organizational context - mainly leadership, trust and training - increase the motivation for change, they don’t genuinely consider paradoxes as something inherent in human nature and that living with paradoxes can enhance learning and transformation.

This study contributes to the field of lean sustainability through the transfer and application of the organizational theory on the management

organizational paradoxes into lean context. As introduced in section 1.3, the management of paradoxes in the extant organizational theory entails the use of a sequence of acceptance and resolution strategies in dealing with organizational paradoxes, as opposed to the exclusive use of the resolution strategy as it is the case in the extant lean literature. The main argument is that the combination of acceptance and resolution strategies facilitates individual reframing and second order learning and enhances organizational performance and effectiveness. Moreover, the combination of acceptance and resolution facilitates change and transformation and avoids inertia and vicious circles of resistance, which can also be the outcomes of the paradoxical tensions (Smith and Lewis, 2011; Quinn and Cameron, 1988; Lewis, 2000; Van de Ven and Poole, 1988).

Having outlined the motivation and the study domain of the thesis, the next section presents its research questions.

1.5 Research questions

The first research question of this thesis aims at identifying the various categories of the organizational paradoxes in lean and the strategies used for dealing with them. The identification and the discussion of the organizational paradoxes in lean is the starting point in this study as it connects lean literature to the mainstream organizational literature on paradoxes. Smith and Lewis (2011) argue that organizational paradoxes represent core activities of any organization and lean organizations should be no exception. Within the same context, the management literature states that organizational change such as lean conversion ignites and even creates the various types of organizational paradoxes. Moreover, dealing with paradoxes is crucial to long term effectiveness and managerial responses to paradoxes may determine the fate of the organization (Quinn and Cameron, 1988). Based on this, the first research question of the thesis is:

1. *What are the paradoxes emerging from lean implementation and what are the strategies for dealing with them?*

The second research question of this thesis investigates the strategies used in managing and dealing with lean paradoxes. In the lean literature, there is dominance of the use of the resolution strategy or the rational approach in dealing with the organizational paradoxes in lean. On the other hand, the organizational literature on paradoxes states that the combination of acceptance and resolution strategies is more likely to achieve positive outcomes and enhance organizational performance, rather than the use of one type of strategy (resolution). Moreover, the organizational literature identifies and discusses various contextual factors that can either hinder or

facilitate the management of organizational paradoxes and its outcomes. Based on this, the second research question of the thesis is:

2. How and why will the adoption of the paradoxical perspective facilitate lean management and contribute to lean sustainability?

Answering the two questions will contribute to the extant lean literature by demonstrating the effects of the combination of two strategies (acceptance and resolution) for dealing with lean paradoxes on lean sustainability. Moreover, the two research questions will enable the identification organizational factors that can facilitate lean conversion and contribute to lean practice. Having outlined the research questions of the thesis, the next section presents the philosophy of science and the paradigm adopted in the thesis and introduces the case study as a strategy for answering these two questions.

1.6 Philosophy of science and the case study

This section introduces the paradigm related to the philosophy of science adopted in this thesis and presents the case study as a method for answering the two research questions.

1.6.1 The paradigm adopted in this thesis

According to Morgan (1983), research is necessarily a choice-making process, because all lenses are selective and tend to emphasize some aspects of social reality while hiding others. This thesis adopts a critical realist philosophy which acknowledges that organizational theories are socially constructed (fallibilist epistemology), but ontological realism – the other core feature of the critical realist philosophy – posits the existence of a world independent of researchers' knowledge of it (Miller and Tsang, 2010). According to Miller and Tsang (2010), the ontological realism paradigm “*provides some hope for achieving greater precision over time*” (p. 153) in the study of organizational theories. Lincoln and Guba (2000, p. 165) situates the critical realist philosophy within the post-positivist paradigm which supposes the existence of “*real reality but only imperfectly and probabilistically apprehendable*”.

In the positivist paradigm, it is assumed that there is a reality out there to be studied and fully understood, whereas the post-positivists argue that reality can be only approximately apprehended (Guba, 1990). Post-positivism relies on multiple methods (qualitative and quantitative) as a way of capturing as much of reality as possible. Within the post-positivist paradigm, no specific method can be privileged over any other as the

emphasis is directed toward the discovery and verification of theories (Lincoln and Guba, 2000).

Historically, qualitative research was defined within the positivist paradigm as qualitative researchers attempted to use less rigorous methods to deliver good positivist research. However, because constant social change, and ambiguity and diversification of social life are increasingly challenging researchers with multiple contexts and perspectives, traditional positivist deductive methodologies are failing to deliver and convince. Thus qualitative research is increasingly forced to make use of the inductive approach instead of starting from known theories and testing them (Flick, 1998). Nowadays, in order to reduce the likelihood of misinterpretation, qualitative researchers use narrative, content, discourse, archival, and even statistics, tables, graphs, and numbers. They also utilize interviews, survey, and direct participant observation among others. All of these methods can provide important insights and knowledge (Nelson et al., 1992).

More importantly, within the post-positivist paradigm, the use of multi-method or triangulation reflects an attempt to increase the understanding of the phenomenon in question since objective reality can never be captured and things are known only through representations. Within this context, triangulation is not a tool or a strategy of validation, but an alternative to validation. It is also considered a process of using multiple perceptions to clarify interpretations and meanings by verifying the repeatability of an observation. But, acknowledging that no interpretation is perfectly repeatable, triangulation serves also to clarify meaning in identifying different ways the phenomenon is being observed (Denzin and Lincoln, 2000; Flick, 1998).

Based on this, the next section presents the case study as strategy and method that enables answering the two research questions of the thesis as it permits extensive triangulation and different ways and methods (qualitative and quantitative) to observe and study the phenomenon according to the post-positivist and critical realist paradigm.

1.6.2 Case study

Case study is not a methodological choice but a choice of what is to be studied. The important question is: What can be learned from the selected case? The search for particularity competes with the search for generalizability (Stake, 2000). Each case has important and unique features and every case can be seen a step toward grand generalization, especially in the case that runs counter to the existing rule. Damage occurs when the commitment to generalize or to theorize runs so strong that the researcher's attention is drawn from features important for understanding the case itself (Stake, 2000).

According to Eisenhardt (1989, p. 534), "*the case study is a research method which focuses on understanding the dynamics present within single settings*". A case study can involve both qualitative and quantitative methods and tools for data collection from a number of informants or sources by a direct observer. The direct observation occurs within natural setting that take into consideration "*the role of the context in which the phenomenon occurs*" and "*the dynamics of the temporal dimension through which the events of the phenomenon unfold*", therefore facilitating the understanding of why and how a phenomenon occurs (Meredith, 1998, p. 443).

In the post-positivist paradigm, the understanding of the empirical data can be influenced by the assumptions and beliefs specified by the researcher. The objective of the case research is to achieve a deep understanding of the investigated phenomenon through triangulation - the use of multiple sources of evidence - which assures that the observations being collected are indeed accurate and reduces the bias caused by the observer or researcher's

perceptual framework. A case study can involve single or multiple settings (Eisenhardt, 1989). The investigation of multiple settings or the multiple-case study is not intended to increase the sample size of the study, but rather to extend the study to new populations (Meredith, 1998).

Benbasat et al. (1987) identify three advantages of the case research: (1) the phenomenon can be studied in its natural context which enables direct observation of the events and the generation of relevant theory; (2) the case method allows the questions of why, rather than just what and how, to be answered with an understanding of the nature and the complexity of the phenomenon; and (3) the case method allows for exploratory investigations where the variables are unknown and the phenomenon not completely understood. More specifically, Yin (2009; 2003) cites that a case study method can be used for answering exploratory “*what*” questions - first research question of this thesis, and is recommended for answering explanatory questions of “*how*” and “*why*” - second research question of this thesis. Nevertheless, the case research method is more recommended for the “*how*” and “*why*” questions because such questions entail that theoretical and operational links to be traced over time. While surveys and archival analysis are more recommended for answering the questions of what of the phenomenon and is limited to the theory as originally formulated, the case research can move beyond the limitations of the original theory, especially through explaining anomalies or unexpected outcomes (Meredith, 1998).

As for the selection of cases for the empirical study of this thesis, three companies were selected from different manufacturing and service industries in Denmark: financial products, healthcare and public transport.

As for data collection, semi-structured interviews are the primary source for collecting data. Semi-structured interviews allow the researcher to intervene, clarify and add questions during the interviews, which can be relevant for understanding the context of events (Eisenhardt, 1989). Chapter 5 – Research methodology – reviews in more details the topics related to the criteria adopted for assessing the trustworthiness of the case study, and presents in more details the rationales for case selection, data collection, data reduction and analysis, and conclusions drawing. The next section of the chapter outlines the structure of the thesis.

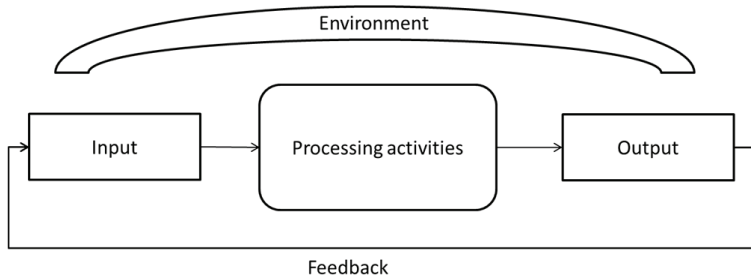
1.7 Research design and structure of the thesis

A core element of this thesis is the application of the organizational theory on paradoxes to lean management with the objective of facilitating lean conversion and increasing lean sustainability within organizations. The structure of the thesis reflects and parallels the research design which enables the researcher to answer the two research questions. Formally, the thesis is structured according to the seven following chapters. Chapter 1 presents the study domain, the motivation, the research questions, the paradigm and the case study method adopted in the thesis. An important element of this thesis is the transfer of the organizational theory on the management of organizational paradoxes into lean context in order to increase lean sustainability in organizations.

Chapter 2 is a core chapter of the thesis as it presents the management of the organizational paradoxes as a meta-theory for approaching lean management and enhancing lean sustainability. A meta-theory provides a high-level conceptual scheme to study the various organizational phenomena within which other theories and methodologies can be contained (Ritzer, 2001; Uto, 2005). Ritzer (2001) identified three characteristics of a good meta-theory: (1) Meta-theories serve as a framework for developing overarching perspectives for a specific domain; (2) Meta-theories provide a lens that enables the researcher to understand more contexts for the investigated phenomenon. They provide an ontological arrangement of constructs in a systems perspective which can be used as guideline for creating context- or system-specific theoretical models; (3) A meta-theory can be used to create a better understanding of a given theory. It makes a theory a subject matter of study and discusses the theory through the principles that are encompassed in the meta-theory.

In this thesis, the adoption of the theory on organizational paradoxes as meta-theory for the management of lean paradoxes provides a systems perspective for approaching lean conversion and sustainability within organizations. It does so by grouping activities into input, processing, and output - the three basic constructs of a system (Wasson, 2006). The input–processing–output model (Figure 1) is a simple description but has great generalizability as it also includes the interactions between the system and the environment and the process of feedback or circular causality.

Figure 1 - The input-processing-output model



Source: adapted from Watson (2006)

In fact, chapter 2 reviews the various definitions and types of organizational paradoxes (Inputs of the model in Figure 1). Then it discusses the various strategies used for dealing with organizational paradoxes (Processing activities). The chapter also identifies the main outcomes of the management of paradoxes (Output) and discusses contextual factors such as organizational change and mental models (Environment). Moreover, the

chapter presents the management of paradoxes as a dynamic process where the outcomes can become inputs for the process (Feedback loops or circular causality).

Chapter 3 reviews the study domain of the thesis and presents an overview of lean philosophy and its evolution outside the manufacturing sector emphasizing its inherent paradoxical nature. More importantly, this chapter identifies the four categories of organizational paradoxes in the reviewed lean studies. The chapter also presents and discusses the dominant strategy used for dealing with lean paradoxes across a sample of lean studies and its limitations. By emphasizing the paradoxical nature of lean and identifying the four categories of organizational paradoxes in lean (Inputs in Figure 1), this chapter prepares the ground for the use of the model in Figure 1 as a meta-theory for investigating the management of the organizational paradoxes in lean.

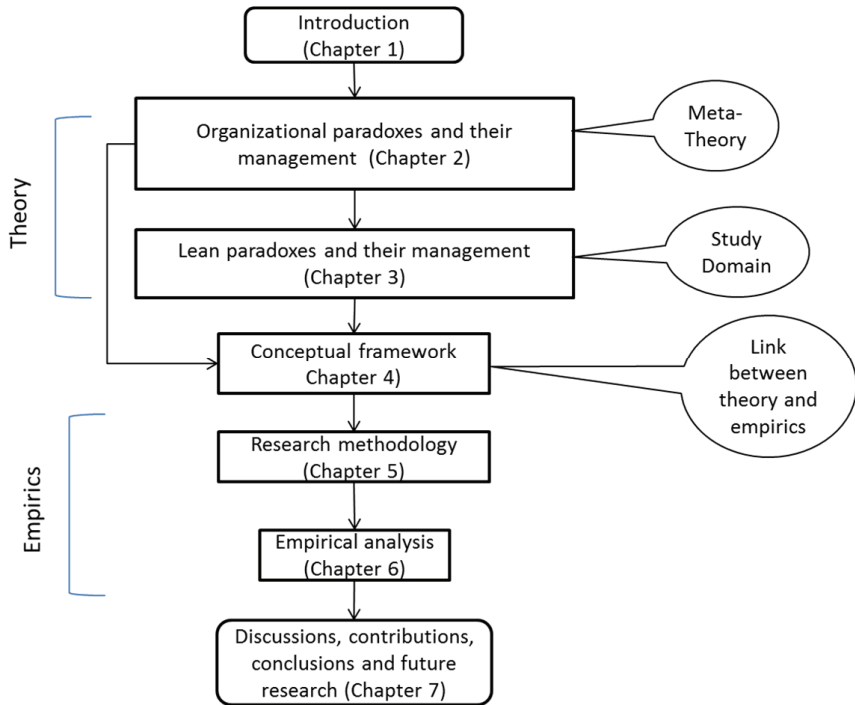
Chapter 4 presents the conceptual framework of the study by incorporating the theoretical findings from Chapter 2 and applying them to the management of lean paradoxes as depicted in Chapter 3. The conceptual framework is the link between theory and empirics and plays a significant role in guiding data collection, data analysis and conclusions drawing of the study. More importantly, this chapter applies the general model in Figure 1 to the context of lean as the inputs in the model become the various categories of organizational paradoxes in lean. More precisely, organizational paradoxes are the starting point for the empirical investigation and the entry into the three case companies. As such the process of data collection and data analysis follows the sequence of activities depicted in the model. In fact, the process starts with identifying the various categories of organizational paradoxes in each company, then

investigates the strategies used for dealing with these lean paradoxes, and finally discusses the factors influencing the management of paradoxes and the outcomes.

Chapter 5 presents the research methodology of the thesis, which covers the following topics: criteria for assessing the trustworthiness of the study and the rationales for data collection, data analysis and conclusions drawing. More importantly, Chapter 5 presents the case study as a method that can be used for answering the exploratory “what” questions (first research question of this thesis) and the “how” and “why” explanatory questions (second research question of the thesis). Furthermore, according to the post-positivist paradigm, no interpretation or conclusion is perfectly repeatable; thus, triangulation (through interviews, site visits and direct observation) becomes crucial as it serves to clarify meaning in identifying different ways the phenomenon is being observed during case study.

Chapter 6 presents the empirical analysis of the three case companies. More specifically, it contains the within-case and the cross-case analysis which produce various propositions regarding lean paradoxes and their management. These propositions constitute the basis for answering the two research questions of the thesis and generating recommendations for theory and practice. Finally, chapter 7 outlines the conclusions, limitations, and the future research opportunities. Figure 2 depicts the structure of the thesis graphically.

Figure 2 - Research design and structure of the thesis



Source: Author

Chapter 2 Organizational paradoxes and their management

Some ambiguity exists regarding the definition and nature of the organizational or social paradoxes (Quinn and Cameron, 1988). This ambiguity is due to the fact that the use and meaning of paradox have changed: *“It is now more than ever seen by many theorists as the sine qua non for making sense of a world that is both global and local, diverse in its workforce, technologically fast and smart, and destined for disruptive experiences and the unexpected”* (Couchman and Fulop, 2002, p 39). Similarly, Lewis (2000, p.760) cites that paradox has become an *“umbrella”* term for understanding the universal conditions of life, and for managing the inevitable complexity, ambiguity and diversity that this brings into organizations.

One of the objectives of this chapter is to reduce the ambiguity surrounding organizational paradoxes by reviewing the various definitions identified in the extant literature and by explaining the genesis and ontology of organizational paradoxes. Moreover, this chapter presents and explains the various types of organizational paradoxes and introduces the management of paradoxes as a necessary and relevant managerial task, which facilitates change and transformation and enables companies avoid inertia and resistance. The management of paradoxes is a core element of this chapter as it presents and discusses what are the strategies used for dealing with organizational paradoxes, what are the factors that can influence both positively and negatively the management of paradoxes, and finally what are the outcomes of the management of paradoxes.

An important feature of the management of paradoxes presented in this chapter is the alternation of two strategies: acceptance and resolution of paradoxes. It is important to mention though that although organizational paradoxes involve tensions, contradictions and inconsistencies, they ought not to be seen exclusively as a source of conflict and inertia; on the contrary, paradoxes and their inherent contradictions can become an important attractor for creativity, learning and change (Quinn and Cameron, 1988; Smith and Berg, 1987). The main argument of this chapter is that the management of organizational paradoxes based on the use of the two opposing strategies creates virtuous circles of change and learning and avoids the vicious circles of inertia and resistance (Smith and Lewis, 2011; Quinn and Cameron, 1988).

This chapter is composed of seven sections. The first section reviews the various definitions of paradoxes. The second section discusses the genesis and nature of organizational facilitating the understanding of how a paradox is created or made salient and how it can be managed. The third section focuses on the important role of paradox as a metaphor which facilitates mental reframing or the creation of new mental models. The fourth section reviews and clarifies the various categories of organizational paradoxes. The fifth section reviews the various strategies for managing paradoxes identified in the extant organizational literature focusing on the dynamic and self-referential aspects of paradoxes as a facilitator of organizational change and transformation. The sixth section draws on the complexity science, particularly the self-organizing proprieties, in order to strengthen the theoretical foundations of how and why the management of paradoxes can achieve change and transformation. The seventh and last section concludes this chapter and summarizes its main findings.

2.1 Definitions of organizational paradoxes

Paradox is an old concept that has its roots in ancient philosophy. In fact, the most known paradox is the logical paradox and its famous example is the Liar paradox, first studied by the philosophers: *“If someone says: I always lie; how are we to understand this statement? It seems both true and false”* (Van de Ven and Poole, 1988, p. 22). A logical paradox occurs when the meaning embedded in the statement contains its own contradiction (Argyris, 1988).

In social science, organizational paradoxes are *“looser, the opposing terms are often somewhat vague, and instead of logical contradictions, tensions and oppositions between incompatible positions must be considered”* (Poole and Van de Ven, 1989, p. 565). Quinn and Cameron (1988) state that paradox *“involves contradictory, mutually exclusive elements that are present and operate equally at the same time”* (p.2), while Ford and Backoff (1988) define organizational paradox as *“some ‘thing’ that is constructed by individuals when oppositional tendencies are brought into recognizable proximity through reflection or interaction”* (p. 89).

Smith and Berg (1987) adopt the definition of paradox advanced by (Hughes and Brecht, 1975; cited in Smith and Berg, 1987, p. 12), which states that a paradox is: *“a statement or set of statements that are self-referential and contradictory and that trigger a vicious circle”*. Smith and Berg support the above definition by arguing that any organizational paradox necessarily contains the three aspects embedded in the definition: self-reference, contradiction and the vicious circle. According to Smith and Berg (1987, p.12), the writing *“This is a sentence”* is self-referential but not paradoxical. The statement *“This sentence is written in Chinese”* is self-

referential and contradictory yet still not paradoxical. However statements such as “*I am lying*” and “*Please ignore this statement*” have all the characteristics of a paradox because they are self-referential, contradictory and circular because they gets individuals trapped without an indication or instruction on how to break the vicious circle.

However, paradoxes need not be contained in one statement as in the above examples. For instance, none of the statements “*The following sentence is false*” or “*The preceding sentence is true*” is paradoxical if they are taken separately. It is only when considered together in sequence that the two statements become paradoxical. Smith and Berg (1987, p.13) state that “*when the second sentence is framed by the first, we suddenly find that the first is framed by the second. In trying to sort out which is true and which is false, we got tangled in a strange loop, a jumbled hierarchy that exists in the area between the two explicit statements; to find the location of the paradox, we cannot fixate our eyes on the concrete, as in the “I am lying” example. Rather, we must look into the empty space between the two sentences*”. The two-sentence or multi-sentence type paradox is the type of paradox most frequently encountered in social organizations, rather than the self-contained logical paradoxes.

A common element of the definitions of organizational paradox presented above is that organizational paradox involves contradictory, mutually exclusive elements that are present and operate equally at the same time. Having defined the construct of organizational paradox, the next section moves a step further and discusses the genesis and the ontology of organizational paradox by focusing on the process of reality construction and its relation to human cognition and social interaction. The review of the definitions and the discussion of the genesis and ontology of organizational

paradoxes are important because, as it will be shown in the next sections of the thesis, they can inform the reader about the strategies for dealing with paradoxes, the factors influencing the management of paradoxes and the outcomes.

2.2 Genesis and ontology of organizational paradoxes

As for the genesis and ontology of organizational paradoxes, Clegg (2002) poses the question about whether paradoxes reside in either the means of representation or in the material world: “*are the paradoxes inherent to the nature of that which is represented or the means or representations?*”(p. 1). Material tensions emanate from the act of organizing because of the dynamic and complex nature of organizational systems (Cameron & Quinn, 1988; Smith & Berg, 1987). According to (Clegg, 2002), some aspects of the world are paradoxical irrespective of the representations or theories used to represent them; while other aspects may well be changed and transformed by the theories and representations used to depict them.

Within the same context, Ford and Backoff (1988) relate the creation of paradox to the process of reality construction and the drawing of dualities and distinctions. According to the constructivist point of view, it is not possible for individuals to know if the acquired knowledge of reality matches some true reality. The reason is that the stimuli that individuals encounter from the environment must be transformed and converted through the process of cognition into something humans can experience. For instance, the light that stimulates the retina must be converted into a description of a rainbow by the brain. It is this description of the rainbow that constitutes reality and not the electromagnetic radiations that compose the light.

Similarly, data and novelties coming into organizations are converted by organizational actors into descriptions such as organizational performance or market opportunities, and it is these descriptions that constitute the actors' reality. Accordingly, what we experience as human beings is a

reality of our own construction rather than the true reality. Moreover, Ford and Backoff (1988) cite that actors cannot know if their knowledge of reality matches some true reality because *“to know the true reality requires criteria by which it is possible to compare reality to our understanding of it”* (p. 84). And any criteria of comparison would be conceived according to our own descriptions and constructions of reality.

Ford and Backoff (1988) also suggest that actors experience relatively stable realities through social interaction. Social interaction establishes inter-subjective understandings of their realities and some of these realities are adopted and institutionalized. Thus, realities and structures have no objective existence outside human experience. On the contrary, structures and realities are produced and reproduced through social interaction. Institutionalization occurs through the reciprocal use of habitualized actions by different organization members. Habitualized actions become embedded as routines in actors' cognitive system and ready for future use. It is through institutionalization that descriptions are objectified, resulting in actors' experience of a stable and reliable reality and of an objective world other than their own construction.

An important feature of the process of reality construction is the drawing of distinctions and dualities (Foerster, 1984; Glasersfeld, 1984). These distinctions are constructed in accordance with the boundary “not”. Even though “A” and “not A” are distinct elements, they are interdependent, and by defining “A” one is also defining what is “not A”. Any action or reflection involves drawing distinctions. Distinctions give rise to dualities such as stability versus change, efficiency versus innovation and control versus autonomy. According to Ford and Backoff (1988), dualities are the result of reality construction by individuals; however, this fact does not

deny the existence of an external world, only that the effects of the external world are secondary and filtered through our mind.

Ford and Backoff (1988) note that all the attempts to define paradox are based on the notions of constructed dualities. For instance, they cite the three views of paradox adopted in the paradoxical strategies used in psychotherapy, which reflect different views toward the construction of dualities. The relativistic view of paradox regards paradox as a subjective phenomenon that exists in the mind of the actors. Efforts to define paradox as a “thing” that exists outside of or independent of individuals, therefore, are considered misguided. What appears paradoxical to one, therefore, may not be paradoxical to another. According to this view, paradox is individually constructed through cognition and reflection.

The second view is the interactional view that treats paradox as being located in interpersonal contexts and social interaction. A good example of this view of paradox is observed in psychotherapy where therapists direct clients to engage in activities that appear in opposition to the goals of the therapy. This behavior may appear paradoxical to the patients but not to the therapists. And if therapists did not oppose clients’ expectations in behalf of achieving the goal of the therapy, no paradox would occur from the patients’ point of view. Therefore, paradox has a relational feature and it surfaces when messages exist on different levels of abstraction and are oppositional or contradictory in nature. The third and dialectical view of paradox is based on the dialectical principle that thesis generate their own opposites or antithesis, demanding some form of resolution or synthesis. This view suggests that a paradox is made manifest when inherent and systemic tensions, which have been denied or ignored, are brought side by

side and act simultaneously to reach some form of resolution or synthesis (Ford and Backoff, 1988).

The above review of the genesis and nature of organizational paradoxes shows that paradoxes are constructed by individuals' cognition through the process of reality construction and the drawing of distinctions and dualities. According to this view, organizational members do not confront environments independent of their mental frames. Rather, they construct environments through their frames which are the cognitive structures that form the context and enabling grounds within which reality construction and the creation of paradoxes occur (Watzlawick et al., 1974; Quinn and Cameron, 1988). Thus, paradoxes are created and amplified by human cognition (mental frames), but are also inherent in the social system and amplified by social interaction. Thus, any attempt to deal with paradoxes must take into account the mental frames of the individuals involved in the change, and any criteria for the success of change through the management of paradoxes must involve some level of reframing or the creation of new mental frames (Lewis, 2000; Smith and Lewis, 2011). Because of the relevance of mental frames and reframing to the study and management of organizational paradoxes (Van de Ven and Poole, 1988; Quinn and Cameron, 1988; Smith and Lewis, 2011), the next section defines and discusses the notion of reframing.

2.3 Reframing

Since the mid-1980s, there has been strong advocacy of the use of reframing through the use of organizational metaphors as one of the skills of the new leader. Along with the emergence and consolidation of the post-modern realities in studying organizational life, reframing has gained momentum as an approach for analyzing and responding to organizational situations through the use of multiple frames (Morgan, 1986; Bolman and Deal, 1991). Reframing is directly related to the process of organizational change in that it increases the ability of managers to break out of traditional perspectives and structures and to identify and enact novel responses to their ambiguous organizational worlds. For instance, Morgan (1986) argues that organizational problems can be framed and reframed in different ways allowing the emergence of new kinds of solutions, and Bolman and Deal (1991) argues that managers' inability to approach organizational problems from multiple perspectives can undermine efforts to change and transform organizations.

Common to the reframing approach is the view that people become trapped into single frame thinking and that this limits their ability to respond to organizational problems in novel and creative ways: "*Frames filter out some things while allowing others to pass through easily*" (Bolman and Deal, 1991, p. 11). Reframing involves the assumption that, by getting people to use multiple frames or perspectives, their repertoire of interpretations and possible actions will be expanded in any situation (Morgan, 1993).

As a technique, reframing engages the use of different metaphors for understanding and taking action in the organizational world. Morgan (1986,

1993) has used a wider variety of metaphors such as viewing organizations as machines, organisms and brains. Common to these authors is the view that effective managers draw on a variety of frames to provide different interpretations of organizational situations, and to identify a variety of actions which they can pursue.

Within this context, paradox is considered one of the metaphors which can serve to make our analysis richer and more complex (Van de Ven and Poole, 1988). As a metaphor, paradoxes are important because they reflect the underlying tensions that generate and energize organizational change (Quinn and Cameron, 1988). As Starbucks (1988) notes, every force in a social system tends to initiate an opposing force. While constantly changing organizations are filled with polarities, it is natural to ignore the oppositions in a social system and to see only the elements to which we, as observers, are predisposed. Hence, the employment of a paradoxical perspective leads us to a much increased awareness of the polarities that exist in organization phenomena (Starbuck, 1988).

By and large, however, most individuals seem prone to merely ignoring one side of the paradox or the other. In order to maintain a rational, logical view of organizational action, the complexity of simultaneous contradictions is frequently managed by ignoring one side of the contradiction and maintaining a simple linear perspective. “*Examples in organizational theory include maintaining that productivity and satisfaction are positively related, environmental turbulence and organic structures are positively related, and so on; the probability that the exact opposite is also simultaneously true is generally ignored*” (Quinn and Cameron, 1988, p. 292). These oppositional tendencies, which frequently manifest themselves as paradoxes, provide the

underlying tensions for change. A focus on paradox, therefore, “*moves us away from the concept of organizations as static systems coping with problematic environmental fluctuations through deviation counteracting processes to a concept of organizations as continually dynamic systems that carry the seeds of change within themselves*” (Quinn and Cameron, 1988, p. 82).

Furthermore, the reframing process starts with some trigger such as statement, person, or event that unfreezes a particular way of understanding a situation and indicates that this understanding might be changed. To be effective, the challenge to the current understanding has to be strong because, once particular frames are developed, they tend to endure (Bartunek, 1988). Two factors which are particularly relevant to reframing include the type of information generated and the constraints on a person to achieve a particular outcome. In particular, external constraints on the outcomes of reframing affect the start of the reframing process. If people are strongly pressured to accept a particular perspective, it is unlikely that reframing will endure: “*the new perspective will not be fully understood, and in times of meaningful challenge is unlikely to endure*” (Bartunek, 1988, p. 148). During the process of reframing, external constraints affect the range of understandings created. External pressures tend to force a particular perspective and decrease creative insights by reducing the paradoxical possibilities present by divergent information. Consequently, new frames should be less creative than they might otherwise be (Bartunek, 1998).

Furthermore, there is evidence that, even though managers cannot completely control reframing, they can have influence on subordinates’

mental frames. This influence can happen in two ways. First, a manager can trigger an initial stimulus for reframing by making subordinates aware of their limitations and by establishing conditions and setting directions that enable the paradoxical thinking (Rothenberg, 1979). Second, a manager should refrain from constraining the outcome of the process. These two recommendations have paradoxical characteristics: on the one hand, a manager triggers the initial stimulus for reframing and set it in motion in a specific direction; on the other hand, a manager should not constrain its outcome by demanding the adoption of his perspective: “*managers should be simultaneously encouraging and neutral, both taking control and fostering autonomy*” (Bartunek, 1988, p. 151).

Moreover, organizational factors can influence both positively or negatively the reframing process. For instance, factors - such as cognitive and behavioral consistency and defensiveness through the use of either/or logic hinder the acceptance of a paradox and contribute to vicious circles and inertia (Quinn and Cameron, 1988; Lewis, 2000; Smith and Lewis, 2011; Argyris, 1988; Smith and Berg, 1987). According to Lewis (2000), formal logic and technical rationality contribute to the creation of vicious circles because it is based on either/or thinking which sometimes is incapable of capturing the complexity of the paradoxical phenomena. The either/or logic is the basis of human rationality which leads to choose one pole of paradox and to label the other pole of paradox bad (Quinn and Cameron, 1988).

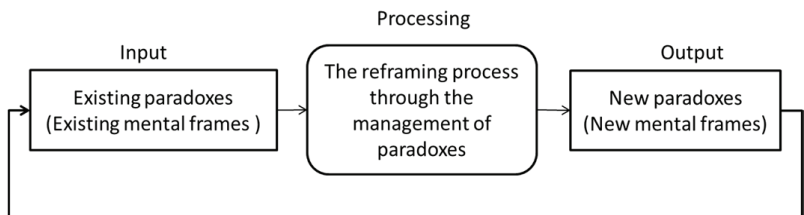
On the other hand, factors such as cognitive and behavioral complexity contribute to the creations of virtuous circles and to view organizational phenomena from both/and rather than either/or perspective. Within this context, “*complexity implies the ability to respond to a host of ambiguous*

and contradictory forces, including the simultaneous presence of opposites” (Denison et al., 1995, p. 526), and effective leaders have the behavioral capacity to identify and react to paradoxical situations and complexities in the business environments. Within the same context, Cameron and Quinn (1988) cite that the effective functioning of organizations require exploring and balancing dualities and oppositions. They also note that effective organizations “*do not pursue a single set of criteria; rather, they pursue competing, or paradoxical, criteria simultaneously*” (Quinn and Cameron, 1988, p. 10), such as centralization versus decentralization, integration versus differentiation and internal focus versus external focus. Peters and Waterman’s (1982) analysis of corporate effectiveness showed that excellent organizations possess a variety of contradictory and paradoxical characteristics such as loose and tight coupling, productivity through participation along with a bias for action, and autonomy and entrepreneurship. Within this view, managers and leaders also think and act paradoxically: “*effective managers, too, not only act logically and rationally but also illogically and irrationally*” (Quinn and Cameron, 1988, preface).

As for this thesis, managers act paradoxically through the adoption of the paradoxical perspective based on the alternation between acceptance and resolution strategies, which facilitates reframing by changing the mental models of the individuals involved in the change. It is important to note, however, that mental models play a double role in the management of paradoxes. On the one hand, mental models are the contextual factors that influence the creation and the management of paradoxes (Environment in Figure 1). On the other hand, mental models are the outcomes of the management of paradoxes (Output in Figure 1).

In fact, since paradoxes are also inherent in the social system and amplified by social interaction, the management of paradoxes deals with the existing paradoxes, but at the same time, creates new paradoxes. In other words, the act of organizing is inherently paradoxical and managerial actions for dealing with existing paradoxes create other paradoxes, which require another cycle of managerial actions (Smith and Lewis, 2011). As such, the management of paradoxes deals with existing paradoxes (current mental models), yet it creates new paradoxes (new mental models). These new mental models form become part of the environment or context and ignite other paradoxes, which become the new inputs in Figure 1, and the cycle goes on. Figure 3 parallels the input-processing-output model in Figure 1 emphasizing the reframing process associated with the management of paradoxes. The association between the management of paradoxes and the reframing is crucial feature of this thesis, and will be one of the main elements of the conceptual model of this study.

Figure 3 - The input-processing-output model of reframing



Source: literature review

Having defined and discussed the notion of reframing, and presented the roles of paradoxes and paradoxical thinking in facilitating reframing and change, the next chapter presents and discusses the various types of organizational paradoxes identified in the extant literature.

2.4 Types of organizational paradoxes

This section reviews the various categories of organizational paradoxes identified in the extant management literature. The section draws heavily on the works of (Smith and Lewis, 2011; Lewis, 2000; Lüscher and Lewis, 2008), which identify four categories of organizational paradoxes: paradoxes of organizing, paradoxes of belonging, paradoxes of learning and paradoxes of performing and the interactions among them (Figure 4).

According to Smith and Lewis (2011), the four categories of paradox represent core activities and elements of organizations. The paradoxes of learning rotate around the ability to assimilate a new knowledge which enables actors to adjust to variations and change and they involve struggle between the old and the new knowledge. The belonging paradoxes reflect tensions of identity and interpersonal relationships which arise between the individual and the collective. These paradoxes emerge because actors strive for both preserving their own identities and maintaining a collective affiliation. The organizing paradoxes surface as organizations create competing designs and processes in order to enhance performance. Implementing lean and just-in-time practices ignite various organizing paradoxes, which emerge from competing designs such as increasing employee empowerment and creativity as well as adopting formal statistical processes and controls (Eisenhardt and Westcott, 1988). Finally, the paradoxes of performing typically emerge from conflicting demands among different stakeholders. Moreover organizational change tends to exacerbate the tensions of performing by fostering competing measures of managerial success.

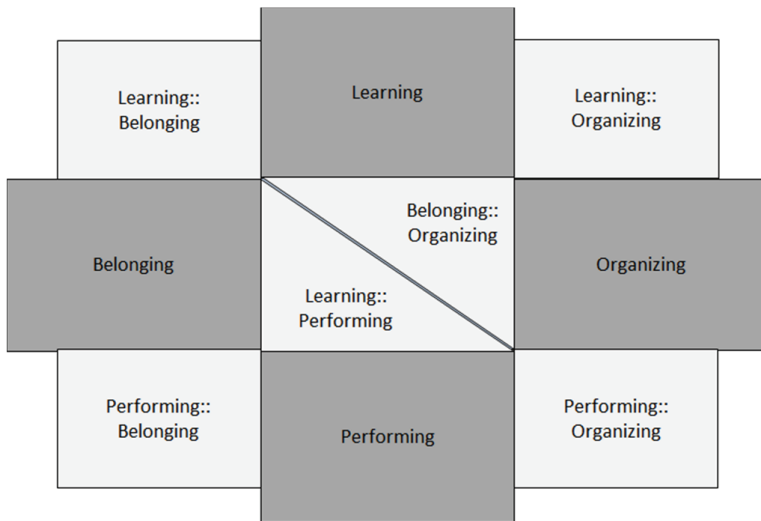
Differentiating paradoxes from similar organizational tensions, such as dilemmas and dialectics, is important because it highlights the core characteristics of paradox (Smith and Lewis, 2011). In fact, paradox is defined as contradictory yet interrelated elements that exist simultaneously and persist over time. Such elements seem logical when considered in isolation but irrational, inconsistent, and even absurd when juxtaposed (Lewis, 2000). However, an important feature of paradox is that it denotes elements, or dualities, which are oppositional to one another, yet are also synergistic and interrelated within a larger system (Cameron & Quinn, 1988).

On the other hand, a dilemma denotes a tension such that each competing element of the duality poses clear advantages and disadvantages. Resolving the dilemma involves weighing pros and cons as in the classic “make versus buy” decision which poses a dilemma when both options have pros and cons (Smith and Lewis, 2011). In contrast, a dialectic denotes an ongoing process of resolving tensions through integration. In this case A and B are contradictory (thesis and antithesis) which merge into a combined element (synthesis). Yet a new tension eventually surfaces as the resulting synthesis becomes a new thesis, and eventually spurs another antithesis (Smith and Lewis, 2011). Quinn and Cameron (1988) mention that paradox differs from dilemma in that no choice needs to be made between two or more contradictions. Paradox also differs from dialectic in that both of the contradictory elements in a paradox are accepted and present. Both operate simultaneously and don’t merge into synthesis. The key characteristic in paradox is the simultaneous presence of contradictory, even mutually exclusive elements (Quinn and Cameron, 1988).

It is important to mention, however, that dilemmas, dialectics, and paradoxes can overlap over time creating a conceptual confusion (Smith and Lewis, 2011). A dilemma may prove paradoxical, for instance, when a longer time horizon shows how any choice between two elements A and B is temporary. Over time the contradictions resurface as the differences between advantages and disadvantages become less clear (Cameron and Quinn, 1988). Within this context, Lüscher and Lewis (2008) found that pushing managers to explore dilemmas often surfaced their paradoxical nature. The more managers stressed the positive of one side, the more this accentuated the opposite. For example, in the tension between delegation and control, the more managers discussed the importance of delegation to empower employees, the more this highlighted the need for control to ensure timely execution.

Similarly, dialectics may prove paradoxical when the contradictory and interrelated relationship between thesis and antithesis persists over time. Synthesis stresses the similarities between elements and may neglect valued differences which can make the integration short lived and reignite the tension between thesis and antithesis (Smith and Lewis, 2011). Moreover, Even as tensions persist in organizational systems, organizational paradoxes *“may remain latent — dormant, unperceived, or ignored — until environmental factors or cognitive efforts accentuate the oppositional and relational nature of dualities; latent tensions then become salient—the contradictory and inconsistent nature of the tensions becomes experienced by organizational actors”* (Smith and Lewis, 2011, p. 360).

Figure 4 - Categories of organizational paradoxes



Source: Smith and Lewis (2011)

Having introduced the various types of organizational paradoxes and differentiated them from other similar concepts, such as dilemma and dialectics, the next sections of this chapter presents and discusses each type of organizational paradox depicted in Figure 4.

2.4.1 Organizing paradoxes

Organizations are the result of actions which draw boundaries and distinctions that foster tensions. The paradoxes of organizing emerge during the act of organizing that draws distinctions which reflect an inherent source of tensions and the conflicting aspects of organizational design (Smith and Lewis, 2011). For instance, when leaders define that an organization should operate tightly coupled, they define simultaneously that the same organization should not operate loosely coupled (Ford and Backoff, 1988). Lüscher and Lewis (2008, p.226) indicate that confusion over structural and procedural changes can ignite the organizing paradoxes. The authors cite a quotation from a manager exemplifying the confusion generated by the organizing paradox: *“I know we are part of the changes. But are we supposed to continue making changes or should we just try to create something more stable?”*

Lüscher and Lewis (2008, p. 233) cite also that organizing paradoxes emerge as managers and employees examine such problems as *“how to implement teams when the very purpose of teams was still emerging within the organization”*. Paradoxes related to organizational change and to the ongoing process of organizing can become paralyzing when managers and employees blame each other for the tensions. On one hand, top managers may attempt to deny the paradoxical elements of change, sending straightforward messages in order to help employees comprehend the complicated issues of organizational change. The result, however, can be a vicious cycle. Employees might eventually note conflicts among different mandates and feel a sense of stuckness. Striving to maintain control and stability and, at the same time, create change, managers ignite the organizing paradoxes (Smith and Lewis, 2011; Lüscher and Lewis, 2008).

For instance, managers might value employees who take initiative and are creative. Yet, the organizing paradox can emerge if employees perceive that rewarded and promoted colleagues tend to value efficiency and stability (Lüscher and Lewis, 2008). Lüscher and Lewis (2008, p. 233) cite the concluding interview of the CEO of the investigated company as a concrete example of the emergence of the organizing paradox: *“I tell my managers that I do not want them to question firm goals and strategies all the time. They have to be able to convey common aims and stick to the plan. Yet later, he said: The managers around me all know that they are obligated to question routine practice and engage in dialogues to improve praxis all the time. They must be willing to take personal risks and constantly reflect on whether practice could be improved”*.

In general, organizing paradoxes surface as organizations create competing designs and processes in order to enhance performance. Implementing lean and just-in-time practices ignite various organizing paradoxes, which emerge from competing designs such as increasing employee empowerment and creativity as well as adopting formal statistical processes and controls (Eisenhardt and Westcott, 1988; Adler et al., 1999). Moreover, according to Lewis (2000), questions like *“How can organizations operate efficiently and adapt continuously? Why do some attempts to increase employee involvement and commitment intensify resistance and mistrust? Why do formal procedures aimed at assuring fair treatment of employees often trigger claims of injustice?”* (p. 767) indicate the presence of the organizing paradox.

2.4.2 Belonging paradoxes

These paradoxes reflect tensions of identity and relationships, and arise between the individual and the collective. The belonging paradoxes emerge because actors strive for both preserving their own identities and maintaining a collective affiliation. Tensions between self and the other are the core feature of the belonging paradoxes (Smith and Berg, 1987). Opposing yet coexisting roles, beliefs and values ignite the tensions of belonging. Moreover, the belonging paradoxes intensify as actors make decisions about how much time and effort to invest in the group. On the one hand, groups become more effective if the individuality of their members is respected. On the other hand, individuality is a self-referential loop which can disrupt group decision and performance (Smith and Lewis, 2011).

Lüscher and Lewis (2008) indicate that belonging paradoxes begin as organizational problems and tensions are formulated according to the following: *“How could managers begin working as a team when they did not trust the team? How could managers come to trust each other if not by sharing common experiences? How could they become part of the team, while preserving their independence?”* (p. 232). Moreover, Lüscher and Lewis (2008, p. 232) present the citation of one manager showing that the anxiety stemming from teams can accentuate the belonging paradoxes: *“I don’t know what we are doing in teams if nobody ever wants to say what they are really thinking. . . Nobody dares ask for help, including myself. . . Are people scared or what? We don’t know what will be accepted, and I guess we want to know that first. And if nobody talks, we’ll never know, will we?”*

Within the same context, Lewis (2000) cites that questions like “*How do actors become integral members of a group and retain their individuality? Why do consensus and cohesion appear to coexist with conflict and division in organizational life? As organizations become more global and interconnected, why are battles to retain local traditions escalating?*” often indicate that actors are struggling with the belonging paradox (p. 769).

2.4.3 Performing paradoxes

The paradoxes of performing typically emerge from conflicting demands among different stakeholders. Moreover organizational change tends to exacerbate the tensions of performing by fostering competing measures of managerial success. Smith and Lewis (2011) mention that organizational change can blur the criteria of managerial success between dimensions such as efficiency or quality and control or empowerment. They note also that organizational change tend to exacerbate performing paradoxes, as managers are challenged to apply opposing and competing practices, such as increasing employee autonomy and accountability.

According to Lüscher and Lewis (2008), questions like “*how do I avoid spending time on team conflict to keep my team focused on their work? How can I delegate, when I know the best way to solve the problem? If teams become self-managing, what is my role?*” (p. 231) indicate the presence of the performing paradox. According to Warglien and Masuch (1996), organizational change may create competing views of managerial success; does it imply productivity or creativity, efficiency or flexibility, control or empowerment? As the employees’ roles get blurred, the paradoxes of performing arise from conflicting organizational demands. Lüscher and

Lewis (2008) cite that the belonging paradoxes can also emerge as actors seek to make sense of their new roles. The following citations of some managers during sparring sessions: *“How can I be in charge and let others make the decisions?”* and *“How can we focus on building our teams, when there is such intense pressure to increase production?”*, and *“As a manager, you are supposed to have all the answers, be the best technician and be very sure of yourself. But how can we be people oriented, but also production oriented?”* indicate the presence of the performing paradox (Lüscher and Lewis, 2008, p. 230).

2.4.4 Learning paradoxes

Lewis (2000) cite that learning paradoxes emerge because human perceptions and actions are self-referential, in a sense that actors draws on past experiences as they attempt to change, and choose interpretations that corroborate, rather than challenge their mental frames. Learning paradoxes reveal the need for framing new knowledge, yet individuals use their extant mental frames to build new frames leading to double-bind (Smith and Berg, 1987). Learning paradoxes surface as companies attempt to change, adjust and innovate, which involve both building upon as well as destroying existing resources in order to create the future (O’Reilly & Tushman, 2008).

A common factor of the learning paradoxes is the ability to assimilate a new knowledge which enables actors to adjust to variations and change. The traditional tensions between incremental and radical innovations are related to the paradoxes of learning (Smith and Lewis, 2011). Thus, organizational change is a key source of learning paradox as actors struggle between the old and the new - a struggle between the certainty of the present and the

uncertainty of the future. Questions like “*Why do actors seem to ignore dramatic changes in their environment? Why do they fail to take action when they do perceive inconsistencies between their understandings and the world around them, or take action that produces results contrary to those intended?*” characterize the presence of the learning paradox (Lewis, 2000, p. 766).

2.4.5 Interaction among paradoxes

In addition to the above paradoxes, tensions operate also between these four categories which tend to create additional six types of organizational paradoxes: learning-organizing, performing-organizing, performing-belonging, learning-belonging, belonging-organizing, and learning-performing (Smith and Lewis, 2011). Learning-organizing paradoxes are more likely to surface as organizations seek to build capabilities that focus on efficiency while also enabling change and adaptability (Eisenhardt and Martin, 2000). Performing-organizing paradoxes are present in the interplay between means and ends or process and outcome. Organizational initiatives that seek high commitment or empowerment and high performance among employees are key source for performing-organizing tensions (Eisenstat et al., 2008; Kaplan and Norton, 1996). Belonging-performing paradoxes emerge when actors' identity clash with organizational goals (Dukerich et al., 2002).

Learning-belonging paradoxes are apparent when individuals struggle between retaining sense of identity and purpose and the need to change and learn something new. Learning-belonging tensions often emerge when individuals assume new roles or responsibilities (Fiol, 2002; Ibarra, 1999). Belonging-organizing tensions are in play when the collective structures and functions clash with and subjugate individual identity for the benefit of the group (Murnighan and Colon, 1991). Finally, learning-performing paradoxes intensify when organizations attempt to build capabilities for the future while maintaining current performance (Andriopoulos and Lewis, 2009; Tushman and O'Reilly, 1996).

Paradoxes operate also across different organizational levels. Paradoxical tensions can emerge at the individual level through cognition and reflection (Ford and Backoff, 1988), between two actors through social interaction (Argyris, 1988), in groups (Smith and Berg, 1987), at the project level (Andriopoulos and Lewis, 2010), and at organizational level (Van de Ven and Poole, 1988; Quinn and Cameron, 1988). Furthermore, paradoxical tensions may be nested across levels. For instance, Andriopoulos and Lewis (2010) identified nested paradoxes of innovation across different levels: individuals, projects, units and firms.

The identification of the various categories of organizational paradoxes is important because organizational paradoxes are the input of the model in Figure 1 which will be the basis for building the conceptual framework of the thesis and answering its two research questions. The next section focuses on the management of organizational paradoxes including the different strategies used for dealing with paradoxes (Processing activities of the model in Figure 1), the influencing factors of the management of paradoxes and the outcomes (Environment and Output in Figure 1).

2.5 The management of organizational paradoxes

Much effort has been devoted to resolving or understanding paradoxes, because they reveal inconsistencies in our logic or assumptions. Paradoxes can arise from either theoretical inconsistencies or from limited frames of reference. They require us to alter our assumptions, to shift perspectives, to pose problems in fundamentally different ways, and to focus on different research questions.

Van de Ven and Poole (1988, p.22)

The management of paradoxes is particularly relevant because, as business environment become more competitive and as organizational process become more complex and emergent, paradoxical tensions become increasingly salient and persistent. Moreover, the response to these tensions may determine an organization's fate (Quinn and Cameron, 1988; Lewis, 2000). Within the same context, Hatch and Ehrlich (1993) state that "*when environments are complex and changing, conditions are ripe for the experience of contradiction, incongruity, and incoherence and the recognition of paradox and ambiguity within organizations*" (pp.505–506).

The strategies used for managing and dealing with paradoxes can be grouped in two generic and opposing categories: acceptance and resolution strategies (Smith and Lewis, 2011). By accepting paradox, actors tend to embrace, live with and learn from the paradox (Lewis, 2000). At the same time, the acceptance of a paradox challenges actors to question the supremacy of rationality and linearity and draws more attention and focus

on the role of cognition in facing the challenges surfaced by paradoxical tensions (Smith and Lewis, 2011). On the other hand, the resolution of paradox implies finding means for meeting competing demands without necessarily eliminating the tensions (Van de Ven and Poole, 1988; Poole and Van de Ven, 1989). Moreover, the management of paradox is itself dynamic and paradoxical as it involves the alternation between the two opposing strategies: acceptance and resolution (Smith and Lewis, 2011). The dynamic management of paradox is labeled in the extant literature as the adoption of the paradoxical perspective, framework, lens or metaphor (Lewis, 2000; Quinn and Cameron, 1988; Smith and Lewis, 2011; Lüscher and Lewis, 2008). However, it is important to mention that regardless of the strategy used for dealing with paradox, “*working with paradoxes is a difficult and long-term effort*” (Van de ven and Poole, 1988, p.25).

In general, the following six studies present the management of paradoxes as a dynamic process based on iterations between two opposing strategies or actions, which paradoxically complement and reinforce each other. These studies also stress the role of mental frames in facilitating or hindering the management of paradoxes. Moreover, a common theme of these studies is that the dynamic management of paradoxes based on the two opposing strategies (acceptance and resolution) generates positive outcomes both at the individual level (creation of new mental frames or reframing of the paradoxical situation) and at the organizational level (change and transformation). Thus, an important element of the management of paradoxes adopted in this thesis is related to the roles of mental frames and reframing. On the one hand, mental frames operate as a mediating factor which can hinder or facilitate the management of paradoxes. On the other hand, reframing or the creation of new mental frames is the output of the

dynamic management of paradoxes. It is important to mention that the management of paradoxes adopted in this thesis draws heavily on the work of Smith and Lewis (2011) reviewed in section 2.5. As it will become clear in the next sections, the work of Smith and Lewis (2011) builds on and improves all the previous models related to the management of organizational paradoxes.

Having this in mind, this section reviews and discusses various studies covering organizational paradoxes and their management. These studies were selected because of two reasons. First, these studies have focused on organizational change by investigating the antecedents, process and outcomes of change and linking it to the management of organizational paradoxes in lean. Linking the management of paradoxes to organizational change is crucial for this thesis because implementing and sustaining lean involve radical change and innovative organizational principles (Smeds, 1994),

Second, these studies have presented and investigated relevant and various elements of organizational paradoxes, such as definitions, ontologies, and the different strategies used for dealing with paradoxes. More importantly, these studies have also discussed the dynamic aspects of the management of paradoxes by alternating two opposing strategies which can facilitate change and transformation, a much needed element for the success of lean implementation and sustainability. Moreover, the selected studies have identified various factors that can influence both positively and negatively the management of paradoxes and its outcomes, which facilitate the task of the researcher in drawing hypothesis and testing them.

2.5.1 Quinn and Cameron (1988)

Quinn and Cameron's book - *Paradox and Transformation: Toward a Theory of Change in Organization and Management* - is a landmark that has been constantly referenced by scholars interested in the study of paradox and its effects on organizations. Quinn and Cameron (1988) recognize that some ambiguity involves the definition of paradox because of the confusion emerging from equating paradox to other similar, but different concepts such as dilemma, irony, inconsistency, dialectic, ambivalence, or conflict. They argue that paradox is different from these concepts because it "*involves contradictory, mutually exclusive elements that are present and operate equally at the same time*" (p.2). The opposing and mutually exclusive elements in a paradox are continuously present and act simultaneously, and none of the contradictory elements has a permanent advantage or dominance over the other.

Moreover, Quinn and Cameron (1988, p. 2-3) observe that "*unexpected or discontinuous elements in analysis have often been labeled paradoxical and the criterion of contradictory, mutually exclusive elements has not always been applied*". Comparing paradox to dilemma can sharpen the understanding of what a paradox is. Quinn and Cameron cite that a dilemma is an either-or situation where one alternative must be selected over other attractive alternatives; it denotes a tension where each pole presents clear advantages and disadvantages. Paradox is different from dilemma in that the poles of a paradox don't present clear advantages and disadvantages; they support each other instead and "*no choice*" needs to be made between its two opposing poles.

For Quinn and Cameron (1988), paradox is fundamentally a mental construct: “*it exists only in the thoughts and interpretations of the individual*” (p. 4). They draw on the field of human psychology which distinguishes between two types of problems – convergent and divergent problems. Convergent problems deal with logical and quantifiable issues and ideas. Divergent problems, on the other hand, are problems that are not easily quantifiable and that can have more than one solution. The more divergent problems are investigated and studied, the more the solutions tend to become contradictory and paradoxical. Dealing with divergent problems, because of their inherent contradictory and paradoxical nature, is more likely to produce breakthroughs in science of the kind investigated by (Rothenberg, 1979).

Rothenberg (1979) introduces the concept of “Janusian thinking” which occurs when two contradictory thoughts are held to be true simultaneously, and he notes that creativity involves paradoxical attributes, that is, the simultaneous presence of contradictory elements, and that that paradoxical thinking is associated with creative insights and scientific breakthroughs. Quinn and Cameron (1988, p. 5) mention that “*the surprising nature of Janusian formulations results from the preconception that two opposites cannot both be valid at the same time; however, holding such thoughts engenders the flexibility of thought needed for individual creativity*”. In the same context, Bartunek (1988, p. 173) notes also that one major effect of paradoxical tensions is creativity because “*people are forced to look beyond the obvious and to re-examine the basic assumptions which underlie the paradox presented by conflicting goals; creative reframing occurs as people resolve the*

paradox through new insights into the linkages between apparently conflicting demands”.

2.2.1.1 The paradoxical perspective or framework

Quinn and Cameron (1988) cite that their objective is not to develop a predictive theory of paradox. Rather, they seek to develop a paradoxical lens, framework or perspective for analyzing organizational phenomena: *“The major contribution to be made is not a set of specific, testable hypotheses explaining paradox, but rather is a stimulus for asking new and richer questions”* (p. 289). They argue also that the introduction of a paradoxical framework will allow scholars to focus better on the dynamic, contradictory and transformational aspects of organizational life. It is important to note that Quinn and Cameron view paradox both as a contradiction or opposition and as a dynamic process. As a contradiction, paradox enriches the analysis by inciting people to look for the opposite positive values of the various organizational phenomena. As a dynamic process, paradox helps scholars focus on processes and complex relationships in organizations that lead to vicious circles (negative outcomes) and virtuous circles (positive outcomes). The virtuous circles facilitate change and transformation and energize individuals to reframe and adopt creative solutions to organizational problems (Quinn and Cameron, 1988). The next section focuses on the dynamic aspects of paradox as facilitators for change and transformation.

2.2.1.2 Paradox as a dynamic process

According to this view, paradox is seen as *“a circular, self-referential, or dynamic process”* that leads to negative or positive outcomes (Quinn

and Cameron, 1988, p. 292). While sometimes paradoxical tensions can create a vicious circle of rigidity and resistance, they can also liberate the creativity and intrinsic motivation in people that can trigger a virtuous circle of learning, change and transformation.

2.2.1.2.1 Vicious circles

Among the elements that contribute to the negative dynamics is the adoption of either/or logic (Quinn and Cameron, 1988). The either/or logic is the basis of human rationality which leads to choose one pole of paradox or one strategy of action and to label the other pole of paradox or the other strategy of action bad. Individuals are goal-oriented and guided by their interests and beliefs, and by the constraints imposed by the social environment (Van de Ven and Poole, 1988). When pursuing their goals, individuals may follow a strategy that can generate a vicious circle of unintended consequences. Hence, a strange loop is created where the strategy may lead to initial success and the desired outcome, but then, over time, a shift of course may lead to unintended consequences opposed to the original goals. Because the either/or logic is based on the splitting of tensions and polarities, it may lead to lack of creative tensions which trigger strange loops and vicious circles (Mausch, 1985).

Another element that contributes to the creation to strange loops and vicious circles is that, through projection, individuals perceive that their problems lie outside their control, in the external environment (Quinn and Cameron, 1988). When individuals face unintended consequences, they tend to review their action strategy in order to identify possible logical flaws. However, the misfit often lies in the assumptions, values and beliefs that underlie their logic and not in the logic itself. As

individuals project their problems outward and deal exclusively with the external source of problems instead of changing their own assumptions, the problem intensifies (Smith and Berg, 1987).

A third factor that contributes to the creation of the negative dynamics is that paradox is self-sealing and un-discussable phenomenon (Argyris, 1988). And any attempt to break the vicious circle often reinforces the problem. *“To tell the person that the source of the problem is not on the target system but in his or her own assumptions is threatening, even offensive... the credibility of the helping person is often discounted, and the individual tends to defend the original position”* (Quinn and Cameron, 1988, p. 296).

2.2.1.2.2 Virtuous circles

Instead of producing vicious circles, paradox can produce virtuous circles by inverting the vicious dynamic and helping individuals become energized (Quinn and Cameron, 1988). The same contradictory forces are present in vicious and virtuous circles; however in the latter case, they are the source of creative energy that elevates the person to a higher level of performance and produce a synergistic flow state (Csikzentmihalyi, 1976). In the flow state, individuals move from a state of defensiveness to a state of flow and a feeling of being energized. During the flow state, actors take on paradoxical proprieties, where the split between the self and the environment, the past and the present and between the action and the cognition collapses and disappears (Csikzentmihalyi, 1976). In the flow state, *“mental reframing take place”* as individuals take on new mental frames and become attuned to

the environment. As a consequence, oppositions and contradictions form a self-reinforcing cycle that drives performance and energy to a higher level (Quinn and Cameron, 1988, p. 300).

A frame, or schema, is best understood as generalized cognitive structure, framework, or template people use to impose structure on, and impart meaning to, some particular domain. Reframing is a qualitative, discontinuous, second order or double loop shift in the understanding of some domain (Argyris and Schön 1974), not an incremental modification of previous understanding. That is, “*reframing does not occur if a person holds an opinion more or less strongly than before, or if there is a slight nuance in understanding that was not present before. It does occur if a person adopts a qualitatively different opinion than previously*” (Bartunek, 1988, p 139).

Although “*reframing leads to rebalancing polarities and to peak performance; it, however, if exclusively pursued, will lead to exhaustion of resources and collapse of the system*” (Quinn and Cameron, 1988, p. 304). Quinn and Cameron cite that the high energy during the flow state cannot be sustained indefinitely, and that it must be routinized in order to avoid the degeneration of the system. Thus, it is the combination or the alternation between reframing and purposive strategies (routinization) that facilitate organizational transformation (Quinn and Cameron, 1988).

2.2.1.2.3 The transformation

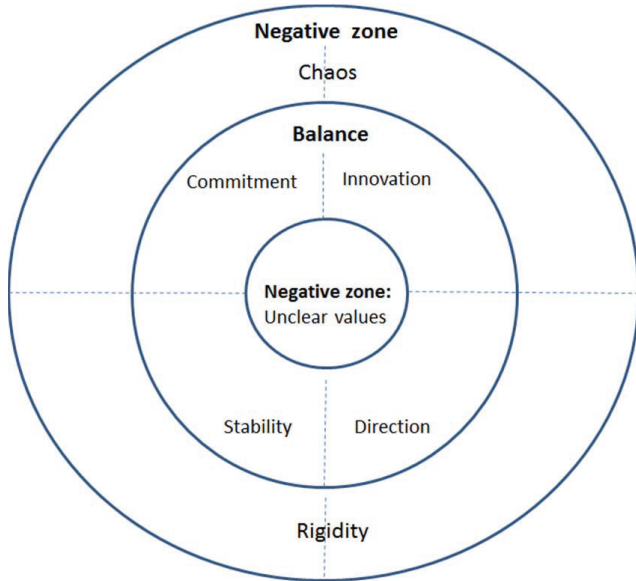
According to Quinn and Cameron (1988), the paradoxical perspective implies that organizations are dynamic and constituted of streams of energy which are constantly transformed. The energy flows can take

material forms or relatively stable patterns of movement in our world (Ford and Ford, 1994). However, change and transformation are continuous and paradoxical, and follow both purposive and reframing strategies. While the purposive strategies of action - intentionally designed by individuals through their purposive logic - lead to goal accomplishment, the reframing strategies lead to peak performance and rebalancing of tensions. Thus, the combination of both strategies leads to virtuous circles of change and transformation. However, either strategy, if exclusively pursued, activates the vicious circles which lead to the exhaustion and the destruction of the social system.

This dynamic transformation is illustrated in figure 5, which is adapted from Quinn (1988). The middle circle (balance) contains sets of opposing effectiveness criteria such as direction and stability versus innovation and commitment. In describing the dynamic paradoxical process of transformation, Quinn and Cameron (1988, p. 306) cite that *“while any set of criteria might be emphasized at a given time, if any one is pursued exclusively, the creative tension between polarities may be lost, and the positive value can become negative”*. Thus, during the movement from the positive zone (balance) to the negative zone a strange and destructive transition occurs, where innovation and commitment become chaos and stability and direction become rigidity. Thus, for Quinn and Cameron (1988), the adoption of the paradoxical perspective as a dynamic process of transformation entails the continuous balance of polarities and tensions through the combination of two paradoxical and opposing strategies: the purposive logic and the reframing strategies. The purposive strategies are similar to the

resolution strategies while the reframing strategies are considered part of the acceptance strategies (Lewis, 2000; Smith and Lewis, 2011).

Figure 5 - The transformation of positive values



Source: Quinn (1988)

2.5.2 Lewis (2000)

Lewis (2000, p. 760) cites that “*paradox denotes contradictory yet interrelated elements- elements that seem logical in isolation but absurd and irrational when appearing simultaneously*”. The contradictory and interrelated elements create tensions that persist over time. Lewis (2000) views paradox as possessing varied meanings according to the perspective of study. While philosophers view human existence as paradoxical emerging from tensions between life and death, psychologists stress the cognitive nature of paradox, analyzing the impact of paradoxical tensions on mental health.

This view points towards a perspective where individuals and teams are inherently paradoxical, involved in tensions and defense mechanisms at their very core. In organization studies, Lewis (2000, p. 761) states that “*a paradox may denote a wide variety of contradictory yet interwoven elements: perspectives, feelings, messages, demands, identities, interests, or practices*”. Moreover, actors construct paradox through cognition and social interaction while attempting to adapt and respond to an increasingly complex world. More precisely, Lewis cites that two factors contribute to the exacerbation of paradoxical tensions: formal logic and language.

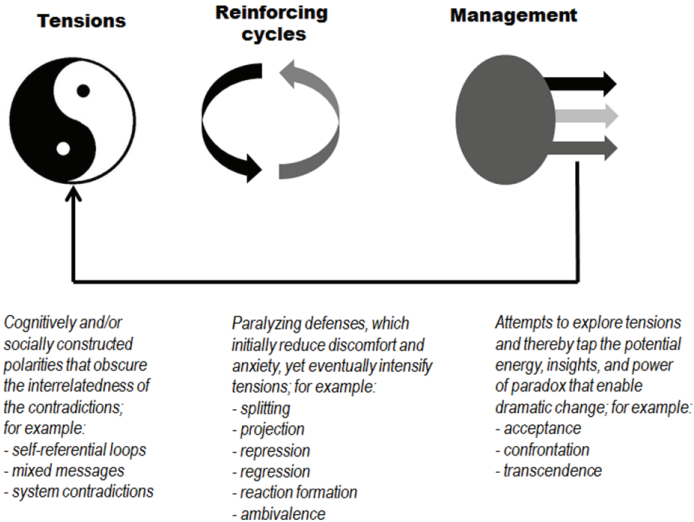
On the one hand, formal logic and technical rationality contribute to the creation of tensions because it is based on either/or thinking which sometimes is incapable to capture the complexity of the paradoxical phenomena. On the other hand, neither language nor conventional grammar are elaborated enough to capture such complexity. Hence, actors frequently try to define a phenomenon by explaining what it is not

which feeds the tendency to polarize concepts, emotions and sensations. For instance, Lewis (2000) cites that differentiating trust from distrust reveal the limitations of language based conventional logic because these sensations often coexist in human beings.

Furthermore, Lewis (2000) recommends that organization studies adopt a paradox perspective in order to avoid simplistic distinctions which are frequently apparent in such concepts and constructs as differentiation/integration, efficiency/flexibility and stability/change. However, the main contribution of her article is the presentation of a paradox framework (figure 6), which presents key elements of the management of paradox. First, the framework presents paradoxical tensions as emerging from polarized cognitive frames and social constructions. Second, it shows how actors' defensive mechanisms intensify tensions through reinforcing cycles. Third, the paradox framework state how cognitive and behavioral complexity can help actors avoid paralysis and vicious cycles through acceptance, confrontation or transcendence of a paradox. According to (Lewis, 2000, p. 761), *“by linking management back to tensions, the framework depicts exploration itself as paradoxical; rather than a linear progression marked by a distinct endpoint or resolution, exploring paradox is an ongoing and cyclical journey”*. Figure 6 illustrates these three elements of paradox and the cyclical relation among them.

Figure 6 - A paradox framework

A Paradox Framework



Source: Lewis (2000)

An important feature of Lewis' view of paradox is that tensions might initiate a virtuous circle that can lead actors to re-evaluate current understanding of polarities and complex relationships among opposites, spurring creativity and change. However, the dynamics of paradoxical tensions are more likely to activate defensive mechanisms where actors become trapped in vicious circles that exacerbate the tension to a point that inhibits change and learning. Argyris (1988, p. 257) defines defensive routines as any action or rule that *“prevents someone (or some system) from experiencing embarrassment or threat, and simultaneously prevents anyone from correcting the causes of the embarrassment or threat”*.

According to (Lewis, 2000), managing paradox means breaking the defensive mechanisms and rethinking past perceptions and beliefs. Managing paradox also involves struggling with our natural inclination as human beings to attempt to resolve paradoxes and to transform them into something familiar and rational. Managers need to learn to live with and learn from tensions and contradictions provoked by paradoxical phenomena. However, living with and learning from paradoxes is difficult because it requires counterintuitive reactions.

More precisely, Lewis (2000) presents three ways for managing paradoxes: acceptance, confrontation and transcendence. Acceptance of paradox offers a sense of freedom (Schneider, 1990) by avoiding unnecessary debates and focusing instead on performing tasks and goals (Murnighan and Conlon, 1991). Confronting paradox and discussing their tensions help actors construct a more accommodating understanding of the paradoxical phenomenon (Smith and Berg, 1987; Vince and Broussine, 1996). By discussing their underlying logic, actors may identify new insights and avoid the paralysis caused by their defensive mechanisms.

According to (Lewis, 2000, p.764), “*transcendence implies the capacity to think paradoxically*”. Lewis shares the view that transcendence helps actors break the vicious circles by using first-order thinking because first-order thinking produces a solution that is part of the problem. In contrast, second order thinking enables actors to examine implicit assumptions in order to construct a more comprehensive perception of opposites. Second order thinking might help actors reframe their assumptions, learn from existing tensions, and develop a more complicated repertoire of understandings and behaviors that better reflects organizational intricacies. Within this context, reframing means a change in the meaning according to which paradoxical

tensions become viewed as complementary and synergetic (Denison et al., 1995).

In summary, Lewis (2000) stresses the importance of building the ability to think paradoxically and avoiding the tendency to oversimplify the tensions of organizational life. She argues that the paradoxical perspective or framework - based on tensions, defensive mechanisms and their management - "*might help researchers address what tensions exist, why they may fuel reinforcing cycles, and how actors may manage paradoxes to foster change and understanding*" (p.774). It is important, however, to mention that Lewis (2000) has focused on the acceptance strategies of paradox as a facilitator for individual reframing.

However, Lewis (2000) has not discussed the resolution strategies of paradoxes which, combined with the acceptance strategies, can achieve organizational change and transformation. The model of (Smith and Lewis, 2011) presented next attempts to bridge this gap by presenting a more complete and dynamic model for the management of organizational paradoxes at both the individual and the organizational level.

2.5.3 Poole and Van de Ven (1989) / Van de Ven and Poole (1988)

Van de Ven and Poole's main contribution to the study of paradox is related to the adoption of the paradoxical perspective in theory building. In their attempt to build a theory of change, Van de Ven and Poole (1988) cite that the task requires a willingness to accept and deal with paradoxical tensions. Within this context, Van de Ven and Poole state that a paradox is a "*real contradiction between equally well-based assumptions or conclusions*" (p. 22). While the two opposing poles appear sound when temporally or spatially separated, they become contradictory when considered together. The main argument of their analysis is that social science loses an important support for theory building if the inherent paradoxes are ignored or eliminated. Traditionally, the presence of contradictory assumptions or conclusions is considered an indicator of poor theory, and theorists dedicate much effort in order to maintain rationality and eliminate such inconsistencies from theory building.

Poole and Van de Ven (1989) argue that, while the value of rationality and consistency cannot be ignored, it is not a guarantee for good management theories. Since no theory would capture the complexity of the real world, theorists attempt to simplify the reality through incomplete and consistent theories. Starbuck (1988) supports their argument by stating that if rationality and consistency cannot fully comprehend the real world, then improving a theory's rationality may not improve the quality of theory building: "*a theory should possess only enough rationality to render it understandable and satisfying, and it should retain as much irrationality as we can tolerate; hence theorists*

should be striving to create theories that balance rationality against irrationality, not maximally rational ones” (p.71).

Based on the paradoxical perspective, Poole and Van de Ven (1989) propose a strategy that advises theorists to look for contradictions and tensions and use them to build a more encompassing and effective management theories. It requires the exploration and the identification of competing statements, opposing explanations and the discovery of ways of relating and integrating them. However, Van de Ven and Poole state that the alternative strategy is not supposed to replace traditional theory building; rather, it recommends the use of paradox as a lens or as an offsetting force against traditional theory building which theorists can benefit from by gaining insights from multiple perspectives (Poole and Van de Ven, 1989).

Van de Ven and Poole (1988) cite four contradictions and tensions that a more encompassing change theory should account for: first, it should link individual actions and motives to collective structure which they call part-whole relations among structure and action; second, it should explain both sources of change: the inherent source of change from within the social structure due to dialectical and paradoxical tensions and the other source of change from outside the structure due to social interaction and environment; third, it should explain both stability and order – forces of consensus and consistency versus forces of conflict and disruption – forces that are interdependent and support each other; fourth, since , by definition, change can only be noted over time, then a theory of organizational change should include time “*as its key historical metric*” (Van de Ven and Poole, 1988, p. 21).

Van de Ven and Poole argue that, if no organizational theory of change has succeeded in synthesizing these four requirements, it is due to the fact that social theorists haven't treated properly the paradoxical tensions in the first three requirements. Instead, theorists have emphasized one pole of a paradox in detriment of the other. For instance, the first requirement that a theory of organizational change should meet is related to relations among actions and structure. An organization is a social structure constructed by people; individual actors create and maintain structures; structures impose constraints on action, even shaping actors' interests and purposes. And theorists have not been successful in developing a theory that connects individual interests with social structure and deal with such paradoxical tensions. Three aspects contribute to the difficulty of building such theory of organizational change:

First, ambiguity surrounds the genesis of action and structure. While most theories of action view individual purpose and action as the source of organizational structure, the structuralists focus on issues of power and how coordination is achieved. In the structuralist version, action is impossible without authority, rules, and information – resources that stem from organizational structure. Thus, “*we are confronted with a potential paradox: action requires structure, yet structure only exists through action*” (Van de Ven and Poole, 1988, p.27).

A second aspect of this paradox is related to contrary ontological assumptions about structure and action. While organizational structures are assumed to be measurable and tangible, action is more subjective. To map actions it is necessary to trace personal motives and purposes. This

contributes to another paradox for a theory of change: “*organizational change must be seen as change in concrete, measurable properties; yet organizational change is best understood as a result of inter-subjective processes of intentionality and practical reasoning*” (Van de Ven and Poole, 1988, p.28).

The third paradoxical aspect derives from how action and structure fit into social scientific research. While structural explanations are variance theories, action explanations are a type of process theory. This fact contributes to the third paradox: “*a deterministic approach must be adopted if research focuses on changes in structure. Yet an interpretive approach should be followed if research attempts to explain action, the connections between events and the individual motivations behind change*” (Van de Ven and Poole, 1988, p.28).

Van de Ven and Poole (1988) and Poole and Van de Ven (1989) cite four generic strategies for dealing with the paradoxical tensions in theory building. The first strategy is to accept the paradox without ignoring the paradoxical tensions. Instead, they recommend using them constructively. They claim that juxtaposing contradictions constitutes an opportunity for learning and stimulate theory development (Poole and Van de Ven, 1989). However, accepting paradox has its challenges. The main challenge is that the relationship between the opposing poles of a paradox must be clearly defined. If this relationship between opposing tensions is not clear, “*fragmentation of knowledge and counterproductive bickering among proponents of the correct horn of the dilemma*” might occur (Van de Ven and Poole, 1988, p.23).

In the case of the action-structure paradox, Van de Ven and Poole (1988) cite that living with this paradox is to accept its existence and use it constructively for understanding organizational change. Van de Ven and Poole state also that the action-structure paradox can exist at multiple levels of organizational analysis. Different insights can be gained by living with the tensions or contradictions emerging from both the horizontal and the vertical relationships between structure and action (Van de Ven and poole, 1988, p.29).

In addition to the horizontal level, considering the vertical level of analysis is useful, because many misfits apparent at one level of the organization manifest themselves in different and contradictory ways at other levels. For example, based on the concept of requisite variety, Van de Ven and Poole argue that with increasing environmental complexity, uncertainty, and variety, the overall structure of the organization becomes more complex, loosely coupled. If this is so at the macro level, than at the micro level the structure of the individual parts or groups within the organization will become simpler and tightly coupled: *“the whole tries to become more adaptive, but this results in the parts exhibiting characteristics that lead to non-adaptiveness, narrowness, and groupthink”* (Van de Ven and Poole, 1988, p.30). In summary, much can be learned about organizational change by accepting the paradoxical misfits generated by the action-structure paradox at micro-macro and horizontal-vertical levels of organizational analysis.

The second strategy is to deal with paradox through spatial separation among different levels of analysis. This approach assumes that one pole of the paradox operates at one level of analysis while the other pole

operates at a different level. This strategy implies that it is necessary to specify as precisely as possible how the levels interrelate (Poole and Van de Ven, 1989). Level distinctions such as micro-macro, or individual-society have contributed considerably to social research (Van de Ven Poole, 1988). They assume that individuals have purpose and can act but organizations cannot, and attempts to specify models by which individual actions can combine to create collective outcomes.

For example, Van de Ven and Poole (1988) observe that structural-functional theories have been criticized for their inability to explain change because of the emphasis on stability, without taking account of the control of disruptive tendencies at the micro level. On the other hand, radical change theories overemphasize conflict and disruptive tendencies in organizations without admitting that these tendencies can only occur by having order and stability at the micro level. Many insights in social science have resulted from attempts to sort out similar misfits across levels and their relationships.

The third approach takes into account the role of time. In this approach, one pole of the paradox is assumed to hold during one time period and the other during a different time period (Poole and Van de Ven, 1989). Tushman and Romanelli's punctuated equilibrium model of organizational evolution considers alternating cycles of convergence and reorientation (Tushman and Romanelli, 1985). Within this context, *“convergence seems to be predominantly influenced by structure, whereas reorientation is driven by purposive actions of executive leaders”* (Van de Ven and Poole, 1988, p 33).

The resolution of paradoxes by level distinctions or temporal analysis leaves each set of assumptions or processes basically intact. Both side of the paradox are assumed to be sound, and the paradox is resolved by separating them and explaining how one pole of the paradox sustains the other. However, Van de Ven and Poole (1988; 1989) discuss the possibility that the paradox may stem from conceptual limitations or logical flaw in theory. They argue that the introduction of new logic or frame is needed to remedy the flaw in theory. This leads us to the fourth strategy for dealing with paradox which is by synthesis and introducing new terms to resolve the paradox.

Van de Ven and Poole draw on the theory of structuration of Giddens in order to exemplify the fourth approach for dealing with paradoxes. Structuration refers to the process of production and reproduction of social systems via members' application of rules and resources. Implicit in this definition is a distinction between system and structure. Structure refers to the rules and resources people use in acting and interacting. System is the outcome of the application of rules and resources, the observable patterns of relations between people and groups.

The theory of structuration assigns a dual nature to structures: they are both the medium and outcome of action. The novel conceptualization that might resolve the paradox is the introduction of the “modalities of structuration” between structure and individual actions: “*a modality of structuration represents the individual actor’s appropriation of structure for use in a particular action context*” (Poole and Van de Ven, 1989, p. 574). For example, in a conflict situation, an individual might use a workflow diagram as a norm to justify her claim that orders should be routed to another person. In doing this the individual, according to her

own motives. However, despite the central role individuals play in producing and reproducing structures, the complexity of social systems means that people do not wholly control structuration. Systems may be very complex, and apparently straightforward actions may lead to consequences unintended by individuals trying to control the system (Van de Ven and Poole, 1988).

In summary, Van de Ven and Poole propose four strategies for dealing with paradoxes emerging from building a more encompassing theory of change. The first strategy is an acceptance strategy which leaves both poles of the paradox intact. The three remaining strategies are resolution strategies because they either separate the tensions temporally or spatially, or create a synthesis that is different from both thesis and antithesis. However, Van de Ven and Poole clarify that every strategy has its advantages and disadvantages, and the combination or the alternation of more than one strategy might be needed and even recommended for dealing with organizational tensions across different levels. For instance, Poole and Van de Ven (1989) state that acceptance strategies can prepare the ground for the resolution of paradox, whether by temporal and spatial separation or by creating a synthesis. It is important to note that Van de Ven and Poole (1989) are more likely to approach paradox as a static contradiction that facilitates the identification and exploration of competing statements, rather than a dynamic process that lead to negative or positive outcomes (Smith and Lewis, 2011). Moreover, Van de Ven and Poole don't elaborate on organizational factors or conditions that can facilitate or hinder the management of paradoxes.

2.5.4 Putnam (1986)

Putnam (1986) approaches the paradoxical tensions through her studies of organizational communication and change. She states that contradictions frequently become evident in social interaction. While, on the one hand, individuals accept that meanings and messages change over time and across cultures, on the other hand, individuals expect consistency and predictability of meanings and messages. The negative reaction towards message inconsistency may reside in the fact that people associate inconsistencies and contradictions with deliberate deception and wrongdoing. Moreover, individuals also expect consistency between verbal and non-verbal messages. Hence, a person who *“simultaneously expresses verbal affirmation and nonverbal rejection may be concealing information or trying to trick us in some way”* (Putnam, 1986, p.151).

Even when people do not suspect a contradictory message, they find it difficult to respond to it and to deal with the related tensions. According to Putnam, contradictory messages emerge when people try to adapt to environmental change and from the multiple and different levels of communication and interaction. A frequently encountered form of contradiction is the message-action relationship. In organizational context, this contradiction applies to the consistency between the way individuals act and the prevailing organizational routines and procedures. More specifically, a message-action contradiction emerges when the way to accomplish an organizational task clashes with the established bureaucracy (Putnam, 1986).

Moreover, individuals use interpretative schemes to communicate and to draw meanings from what others individuals say. These interpretative schemes are based the simultaneous interplay among three components: 1) message elements which refer to the verbal and non-verbal behaviors; 2) interpretations of these elements, and 3) the context in which the message and the interpretations occur. The exchange of messages involves transforming both verbal and non-verbal messages, contextual cues, events and experiences into interpretations. Hence, interpretations occur within a particular context and both communication and context operate in a reflexive unity. Putnam shares the view in which communication is a continuous process of creating and changing interpretations through social interaction of organizational members. This process constructs a social reality with set of interpretative schemes and social structures such as procedures and rules. Paradoxical tensions and conflicts are considered ruptures in the process of reality construction and represent an opportunity for change (Putnam, 1986).

Within this continuous process of social interaction and communication, Putnam (1986, p. 153) defines paradox as a contradiction where “*mutually exclusive alternatives evolve over time*”, and identifies three interrelated types of paradox: contradictory messages, paradox cycles, and system contradictions. Contradictory messages refer the coexistence of mutually exclusive elements. Contradictory messages denote inconsistencies between statements or between verbal and nonverbal responses that appear during social interactions. Such tensions stem from the construction of ambiguous messages. For example, a supervisor calls for teamwork but closely monitors individual performance.

According to (Putnam, 1986), there are three possible responses to the paradox of contradictory messages: (1) accepting one of the messages and ignoring the other; (2) accepting both messages and operating within the contradiction; (3) merging the contradiction into a creative alternative. Contradictory messages and paradoxical tensions produce anxiety that raises actors' defenses (Schneider, 1990). Anxiety may subside once a person reacts and choose one of the opposing elements. Accepting both messages is to accept contradictions as inherent elements in our social world. The third response is to integrate the contradictions into a creative solution or merging opposite elements into a coherent whole (Rothenberg, 1979).

The second type of paradox is the paradox cycle which is a self-reflexive contradiction in that the contradictory messages are embedded in one another. Putnam cites the following narrative as an example of a paradox cycle. A supervisor begins his meeting by asking his employees to increase their participation in the work process. The supervisor delegates tasks and efforts, and considers that his main responsibility is to coordinate these efforts in order to achieve organizational goals. However, teams in another department complain about delays involving the process of which the supervisor is responsible. The same supervisor, in response to the complaints, increases the process efficiency by supervising the process closely and aiding his employees with their tasks. His effort to supervise work closely reduces the autonomy of his employees and creates a reflexive contradiction: On the verbal level he encourages his employees to get involved, but on the nonverbal level he discourages their participation by aiding them in doing their tasks (Putnam, 1986).

The paradox cycle becomes a self-sustaining system entrapping both supervisor and employees as victims of their own behavior. Until this point, the contradiction has evolved from oversight and actors have no intentional entrapment. An intentional entrapment occurs if, for instance, one employee feels that the supervisor efficient manner makes him unapproachable. As a consequence, the employees feel unable to change the behavior of the supervisor and react by abstaining from work or from participating in group discussions. This behavior perpetuates the paradox cycle when the supervisor interprets the employee's behavior as apathy toward the group and the company (Putnam 1986).

According to Putnam (1986, p. 160), unlike the message contradiction “*a paradox cycle strips the participants of choice*”. As a consequence, attempts to respond to paradox cycle with the same cognitive frame set by the contradictory messages would perpetuate the vicious cycle. Putnam cites that one approach to free oneself from a paradox cycle is to meta-communicate: By meta-communicating, a person steps outside the cognitive frame that originates the paradox cycle and describes it from the outside. However, meta-communication is more effective in the oversight stage of the paradox cycle and less effective in the intentional entrapment stage. A second approach is to transcend the paradox cycle by merging contradictory messages and by synthesizing the opposites. By transcending the paradox cycle, actors reframe the situation and create a new logic that relates the contradictory messages.

The third type of paradox is system contradictions which are manifested when the other two types of paradoxes – message contradictions and paradox cycle – become entrenched into the systems, processes and

goals of an organization. A system contradiction emanates from the process of organizing where members create new procedures and structures when the existing social arrangements become dysfunctional. However, hidden problems arise and create further imperfections and imbalances that continually challenge the prevailing structure (Putnam, 1986). System contradictions emerge also from social interaction. The continuous social interactions escape the control of organizational members and members' actions produce unintended consequences. Following the dialectical approach to organizing, message contradictions and paradox cycle can lead to organizational changes while maintaining the prevailing social order. In this case, the prevailing system absorbs tensions and contradictions and transforms them into new social order. However, under some circumstances contradictions can undermine the system and destroy the existing social order (Putnam, 1986).

In summary, Putnam (1986) adopts a dynamic view of paradox and considers that micro-level paradoxes can prepare the emergence of macro-level and system paradoxes. She also considers that responses to paradoxes can generate (negative outcomes) vicious and (positive outcomes) virtuous circles. Thus, Putnam approaches paradox as a metaphor which can facilitate change and transformation. Moreover, the author investigates and discusses various factors which can influence the management of paradoxes. In fact, according to Putnam (1986, p. 166), *“efforts to merge a contradiction into creative alternative, to expose organizational traps, and to view the situation from - both the inside and the outside - emancipate the system and its members. In contrast, behaviors that either implicitly or explicitly adhere to one side of a contradiction, lead to withdrawal from the scene, or consistently repress*

evolving changes can result in the dissolution of work relationships, work units, and even organizations”.

2.5.5 Smith and Berg (1987)

Smith and Berg (1987) use the paradoxical perspective in order to gain more insights on how groups' dynamics evolve. The authors cite that their study differs from other studies on group dynamics because it considers conflicts and tensions as inherent in group life. For this purpose, they observe that, although it is frequently claimed that conflict can be constructive, group members often experience conflict as dangerous and destructive to the group. In their book *Paradoxes of group life*, the authors seek to change this frame by exploring the reality that “*group life is inherently paradoxical*” (Smith and Berg, 1987, p. 11).

Furthermore, Smith and Berg (1987) state that the paradoxical perspective adopted in their work is based on the observation that group relations are shaped by emotions, thoughts and actions that are perceived as contradictory and paradoxical by group members. The self-referential, contradictory and circular aspects of the paradoxical situation prevent groups from freeing themselves from the binds of the paradox: “*it is precisely because the contradictions are bound together that the circularity exists*” (Smith and Berg, 1987, p. 14). Thus, the primary task of the group becomes the management of the contradictions and their binding effects. The successful management of these contradictions can increase the understanding of the connections and relationships between the two opposing poles of the paradox. This understanding increases the alignment between team members' development and the group's collective life.

Furthermore, Smith and Berg (1987) argue that issues such as multiple frames of meaning and double bind contribute to the creation of the

paradoxical aspects of conflicts in groups. The issue of multiple frames emerges when different meanings of different levels of the same concept get mixed up. The main thought behind the multiple frame of meaning is best expressed by (Bateson, Jackson, Haley, and Weakland, 1956 cited in Smith and Berg, 1987, p. 54) as follows: *“To describe a class of objects or events we require a concept (or set of concepts) that operate(s) at a different levels of abstraction that the concepts appropriate for describing one of the objects or events of which the class is constituted”*. This results in a conflict of logics that creates seemingly contradictory and unresolvable activities.

Multiple frames give rise to double binding situations. The meaning of an event emerges from the relation of that event to the context in which it is framed. Different contexts can frame different meanings for the same event which create multiple and contradictory meanings. Thus, the choice of action might be overwhelming because contradictory meanings can suggest opposing actions. Hence, individuals are caught in double binding situation without knowing how to free themselves from the double bind.

In addition to multiple frames and double bind, Smith and Berg (1987) mention that psychological processes of splitting and projection contribute to the creation of paradoxical situations at the individual, group and intergroup levels. Splitting is a psychological phenomenon which is used as a defense mechanism by individuals against emotional ambivalence. Smith and Berg (1987) draw on the clinical literature and give an example of psychological splitting of an infant struggling with the emotional ambivalence toward the mother. The process of splitting of the infant starts with *“the early ambivalence surrounding the desire to*

be fused with the mother and the wish to be separated from her; this ambivalence creates love-hate reactions toward the mother” (p.68). In order to reestablish the emotional equilibrium, the infant splits the feelings of love and hate and projects them onto different persons or objects – for example “*good mummy and bad daddy*” (p.68). Splitting and projection are an indication of psychological rigidity toward emotional ambivalence because it leads to alternation between two extremes (good and bad or love and hate), instead of the acceptance that one feels both positively and negatively toward the same person or objects.

Smith and Berg (1987) argue that, because splitting is an unconscious process, people lose sight of the paradoxical nature of the conflict and recur to non-paradoxical techniques such as eliminating one side of the individual ambivalence. However, when people don’t use a paradoxical lens, it becomes increasingly difficult to see the links or connections between two opposites and the management of paradoxical situations. The authors state that most theories of group conflicts and development are based on stages and phases and don’t focus on the process by which groups and individuals move from one state to another. On the other hand, a paradoxical framework entails a model of movement. In order to clarify the power of the paradoxical perspective, the authors explore the processes of both *movement* and *stuckness*. In opposition to movement, stuckness refers to “*the repetitive, often unconscious tensions that prevent group from even doing the work of problem solving on scarce resources or compromising about conflicting needs*” (Smith and Berg, 1987, p. 207). Moreover, a paradoxical lens entails that the sources of both movement and stuckness are embedded in the ways individuals and

groups react to the presence of contradictions or paradoxes. Like the relation between the two opposed poles of a paradox, the relationship between movement and stuckness is paradoxical itself.

The central thesis evoked by Smith and Berg for both individuals and group is about how to survive and succeed in a social world filled with paradoxical tensions. Smith and Berg (1987) suggest that the survival and growth in a paradoxical world “*involve not only the experience of paradox but the various ways of thinking about paradox that enable us to tolerate or manage contradictions and conflict... some of the choices we make in our efforts to cope with paradox are likely to produce stagnation and stuckness; other choices facilitate movement*” (p. 208).

Efforts to reconcile the opposing forces and eliminate the contradictions often lead to further entrenchment of the oppositions and to paralysis and stuckness. Moreover, Smith and Berg argue that individuals and groups are less likely to understand the paradoxical tensions until they immerse themselves in the extremes and live within the paradox. It is through the immersion in the extremes and the oscillation and movement between the extremes that individuals and groups learn how to free themselves from the vicious circularity of a paradox and see the link or the pattern connecting the extremes – necessary condition for the survival and growth of the group. Within this context, “*movement refers to leaving old patterns, at least for a time, and exploring new psychological or emotional ground in the life of group*” (Smith and Berg, 1987, p. 217).

Thus, Smith and Berg (1987) depict the paradoxical perspective as movement or oscillation between two extremes which enables the survival of the group. It does so because it enables individuals and

groups to reframe their mental models by increasing their understanding of the link that exists between the two extremes.

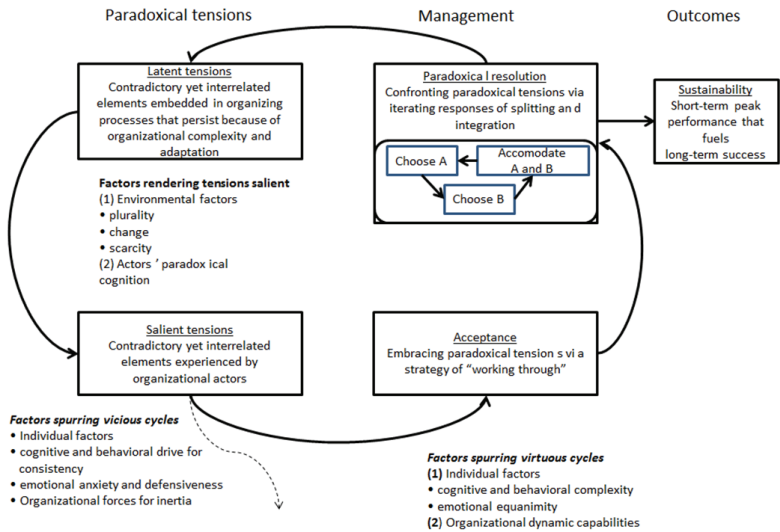
2.5.6 Smith and Lewis (2011)

Smith and Lewis (2011) have reviewed studies of paradox during the last twenty years and identified three research gaps in the extant paradox literature. The three gaps are related to three themes: the conceptualization of paradox, the ontological nature of paradoxical tensions, and the strategies to respond to these tensions. The authors cite that the lack of conceptual clarity in the study of paradox is evident in the different concepts and terms used to describe tensions, such as paradox, dilemma, and dialectic. The second gap in the literature stems from the ontological debate that situates paradoxical tensions either as an inherent in the social system or as representations and constructions that emerge from human cognition. The third gap is related to the lack of integrated responses to paradoxical tensions through the use of acceptance and resolution strategies.

The authors attempt to bridge these gaps in the extant literature by advancing a dynamic equilibrium model (figure 7) based on three principal features: (1) paradoxical tensions that are both latent in the system and salient in human cognition and social interaction, (2) responses to paradoxical tensions that imply combination of acceptance and resolution strategies, and (3) the impact of management of paradox on organizational effectiveness and sustainability. As such, Smith and Lewis's model builds upon and improves the gaps of the previous models for dealing with organizational paradoxes. More importantly, the model of Smith and Lewis reflects more precisely the systems perspective advanced through the input-processing-output model in Figure 1. In fact, Smith and Lewis define the four categories of organizational paradoxes and their interactions (Inputs). They also discuss the sequence of the acceptance and resolution strategies (processing activities) and investigate contextual factors (Environment)

such as paradoxical cognition and behavioral consistency that influence the management of paradoxes. Furthermore, the model presented by Smith and Lewis is dynamic and circular where outputs become input to the process (Feedback). Based on this, this thesis draws heavily on the model of Smith of Lewis as the basis for building the conceptual framework (Chapter 4) and in conducting the analysis of this thesis (Chapters 6 and 7).

Figure 7 - A dynamic equilibrium model of organizing



Source: Smith and Lewis (2011)

The first feature of the model considers paradoxical tensions as both latent or inherent within the system and salient or socially constructed by actors' cognition and interaction. In fact, Smith and Lewis argue that paradoxes are

latent and inherent in the system because organizations are inherently paradoxical and the opposing yet interrelated dualities of paradoxes are embedded in the process of organizing. Moreover Smith and Lewis argue that the latent paradoxes are made salient through social interaction and actors' cognition and accelerated by environmental conditions such as organizational change. More precisely, the model assumes that paradoxical tensions remain latent or dormant until environmental factors combined with human cognition and social interactions accentuate the oppositional and dialectical forces of a paradox. As a consequence, tensions intensify to the point that organizational actors experience and recognize their effect.

Responses to paradoxical tensions - the second feature of the model - can spur both vicious and virtuous cycles. Forces of inertia are the main cause of vicious circles and they emanates from such factors as cognitive and behavioral consistency and defensiveness, which make actors lean toward consistency between their cognition and actions (Van de Ven and Poole, 1988). In the face of contradictions, individuals present anxiety (Schneider, 1990), and employ defense mechanisms such as denial and humor (Vince & Broussine, 1996) in order to avoid embarrassment and inconsistencies. Virtuous circles are triggered by awareness and acceptance of paradox rather than defensiveness. Factors such as cognitive and behavioral complexity (Denison et al. 1995) contribute to the formation of paradoxical thinking and to view organizational phenomena from both/and rather than both/or perspective (Smith and Lewis, 2011).

In responding to paradoxes the model proposes a combination of acceptance and resolution strategies where acceptance strategies prepare the ground for the resolution strategies. Acceptance assumes that opposing tensions can

coexist and actors can explore and benefit from the relationship between the two opposites (Smith and Berg, 1987). Acceptance strategies may be passive or proactive (Smith and Lewis, 2011). In passive strategies actors “*play through rather than confront tensions, thereby avoiding potentially disastrous conflicts*” (Smith and Lewis, 2011, p. 385). While proactive strategies entail confronting paradoxes and discussing their tensions which help actors construct a more accommodating understanding of the paradoxical phenomenon (Smith and Berg, 1987; Vince and Broussine, 1996).

Acceptance of the presence of contradictions provides a comfort with tensions and enables actors to use resolution strategies for dealing with paradoxes. Resolution involves responding to paradoxical tensions by separating physically or temporarily tensions or by finding synergies or synthesis that accommodate the opposing elements of a paradox. According to Smith and Lewis (2011, p. 392), a dynamic equilibrium model involves acceptance and resolution of paradoxes through “*consistent inconsistency*” where iterations between resolution alternatives ensure simultaneous attention to short term goals and long term adaptability. Being consistently inconsistent means that actors make short time choices while remaining aware of the long term effects of such choices.

The third feature of the model is the impact of the management of paradox on organizational effectiveness and sustainability. Smith and Lewis (2011) argue that the dynamic model enables sustainability by fostering learning and creativity and liberating human potential. Smith and Lewis (2011) state, that the use of paradoxical perspective through the alternation of acceptance and resolution strategies -, results in more positive responses to paradoxical

tensions. Acceptance implies viewing tensions as an opportunity for creativity and change. Smith and Berg (1987, p. 215) cite that “*by immersing oneself in the opposing forces, it becomes possible to discover the link between them, the framework that gives meaning to the apparent contradictions in the experience*”. Within the same context, Rothenberg (1979) finds that creative individuals have the capacity to juxtapose contradictory elements. The juxtaposition of opposing elements transmits positive energy to individuals that become more engaged and more persistent in the face of challenges (Seligman & Csikszentmihalyi, 2000) and helps increase team effectiveness as well as organizational performance (Quinn and Cameron, 1988).

Smith and Lewis (2011) compare the paradoxical lens to the contingency theory in order to draw insights regarding the management of organizational tensions. Contingency theory has been used to study organizational tensions across phenomena and levels of analysis. According to the contingency perspective, success depends on alignment within the internal system and with the external environment, and the role of management is to recognize and then resolve tensions. As with contingency theory, a paradox perspective explores tensions across phenomena and levels. But in contrast to contingency theory, a paradox perspective assumes that tensions persist within complex and dynamic systems. Moreover, these tensions can be beneficial for the organization. Smith and Lewis (2011, p. 395) state that contingency approach relies on questions such as “*under what conditions is A or B more effective?*”, while a paradox perspective asks “*how can organizations and their managers effectively engage A and B simultaneously?*” Hence, the paradoxical lens favor a both/and approach

rather than an either/or approach for dealing with opposing organizational phenomenon (Smith and Lewis, 2011).

In summary, Smith and Lewis (2011) use paradox as a dynamic metaphor that can generate transformation and change, rather than a static contradiction between two opposites. The authors argue that, a management strategy based on the acceptance and the consistently inconsistent resolution of paradoxes initiates virtuous circles of creativity, learning and change. They also argue that the adoption of the paradoxical perspective based on the alternation of the acceptance and the resolution of the paradoxes can enhance organizational performance and sustainability.

2.5.7 Summary and conclusions of the management of paradoxes

This section summarizes and concludes the section on the management of organizational paradoxes by comparing and discussing the above reviewed studies. The discussion rotates around the constructs contained in the input-processing-output model presented in Figure 1. These are: organizational paradoxes (inputs), strategies for dealing with paradoxes (Processing activities), outcomes of the management of paradoxes (Outputs), and factors influencing the management of paradoxes (Environment). Table 1 contains a description of the constructs in the input-processing-output model for each of the six reviewed studies. It is important to note that the conceptual model of this thesis draws heavily on the model advanced by (Smith and Lewis, 2011) because it reflects more precisely the systems perspective contained in the input-processing-output model in Figure 1 (see section 2.5.6).

Organizational theory argues that the four categories of organizational paradoxes (Column 2 in Table 1) represent core activities of organizations and they are expected to be found in any type of organization (Smith and Lewis, 2011). In this thesis, the identification of the organizational paradoxes is important because they are the inputs of the input-processing-output model of Figure 1.

As for the strategies for dealing with organizational paradoxes (Column 3 in Table 1), a common feature of these studies is the use of two opposing strategies (acceptance and resolution), which contributes for balancing paradoxical tensions and facilitating change and transformation. In fact, scholars agree that the management of paradoxes is itself paradoxical as it involves the use and alternation between two opposing strategies for dealing

with paradoxes: acceptance and resolution. While acceptance strategies encourage actors to live with and learn from the paradoxes, resolution strategies seek responses to paradoxical tensions, either through separating the two opposing poles temporally or spatially, or by finding synergies or synthesis that accommodate the two extremes. It is the alternation of acceptance and resolution that constitutes the paradoxical perspective (Processing activities in Figure 1) which enhances organizational performance and adaptability.

As for the factors influencing the management of paradoxes (Column 4 in Table 1), factors - such as cognitive, behavioral consistency and defensiveness, and the use of either/or mental frame and logic – hinder the acceptance of a paradox and contribute to vicious circles of resistance and inertia. On the other hand, cognitive and behavioral complexity and the use of both/and mental frame contribute to view organizational phenomena from “*both the inside and the outside*”, which tends to create virtuous circles of change and to facilitate the acceptance of paradox by promoting the reframing and the transcendence of the link or the relationship between the two opposing poles. Thus, according to the reviewed studies, the mental frames (Environment of Figure 1) of the involved in the change initiative can influence the management of paradoxes and its outcomes.

As for the outcomes of the paradoxical perspective (Column 5 in Table 1), two level of analysis are worth mentioning. At the individual level, the adoption of the paradoxical perspective entails a movement between the two opposing poles of paradoxes, which facilitates the reframing and the transcendence of the paradoxical situation. Thus, at the individual level, the main outcome of the management of paradoxes is the creation of a new

mental frame (Output in Figure 1) within individuals, which fosters double-loop learning and creative insights. Thus, reframing is the main outcome of the management of paradoxes at the individual level.

At the organizational level, the adoption of the management of paradoxes through the alternation between acceptance and resolution generates positive outcomes as it facilitates organizational change and transformation (Output in Figure 1). While the acceptance of the paradoxes increases the understanding of the tensions and creates new mental frames associated with double loop learning, the resolution of the paradoxes reaps the benefits of the increased level of understanding and leads to better resolutions of paradoxes. Within this context, acceptance strategies precede and prepare the ground for the effective resolution of the paradoxes.

The next section concludes this chapter of the thesis demonstrating the dynamics forces of the paradox by drawing on the self-organizing properties within the complexity science.

Table 1 – Overview of strategies, factors and outcomes of the management of organizational paradoxes

Author	Definition of organizational paradox	Strategies for paradox management	Factors influencing the management of paradoxes	Outcomes
Quinn and Cameron (1988)	Paradox involves contradictory, mutually exclusive elements that are present and operate equally at the same time.	Alternation between two opposing strategies: logic purposive and reframing.	Either/or logic and projection produce vicious circles, while mental reframing and both/and logic enhance the acceptance of paradoxes and facilitates virtuous circles of change and transformation.	The adoption of the paradoxical perspective leads to organizational change and transformation.
Lewis (2000)	A paradox may denote a wide variety of contradictory yet interwoven elements: perspectives, feelings, messages, demands, identities, interests, or practices. Lewis identifies three categories of organizational paradoxes: learning, organizing, and belonging.	Three strategies: acceptance, confrontation or transcendence. By linking management back to tensions, the presented framework depicts the management of paradoxes itself as paradoxical.	Defensive mechanisms create inertia and resistance, while cognitive and behavioral complexity can help actors avoid paralysis and vicious cycles.	The paradoxical framework liberates individuals from their defenses and facilitates understanding and reframing at the individual level, and change and transformation at the organizational level.
Poole and Van de Ven (1989)	A paradox is a “real contradiction between equally well-based assumptions or conclusions	Four strategies for dealing with paradoxes in theory building: acceptance, temporal	Although the value of rationality and consistency cannot be ignored, it is not a guarantee for building good management theories.	The management of paradoxes based on the four strategies helps building better theories through the exploration and the

		separation, spatial separation and synthesis, with acceptance preparing the ground for the other three strategies		identification of competing statements and opposing explanations, and the discovery of ways of relating and integrating them.
Putnam (1986)	Paradox is defined as a contradiction where mutually exclusive alternatives evolve over time.	Acceptance, meta-communication and transcendence are the strategies for dealing with organizational paradoxes.	Efforts to view the situation from both the inside and the outside emancipate the system and its members. In contrast, behaviors that adhere to one side of a contradiction lead to resistance and inertia.	The management of paradox facilitates individual reframing and organizational change, and avoids the rupture of the social system.
Smith and Berg (1987)	Paradox is a statement or set of statements that are self-referential and contradictory and that trigger a vicious circle. Smith and Berg cite three categories of organizational paradoxes: belonging, engaging, and speaking.	The management of paradoxes entails opposing actions that motivate the movement between the two opposing poles of the paradox.	Multiple frames of meaning, double bind, and psychological processes of splitting and projection accentuate the creation of the paradoxical aspects of conflicts at both the individual and group level. On the other hand, the immersion in the extremes and the oscillation and movement between the extremes help individuals and groups free themselves from the vicious circularity of a paradox.	The movement between extremes enables individuals and groups to reframe their mental models by increasing their understanding of the link that exists between the two poles of paradox, and see the link or the pattern connecting the extremes – which is necessary condition for the survival and growth of the group.

<p>Smith and Lewis (2011)</p>	<p>Paradox is defined as contradictory yet interrelated elements that exist simultaneously and persist over time. Smith and Lewis identify four categories of organizational paradoxes, which are: learning, organizing, belonging and performing.</p>	<p>The management of paradoxes is based on iterations between acceptance and resolution strategies.</p>	<p>Cognitive and behavioral consistency and defensiveness create vicious circles and hinder transformation. Cognitive and behavioral complexity contribute to view organizational phenomena from both/and rather than both/or perspective facilitates reframing and change.</p>	<p>The outcomes are the creation of virtuous circles of creativity and learning which facilitates individual reframing and enhances organizations' performance.</p>
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Source: Based on the literature review

2.6 Dynamic forces of paradox

The section draws on the complexity science models to strengthen the theoretical foundations of how and why the adoption of the paradoxical perspective creates the necessary energy within the social system triggering change and transformation.

2.6.1 Complexity science

Within the search for the sources of complexity there must also be an impulse toward the fundamental, toward simplicity. It is through the dialectic between simplification and complexification that our understanding of change and innovation will ultimately advance.

(Poole and Van de Ven, 2004, p. 395)

Up to this point of the thesis, it has been somehow accepted that using paradox as a metaphor can create the energy for change and facilitate transformation. In this section, the intention is to draw on the complexity science model in order to strengthen the theoretical foundations of why and how the paradoxical perspective create the energy needed for unfreezing the social system and increasing the motivation for change among individuals.

Daft and Lewin (1990) argue that the behavior of complex systems is surprising and unpredictable because it is nonlinear. In nonlinear systems, small change in one parameter can drastically change the behavior of the whole system, and the whole is often different from the sum of the parts. Complex systems connect inputs to outputs in a nonlinear pattern as their components interact with one another via extensive feedback loops (Casti 1994).

According to Simon (1996, p. 1), the central task of a normal science is to show that complexity can be a mask for simplicity. In fact, organization scholars reduce a complex system to a simpler one by simplifying what they consider unnecessary or irrelevant for their purpose. Modeling the nonlinear outcomes of complex systems has been so difficult that scholars have preferred the more analytically tractable problems (Casti 1994). In fact, Complexity science has its roots in general system theory; however they differ in their approach toward the notion of causality. In general system theory, causal relationships are linear and cannot deal with the notion of causality associated with living systems. Moreover, general system theory use a top down approach toward causality, which require the identification a priori of the variables under study and the relationships among them. However, living systems incorporate linear and nonlinear causalities which require complex models that operate both top down and bottom up approaches toward causality. In complex models, behavior is specified only locally and global behavior can only be observed via simulation. More importantly, complex models simulate *“life as a dynamical process that only exists in quasi-equilibrium states”* (Dooley, 2004, p. 357).

It is important to state that complexity science is broad and includes both positivist and constructivist approaches (Stacey, 1999). However, in most cases, complexity theory has been used as a metaphor for approaching various organizational problems, rather than predictive theory with rigorous applications to organizational change and innovation (Poole and Van de Ven, 2004). In the next section, the self-organizing models of complexity science are presented as metaphor that offers relevant insights for the understanding the power of paradoxes in generating change and transformation.

2.6.2 Self-organizing models

According to (Dooley, 2004), complexity science encompasses a broad set of concepts and models related to the systemic and dynamic aspects of living systems. Self-organizing models are complex adaptive models that simulate how order is created from within the system. The critical parameter that can trigger change is the level of energy within the system. The new order or the reorganization of the system emerges as internal and external forces push the system to a state far-from-equilibrium and to its limits for processing and dissipating energy. When the operating forces push the system beyond this boundary, the system recognizes that its current structure and state of equilibrium is not capable of dissipating the excess of energy, and its components must adopt a new configuration that is more capable of dissipating the excess of energy and expand the boundary of the existing system (Prigogine and Stengers, 1984).

According to Prigogine and Stengers (1984), at far-from-equilibrium state, small perturbations may be responsible for pushing the system to a new attractive point of equilibrium, at which convergent forces one gain dominate and bind the system to its new state of equilibrium. In physics, the transition of water from solid to liquid to gas is an example of new attractive points of equilibriums. Among other types of change, change via far-from-equilibrium has special proprieties because change in the initial state of equilibrium within the system induces new pattern of behavior. More specifically, the system does not change the environment nor the environmental forces change the system; rather, environmental forces trigger internal mechanisms of the system that are the source of the

transformation to the new state of equilibrium. Within this context, lean and total quality management can push the boundaries between a company and its environment - composed of customers and suppliers among others – and enable new far-from-equilibrium conditions to form (Dooley, 2004).

Self-organization is not the result of individual agents' behavior to seek order; it is rather the natural result of nonlinear interaction (Fontana and Ballati 1999). *“When the interactions of large numbers of components involve positive feedback loops, some behaviors amplify, quickly crowding out others. Groups of components become locked into self-reinforcing feedback cycles that lead to predictable collective behavior; interacting microscopic entities form macroscopic structures that simplify the input structure of other macroscopic structures”* (Anderson, 1999, p. 222).

Self-organization occurs in open systems as it needs to import energy from the outside world (Prigogine and Stengers 1984). Organizations are social entities with dissipative structures that can only be maintained when members interact and contribute energy to them. This may explain the resilience of the informal structures and cultures which emerge and persist in the formal organizational structure (Barnard 1938). Generally, the more turbulent an organization's environment is, the more energy and interaction among members are needed to keep the system above the threshold that sustains the self-organization (Anderson, 1999). When there are too few components or interactions among members, the self-organizing patterns tend not to emerge (Weick 1979).

Having introduced the self-organization models and their main characteristics, the next section explores the self-organizing models as a

metaphor or model showing the power of paradox and paradoxical thinking in approaching organizational phenomena and creating change and transformation.

2.6.3 Paradox and the self-organizing models

The self-organizing models give us the theoretical foundations for why and how the adoption of the paradoxical perspective can bring about reframing, and organizational change and transformation. Westenholtz (1993) argues that individuals are not capable of seeking double-loop learning outside the existing frame of reference. This is because the change process is self-referential and, the individual adopts the environmental responses that confirm the existing frame of reference. However, Westenholtz (1993) argues that it is possible to change the individual's frame of reference through the cognitive paradoxical process. Within this context, cognitive paradoxical process or paradoxical thinking "*implies the ability to respond to a host of ambiguous and contradictory forces, including the simultaneous presence of opposites*" (Denison et al., 1995, p. 526. She argues that, by facilitating movement between opposing frames of reference, the cognitive paradoxical process creates the internal energy pushing the system to a new attractive point of equilibrium (the new frame of reference). At the far from equilibrium, small perturbations caused by the cognitive paradoxical process may be responsible for pushing the social system toward a new attractive point of equilibrium, which is the reframing of the relationship between the two opposing poles of paradox.

Within this context, Dooley (2004) cites the example of a multi-functional team where the operating norms of the group can emerge in a self-organized

fashion because of (1) boundaries that separate the team from its organizational environment, creating identity tensions of “*us and them*” (p. 368), (2) differences that emerge because of the heterogeneous experiences and personalities among team members, and (3) exchanges among team members that alter mental frames from one position to another. The paradoxical cognitive process contributes to the self-organized transformation as “*organizational change can be induced by changing containers, focusing on different differences, or changing the nature of exchange*” (p. 368), which are characteristics of the paradoxical cognitive process creating the energy needed to push the system toward a far-from-equilibrium state.

The view, that paradoxical thinking creates the energy needed to push the system to a far-from-equilibrium state, is also shared by other scholars although within different contexts. For instance, Smith and Tushman (2005) argue that the paradoxical cognition - based on paradoxical frames and cognitive processes of differentiating and integrating strategies - creates the conditions needed to avoid managerial paralysis. They mention that the alternation of the two opposing strategies of differentiating and integrating increases managers’ ability to understand and cope with paradoxical tensions and avoid being overwhelmed by the inconsistencies.

Having presented the self-organizing models as a metaphor that supports paradoxes and paradoxical thinking as generator of energy within the social system, the next section concludes this chapter and presents its main findings.

2.7 Summary and conclusions of the chapter

This first theme of this chapter is to define organizational paradoxes and explain their nature and genesis. A common feature of the definitions of organizational paradox presented across all the studies reviewed in this chapter is that organizational paradox involves contradictory, mutually exclusive elements that are present and operate equally at the same time. It is different from dilemma and dialectics in that no choice needs to be made between the two opposing poles of paradox. As for their nature and genesis, organizational paradoxes are constructed by individuals' cognition through the process of reality construction and the drawing of distinctions and dualities. Moreover, as a metaphor, organizational paradoxes can facilitate individual reframing and create the energy for organizational change and transformation.

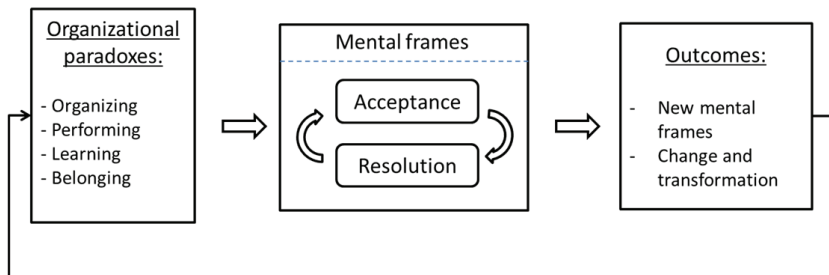
As for the types of organizational paradoxes (Inputs in Figure 1), the extant literature identify four categories of organizational paradoxes which represent core activities and elements of organizations: paradoxes of organizing (processes), paradoxes of belonging (identity/relationship), paradoxes of learning (knowledge) and paradoxes of performing (goals). As such, they are expected to be found in any type of organization. Moreover, organizational paradoxes can remain latent or dormant until organizational change accentuates their oppositional forces. As a consequence, paradoxes intensify and become salient to the point that organizational actors experience and recognize their effect.

As for the management of organizational paradoxes (Processing activities in Figure 1), this chapter shows that the alternation between two opposing strategies - acceptance and resolution – can bring about individual reframing

and facilitate change and transformation (Output in Figure 1). Within this context, mental frames are important contextual elements (Environment in Figure 1) which can influence both positively or negatively the management of paradoxes. Moreover, this chapter draws on the self-organizing models of the complexity science in order to strengthen the theoretical foundations of the argument relating the adoption of the paradoxical perspective, or paradox as a metaphor, to the creation of the energy within the social system which facilitate reframing, change and transformation. According to self-organizational proprieties, each iteration between acceptance and resolution increases the energy in the system that moves toward the new equilibrium (Feedback in Figure 1).

Figure 8 parallels the input-processing-output model depicted in Figure 1 applied to the management of organizational paradoxes.

Figure 8 - The management of organizational paradoxes (Meta-theory)



Source: Literature review

Chapter 2 is a core chapter as it produces the systems perspective of the management of organizational paradoxes (Figure 8) that will be the basis for

building the conceptual framework of the study (Chapter 4). The next chapter presents lean philosophy focusing on its paradoxical nature and reviewing the strategies used for dealing with lean paradoxes in a sample of selected lean studies.

Chapter 3 - Lean paradoxes and their management

The core objective of this chapter is to identify the various categories of organizational paradoxes in a sample of lean studies. Moreover this chapter aims at discussing the various strategies used for the management of lean paradoxes. By emphasizing the paradoxical nature of lean and identifying the four categories of organizational paradoxes in lean, this chapter prepares the ground for the use of the systems perspective (meta-theory) depicted in Figure 8 as lean paradoxes become the inputs in the model.

The chapter is composed of five sections. The first section provides an introduction to lean philosophy and its principles. The second section comments on lean evolution outside Japan and outside the manufacturing sector. The third section discusses the challenges faced by managers attempting to implement lean in the service sector. The fourth section identifies the four categories of organizational paradoxes in lean and discusses the strategy used for dealing with them in the extant lean literature. Finally, the last section concludes this chapter and presents its main findings.

3.1 Introduction to lean philosophy

The shop-floors of Japanese manufacturers and in particular, Toyota, are considered the origins of lean thinking (Monden, 1983). Following the Second World War, the Japanese economy was not contributing to the industrial growth desired by top Japanese companies. In order to face the scarcity of resources and the competition, Toyota introduced and improved various techniques and methods which would cause a significant impact on the manufacturing systems in Japan and worldwide. These techniques and methods include just-in-time (JIT), kanban, pull, production leveling, automated mistake proofing, high level of employees' involvement, and problem-solving skills. Still the cornerstone of the Toyota system is the continuous elimination of waste from the production flow. The seven types of waste or “muda” originally identified at Toyota by Taiichi Ohno are: Over production, waiting, transportation, inappropriate processing, inventory, unnecessary motions, and defects (Monden, 1983; Shingo, 1981).

The Toyota model represented a counterintuitive thinking to the established capital-intensive mass production system with its large batches and dedicated machines. However, the generic term lean manufacturing was popularized by the International Motor Vehicle Programme (IMVP) researchers of the Massachusetts Institute of Technology. Their project focused on the significant performance gap between Western and Japanese automotive industries of 52 assembly plants in 14 countries over a five-year period. The project gave birth to the seminal book of (Womack, Jones, & Roos, 1990) – *The Machine that Changed the World* – which codified much of the core features of lean manufacturing.

In “The machine that changed the world”, Womack, Jones, & Roos cites that Lean Production is “lean” because it uses less of human effort, manufacturing space and investment in tools and engineering hours compared with mass production. The authors state also that “*lean combines the advantages of craft and mass production, while avoiding the high cost of the former and the rigidity of the latter; toward this end, lean production employ teams of multi-skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in enormous variety*” (p. 13). Rather than setting a goal of a specific level of leanness, lean production is focused on a continuous improvement process. Each improvement in flow or reduction in waste leads to new goals (Monden, 1983; Womack, Jones, & Roos, 1990).

In their book - Lean thinking -, Womack & Jones (2003) identify and describe the following five lean principles in order to guide organizations in their journey to become lean.

1. Value

Value can only be defined by the ultimate customer; value is only meaningful when expressed in terms of a specific product which meets the customer’s needs at a specific price at a specific time. The way to do this is to ignore existing assets and technologies and to rethink firms on a product-line basis with strong, dedicated product teams. Specifying value accurately is the critical first step in lean thinking. Providing the wrong good or service the right way is “muda” (waste in Japanese).

2. Value stream

The value stream is the set of all specific actions required to bring a specific product through the three critical management tasks of any business: (1) the problem-solving task running from concept through detailed design and engineering to production launch; (2) the information management task running from order-taking through detailed scheduling delivery; (3) the physical transformation task proceeding from raw materials to a finished product in the hands of the customer. Value stream analysis reveals three categories of activities or actions: (1) the value creating actions; (2) type I muda: this includes actions that create no value but are unavoidable with current technologies and production assets; (3) type II muda: this includes actions that create no value and are immediately avoidable.

3. Flow

Once value has been precisely specified, the value stream for a specific product fully mapped, and “*muda*” eliminated, then it’s time to make the value-creating activities flow. According to (Womack & Jones, 2003), organizing in flow is counterintuitive because it leads to a redefinition of the well-established hierarchical structure based on functions and departments. Womack & Jones (2003) cite also that the key technique in implementing the flow approach is the concept of “takt time”, which synchronizes the rate of production to customers’ demand. The elimination of waste creates transparency which facilitates producing to “takt time” and “*alerts the whole team immediately to the need either for additional orders or to think of ways to remove waste if takt time needs to be reduced to accommodate an increase in orders*” (p. 56).

Womack & Jones (2003) claim that raising awareness of the tight coupling or connection between the activities within the organizations is effective

against the generation of waste or “*muda*”. Womack, Jones, & Roos, (1990) cite also that while lean-production does indeed remove slack and waste, “*lean production offers a creative tension in which workers have many ways to address challenges*” (p. 101) and workers should possess the skills they need to face the continuing challenge of making the work flow according to *takt time*. Womack, Jones, & Roos, (1990) mention that lean calls for learning more skills and applying these skills in groups and teams rather than within a function.

4. Pull

The effect of converting from departments to product teams and flow is that the time required going from concept to launch, sale to delivery, and raw material to the customer falls dramatically. Womack & Jones, 2003, (p. 24) summarizes the progression from value to pull by stating that “*this is a big achievement because the ability to design, schedule, and make exactly what the customer wants just when the customer wants it means you can throw away the sales forecast and simply make what customers actually tell you they need; that is, you can let the customer pull the product from you*”.

5. Perfection

The interaction among the four initial principles seems to create a virtuous circle which is the basis for the fifth principle of lean thinking: perfection. In fact, getting products and value to flow according to the *takt time* exposes the wastes and inefficiencies in the process. The more the production flow, the more impediments to flow are revealed within the value stream. This generates the creative tension that pushes employees toward specifying value more accurately and learning of better ways to enhance flow and pull (Womack and Jones, 2003).

Womack and Jones (2003) and Womack, Jones, & Roos, (1990) have identified various paradoxes associated with the conversion from mass production to lean enterprise. When referring to people and learning, Womack, Jones, & Roos, (1990) mention that lean production calls for learning far more professional skills and applying these creatively in a team setting rather than in a traditional hierarchy: *“The paradox is that the better you are at team-work, the less you may know about specific, narrow specialty that you can take with you to another company or to start a new business”* (p. 14). In fact, a common aspect of the learning paradoxes is related to the ability to assimilate a new knowledge which enables agents to adjust to new roles (Lewis, 2000).

Womack and Jones (2003) also mention that the lack of steep ladder in lean with less titles and job descriptions may itself be a source of tension and disappointment among employees. Within a flat organizational structure, if companies are to keep employees’ motivation, companies must offer them a continuing variety of challenges. They mention the importance of trust between management and employees in stretching the skills of the team by giving the employees broader tasks than they normally do. The authors cite that *“when a small team is given the mandate to “just do it”, we always find that the professionals suddenly discover that each can successfully cover a much broader scope of tasks than they have ever been allowed previously. They do the job and they enjoy it”* (p.54). The duality of *“narrower versus broader tasks”* is an example of the paradox of organizing which emerges during the act of organizing that draws distinctions reflecting the conflicting aspects of organizational design (Smith and Lewis, 2011).

Womack and Jones, (2003) also mention that, as lean enterprise creates flows of value, employees are increasingly involved in value-creating tasks.

They observe that “*while the actual work is likely to be much more rewarding than in the previously disconnected world of departmentalized batches and queues, the lack of perceived progression and the loss of a commanding skill may be dispiriting*” (278). To deal with this problem, Womack & Jones (2003) suggest that “*a new form of career must be devised, an “alternating career” in which employees go back and forth between applying what they know in a team context and taking time out to learn new skills in a functional setting*” (p.279).

The basic idea would be to switch employees between working in teams for the life of a development project or during a product’s production life and working in their “home functions” when a project is completed. In the home function, reassigned employees could receive training on new skills, or work on advanced projects and stretch their existing skills to the limit. Furthermore, Womack and Jones (2003) recommend the creation of the lean promotion function; this function is composed of the experts who are willing to master all of the knowledge and methods needed to create perfect value streams and to teach this knowledge to line employees.

Furthermore, Womack & Jones (2003, p. 65) state that “*the type of activities which people all over the world consistently report as most rewarding- that is, which make them feel best – involve a clear objective, a need for concentration so intense that no attention is left over, a lack of interruptions and distractions, clear an immediate feedback on progress toward the objective, and a sense of challenge – the perception that one’s skill are adequate, but just adequate, to cope with the task at hand*”. Within the same context, Womack, Jones, & Roos (1990) cite that, while lean-production does indeed remove all slack, it also provides workers with the skills they need to control their work environment and the continuing challenge of

making the work go more smoothly. *“While the mass production plant is often filled with mind-numbing stress, as workers struggle to assemble “unmanufacturable” products and have no way to improve their working environment, lean production offers a creative tension in which workers have many ways to address challenges. This creative tension involved in solving complex problems is precisely what has separated manual factory work from professional “think” work in the age of mass production”* (p. 101).

In summary, Womack and Jones (2003) and Womack, Jones and Roos, (1990) have mentioned the presence of various organizational paradoxes associated with lean conversion, such as learning (knowledge and skills), organizing (processes and functions), and belonging (relationships / groups formation) paradoxes. In fact, Womack and colleagues seem to support the argument of (Smith and Lewis, 2011), who state that organizational paradoxes are expected to be found in any organization since they represent core activities such as learning, organizing and performing, and lean organizations are no exception .

3.2 Lean evolution

During the 1990s, the exploration of the lean enterprise model based on the above five principles supported a thesis of transference outside Japan and the ability of other non-automotive sectors' emulation based upon the premise that manufacturing problems were universal problems (Womack et al., 1990). Inspired by the superior performance achieved by lean production over the performance of traditional mass production, western manufacturers emulated successfully lean tools, but often found it difficult to introduce the organizational culture and vision much needed to sustain lean. So many lean initiatives had limited success, and fell short of achieving a major impact on the overall performance of the involved companies (Holweg and Pil, 2001). In fact, up to 1990, the main weaknesses of lean manufacturing were its automotive manufacturing focus and the limited appreciation of how to handle variability in demand. The implementation was exclusively tool-focused, which often neglected the human aspects and the work system core to the success of the lean manufacturing approach (Hines et al., 2004).

In their analysis and assessment of lean evolution, Hines et al. (2004) argue that lean exists at two levels: strategic and operational. The strategic thinking with focus on customer value applies everywhere, while the operational shop-floor tools do not. They also mention that the existence of the two levels in lean has led to confusion and misunderstanding as to where and how to apply lean. Moreover, they state that lean has evolved on the basis of its five principles and long gone beyond the operational shop-floor application, which has largely been imitation of Toyota. For Hines and colleagues, organizations that miss the strategic level of lean, based on the

understanding of customer value and value creation, tend to assume that quality, delivery and cost are equivalent to customer value. This has led to the “island optimization” of assembly plants, and to a sub-optimization of their complete supply chain (Holweg and Pil, 2001; Holweg, 2003). However, from a strategic point of view companies can integrate other approaches and tools without contradicting the core objective of lean which is to provide customer value. Based on this, other tools and concepts that provide customer value can be incorporated under lean strategy, even if the traditional Toyota tools, such as kanban, level scheduling, or takt time, are not used (Hines et al., 2004).

More specifically, when applied to sectors outside the high-volume repetitive production, such as the service sector, lean conversion presents considerable challenge as scholars have proposed a range of other approaches to counter variability and variety of processes, products and skills (Hines et al., 2004). The service sector is of particular interest for this thesis since the three case companies of the empirical analysis are service companies (healthcare, financial and public transport), which have been working on lean implementation and sustainability for some years. Based on the relevance of the service sector for this study, the next section introduces the main characteristics and issues related to lean implementation in services.

3.3 Lean services

Researchers agree that in the post-modern era the quality of life has become the guiding principle in western societies. Because of this, “*services like health, education, transport, financial services (banks, financial institutions) and even public services have come to form the integrated basis of the life of citizens – who are the clients of these organizations – in this new post-industrial era*” (Suárez-Barraza et al., 2012, p. 360). In fact, services now constitute the biggest employer for developed economies, as they account for approximately three quarters of gross domestic product in the USA and UK (Apte, 2012, Zeithaml et al. 1990).

However, in spite of the expressive weight of the service industries in the developed economies, the productivity in this sector has been much lower than that of the manufacturing area and the quality of services delivered by the majority of organizations is not of the level required by customers. In the USA, research has reported customer satisfaction rates to be at a record low (Fournier et al., 1998) while in the UK, a study of British consumers found 86 per cent complaining of the poor quality of customer service (Acland, 2005). Even worse, indicators suggest that the level of service quality is actually declining, with service quality deteriorating year after year (Dickson et al., 2005).

However, in the current context, there are growing external pressures on service industries to reduce costs, increase flexibility and improve quality (Cavaness & Mannochehri, 1993; Fitzsimmons & Fitzsimmons, 1994). In fact, many organizations in the service sector has looked to the manufacturing sector in order to emulate their techniques and tools so as to become more lean and to improve their services quality and reduce costs

(Kinnie et al., 1996). Even though Lean philosophy has its origin in the manufacturing environment, researchers believe that lean is equally relevant to service organizations, as both types of organizations use system approach or process view in order to reduce cost and improve quality (Piercy and Rich, 2009; Corbett, 2007). However, the real challenge is to understand the logic and the characteristics of service organizations in order to decide which lean practices and tools to use and how to apply them effectively (Randor and Osborne, 2013; Alsmadi et al, 2012). For instance, Radnor and Osborne (2013) cite that “*without utilization of a service-dominant logic, the Lean approach will be doomed to failure as an approach to public services reform – both as a set of managerial practices and as a theory*” (p. 266).

Although, both manufacturing and service operations involve a number of input-transformation-output activities, service operations are characterized by issues such as intangibility, heterogeneity, inseparability and perishability (Moeller, 2010; Grönroos, 2000; Fitzsimmons & Fitzsimmons, 2006), which pose considerable challenges for the implementation of lean practices in services (Piercy and Rich, 2009; Radnor and Osborne, 2013). First, according to Moeller (2010, p. 361) “*the most common definition of intangibility is the state of not being palpable and material*”. While a manufactured product is an object or a device, a service is a performance, an effort or an experience (Berry, 1980). Among other things, this means that the satisfaction of the customer with the service is tightly link to its expectations of that service, and that any potential gap between expectations and experience affects directly the perceived performance and impact of that service (Grönroos, 2000).

Second, heterogeneity of services is linked to the difficulty in standardizing services. This difficulty has been related to different aspects of services, such as outcomes, individual productivity, and production performance over a certain period of time (Moeller, 2010). Third, inseparability entails that the simultaneous production and consumption of services, which also means that the service provider and the consumer are often physically present when consumption takes place. Education and consultations of physicians are common examples of inseparable services (Berry, 1980). Fourth and last, perishability has often been associated with the unavailable option of storing services and that is because the outcome of the process seems to perish right away with its consumption and at the end of the transformation all that remains is the experience of the service (Moeller, 2010).

In fact, various researchers have highlighted the above core characteristics of services as posing considerable challenges for their management and for lean implementation (Radnor and Osborne, 2013; Piercy and Rich, 2009; Alsmadi et al, 2012). For instance, Piercy and Rich (2009) have investigated lean implementation in the call center of three financial service companies and identified various practices for lean service improvement, such as value identification, mapping of value, and work-task redesign. Piercy and Rich stress that importance of uniting these practices and efforts and bringing them together for the success of lean implementation in service operations. For instance, since a critical issue for the customers was that their complaints could be resolved at first contact or that they were handled by a single claim handler if multiple contacts were needed, the three companies have created a single pool of workers removing the need for the call to be referred through the routing system, trained these claim handlers so they could resolve queries without constant referral to other units and,

redesigned the performance measurement and remuneration systems in order to reduce dysfunctional behavior. Solving the complaints at first contact and having a single claim handler if multiple contacts were necessary have contributed to reduce the negative effects of the heterogeneity and the difficulty of standardization of the call service on the performance of the call center (Piercy and Rich, 2009).

Furthermore, in their assessment of the impact of lean on public services, Radnor and Osborne (2013) mention that the successes of lean in public services seem to lack sustainability in the benefits achieved. Moreover, they argue that, should lean have a substantial and enduring impact upon public services, *“it cannot be treated as a theory in its own right”* (p. 267). This entails that lean should not be only considered as a set of tools. Rather it has to be adjusted to *“a public service dominant business logic”* (p. 267). In fact, the authors cite some case examples from public services where lean initiatives had more focus on the operational level and lean tools rather than the strategic level based on the dominant business logic within public services. This approach to lean implementation in public services has led to short-term success in improving the internal efficiency. However, it has missed core issues in the public service dominant business logic, such as the centrality of the customer and customer value to organizational effectiveness (Radnor and Osborne, 2013).

Having introduced lean philosophy and its principles, and the challenges faced by companies during lean conversion, the next section of this chapter introduces the paradoxical nature of lean and discusses the management of lean paradoxes in the extant literature.

3.4 Lean paradoxes and their management

This section reviews two samples of lean studies in an attempt to identify what are the organizational paradoxes (the first group of studies) and what strategies are used for dealing with them (the second group of studies) in the extant lean literature. The main objective of this section is to strengthen the motivation of this study by identifying peculiarities, limitations and gaps in the approaches used for dealing with lean paradoxes, and to build the foundations for answering the two research questions of the thesis.

3.4.1 Lean paradoxes

This section presents a summary of nine lean studies that have identified various paradoxical situations within lean philosophy. Not all these studies have used the word “paradox” in their description of the tensions and challenges that individuals and companies face during lean conversion. However, the literature review in the previous chapter (chapter 2) gives various definitions, citations and explanations on how to identify the four categories of organizational paradoxes, which represent core activities of any company (Smith and Lewis, 2011; Lewis, 2000; Lüscher and Lewis, 2008). The main objective of this section is to identify descriptions and citations in each of the nine lean studies which correspond to one or more of the four categories of organizational paradoxes. The identification of the organizational paradoxes in lean is important because it will enable the transference of the systems perspective (meta-theory) depicted in Figure 8 to the lean context. Table 2 presents the name of the author (s) of each study and a description of the source of paradoxes within each lean study.

Table 2 - Overview of sources of tensions and paradoxes within lean

Author (s)	Sources of paradoxes within lean
Radnor and Osborne (2013)	<p>Radnor and Osborne mention that the focus of lean introduction in public services has been upon “<i>internal customers and internal efficiency rather than external end-users and external effectiveness</i>”. The authors argue that it is crucial for the success of lean in public services “<i>to operationalize the core philosophy of Lean, rather than simply applying its tools in a mechanistic and product-dominant manner</i>” (p. 279). Based on this gap, they propose a reform strategy for lean in public services based on five propositions which describe the core elements of a public services dominant theory of Lean. By reviewing the various organizational paradoxes identified in chapter 2, one can observe that each of these propositions can be related to one or more organizational paradoxes in lean.</p> <p>For example, the first proposition suggests that a focus on internal efficiency is a necessary but not a sufficient condition for the effective implementation of Lean within public services. The focus should also be on adding value to the end-users of public services and on improving external effectiveness. According to Lüscher and Lewis (2008), this situation can ignite the performing paradox as actors face competing measures of success.</p> <p>Moreover, the second proposition implies that “<i>the quality of internal processes is a key influencer of, and contributor to, the quality of external service and their reform only has meaning when this understanding is embedded in any internal reform process</i>” (p. 280). Smith and Lewis (2011) argue that the organizing paradoxes can surface if individuals perceive that the quality of internal process and the quality of external service involve competing designs.</p>
Modig and Åhlström (2012)	<p>According to Modig and Åhlström, companies frequently face a paradox related to two types of efficiency: resource efficiency and flow efficiency. Resource efficiency is the dominant form of efficiency as companies are “<i>organized around specific functions and specialized around resources</i>” (p. 15). However, flow efficiency – created through an organization’s processes – is important to meet customer’s needs efficiently.</p> <p>While the authors argue that both forms of efficiency are needed, they mention that it is very difficult, if not impossible, to score high on both forms of efficiency. In fact, although resource efficiency may be beneficial from the organization’s point of view, it can present a problem from a customer perspective. The negative effects on customer create the need for a lot of additional resources, work and efforts across processes.</p>

	<p>According to the above situation, the paradox of performing (internal focus versus customer perspective) can emerge as competing success factors are considered (Lüscher and Lewis, 2008; Smith and Lewis, 2011).</p>
<p>Piercy and Rich (2009)</p>	<p>In their study of the claims process of three UK-based call service centers in the financial services industry, Piercy and Rich analyze and assess the implementation of lean as an improvement philosophy in the three companies.</p> <p>Examining their operational system, the three companies decided to redesign the call process and the organizational systems that supported it. This redesign would be based on shifting the managerial focus of the organization away from traditional, mass production logic to a lean philosophy. The authors mention three key changes: (1) to create a single pool of workers and remove the need for the call routing system; (2) to train the staff so they could resolve claims without constant referral to other units or a work in progress buffers; and, (3) to redesign the performance measurement systems of each company to reduce dysfunctional behavior.</p> <p>The biggest change for staff was the change in the business model: from tightly defined departments into a single organizational unit. This involved a new belief that the employees were more capable of achieving more than the previous model dictated. Physical changes in the workplace were also required as a single area, with staff from both claims process and technical support areas, was created so that when claims arrive they could be quickly resolved. Within this context, one can detect the presence of the belonging paradoxes which are ignited by opposing yet coexisting roles, beliefs and values among individuals and groups (Lüscher and Lewis, 2008; Lewis, 2000). In fact, the shift by the management of each company to view staff as more capable is an indication of the existence of opposing yet coexisting beliefs and values (Lüscher and Lewis, 2008). Moreover, the physical changes in the workplace are related to the presence of the organizing paradoxes as companies create competing designs to enhance their performance (Lewis, 2000).</p> <p>Furthermore, another big challenge the organizations faced was in retraining staff to realize the single-contact strategy. Each company needed multi-skilled employees which are able to handle all the phases of customers' claims. In fact, the training aimed <i>"to widen the range of skills (to answer multiple customer issues) and also to increase the depth of their skill base (empowering them to act independently of set scripts based on their own knowledge of the operational requirements of each type of customer issue or activity)"</i> (p.66). This challenge indicates the</p>

	<p>presence of the learning paradoxes which involves a struggle between the certainty of the present (existent knowledge and skills) and the uncertainty of the future (new knowledge and skills) (Lewis, 2000).</p>
Spear and Bowen (1999)	<p>Spear and Bowen cite that it is difficult to replicate Toyota success because observers confuse the tools and practices they see on their visits with the Toyota system itself. For the authors, an apparent paradox of the Toyota system is that the rigid specification is the basis that facilitates flexibility and creativity at Toyota. The authors explain the apparent paradox at Toyota by describing four principles: “three rules of design, which show how Toyota sets up all its operations as experiments and one rule of improvement, which describes how Toyota teaches the scientific method to workers at every level of the organization” (p.98).</p>
Lewis, M. A.(2000)	<p>Lewis argues that one of the core features of lean is the removal of waste through the refinement of operational procedures. He observes in his study that firms would inevitably see a narrowing of innovative activity as they refine their processes. He suggests that some form of management of tensions or trade-off between the degree of lean production and innovation might be needed in order to maintain the long term adaptability of the companies.</p> <p>In fact, in the context of ongoing cost reduction and the implementation of lean principles, there was an established mindset in the company that activities that didn’t contribute directly to cost reduction were considered muda and eliminated, resulting in the narrowing of innovation activities within the company.</p>
Mullarkey, Jackson and Parker (1995)	<p>Mullarkey and colleagues cite that a conflict or a paradox arises within lean when elements such as multiskilling and job rotation in product-based teamworking can give rise to the contradictory perceptions of increased autonomy and increased control among employees. The authors argue that the simultaneous introduction of many changes can lead to increase employees’ perceptions of problems during just in time implementation. Mullarkey and colleagues propose that “<i>a highly developmental human-centered participatory approach to the introduction of JIT, by ensuring that employees were sufficiently multi-skilled and well-trained in the principles of quality control and team-working</i>” (p. 76) can increase the perceptions of autonomy and reduce stress among employees, and reduce the negative perceptions associated with the change.</p> <p>The contradictory and simultaneous perceptions among employees of increased autonomy and increased control simultaneously indicate the presence of the organizing paradox. In fact, the paradoxes of organizing emerge during the act of organizing that draws distinctions which reflect an inherent source of tensions and the conflicting aspects of organizational design (Smith and Lewis, 2011).</p>

<p>Karlsson and Åhlström (1996)</p>	<p>Karlsson and Åhlström cite that one major tension or challenge when introducing lean in product development is to move from basing activities on milestones to implementing a continuous concurrent process. They argue that top management overemphasis on research and development activities in development projects can hinder the cross-functional integration of teams. Within this context, they mention that “creating a team with members from various functions is easier than achieving cross-functional focus throughout the organization” (p. 283).</p> <p>They cite factors that can support the conversion to lean product development such as lean buffers in schedules, close cooperation with close customers, competence of individual engineers, top management commitment and support, regular meetings with management representatives from different functions. The authors observe that more attention from top management is crucial for the creation of an awareness of the need for change. They also propose that a certain degree of unlearning regarding current procedures and measurements is beneficial to lean implementation, which outlines the learning tension within lean.</p>
<p>Danneels (2003)</p>	<p>Danneels (2003) identifies an organizing paradox associated with the process of tight coupling versus loose coupling with customers. While tight coupling increase the understanding of customers’ needs and improve services quality, loose coupling enable firms to explore new opportunities or fight new threats. The organizing paradox is created because the same process that enables companies to be efficient limits future adaptability. In other words, Danneels (2003) explains that “developing close links with customers is both beneficial and detrimental” (Danneels, 2003, p. 560).</p>

Source: Review of lean studies

By representing core activities of organizations, the four categories of paradoxes: learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes), and performing (goals) are expected to be found in any type of organizations (Smith and Lewis, 2011). The above review of lean studies supports the view of Smith and Lewis as the four categories of organizational paradoxes were identified in these studies. The identification of lean paradoxes is an important step in this study as they constitute the inputs in the model depicted in

Figure 8, which will be the basis for building the conceptual framework covered in the next chapter.

3.4.2 The management of lean paradoxes

The objective of this section is to identify what are the strategies used for dealing with the organizational paradoxes in lean in a sample of lean studies. The review of the strategies used for dealing with lean paradoxes strengthens the motivation of this study as it emphasizes the gap between the dominant resolution strategy adopted in lean studies and the paradoxical perspective based on the combination of the two opposing yet complementary strategies (acceptance and resolution). By doing so, the review of the strategies prepares the ground for the application of the systems perspective depicted in Figure 8 as the strategies for dealing with the organizational paradoxes in lean constitutes the processing activities in the model. Four studies were selected from the extant lean literature because of their focus on the organizational paradoxes within lean as facilitator for change and learning, which is the core theme of this thesis.

3.4.2.1 Eisenhardt and Westcott (1988)

In their study of just-in-time, Eisenhardt and Westcott (1988) introduce the basic characteristics and differences between western and eastern philosophies. They observe that western thinking is based on a linear view of reality based on tradeoffs among resources, and rarely individuals stop to consider the validity of the assumptions supporting those tradeoffs. In contrast, eastern thinking emphasizes the timeless improvement and the attainment of perfection. In eastern thinking, the concept of tradeoffs is replaced by a view of reality based on the harmony and integration instead of competition between opposing elements. According to this view, mutually exclusive alternatives are not necessary mutually exclusive. Rather, individuals do not fully understand their interrelationship.

Moreover, Eisenhardt and Westcott (1988) cites three themes that form the basis of the “just in time” concept and constitute the source of the tensions and paradoxes within just-in-time. The first theme is the constant pressure to resolve paradoxes emerging from multiple conflicting goals. For instance, while the traditional western view tend to consider quality, low cost as trade-off of mutually exclusive goals, “just in time” pursues both cost and quality objectives simultaneously. This leads to the re-examination of taken for granted assumptions and to more creative ways to perform tasks such as machines setups and the constant interaction with suppliers (Eisenhardt and Westcott, 1988). Thus, the first theme identified by Eisenhardt and Westcott is related to the paradoxes of performing which typically emerge from conflicting demands among different stakeholders (Smith and Lewis, 2011).

The second theme in just-in-time is the creation of paradoxical tensions by pursuing continuous improvement and perfection. The pursuit of perfection

contradicts our common sense, challenge our cognitive limitations and contribute to the creation of paradoxes. Ultimate goals such as zero defects, production lot size of one and zero inventory create tension for continuous improvement, learning and creativity. Even though ultimate goals are unlikely to be achieved, they provide the motivation and the energy to look beyond the existing limits and keep on improving continuously. Reframing and learning occur as people try to solve paradoxes through new insights and by acquiring new frame of references (Eisenhardt and Westcott, 1988).

According to Eisenhardt and Westcott (1988), continual reframing occurs as people use new insights to solve tensions and problems. For example, the traditional manufacturing plant ramp up production to a determined level of production and quality. Then different mechanisms such as inventory and planning buffer the manufacturing process from the external environment. In contrast, lean and just-in-time rely on continuous improvement for the reconceptualization of the process using other mechanisms such as problem solving tools and experimentation. *“This experimentation is captured in the just-in-time analogy of smoothing the flow of the river by removing the rocks. The result is continual change of the process such that manufacturing management resembles fluid and adaptive motion, rather than execution of a fixed set of routines”* (Eisenhardt and Westcott, 1988, p. 176).

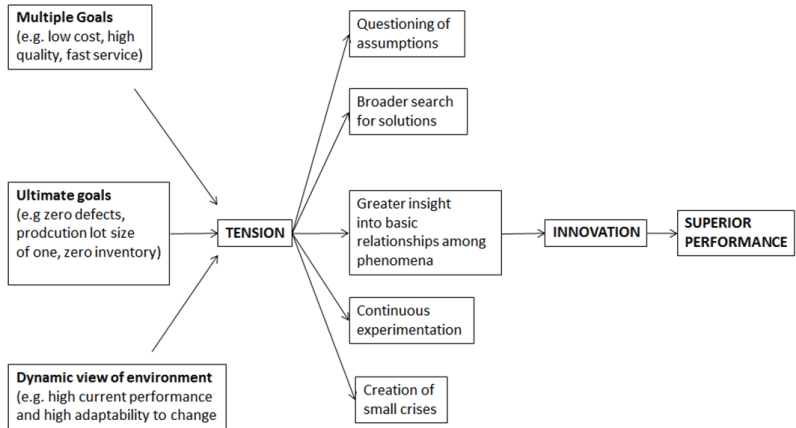
The third theme is the dynamic view of the environment in eastern philosophy where constant flow, motion and change are the norms. This dynamic view creates tensions and paradoxes by forcing companies and individuals to be consistent enough to deal with current problems as well as flexible enough to respond to changes and unexpected challenges (Eisenhardt and Westcott, 1988). The second and third themes are mostly related to the learning paradoxes which surface as companies attempt to

change, adjust and innovate, which involve both building upon as well as destroying existing resources in order to create the future (O'Reilly & Tushman, 2008).

Figure 9 depicts the process model linking the paradoxical nature of lean to innovation and performance. According to Eisenhardt and Westcott (1988), the central idea of their work is that “*explicit creation of paradox in the form of multiple and ultimate goals in a dynamic context creates organizational innovation and, ultimately, superior performance*” (p. 191). They argue that paradoxical tensions and goals create the motivation for change and help people understand the underlying relationships among the opposing poles of paradox.

It is important to note, though, that Eisenhardt and Westcott (1988) view paradoxes exclusively as a source of virtuous circles, innovation and superior performance. However, it is known from the paradox literature that paradoxical tensions can also create vicious circles of resistance and rigidity (Lewis, 2000). Thus, the exclusive focus on the positive outcomes of paradox and the lack of insights on how to manage paradoxical tensions and transform the vicious circles into positive outcomes are two limitations of (Eisenhardt and Westcott, 1988)’s study of lean paradoxes and their management.

Figure 9 - A process model linking lean paradoxical demands with innovation and performance



Source: Eisenhardt and Westcott (1988)

3.4.2.2 Osono, Shimizu and Takeuchi (2008)

Osono et al (2008) spent six years of research at Toyota that culminated in the publishing of the book – *Extreme Toyota: Radical Contradictions That Drive Success at the World’s Best Manufacturer*. During their journey at Toyota, Osono and colleagues observed that the company actively embraces and manages paradoxes instead of passively living with them. Toyota actually thrives on paradoxes and uses them to energize itself. Their key discovery was that Toyota’s success resides not only in its manufacturing process – The Toyota production System –, but also in its ability to create and harness a set of paradoxes and contradictions within the organization.

More specifically, Osono and colleagues identified six contradictory forces driving Toyota success and performance. These six contradictory forces are deliberately generated within the company, driving Toyota away from its comfort zone and creating creative tension out of the state of disequilibrium. Within the six contradictory forces, the authors identify three forces of expansion and three forces of integration. The expansive forces lead Toyota toward greater complexity, opportunities and diversity, whereas the integrative forces allow the company to internalize the different perspectives and experiences and make sense of the uncertainty and complexity of the environment in which it operates. The three expansive forces are: (1) Impossible goals, (2) Experimentation, and (3) Local customization. The three integrative forces are: (1) Founders’ philosophies, (2) Nerve system, and (3) Up and In. Next each of these forces is briefly reviewed. Each of these six forces is reviewed next:

1. Impossible goals:

Impossible goals bring the motivation to move beyond the established procedures and to experiment with new things. Impossible goals are the motor of evolution at Toyota and are assimilated as deep social value within the organization. They represent the process of continuous improvement in face of paradoxical tensions, which means that solutions to problems at Toyota must not oversimplify the complex reality by striking compromise or following an either/or thinking. On the contrary, solutions must take into account local complexities and embrace paradoxes and contradictions.

2. Experimentation:

The force of experimentation reveals two paradoxes in Toyota operations: “*gradualism versus the big leap, and stability versus paranoia*” (Osono et al., 2008, p. 27). By breaking the big goal into manageable parts and bringing in innovative practices and processes for solving the most difficult parts, Toyota manage the tensions emerging from dealing with the paradox of gradualism versus the big leap. Toyota recognizes that every plan is incomplete and imperfect, and will only be improved and completed by the following projects. In case of failure, the original plan Toyota modifies the plan and learns from the experience. If the original plan succeeds, Toyota creates a routine for the new practice and shares it across the organization. By doing this, Toyota manages the second paradox of stability versus paranoia.

3. Local customization

Local customization is considered an expansive force at Toyota because the company customizes its products and services to match the level of sophistication required by local customers. Like many other big corporations Toyota concentrates product development and manufacturing preparation processes at its headquarters: however, Toyota brings in high level of customization to match local needs. While this approach can increase operational complexity, it expands the boundaries of Toyota's base of knowledge which incorporates experiences gathered from various markets.

4. Founders' philosophies

Values and concepts like kaizen or continuous improvement, respect for people, teamwork and humility are the basis of Toyota's corporate values and have profoundly influenced Toyota's image and performance. Toyota consolidates and reinforces these values and practices every day: *"these values have withstood the test of time to define, shape, and give stability to Toyota's corporate culture"* (Osono et al., 2008, p. 31).

5. Nerve system

The regular and extensive use of cross-functional teams across departments and units creates multiple and redundant layers of formal and informal communication that interconnect the organization across geographies. This practice is reinforced by the company philosophy that sends employees from all organizational levels to see things first hand and as close as possible to the final customer.

6. *Up and In Human Resource Management*

Toyota's up-and-in human resource management seems to contradict the traditional and established up-or-out practice, where employees are expected to deliver and excel, and poor performers are expected to leave the company. By adopting up-and-in practice, Toyota signalize to its employees that their skills are developed to serve long-term goals, which means also that employees are allowed to fail. Toyota commits resources for the development of every employee and the performance evaluation is unique in a sense that it is based on long-term team-based and learning-based evaluations. Issues are resolved as close as possible to the field placing high level of authority and responsibility at lower levels in the organization.

The authors argue that “*the six forces complement each other in opposition and create complex dependencies that drive Toyota to an extreme state of disequilibrium*” (p. 227). The six contradictory forces are self-generated and deliberately imposed. They move people away from their comfort zone and create healthy tension and instability within the organization. They are the catalyst to find new solutions beyond contradictions through higher levels of resolution, where no compromise or tradeoffs are allowed.

In summary, Osono et al. (2008) share the same view expressed by Eisenhardt and Westcott (1988), which considers paradox as a positive force that push the organization toward innovation and transformation as they give plenty of examples about how Toyota successfully creates and maintains each of the six contradictory forces. Not surprisingly, Osono et al. (2008) and Eisenhardt and Westcott's (1988) approaches to paradox share the same weaknesses: neither of the studies mentions the negative outcomes of paradox nor discusses the management of paradox as a framework for

transforming vicious circles into virtuous circles of change and transformation.

3.4.2.3 Adler et al. (1999)

Adler and colleagues investigated two major model changes in a lean car manufacturer NUMMI – a Toyota subsidiary located in Fremont, California - which had faced numerous obstacles and succeeded in shifting the tradeoff of efficiency and flexibility and improving both efficiency and flexibility. Adler et al. (1999) identified four mechanisms that supported the endeavor of shifting the tradeoff: first, meta-routines – standardized procedures for changing other routines and for creating new ones; second, enrichment – add non-routine tasks to routine tasks; third, switching – separate routine and non-routine tasks temporally and switch employees between them sequentially; fourth, partitioning, create subunits that specialize in routine or in non-routine tasks.

According to Adler and colleagues, the company success in dealing with the issues emanating from these four mechanisms depended on various features of organizational context, mainly leadership, trust and training. The combination of these factors helped the company mitigate the possible impediments for each of the mechanisms and to succeed in the two major model changeovers within the company. Table 3 summarizes the key findings related to the four mechanisms, the possible impediments for each of the mechanisms and the factors adopted by the company in order to mitigate these impediments.

Adler et al (1999) mention that committed leadership was crucial for mitigating the impediments and keeping the long term focus: *“without that leadership, the pressures for short term production performance would have become much more salient to lower-level manufacturing managers*

that the need for flexibility and innovation” (p. 65). Yet, Adler and colleagues use a strictly rational approach in dealing with paradoxes which focus exclusively on removing the inconsistencies and solving the paradoxes, rather than on accepting and learning from paradoxical tensions. For instance, one of the mechanisms is role switching between improvement tasks and production tasks and entails resolution through temporal separation between improvement and operational tasks. The other mechanism is partition which entails resolution through spatial separation between improvement and operational tasks. Both mechanisms attempt to solve the paradox. It is important to mention that the main organizational paradox covered by Adler and colleagues is the organizing paradox that emerges as routinization reduces task variety and autonomy compared to unconstrained creativity (Smith and Lewis, 2011).

Table 3 - Key findings of trade-off shifting mechanisms

Trade-off shifting mechanism	NUMMI Changeover mechanisms	Possible impediments	Factors at NUMMI mitigating possible impediments
<p><u>Meta-routines:</u> Standardized procedures for changing existing routines and for creating new ones</p>	<p>-Problem-solving process is standardized in six-step procedure</p> <p>- Pilot Team relies on extensive documentation</p>	<p>Routinization reduces task variety and autonomy compared to unconstrained creativity, and therefore reduces intrinsic motivation, which creates resistance or reduces commitment</p>	<p>-Workers participate in standardization processes</p> <p>-Well designed meta-routines provide structure and role clarity that are seen as useful in performing non-routine tasks</p>
<p><u>Enrichment:</u> Add non-routine tasks to routine production tasks</p>	<p>-Kaizen is worker’s responsibility during job design process, regular production and during acceleration.</p> <p>-Kaizen is also supplier’s responsibility during contract period and between contracts</p>	<p>- Training is costly and skill only rarely used, so efficiency is lost</p> <p>- Associated horizontal job enlargement reduces consistency</p>	<p>Complementary investment in support for worker kaizen, which leads to a considerable flow of useful ideas</p> <p>-The core work-cycle remains very short and highly standardized</p>
<p><u>Switching:</u> Separate times for routine and non-routine tasks and switch between them sequentially</p>	<p>-Kaizen is also conducted off-line in quality circles</p> <p>-Production workers participate in kaizen activities during pilot runs</p> <p>-Workers rotate through pilot team</p>	<p>Conflicting expectations in two roles: high autonomy and therefore high commitment in non-routine roles versus low autonomy and therefore low commitment in routine roles</p>	<p>NUMMI ensures that routine work is not alienating: participative leadership and culture, worker training, supportive teams, employment security, gain-sharing.</p> <p>-High mutual trust between managers and workers</p>

<p>Partitioning: Create subunits that specialize in routine or in non-routine tasks</p>	<ul style="list-style-type: none"> -A new position is created: Pilot team. -An old partition eliminated: production workers do methods engineering. -Responsibilities are redistributed across existing partitions and suppliers do more design work 	<ul style="list-style-type: none"> - Additional overhead is required to support different structures in different subunits - New subunits need to be integrated, but integration mechanisms are costly 	<ul style="list-style-type: none"> -Assignments to the Pilot team are temporary rather than permanent, which helps keep goals and values aligned across subunits -The Pilot team works in close daily interaction with production, and does much of its work on the shop floor, which reduces parochialism

Source: Adler et al. (1999)

3.4.2.4 Repenning and Sterman (2001)

Repenning and Sterman (2001) explain that firms frequently face a paradox when attempting to improve their performance, which is related to the tension emerging from achieving short term goals while remaining tuned to long term challenges. Repenning and Sterman describe this situation as the paradox of *working harder* versus *working smarter*, which can get people caught in the capability trap by focusing on short term results and avoiding necessary investment in process improvement and capabilities. The authors suggest that overcoming the capability trap is difficult mainly because it means that performance would deteriorate before it could improve. The success in dealing with this paradox depends on shift of the mental models of both employees and managers.

By investigating the paradoxical tensions emerging from the duality of working harder versus working smarter, Repenning and Sterman (2001) have covered two organizational paradoxes: the paradoxes of performing and learning. In fact, the paradoxes of performing typically emerge from conflicting demands among different stakeholders (Smith and Lewis, 2011). In this study, the conflicting demands are the focus on short term results – working harder – versus the focus on long term results – working smarter.

As for the learning paradox, Lewis (2000) cite that learning paradoxes emerge because human cognition and behavior are self-referential, in a sense that actors choose interpretations that corroborate, rather than challenge their mental frames. Learning paradoxes reveal the need for framing new knowledge, yet individuals use their extant mental frames to build new frames leading to double-bind (Smith and Berg, 1987). In this study, one of the barriers to the success of improvement efforts was the use

of the extant mental frame to approach the paradoxical situation emerging from working harder versus working smarter which perpetuated the capability trap.

Repenning and Sterman (2001) recognize the importance of changing the mental model or frame which can be considered as driver for the acceptance of the paradox. They argue that successful improvement must include a significant shift in the mental model of all the participants in the improvement effort. Repenning and Sterman outline the peculiarities of the current mental frame: *“the only barrier was the mental model that there were no resources or time for improvement, that these problems were outside their control, and that they could never make a difference”* (p. 86). Moreover, they argue that, in order to succeed in the change efforts, one has to deal with these peculiarities or impediments. By defining the impediments associated with the current mental model and attempting to solve them, Repenning and Sterman follow the path of Adler and colleagues (1999), which adopt a rational approach consisting of dealing with the inconsistencies and eliminating them. Thus, they share the same weaknesses as they don't approach paradox as a source of learning and energy which can facilitate change nor do they seem to consider that holding to tensions rather than solving them can be beneficial to the change efforts.

The next section summarizes and concludes the review of the above four studies on strategies for dealing with lean paradoxes.

3.4.2.5 Conclusions of the management of lean paradoxes

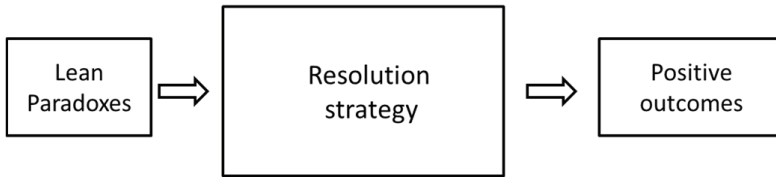
As it is mentioned in the literature review, lean scholars have more frequently used the rational approach in dealing with lean paradoxes. Within this context, rationality entails an inclination towards eliminating the inconsistencies by exclusively attempting to solve the paradoxes (resolution strategy). Thus, the rational strategy entails a focus on the resolution of lean paradoxes without attempting to hold on tensions and to promote the acceptance of the paradoxes. Moreover, the reviewed lean studies don't elaborate on the factors that can influence positively or negatively the management of lean paradoxes. More importantly, the reviewed studies don't consider the management of paradoxes as a dynamic circular process which can create virtuous or vicious circles. Rather, these studies accept that lean philosophy creates the creative tension or the motivation for change (positive outcomes) without explaining the theoretical fundamentals of this argument.

Figure 10 depicts graphically the management of lean paradoxes. In fact, the figure reflects the findings from the extant lean literature as it entails that the resolution strategy of the various categories of lean paradoxes (organizing, performing, learning and belonging) is likely to produce positive outcomes. It is important to note that, unlike the systems perspective depicted in Figure 8, the management of lean paradoxes depicted in Figure 10 lacks two fundamental components: Environment and Feedback or Circular causality.

The next section concludes this chapter and presents the model depicted in Figure 8 as meta-theory or systems perspective which improves the management of lean paradoxes and enhances lean sustainability. It does so

by emphasizing the dynamic aspects of the management of lean paradoxes (Feedback loops or circular causality) and by accounting for the effects of the contextual factors on the outcomes (Environment).

Figure 10 - The management of lean paradoxes



Source: Author based on lean literature review

3.5 Summary and conclusions of the chapter

In the last twenty years, lean production has emerged as one of the manufacturing systems that can help companies become more competitive by shifting the tradeoff efficiency and flexibility (Adler et al., 1999; Volberda, 1996; Meyer, Nakane, Miller, & Ferdows, 1989). Inspired by the superior performance achieved by lean production system in Japan, western manufacturers emulated successfully lean tools, but often fell short of sustaining lean and achieving a relevant impact on the performance of the involved companies (Holweg and Pil, 2001). In fact, early lean implementations were exclusively tool-focused, which often neglected the human aspects, the organizational culture and the work system core to the success of the lean manufacturing approach (Hines et al., 2004).

More specifically, when applied to sectors outside manufacturing, such as the service sector, lean conversion presents additional challenges to companies' management (Hines et al., 2004). Researchers believe though that lean is equally relevant to service organizations, as both types of organizations (manufacturing and service organizations) use the same process view in order to increase efficiency (Piercy and Rich, 2009; Corbett, 2007). However, a crucial element for sustaining lean in the service sector is to understand the logic and the characteristics of the service organizations in order to decide which lean practices and tools to use and how to apply them effectively (Randor and Osborne, 2013).

In order to build its contribution to lean implementation and sustainability within companies, this thesis draws on the view which considers lean as an approach for organizational change, which entails the creation and

resolution of organizational paradoxes. It is during the process of creation and resolution of paradoxes, that creative breakthroughs are achieved facilitating change and transformation (Eisenhardt and Westcott, 1988). In fact, by representing core activities and elements of organizations, the four categories of paradoxes: learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes), and performing (goals) can be identified in any type of organizations (Smith and Lewis, 2011). Lean organizations are no exception as the lean paradoxes identified in the extant lean literature fit well within the four categories of the organizational paradoxes. However, when reviewing and assessing the management of paradoxes in the extant lean literature, two patterns or peculiarities dominate the reviewed lean studies in relation to the strategy used for dealing with lean paradoxes.

The first peculiarity is related to the dominance of the rational approach based on the exclusive use of the resolution strategy for dealing with lean paradoxes. Within this context, the resolution strategy entails a tendency to eliminate the inconsistencies emerging from paradoxical situations by attempting to solve the paradoxes. The second peculiarity of the above lean studies is related to the view that considers paradox as source of energy and positive outcomes without mentioning the vicious circles and the potential negative outcomes associated with paradoxical tensions, such as resistance and inertia (Lewis, 2000).

In order to improve lean sustainability, this thesis draws on the organizational theory on paradoxes as a meta-theory for dealing with the organizational paradoxes in lean (Figure 8). In fact, the adoption of the meta-theory depicted in Figure 8 adds the systems perspective to the

management of lean paradoxes as it includes the loops of feedback and contextual factors or environment, which are the two main gaps or weaknesses of the management of lean paradoxes in the extant lean literature.

The next chapter presents and discusses the conceptual framework of this study which is based on the systems perspective (meta-theory) contained in Figure 8. The conceptual framework is the main link between theory and empirical analysis and, thus, the core element for conducting the empirical analysis and answering the two research questions of the thesis.

Chapter 4 – The conceptual framework of the study

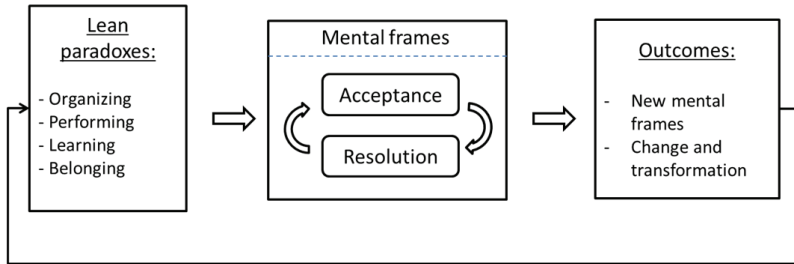
The conceptual framework “*explains either graphically or in narrative form, the main things to be studied – the key factors, constructs or variables – and the presumed relationships among them*” (Miles and Huberman, 1994, p. 18). Moreover, design decisions - such as defining the conceptual framework/model and the research questions - influence the output of the study because they can constrain the analysis by ruling out certain variables and relationships and attending to others. On the one hand, some scholars prefer a more inductive and grounded approach to collecting and analyzing data and argue that the conceptual framework/model should emerge from the field as the research questions will come clear only gradually. On the other hand, other researchers argue that it is impossible to embark upon research without having some idea of what one is looking for. However, most of the qualitative research – as it is the case of this study - lies between these two extremes as researchers frequently know something about the phenomenon under investigation, but not enough to advance a theory (Miles and Huberman, 1994).

In fact, research questions and conceptual framework are related and affect each other. Having defined a list of research questions, one is likely to identify common themes and constructs, implicit or explicit relationships, and then begin to join the pieces generating the conceptual framework or conceptual model. The conceptual framework takes the study to a higher level of abstraction, enables the researcher to visualize the high-level patterns of the investigated phenomenon, and outlines the scope and the boundaries of this study by specifying what will and will not be studied. It

plays also an important role in the study by supporting data collection and reduction into categories, data analysis and conclusions drawing/verification (Miles and Huberman, 1994). More importantly, the conceptual framework avoids ending up in a situation where the collected data doesn't contain evidence to answer the research questions as it assumes some relationships among variables which can lead to the desirable outcomes (Yin, 2009, 2003).

The conceptual framework in Figure 11 depicts the systems perspective presented in Figure 8 by considering lean paradoxes as inputs for the process. The conceptual framework is the link between theory and empirics and plays a significant role in guiding data collection, data analysis and conclusions drawing of the study. More precisely, lean paradoxes are considered the starting point for the data collection and the entry into the three case companies. In fact, the process of data collection and data analysis follows the sequence of activities depicted in the model: the process starts with identifying the various categories of organizational paradoxes in each company, then investigates the strategies used for dealing with these lean paradoxes, and finally discusses the factors influencing the management of paradoxes and the outcomes.

Figure 11- Conceptual framework



Source: Author based on literature review

In summary, the research framework proposes firstly that the four categories of paradoxes are present in lean implementation as paradoxes represent core activities and elements of any organization and lean organizations should be no exception. Secondly, the conceptual framework suggests that the adoption of the paradoxical perspective as strategy for managing lean paradoxes is more likely to achieve positive outcomes, as opposed to the dominant rational strategy adopted in the reviewed lean studies. Moreover, based on the paradox literature, some factors influence positively the outcomes of the management of paradoxes (both/and mental frame and behavioral and cognitive complexity) while other factors can influence negatively the outcomes of change (either/or mental frame).

The next chapter presents the research methodology of the thesis which includes the criteria for assessing the trustworthiness of the study and the rationales for case selection, data collection, data analysis and conclusions drawing.

Chapter 5 – Research methodology

Having adopted the case research method in this thesis, this chapter presents and discusses the criteria for assessing the credibility and trustworthiness of the study, and the rationales for cases selection, data collection, data reduction and analysis, and conclusions drawing.

5.1 Criteria for assessing the trustworthiness of the study

The fact is that some accounts of qualitative research are better than others and the problem of quality and trustworthiness will not go away. The fact is that qualitative research take place in a real social world which can have real consequence in people's life. Thus, shared standards and criteria are worth striving for (Miles and Huberman, 1994). In fact, the criteria used to test rigor in the positivist paradigm are well documented. For instance, Yin, (2009, 2003) cite that four tests have been commonly used to establish the quality and validity of a qualitative social research. These are: construct validity, internal validity, external validity and reliability. These four criteria include exploring the objective value of the inquiry, its applicability to other contexts, its consistency, and its neutrality. When fulfilled, these four criteria converge towards a single reality, and avoid problems related to instability of the research by controlling or randomizing possible sources of bias, and by insulating the bias of the investigator (Guba, 1981; Lincoln and Guba, 1985).

However, according to the post positivist and critical realist paradigm, there is no single reality, but rather there are multiple realities that are socially constructed, and which can lead to diverging outcomes. These multiple constructed realities cannot be controlled and randomized as variables or pieces, but should be studied holistically, since the variables are interrelated and influence each other. Moreover, the variables are themselves directly influenced by the organizational or social context (Guba, 1981; Lincoln and Guba, 1985).

In order to maintain the credibility of the qualitative inquiry, Guba (1981) and Lincoln and Guba (1985) were among the first to propose a set of four criteria

of trustworthiness of the post-positivist paradigm that parallel those of the positivist paradigm. These are: credibility (for internal validity), transferability (for external validity or generalizability), dependability (for reliability), and confirmability (for construct validity or objectivity). By suggesting credibility as an analog to internal validity, transferability as an analog to external validity, dependability as an analog to reliability and confirmability as an analog to objectivity, these four criteria incite researchers to abandon the assumption that enduring and context-free generalizations can and should be sought. Rather, they assert that all human behavior is context-dependent. Moreover, they imply that knowledge can be transferred to other contexts, but this transferability of knowledge requires a “thick description” of the contexts involving the inquiry (Guba, 1981; Lincoln and Guba, 1985). Table 4 summarizes the four of criteria of trustworthiness of the post positivist inquiry and the strategies employed for complying with them (Anfara et al., 2002).

Table 4 - Criteria for trustworthiness of the post-positivist inquiry

Criteria	Strategy employed
Credibility (analog to internal validity)	<ul style="list-style-type: none">- Prolonged engagement in field- Use of peer debriefing- Triangulation- Member checks- Purposive sampling
Transferability (analog to external validity)	<ul style="list-style-type: none">- Provide thick description- Purposive sampling
Dependability (analog to reliability)	<ul style="list-style-type: none">- Create an audit trail- Code-recode strategy- Triangulation- Peer examination
Confirmability (analog to objectivity)	<ul style="list-style-type: none">- Triangulation- Practice reflexivity

Source: Adapted from (Anfara et al., 2002)

As for credibility, prolonged engagement implies intensive contact with the actors in the field to assess possible sources of bias and to identify discrepancies in the inquiry. Triangulation and cross-checking of data are achieved by combining different sources and methods for collecting and analyzing data. The use of peer debriefing implies relying on disinterested professional peer to assist in developing hypotheses and in testing the emerging theory. Purposive sampling can include among other techniques negative case analysis which entails the pursuit of negative instances in developing and testing hypotheses until no further negative instances are found. Finally, members' checks are enhanced by soliciting reactions of colleagues and other professionals to the investigator's reconstruction of events.

As for the transferability, it is enhanced through thick descriptive data about the context of the research so that judgments about the degree of similarity or difference may be made by others members who may choose to refer and draw on the inquiry. As for dependability and confirmability, they can be accounted for by the presence of an external audit and the establishment of an audit trail (Lincoln and Guba, 1985).

5.2 Case selection

Selecting cases is an important element of building and modifying theories from case research. In case research, the selection of cases is done according to theoretical or purposive sampling rather than statistical sampling (Glaser and Strauss, 1967). The purposive sampling is based on theory and assumes that cases are not chosen randomly. Thus, “*the goal of theoretical sampling is to choose cases which are likely to replicate or extend the emergent the theory*” (Eisenhardt, 1989, p. 537), and to enable comparison among cases it is necessary that the cases are chosen according to predefined theoretical criteria (Glaser & Strauss, 1967).

Based on this, the selection of the three cases of this study takes into consideration the following three selection criteria. First, since paradoxes and tensions are made salient in turbulent times and during periods of change (Quinn and Cameron 1988; Smith and Lewis, 2011), then an important criterion for the selection of companies for this study is the presence of change that can ignite paradoxical tensions. In this study, the three selected companies are under pressure to improve performance and are implementing lean as a philosophy for change.

Second, all the three companies have had setbacks during lean implementation and were pushed toward the reevaluation of the approach used for lean implementation. In general, the reevaluation has allowed more bottom-up participation in lean implementation which have increased the acceptance of tensions and reduced the resistance to change. Thus, it is more likely to identify signs of both acceptance and resolution of paradoxes in these companies, rather than an exclusive top down approach toward lean implementation. Third, because the three companies were chosen from different branches of industries

and services in Denmark (healthcare, financial, and public transport), there is the likelihood of encountering different types of context or environment within the three companies. This fact has enhanced the triangulation process in this study as the investigated phenomena were observed across different context and environment. Another rationale for the choice of three Danish case companies is the easy access due to the fact that the researchers and the research institution are also resident in Denmark.

5.3 Data collection

Research questions, conceptual framework and selection of cases give some direction to the researcher - before and during the empirical study - by clarifying what to study and why. Knowing what one wants to study leads inevitably to the question of how one will get the information. Within this context, Miles and Huberman (1994) mentions that instrumentation comprises the various methods used for collecting data, such as recording devices, contact summary or case study protocol, open-ended or semi-structured interviews, transcriptions and write-ups. According to the authors, the question is how much instrumentation has to be designed prior to going out to the field?

Within this context, Kvale (1988) point out that, during open-ended or semi-structured interviews, much interpretation occurs along the way as the informant describing his or her work experiences identifies new relationships and patterns during the interview. Similarly, the researcher who summarizes what has been heard during the interview is, inevitably, interpreting the flow of meaning. The same things can happen even when the interviews and the questions are much more structured: *“so let’s not delude ourselves about total*

control and precision in our instrumentation” (Miles and Huberman, 1994, p. 35).

Furthermore, it is worthwhile mentioning that an important feature of building or modifying theory from case research is the overlap of data collection with data analysis as Glaser and Strauss (1967) recommend joint collection and analysis of data. Field notes, transcripts of direct tape recordings and write-ups are an important means for achieving or maintaining some degree of overlap. Write-up is an intelligible product for anyone, not just for the researcher, which can be read, edited for accuracy, commented on, coded, and analyzed (Miles and Huberman, 1994). Write-ups usually add back some of the missing content because the raw field notes or transcripts, when reviewed, stimulates the researcher to remember events that are not captured in the notes.

Two insights might increase the utility of field notes. First, the researcher is encouraged to write down or record whatever situations occur during data collection, rather than evaluate and note what might seem important, because it is often difficult to know what will be useful at later stage in the research. Second, the researcher can use these notes to push thinking and asking questions such as “*what am I learning?*” and “*how does this case differ from the last?*”. In fact, overlapping data collection with data analysis allow the researcher to take advantage of the flexible collection method and to make adjustments to data collection tools, such as adding new questions to the case protocol or the contact summary sheet (Eisenhardt, 1989, p. 539).

As a preparation for data collection for this study, an introductory meeting was held with Lean project leader at all the three companies. During this meeting, the research project was presented and the criterion for selection of the

employees to be interviewed was discussed. The main criterion was to select employees from different hierarchical levels and different functions. The reason for this choice is the multi-level and nested character of the paradoxical phenomenon, which can reinforce the constructs validity of the study.

The case study protocol or the contact summary (Appendix 1) is a single sheet used as a guideline for asking questions during the interviews which contains the three following open-ended questions: (1) *what are the objectives of implementing lean in your department?*; (2) *what are the paradoxes and tensions that you face during lean implementation?*; and (3) *how do you deal with these paradoxes or tensions?*. The first question is intended to understand the interviewee's role in lean implementation, and give the researcher relevant information about the environment and context surrounding the implementation of lean. The second question of the study protocol has the objective of mapping the different categories of paradoxical tensions which constitutes the inputs of the conceptual framework depicted in Figure 11. Moreover, the second question aims at identifying the various strategies used for dealing with lean paradoxes. The third question aims at identifying and analyzing factors or criteria that can influence the paradox management and its outcomes.

Although the case protocol contains three open-ended questions, other questions were added to the interviews in order to improve the four criteria of trustworthiness of the inquiry. In fact, because paradox is a slippery and ambiguous concept, people frequently confuse paradox with other concepts such as dilemma and tradeoff (Quinn and Cameron, 1988). However, Smith and Berg (1987) facilitate the researcher endeavor by citing three elements facilitating the identification of the presence of a paradox.

First, in paradoxical situations, there is some awareness among team members of the presence of opposing and reinforcing elements of paradox. Second, there is a degree of acceptance among actors that the opposing forces of a paradox are natural and inherent part of organizational life. Third, there is an implicit or explicit assertion that there is a link or connection among the contradictory forces of a paradox. Based on this insights, and in order to enhance constructs validity and verify the existence of the paradoxical situation, questions such as “Are you aware of the presence of the two opposing elements?”, “*How do you understand the relation between these two elements?*”, and “*Can the two opposing poles be present at the same time?*” are frequently asked to the participants during data collection.

Furthermore, the researcher might face a difficult task in identifying the category of the paradox because paradoxes interact among each other (Smith and Lewis, 2011; Smith and Berg, 1987). This thesis will focus on the four main categories of organizational paradoxes (organizing, performing, belonging and learning) and will only mention the relevant interactions among them during the empirical research. However, this study will not map all the six possible interactions among paradoxes in Figure 2, such as learning-organizing, learning-belonging, belonging-organizing, learning-performing, performing-organizing, and performing-belonging. The reason is that the mapping of all the interactions among paradoxes is very challenging empirically and it will not enhance the investigation of the strategies used for dealing with lean paradoxes (see Lüscher and Lewis, 2008).

Therefore, the theoretical insights from the literature review are used for verifying the four main categories of organizational paradoxes encountered during the fieldwork. For instance, organizing paradoxes surface as

organizations create competing designs and processes in order to enhance performance (Smith and Lewis, 2011). Therefore, Lüscher and Lewis (2008) argue that organizing paradoxes can be identified by articulating tensions embedded within the changing system (like control versus autonomy), rather than tensions within individuals' own roles (generating performing paradoxes, such as investing efforts and time in lean projects versus investing time in production) or among their relationships and teams (generating belonging paradoxes such as working alone versus working in teams). Moreover, the answer to specific questions made during the interview can signal the presence of specific type of paradox. For instance, questions like *"How do actors become integral members of a group and retain their individuality?"* can signal the presence of the belonging paradox (Lewis, 2000, p. 769).

During fieldwork, the strategies used for dealing with paradoxes can be identified by observing the actions and behaviors of the people involved in lean management and in improvement projects. For example, managers can promote the acceptance of paradoxes by reducing time pressure on employees which allow them to reflect and increase their understanding of the paradoxical situation. Managers can also encourage employees to embrace the paradox by allowing experimentation and facilitating learning (Repenning and Sterman, 2001). According to Smith and Lewis (2011, p. 385) acceptance allow actors to *"play through rather than confront tensions, thereby avoiding potentially disastrous conflicts"*. Managers can also act more proactively in promoting the acceptance of the paradoxes through confrontation. Confrontation entails the discussion of paradoxical situations – across organizational levels and within teams and improvement committees - which help actors form a more accommodating understanding of the paradoxical phenomenon. Furthermore, managers can promote acceptance by involving employees in the change which

help them achieve better understanding of the challenges. On the other hand, the frequent use of the top down push for implementing lean standards is characteristic of the rational approach and of the resolution strategy which tend to strip individuals from their autonomy by specifying standards and guidelines for action (Smith and Berg, 1987; Vince and Broussine, 1996).

As for the empirical identification of the outcomes of the management of paradoxes, a change in the mental model - which reduces resistance and inertia - is considered positive outcome. For instance, individuals might possess a mental model which entails that the implementation of standards would limit their autonomy and creativity. A positive outcome of the management of this paradox (standards versus autonomy) would entail a change in the mental models of the individuals reflected by the acceptance that the implementation of standards might not necessarily hinder creativity or autonomy. On the contrary, the new mental model based on the acceptance of the paradox can facilitate the implementation of standards as individuals identify opportunities and situations where standards can support creativity instead of hindering it.

5.3.1 Semi-structured interviews

Semi-structured interviews were the primary source for collecting data. Semi-structured interview allows the researcher to intervene, clarify and add questions during the interviews (Eisenhardt, 1989). The flexibility associated with the use of the semi-structured interviews allowed to add and clarify questions – as a result of the interplay between data collection and data analysis - which increased the understanding of the interviewee’s of the objectives of the study and improved the validity and generalizability of the findings.

The number of interviews reached 23 interviews in total with average duration of one hour per interview. All the interviews were voice-recorded and transcribed [1], which contributed to capture all things said during data collection, because it is often difficult to know what will be useful later in the research. The number of interviews included in this study followed the theoretical saturation principle (Glaser and Strauss, 1967). According to this principle, data collection stops when additional interviews resulted in minimal incremental understanding of the phenomenon.

In case research, it is recommended to combine multiple data collection methods which can allow for triangulation and reduction of the perceptual biases of the researcher (Meredith, 1998; Yin 2009, 2003; Eisenhardt, 1989). As for other sources of evidence, site visits and direct observations were also used during data collection. At company A and C, both the advisor of the project and the PhD researcher participated in site visits where various lean practices and tools were observed and the challenges of implementing and sustaining these tools and practices (Visual scorecards, 5S, workflows) were discussed directly with the employees involved in lean conversion within each unit. At company B, the PhD researcher also observed the various lean tools and practices (Score card and flowchart in the shop floor of the workshop), and discussed the challenges emerging from lean conversion directly with the mechanics and traffic planners involved in lean implementation and sustainability.

[1] Because of confidentiality agreement, it is not possible to disclose the whole transcripts of the interviews.

5.4 Data reduction, display and analysis

5.4.1 Data reduction and display

As for data reduction, *“it refers to the process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in written-up field notes or transcriptions”* (Miles and Huberman, 1994, p. 10). The reduction of qualitative data does not necessarily mean quantification. Qualitative data can be reduced through selection, through summary or paraphrase, and so on. The conceptual framework and the research questions are considered the best defense against data overload as they can guide the data reduction process. In this thesis, codes and patterns *“are attached to chunks of varying size – words, phrases, sentences, or whole paragraphs, connected or unconnected to a specific setting”* (Miles and Huberman, 1994, p. 56).

Data reduction is the preliminary phase of the analysis and *“consists of selecting, simplifying, focusing, abstracting and transforming the data that appears in written-up field notes or transcriptions”* (Miles and Huberman, 1994, p.10). Miles and Huberman (1994) recommend the reduction of data into codes. Codes are tags or labels for assigning meaning to the descriptive or inferential information collected and compiled during the study. The coding of the data helps the researcher to find patterns in the answers of the respondents.

The start list of codes representing the key variables of the conceptual framework is presented in Appendix 2. This provisional start list of codes prior to fieldwork can expand as other codes emerge progressively during data collection and analysis. The emerging codes or patterns are grounded empirically as the researcher uncovers new factors or variables, or new

relationships among existing variables, which modify the current conceptual framework. Note that, in order to facilitate the data analysis, the codes are kept semantically close to the terms/variables they represent in the conceptual framework (Miles and Huberman, 1994).

In this thesis, all quotes and written-ups emerging from the 23 interviews are displayed in a matrix format. The matrix is organized in two dimensions (an extract of this matrix is presented in Table 5 [1]). The cell entries are mainly composed of direct quotes, extracts from written-up field notes, and of summaries of findings. The main decision rule used for selecting the quotes and the extracts from the written-ups is the extent of agreements among respondents.

At the top of the matrix are the name of the participant, the transcript number of the interview, and the four variables/boxes contained in the analytical framework (paradox type, the strategies used for dealing with paradoxes, factors influencing the change, and the outcome of change). The transcript number (see Appendix 3) is used in order to trace the citations included in the data analysis back to the original transcript of the interview and it also appears after every citation used in the empirical analysis chapter. The data matrix contains 30 rows corresponding to one lean paradox each. In each cell, quotes or extracts from the written-ups are tagged according the corresponding code listed in Appendix 2.

[1] Because of confidentiality agreement, it is not possible to disclose the whole matrix.

Table 5 - Extract of the display matrix

<i>Name</i>	<i>Paradox type</i>	<i>The management of paradox</i>	<i>Factors influencing the management of paradoxes</i>	<i>Outcome of the management of paradoxes</i>
Niels NN (Transcript 1)	(Organizing) paradox: Standard versus creativity (It is about working according to standards without losing autonomy and creativity)	The oscillation between two strategies for dealing with lean paradoxes: (1) Top down (Resolution) : I am the ultimate responsible for the outcome. I put some red lines however I have to be careful not to impose my own solution on the team. (2) Promoting acceptance through confrontation in our meetings (Acceptance) : Standards help us in performing our tasks; creativity is not gone because of standardization; standard make life easier for us; the employees come with the solution: it is theirs solution..	Mental frame "Standard can kill creativity" hinders the acceptance of standards. The employees were afraid of everything becoming rigid. They were afraid that the company find out they they were not working in the right way (Fnegative)	Reframing has occurred: Now people understand at lean and standard can help; it is change in attitude in order to understand that lean is not the enemy; Now there understanding of what improvement really mean. Standard that makes sense (reframing) - standardize the repetitive parts of the process. If there is something that can be understood differently and it is been repeated than it makes sense to standard. If the standards makes sense for the employees and help them so they will follow it (OPositive) .
Kim DB (Transcript 14)	(Organizing) paradox: Standard versus autonomy (Tensions emerge as employees are asked to follow lean standards and not their own standards)	Alternation between top down and bottom: (1) Top down (Resolution) : we said to managers we should make standards followed.. if you have improvement ideas put in the formal way of getting things improved so it is not your own process but it is everybody project... (2) Bottom up and reflection (Acceptance) : Giving support for their own ideas / you have to have less pressure when you come back to operation.. and leaving time for reflection... keep talking and listening... creating a certain amount of pressure..	People resist and say that standard limit their creativity in solving problems (FNegative) / Belief in the need of the movement between two strategies: I don't think that any organization will live without some pressure /We managed to convince people but it is a permanent management task / People start to understand this but it is a long travel (Fpositive)	We have hard evidence showing that things are improving as they should... when I move around in the organization... people are more interested in discussing things around lean... discussing improvement... the more knowledgeable you are the better improvement you do (OPositive)

Source: Data collection during the empirical study of this thesis

5.4.2 Data analysis

After coding the data, it is possible to develop the analysis - both within-case and cross-case analysis. The main idea of the within-case analysis “*is to become familiar with each case as a stand-alone entity*” which “*allows the unique patterns of each case to emerge before investigators push to generalize patterns across cases*” (Eisenhardt, 1989, p. 540). Having identified the patterns within each case, “*the idea behind the cross-case analysis is to force investigators to go beyond initial impressions, especially through the use of structured and diverse lenses on the data*” (Eisenhardt, 1989, p. 541). In fact, the juxtaposition of pair of cases allows the researcher to observe subtle similarities and differences and avoids simplistic frames and explanations.

From both the within-case and cross-case analysis, patterns and relationships begin to emerge. The process of identifying concepts, patterns and relationships is highly iterative and entails comparing systematically the emergent pattern with the evidence from each case. Moreover, the constant interplay between data and theory enables the researcher to take advantage of the new insights emerging from the data and assess how well the emergent relationships fit the data (Glaser and Strauss, 1967; Eisenhardt, 1989).

In this thesis, the tactics used for data analysis and conclusions drawing are “*noting patterns*”, “*noting relations between variables*” and “*finding intervening variables*” in order to increase the credibility and the trustworthiness of the analysis (Miles and Huberman, 1994; Eisenhardt, 1989). In fact, by scanning the data matrix down rows and across columns, recurring patterns and themes start to emerge. The patterns of variables involve similarities and differences among categories, and the patterns of relationships involve connections in time and space. The idea of relations between

variables/constructs is preconfigured in the conceptual framework (Figure 11). The combination of noting patterns, noting relations between variables and finding intervening variables contribute to increase the credibility and the trustworthiness of the study (Miles and Huberman, 1994). However, “*the competent researcher holds these conclusions lightly, maintaining openness and skepticism, but the conclusions are still there, inchoate and vague at first, then increasingly explicit and grounded*” (Miles and Huberman, 1994, p. 11). Conclusions are verified as the analysis proceeds and the meanings emerging from the data have to be tested for their dependability and confirmability.

The next section concludes this chapter and prepares the ground for the empirical study of the thesis.

5.6 Summary and conclusions of the chapter

Chapter 5 has presented an overview of the case research method and the criteria used for assessing the trustworthiness of the study. In fact, a case study method can be used for answering exploratory “*what*” questions (first research question of this thesis); however, the case research method is more recommended for the “*how*” and “*why*” explanatory questions (second research question of the thesis) as it can move beyond the limitations of the original theory, especially through explaining anomalies or unexpected outcomes. In fact, this thesis aims at modifying and adding to the existent models and theories used for dealing with lean tensions and paradoxes by investigating variables and relationships that can influence the management of paradoxes. It is important to note though that case study is not a methodological choice but a choice of what is to be studied as the interest should be in what can be learned from the selected case. In case study the search for particularity competes with the search for generalizability. Maintaining a constant equilibrium between particularity and generalization is one of the main challenges in conducting case research (Stake, 2000).

The next chapter contains the empirical analysis of the thesis which is based on three cases selected for their potential to offer a credible opportunity for studying lean paradoxes and their management.

Chapter 6 - Empirical Analysis

Three Danish companies were selected to participate in the empirical analysis of this thesis. The three companies come from different manufacturing and service industries: financial products, healthcare and public transport. In the financial and the public transport companies, *Operations* was the investigated unit or department, while *Research and Development* was the focus area within the healthcare company. Table 6 presents a summary of the three cases containing a brief description of the company, the main challenges for implementing lean, and the number of the interviews (data collection) for each of the three companies.

The implementation of lean in the three companies was planned and initiated by top management in order to increase performance and long term adaptability. The implementation of lean has made salient the tensions and paradoxes within these companies as it has ignited and even created the four types of organizational paradoxes within the three companies: organizing, performing, belonging, and learning. As explained in the research methodology chapter, the start point for data collection and analysis of the study is the four categories of organizational paradoxes which are the inputs of the conceptual framework (Figure 11). In fact both data collection and data analysis follow the process depicted in the conceptual framework. According to this model, the sequence of constructs identified and analyzed during the empirical analysis is: Lean paradoxes (Inputs), Strategies used for dealing with these paradoxes (Processing activities), Factors influencing the management of paradoxes (Environment) and the Outcomes (Outputs).

This chapter contains five sections. The first three sections are dedicated to the within-case analysis of the three companies. These three sections are structured equally and contain an introduction of the case, the case findings, and the within-case patterns. The fourth section contains the cross-case analysis of the three case companies. Finally, the fifth section concludes the empirical analysis of the thesis.

Table 6 – Summary of the case studies and data collection

Case company	Brief description	Lean implementation	Data collection
A	<p>Company A is a global healthcare company with more than 50 years of innovation and leadership in healthcare. Headquartered in Denmark, Company A employs approximately 32,000 employees in 75 countries, and markets its products in 179 countries. The unit investigated is Research and Development.</p>	<p>The company hired a consultancy company to assist in implementing lean. All units should implement the following two tools: standardization and visual management. The main challenge for company A is transfer the R&D logic to lean which many employees see as equivalent to standards and rigidity.</p>	<p>9 interviews (1 hour each on average) with employees from different functions and different hierarchical levels</p>
B	<p>Company B has been part of the public transport in Denmark since 1997 and today it is considered one of the largest transport companies in Denmark with 4300 employees. It was acquired by another company in 2010 and, along with the acquisition, the majority of the management team members chose to leave, and a new board of</p>	<p>The main challenge for lean implementation is to enhance the coordination and reduce the attrition between two groups of employees - Mechanics and Traffic planners - which is crucial for the success of the company. The implementation of lean has challenged the roles and values of both groups of employees and ignited the belonging and</p>	<p>Due to the acquisition and the change in roles and tasks, it was possible to interview only 4 employees at company B.</p>

	directors came in. The new board had little knowledge of lean.	identity paradoxes.	
C	Company C is one of the biggest financial companies in Denmark with more than 20.000 employees in 15 countries. The company offers a complete range of banking products and services for both Danish and international customers.	Company C decided to implement lean in its back office operations in order to increase the productivity of the case handling process. One of the main challenges at company C is related to a whole group of team leaders who were required to take on new role based on process knowledge and workforce management rather than technical knowledge.	11 interviews with employees from different functions and different hierarchical levels

6.1 Company A

6.1.1 Introduction

Company A is a global healthcare company with more than 50 years of innovation and leadership in healthcare. Headquartered in Denmark, Company A employs approximately 32,000 employees in 75 countries, and markets its products in 179 countries. Company A has been successful in maintaining its presence globally through innovation and breakthrough products. However in an increasingly global and competitive world, the company realizes the importance of keeping its costs at a competitive level. Particularly, the company must increase its long term efficiency in order to avoid migrating jobs from Denmark to low-salary countries.

The company has decided to adopt lean philosophy as a platform for maintaining the long-term competitiveness. It introduced first lean in its manufacturing operations in Denmark and abroad and, then it decided to implement lean in its Research and Development (R&D) unit in Denmark. Although the implementation of lean was initiated by top management following a top down approach, lower levels in the organization were getting increasingly more autonomy during the implementation process. The implementation of lean in R&D was challenging in a sense that, at the time of lean implementation in R&D, no other company in Denmark have had experience in implementing lean in its Research and Development unit.

In order to facilitate lean implementation in R&D, top management hired an external consultancy with experience in lean. However, disagreements and attritions soon emerged between employees and consultants, mainly regarding the approach for lean implementation adopted by the consultancy.

According to one employee: “*the consultants didn’t have enough experience within R&D; most of their experience came from manufacturing; they tried force onto us tools and techniques which we didn’t buy in because we didn’t believe that these tools were useful in R&D environment*” (transcript 6). The main argument of the employee was that R&D doesn’t have regular repetitive processes as it is the case in manufacturing units.

As a consequence, lean implementation was halted and the management decided to hire another consultancy company and to give more autonomy to the R&D department in adjusting lean locally. During this new phase of lean implementation, units within R&D department could choose between two approaches for implementing lean. Either, a unit can choose to implement the full lean package with the assistance of external consultant or implement a simplified version of lean according to the operational needs of the unit. However, all units should implement the following two tools: standardization and visual management. Standardization is focused on mapping processes and activities and on implementing operational standards. Visual management is mainly based on regular follow up meetings assisted by visual performance measures.

The first two meetings at company A was held with the employee responsible for lean implementation within R&D and the director of the unit participating in the interviews. The director identified 9 employees from different organizational levels and various functions: researchers, engineers, team leaders, directors and vice presidents. All meetings were attended by the PhD project researcher and Professor Britta Gammelgaard, the advisor of the project.

6.1.2 Case Findings

In the beginning of lean implementation in R&D, many employees were skeptic about whether lean could really benefit the R&D unit. As one director described the situation, “*we had much more resistance in the beginning; now people understand that lean and standards can help us; a change in mindset was needed in order to understand that lean is not the enemy; the employees were afraid of everything becoming rigid and they were afraid that the company could find out that they were not working in the right way*” (transcript 1). In fact, in the beginning of lean implementation, there was a dominant mental frame among employees who believed that standards would curtail autonomy and creativity and, as a consequence, standardization was viewed as a “bad thing”.

Moreover, there are various citations in the interviews indicating that, in the beginning of lean implementation at company A, the focus was on the top down change, which started to shift to a more bottom-up participatory approach only after the first round of lean implementation and the attrition between employees and the external consultancy. This fact can be noticed in the statement of one team leader, “*we got more empowerment to adjust lean tools to our reality and this reignited our motivation*” (transcript 4). As indicated in the literature and observed in the interviews, the implementation of lean at company A has generated various paradoxes such as the performing, organizing and belonging paradoxes. Following the research framework, the next three sub-sections present the various categories of lean paradoxes identified at company A, the strategies used for dealing with each paradox and the outcomes.

6.1.2.1 The performing paradox

The performing paradox can be observed during the interviews through the tensions between “*the amount of time and effort that the employees invest in lean and improvement projects*” versus “*the amount of time and effort invested in R&D projects*”. On the one hand, the company’s top management was pushing toward investing more time for sustaining lean. Yet, on the other hand, since time was a scarce commodity at company A and because of the increasing number of projects, employees were often required by top management to reprioritize their time in order to meet projects’ deadlines. As a consequence, employees were investing less time in lean projects, although the top management had repeatedly reiterated the importance of lean for the company. This duality is paradoxical because of the mutually reinforcing yet mutually exclusive character of the two opposing poles. On the one hand, the company needs to allocate resources in order implement improvement projects. On the other hand, in order to deliver R&D projects, the company needs the same resources allocated to lean projects.

In fact, there is a tradition or an established mental frame among managers and employees from different organizational levels within company A that projects deadlines should be met, which often means that all available resources are channeled towards projects in order to avoid delays. While all recognize that the implementation of lean would benefit the organization in the long term, the employees also agree that, by no means, this fact justify delaying a project or missing a deadline. This mental frame was one of the main factors influencing the management of the performing paradox. In fact, there was an either/or mental frame embedded in it which viewed the allocation of resources between R&D projects and lean projects as a trade-

off, which was hindering the attempts to find synergy between the two tasks.

Employees and managers were both struggling to deal with this tension. According to one director: *“one can say that standardization is time demanding and we are not very good at solving the dilemma raising from the task of allocating time between improvement and development projects; we discuss this issue on daily basis, should we prioritize standardization or give support to the projects and there is no solution for this dilemma...”* (Transcript 8). In fact, it seems that both employees and managers were trying to learn from this paradox and to form a clearer vision about how to deal with it. However, the acceptance of this paradox has not reached a level of understanding that would allow them to transcend it or to reframe the link between its two opposing poles. In other terms, company A was not able to find synergies between allocating time to R&D projects and improvement projects according to which the two activities could become reinforcing rather than mutually exclusive.

Nevertheless, there were some attempts to solve this paradox. The resolution strategies used to deal with it were centered on managers requesting that their employees allocate a percent of their time for improvement projects. This is reflected in the following citation of one director: *“I told my employees that 20% of your time should go to improvement projects”* (transcript 1). However, little success was achieved from this initiative because employees were frequently required to reprioritize their time and meet the deadlines of the projects, and the director was not able to change this behavior. This fact seemed only to exacerbate the problem and increase frustrations among employees. According to one laboratory assistant, *“We want to finish implementing 5S -*

5S is one of the lean tools implemented at company A - *but we don't have time to do it; top management thinks that it is good to have 5S but we have to deliver our projects*" (transcript 5).

6.1.2.2 The organizing paradox

The organizing paradox emerges from the tension embedded in questions like "*How could we implement standards without hindering the creativity and the autonomy of the employees?*". At company A, the organizing paradox is related to the interplay between standards versus creativity/autonomy of the employees in performing their tasks. It rotates around organizational standards which foster efficiency and consistency, and the related tensions as employees attempt to keep their autonomy and creativity when complying with these standards.

The main defense or mental frame used by the employees against using standards is that "*standards can hinder creativity and autonomy*". This defense has been used more frequently in the starting phase of lean implementation, when employees had less understanding of the impact of standardization on their productivity or performance. According to one project coordinator, the organizing paradox emerged because "*I have the feeling that, when implementing standards, employees are afraid of losing power and of having less influence on their projects*" (transcript 3).

Both acceptance and resolution strategies were used for dealing with this paradox. In the beginning, managers focused on promoting the acceptance of this paradox. One director describes that a lot of experimentation, involvement and confrontation were needed in order to promote the

acceptance of the organizing paradox. In fact, the confrontation of the organizing paradox was taking place on a daily basis during meetings and discussion groups between managers and employees. The confrontation and the discussion managed to bring the tensions and fears of the employees to surface which facilitated the acceptance of the paradox. Moreover, the confrontation was supported by the experimentation of new standards and the increased involvement of the employees in defining and improving standards. According to the director, the shift in the mental model was noticed when employees started to realize that *“standards can help us in performing our tasks; creativity is not gone because of standardization; standards can make life easier for us; but standards that make sense as we standardize the repetitive parts of the process”* (transcript 1).

During the acceptance phase, employees and managers increased their understanding of the relationship between the two poles of the paradox *“standards versus autonomy”* until it was possible to transcend or reframe the tension between its two poles through the expression *“standards that make sense”*. In fact, the expression *“standards that make sense”* was frequently used in the interviews and seemed to reduce the defensive mechanisms for both groups of individuals involved in change: those resisting rigid standards and those opposing full autonomy. This increasing acceptance of the organizing paradox through the new frame or expression *“standards that make sense”* has facilitated the following resolution phase during lean implementation. That is, employees from various functions and organizational levels started to invest time and effort in standardizing the repetitive processes, which was making sense as it helped them in performing their activities.

In fact, there is an indication in the interviews that the management of the organizing paradox “*standards versus autonomy*” followed a cycle or pattern of iterations between acceptance and resolutions strategies. Each iteration between acceptance and resolution added to and refined the understanding of the expression “*standards that make sense*”, which resulted in new reframing. The following citation in one of the interviews expresses this refinement: “*if there is something that can be understood differently and it has been repeated than it makes sense to implement standard*” (transcript 6). Hence, after the second iteration between acceptance and resolution, the expression “*standards that make sense*” suggested not only activities that have been repeated; rather, it meant repetitive activities that might be understood differently among employees. Consequently, after the second iteration, employees accepted the new frame: “*standardize repetitive activities that can be understood differently*”. Based on this new frame, the subsequent resolution strategies of this paradox started to accommodate the tensions between standards and autonomy by standardizing processes or activities that are repetitive and that can be understood differently.

6.1.2.3 The belonging paradox

Questions like “*How do I contribute to the implementation of standards in my department without losing the core values and roles that constitute my work identity?*” signal the presence of the belonging paradox. It was possible to observe, during the interviews at company A, two groups of employees cultivating two different identities, values and roles. For instance, technical engineers and laboratory technicians had fostered an identity based on discipline and structure in approaching their daily work, whereas products developers and researchers had cultivated a work environment based on creative and non-repetitive ideas and processes, and were resistant to standards and repetitions.

One director declared that it has been a challenge to make the creative people in the organization adopt a structured approach to project development: “*some of our technicians are disciplined because their education and background direct them toward a more structured approach for solving problem; on the other hand, some of our researchers face difficulty in adopting a more structured approach in performing their tasks*” (transcript 1).

However, it was not possible to identify concrete attempts to deal with the belonging paradoxes at company A. Even more, it seemed that, unlike the organizing and performing paradoxes, the belonging paradox hadn't attracted the same managerial attention. When asked about whether there was any strategy to deal with the belonging paradoxes, one team leader mentioned that although the belonging paradoxes were affecting lean implementation and sustainability, there was no concrete attempt to deal

with them. Then, he realized that an initiative should be put in place in order to raise the awareness among managers of the importance of such tensions.

6.1.2.4 Summary of findings

Following the conceptual framework of the thesis, table 7 summarizes the findings at company A according to the four constructs of the conceptual framework: lean paradoxes, the strategies used for dealing with them, the factors influencing the management of paradoxes, and the outcomes of change at company A. As it can be observed in table 7, the rational strategy – based exclusively on the resolution of the paradox – has not achieved much success in dealing with the performing paradox as the employees still believe that all efforts should be channeled towards R&D projects in detriment of improvement projects. On the other hand, the paradoxical strategy based on iterations between acceptance and resolution of the organizing paradox “standards versus autonomy” has achieved more success as the new mental frame “standards that make sense” emerged among employees. Finally, there were no citations in the interviews of attempts to deal with the belonging paradox at company A.

Table 7 - Summary of findings at company A

Management of paradoxes			
Lean paradoxes	Strategies for dealing with paradoxes	Factors influencing the management of paradoxes	Outcomes
Performing paradox: investing time in lean projects versus investing time in R&D projects.	Rational strategy based on the resolution of the paradox through temporal separating between its two opposing poles (investing part of the time in lean projects and the other part in R&D projects).	Either/or mental frame based on the belief that all efforts should be channeled towards R&D projects in case of risk of missing deadlines.	No consistent change in the current mental frame achieved. Employees were still frustrated as they were not able to invest the needed time in lean projects.
Organizing paradox: standards versus creativity/autonomy	Paradoxical strategy based on alternation between acceptance and resolution, where acceptance prepares the ground for the resolution of the paradox.	Either/or mental frame assuming that standards hinder and kill creativity / autonomy.	New mental frame emerged: “ <i>standards that make sense</i> ”, which is facilitating the change as people standardize processes that are repeated and that can be understood differently. Thus, people started to use standards which improved organizational performance and adaptability
Belonging paradox: the implementation of standards	There were no concrete attempts to deal with this paradox.	Either/or mental frame assuming that standards can kill the creative roles and	Mental frame unchanged.

clashes with roles and values of the creative employees in R&D.		practices within the organization.	
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6.2 Company B

6.2.1 Introduction

Company B has been part of the public transport in Denmark since 1997 and today it is considered one of the largest transport companies in Denmark. In order to regain the five year contract with Copenhagen municipality, Company B has to meet some performance criteria such as punctuality and passenger satisfaction. However, it is important to mention that implementing lean and meeting the indicators of punctuality and customer satisfaction offers no guarantee of regaining the contract. In fact, every five years the municipality opens a public tender and the most qualified company wins the tender. This bidding process has been itself a source of tension and uncertainty within company B. On the one hand, company B should invest resources for improving and maintaining quality indicators at a competitive level. On the other hand, the improvement of quality indicators and the investment of resources are necessary but they don't guarantee the renewal of the contract.

Furthermore, company B was acquired by another company in 2010 and, along with the acquisition, the majority of the management team members chose to leave, and a new board of directors came in. The new board was introduced to lean by the lean manager, who attempted to get the support of the new management team for lean implementation. By 2011, most of the new directors were familiar with lean projects at company B, and lean seemed to occupy gradually a bigger part of their agenda.

As for this study, it was only possible to interview four people from company B (see appendix 3) because of the organizational change that was

still ongoing during the time of the interviews. In fact, the roles of the lean consultants, lean manager and other participants in lean projects were directly affected by this change, which hindered the continuation of the sequence of interviews at the company.

6.2.2 Case findings

During data collection and analysis, it was possible to identify the three categories of lean paradoxes at company B: belonging, organizing, and performing. The next three sub-sections present the strategies used for dealing with each paradox, the factors influencing the management of the paradoxes and the outcomes.

6.2.2.1 The belonging paradox

Company B must strive for maintaining and exceeding the quality indicators defined in the contracts with the municipalities through reliable maintenance and planning. Two functions have to work in synchrony in order to achieve a reliable operation at company B: The mechanics and the traffic planners. The mechanics repair the vehicles and the traffic planners have to make sure that the vehicles are on the road at the right time.

The implementation of lean has challenged the roles and values of both groups of employees and ignited the belonging and identity tensions within and between them. On the one hand, the mechanics had built their identity and prestige on the quality of their work, rather than on punctuality and timelines. On the other hand, traffic planners have strict schedules that should be followed and are dependent on the punctuality and precision of the information coming from the mechanics in the workshops. This situation is paradoxical because, on the one hand, the mechanics' prestige is built around the service quality they deliver. On the other hand, their prestige will suffer if they don't collaborate in improving the punctuality of the

operation. The traffic planners face a similar paradoxical situation if the quality of the service is not maintained or even improved.

According to one facility director, *“in the beginning, mechanics and traffic planners were frequently blaming each other for the problems”* (transcript 12). The management at company B used a confrontation strategy in order to bring the tensions between the two functions to surface and to promote the acceptance of the paradox. The director explained that *“every time mechanics and traffic planners are blaming each other for a problem, we put both parties together and we look closely at the problem; this fact has increased the flow of communication between the two functions, and things have begun to change until it is not anymore “us against them””* (transcript 12).

In fact, a regular daily meeting was set up between mechanics and traffic planners, where both groups could communicate more freely about their daily problems and challenges. The increasing communication and confrontation turned out to be constructive in the sense that problems between the two functions were brought to surface, which increased the mutual understanding of the challenges embedded within each function. This mutual understanding increased the acceptance of the challenges emerging from the belonging paradoxes and improved the cooperation among mechanics and traffic planners during the resolution phase of the paradox.

In fact, the acceptance phase has contributed to the creation of a new mental frame among the employees, which facilitated the resolution of the identity tensions. There are various citations in the interviews showing that the new frame *“we are a like a family”* has gradually emerged as a substitute for the old mental frame *“us against them”*. According to the director, both

mechanics and traffic planners have changed their mental frame and their views regarding their roles: “*it has been a cultural change... in the past people asked: what did they do to fix the problem? ...now they ask also: what have we done to solve the problem? ...People now realize that we are dependent on each other and that we should respect each other’s challenges*” (transcript 12). This new mental frame facilitated the resolution of the paradox as people attempted to find synergies between the two functions and to take ownership of the potential problems, rather than to blame each other.

However, according to lean director, a lot of work still has to be done in other areas of the company in order to change the mental model “*us against them*”. The director mentioned that “*some workshops are still considered as kingdom where external interference is not welcome*” (transcript 12).

6.2.2.2 The organizing paradox

The second paradox identified at company B is related to the organizing paradox emerging from the tension between standard and autonomy. Some workers resisted standards implementation as they couldn’t see the benefit from implementing standards in their daily operations. Team leaders were backing their employees because neither leaders nor employees could see the potential benefits from implementing standards. According to lean manager: “*some workers said: we are not robots*” (transcript 10), which indicates the presence of the either/or frame as the employees viewed standards as a “bad thing” that can kill their creativity. The lean manager further explained that it was difficult for the employees to see the link and

to draw parallels between the implementation of lean standards and their jobs or daily activities, and that a lot of work had to be done in order to make the employees realize that standards can really benefit their jobs.

According to the lean manager, *“we need to be very concrete; when we say there is a waste, we should say what is the waste we are talking about... they should know precisely what is the waste in their jobs and how standards can help them eliminate the waste”* (transcript 10). He concluded that by demonstrating how the implementation of standards would affect their daily activities, the employees were more likely to see the link and accept the implementation of standards. However, at the time of the interviews, company B had not achieved any concrete results in dealing with the organizing paradox as more experimentation and more involvement were needed in order to achieve the reframing and facilitate standards implementation.

Furthermore, there are various citations in the interviews indicating that the some learning gaps were influencing the management of the organizing paradox. In fact, as company B started the implementation of standards in its daily operations and the introduction of lean tools, such as workflow maps and follow-up sheets, it was soon realized that, in general, team leaders and the employees lacked some technical skills such as manipulating data in an excel sheet or analyzing the data trend. Moreover, people had to learn how to incorporate formal data analysis into their decision making process.

Based on these learning gaps, the company decided to start an encompassing lean training program for all team leaders and employees before engaging in the implementation of standards. According to lean

manager, because of these learning challenges “*we knew that our company was not ready for standards implementation at that moment*” (transcript 10). In fact, the management at company B believed that the implementation of standards associated with the extant learning tensions would amplify the negative effects of introducing standards and would increase employees’ resistance to lean.

6.2.2.3 The performing paradox

As for the performing paradox, it was frequently noticed in the interviews as people were complaining of the lack of available time for participating in improvement projects. In order to deal with this challenge, managers attempted to resolve this paradox by temporally separating the tensions. According to one manager: “*we tried to promote job rotation between firefighting and improvement projects; while some were solving today’s problems, others were planning for the next*” (transcript 10). Moreover, managers tried to solve this paradox by demanding that employees increase time allocation to improvement projects gradually.

According to lean manager: “*we asked the employees to start by investing 20% of their time in lean and then increase the percentage according to the learning process*” (transcript 10). However, this strategy had achieved limited success as employees still believed that the implementation of standards was time consuming and that its benefits were unclear. The lean manager added that a more comprehensive work has to be done in order to increase the understanding and the acceptance of the problems associated with this performing paradox.

6.2.2.4 Summary of findings

Following the conceptual framework, Table 8 summarizes the lean paradoxes, the strategies used to deal with them, the factors influencing the management of paradoxes, and the outcomes of change at company B. As it can be observed in Table 8, the acceptance of the belonging paradox has contributed to the reframing of the tensions between the two functions and has facilitated the resolution of the paradox. In fact, the dominant mental frame has changed from either/or to both/and logic where people started to identify synergies and accommodate solutions that can solve the challenges faced by both functions. As for the organizing paradox, company A needs more experimentation and involvement in order to achieve some level of acceptance of the paradox. Finally, the rational approach (resolution strategy) adopted in dealing with the performing paradox has not achieved consistent results as employees still struggle with the tension of investing more time in the improvement projects without impacting their daily performance.

Table 8 - Summary of findings at company B

Management of paradoxes			
Lean paradoxes	Strategies for dealing with paradoxes	Factors influencing the management of paradoxes	Outcomes
Belonging paradox: tensions between mechanics and traffic planners	Paradoxical strategy used for promoting the acceptance of the paradox by facilitating the movement between its two opposing poles through involvement, communication, and confrontation of the underlying tensions during the regular daily meetings.	Either/or mental model based on “ <i>us against them</i> ”. Mechanics and Traffic planners were blaming the other for the daily operational problems.	New frame started to emerge: “ <i>we are a like a family</i> ”. Better understanding of each other’s challenges has reduced the tensions between the two groups. However, the mental model “ <i>us against them</i> ” still present in some areas of the companies. More work still has to be done.
Organizing paradox: standards versus autonomy	Paradoxical strategy by attempting to build the acceptance by facilitating the movement between the two opposing poles of the paradox through experimentation and involvement.	Either/or frame “ <i>We are not robots</i> ” was hindering the employees from seeing how standards might benefit their work.	No concrete result had been achieved. More experimentation and involvement are needed in order to achieve the reframing and facilitate standards implementation.
Performing paradox: allocating time for	Rational strategy by focusing on the resolution of the paradox through temporal separation (by	Either/or frame based on the belief that the time invested in standards	Resolution strategy has not been successful as employees still hold

improvement projects versus allocating time for daily operations.	alternating process improvement activities among employees and by demanding that employees invest 20% of their time in lean projects).	implementation will not pay back.	the either/or frame according to which allocating time to improvement project might have negative effect on their performance.
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6.3 Company C

6.3.1 Introduction

Company C is one of the biggest financial companies in Denmark. The company offers a complete range of banking products and services for both Danish and international customers. Company C decided to implement lean in its back office operations in order to increase the productivity of the case handling process. The goal in productivity increase was set to 20% which roughly corresponds to the number of employees going into retirement within the next two or three years. In fact, company C decided not to replace the retiring work force but instead to increase productivity in order to compensate for the natural reduction of employees through retirement.

A considerable part of the employees at company C have more than 20 years of employment. Many of the team leaders were senior case handlers and were promoted to team leaders because of their technical skills as case handlers. This fact was raising many challenges at company C during lean implementation, mainly because team leaders were required to take on new role based on process knowledge and workforce management rather than technical knowledge.

At company C, team leaders go through a lean program in order to learn and apply lean philosophy and tools. The lean program is based on the development and execution of a project related to the work area of the team leader. The project has two modules of 18 weeks each. The first module is called the implementation phase and the second module is called the follow-up phase. In the implementation phase, team leaders are closely supported by an external lean consultant in order to map and improve processes using

lean tools and concepts. In the follow-up phase, the support of lean consultant is reduced and the team leader is expected to start taking ownership of the process. Data from the interviews indicate that there is more time for reflection in the follow-up phase in relation to the knowledge and experiences acquired in the implementation phase. According to one lean consultant, there are many things that team leaders are supposed to learn in the implementation phase and the pressure on them is high:

“They have to learn operations management techniques where team leader plans every single day and balance the work load among the employees... not only technical leader but also a process consultant... doing improvement and eliminating the root cause of the problems” (transcript 15).

6.3.2 Case findings

It is worth mentioning though that the behavioral and cognitive complexities among managers and employees were consistently and frequently noticed during the interviews at company C. In fact, the behavioral and cognitive complexity becomes as managers and employees frequently demonstrate a sheer belief in the power and the long term positive effects of combining opposing strategies and effective leaders have the behavioral capacity to identify and react to paradoxical situations and complexities in the business environment (Denison et al, 1995). More importantly, behavioral and cognitive complexities foster the both/and mental frames which tend to create virtuous circles of change and to facilitate the acceptance of a paradox by facilitating the movement between its opposing poles.

In fact, there are various citations in the interviews recognizing the importance of combining and alternating different strategies for dealing with tensions and paradoxes, such as combining top down versus bottom up and acceptance versus resolution strategies. Moreover, there is consistent pattern across the interviews at company C indicating a strong and genuine belief among employees and managers that dealing with paradoxical tensions is a long term effort and that alternating between acceptance and resolution is more likely to produce positive results and achieve the desired lean transformation. One lean consultant have described the transformation process, by stating that *“one should keep on trying until it succeeds... if you have the right tools and the adequate approach then you can succeed everywhere ... you should keep on”* (transcript 21). Another team leader described the process as *“focus, focus, focus... involve the employees in the change and help them to let go old habits...and intervene when it is needed*

in to remove the obstacles” (transcript 18). Furthermore, the following statement of the department director reinforces the general approach used for dealing with the various tensions and paradoxes at company C:

“the pressure in the first 4 months of the project is very high... you have more time to think in the next 4 months during the following up phase... you can’t replicate the first 4 months a lot in the same organization... people will get killed of it... you have to have less pressure when you come back to operation... and leaving time for reflection... keep talking and listening... creating a certain amount of pressure though.. I don’t think that any organization will live without some pressure ... we need to go into the emotional part of us rather than brain... in the business world there are more brain stuff than stomach stuff” (transcript 14).

As for the organizational paradoxes, it was possible to identify the organizing and belonging paradoxes at company C. The next two subsections present the strategies used for dealing with each paradox, the factors influencing the paradox management and the outcomes.

6.3.2.1 The organizing paradox

The organizing paradox emerges at company C as employees are required to follow lean standards instead of their own way of handling cases and claims. Employees resist standards because they believe that standards can limit their creativity and autonomy during case handling. Managers attempt to promote the acceptance of this paradox by stressing the fact that standards are not “*sacred*”; rather they should be seen as a dynamic tool that can be improved by the users. According to one director, “*if one employee*

has improvement ideas, then he or she should put it in the formal and standard way of getting things improved so it becomes everybody's project" (transcript 14).

Moreover, some team leaders mentioned that their employees resisted standards because of the embarrassment in case their performance felt below the average performance of the area. Other employees argued that standards can limit their autonomy in searching for all potential sources of errors that led to customers' complaints. However, according to one team leader, the positive effects of using standards soon emerged as *"employees say that it is good to have standards because "when I go home I can say that it was a good day and I have achieved my goal, because with standards, one can achieve the goal although there is still a bunch of cases waiting in line for the next day...we say to them that the standard will be followed until we decide to change it... when we find better way of doing things, then we improve the standard"* (transcript 16). The team leader added that, within lean environment, employees could use their creativity in finding better standards or in improving the existing ones, rather than in changing operational procedures and in finding different ways for handling similar cases or claims.

The confrontation of the organizing paradox through the discussions of the tensions in groups and the involvement of the team in the improvement efforts was crucial for achieving the acceptance and the reframing of the tension between standards and autonomy/creativity. Moreover, the acceptance of the paradox facilitated the resolution strategy as people got engaged in the improvement effort and started to believe that standards could reinforce creativity rather than hinder it. According to one lean consultant, *"we take the employees that put most resistance early on the*

improvement workshop where he or she can have more influence in the output of the process; in the first day of the workshop they might complain; however at certain point of the workshop they begin to get engaged in the process and contribute to the improvement effort... they have normally a lot of energy... they begin to see the benefits of the process and come up with a lot of good ideas for improvement; they can be considered change agents because other employees usually listen to them” (transcript 21). However, in some cases there was a need for a more top down push in order to make some employees participate in the improvement process. According to one manager: *“we communicate to the employees that lean has come to the department and will stay; so you have to decide what you want”* (transcript 20).

6.3.2.2 The belonging paradox

The belonging paradox has been also frequently noticed in the interviews at company C. The belonging paradox emerges as team leaders are required to take on a new role during lean transformation. According to the new role, team leaders are expected to act as process and operations managers rather than firefighters or technical experts for case handling. According to one consultant: *“people want to hold on the old role as firefighters because it has been the source of their prestige within the company”* (transcript 17). Another manager described the situation by describing that *“it is about letting go of the old role and embracing the new role”* (transcript 18). He added that *“sometimes they suddenly embrace the new role and become good leaders... as soon as they reach some level of understanding... so they*

become the big advocates of the new role... when they see the effect of the new role and of the new tools on their daily work” (transcript 18).

Having in mind the variety of skills and competences that team leaders should assimilate, the follow-up phase is considered as a buffer period used for reflection where team leaders consolidate the gains achieved during the implementation phase, instead of starting new projects. In the reflection phase, the acceptance of lean tensions and paradoxes is increased as team leaders consolidate their knowledge of lean philosophy and tools. The acceptance of the paradox enables team leaders to take on more challenging roles in relation to the dissemination of lean mindset and the use of lean tools in their respective areas when the training period is over. Thus, the reflection and the acceptance are considered as facilitator to the implementation phase which also entails the resolution of the paradoxical tensions as employees are expected to regularly use lean tools in their daily activities and to enhance their performance.

However, the belonging paradox has often required various sessions of confrontation in order to achieve the new level of understanding and the acceptance of the new role among the employees. The confrontation is either done by the lean manager or by the direct superior of the employee. One director summarized the confrontation philosophy as: *“First of all we have to be determined that this is something we want to do... and not see it as time-bound project... the project is there to facilitate broader change of behavior and attitude... we tell our employee that we want this, so how can we help you to get on?” (Transcript 14).*

Furthermore, it is important to note that the learning tensions have been interacting with and influencing the management of the belonging paradox.

One lean consultant described this interaction between the two paradoxes as *“employees want the change and want to learn new things; they can see the benefit of the new tools; however it is about skills and competences because there is a lot of new things they have to learn; they have to learn how to become an operations manager that follow the daily operational plan, how to allocate work load to each employee... they should not only be technical leaders but also lean consultants”* (transcript 15). Being aware of these learning challenges, the top management at company C had been investing heavily in training and in using external consultants in order to support the employees in their initial experiences with lean.

6.3.2.3 Summary of findings

Following the conceptual framework, Table 9 summarizes the lean paradoxes, the strategies used to deal with them, the factors influencing the management of paradoxes, and the outcomes of change at company C. First, the paradoxical perspective was used in dealing with the organizing paradox where the acceptance of the duality “*standards versus autonomy/creativity*” contributed to the resolution of the paradox as employees adopted standards in their activities and became less concerned of the impact of standards on their autonomy and creativity. The paradoxical perspective was also successfully used in dealing with the belonging paradox as employees gradually regained their prestige and mastered the new role within lean environment. In dealing with both paradoxes (organizing and belonging paradoxes), the alternation between acceptance and resolution strategies has achieved positive outcomes: mental reframing at the individual level and enhanced performance at the organizational level. The management of paradoxes at company C was facilitated by the cognitive and behavioral complexity of both managers and employees who held a share belief in the importance of alternating and switching strategies in dealing with lean paradoxes.

The next section of this thesis presents the cross-case analysis through the identification and discussion of patterns across the three cases.

Table 9 - Summary of findings at company C

	Management of paradoxes		
Lean paradoxes	Strategies for dealing with paradoxes	Factors influencing the management of paradoxes	Outcomes
Organizing paradox: Standard versus autonomy	Paradoxical strategy through the alternation between acceptance and resolution. Confrontation, involvement and support for learning increased the acceptance of the paradox. The increased acceptance facilitated the resolution of the organizing paradox as employees started to use standards in their daily activities.	Either/or mental frame based on the belief that “standards hinder autonomy/creativity”. Moreover, people feel uneasy for being evaluated and measured constantly. On the other hand, the behavioral and cognitive complexity of managers – by involving employees, confronting tensions, and allowing for creativity in creating and improving standards – was facilitating the management of the organizing paradox.	New mental frame as people became aware of the benefits of implementing standards and less concerned about the impact of standards on their autonomy and creativity.
Belonging paradoxes: New roles and values	Paradoxical strategy as the acceptance of the paradox was followed by the resolution phase where employees started to incorporate lean tools and philosophy in their new roles.	Either/or mental frame as team leaders were afraid from letting go of the old role – source of their prestige in the company. Moreover, team leaders and employees were stretched to the maximum of their learning capacity which increased resistance and frustration	New mental frame as people realized that it was possible to maintain their prestige by taking on the new role. In fact, their prestige increased as they mastered the new role and as the company supported

		<p>to the adoption of the new roles.</p> <p>On the other hand, the behavioral and cognitive complexity of managers – by allowing time buffers for understanding the challenges of the new role - was facilitating the management of the organizing paradox.</p>	<p>them in their challenges through the facilitation of the learning process.</p>
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6.4 Cross-case analysis

Having identified the organizational paradoxes in lean and discussed their management in each of the three cases, the cross-case analysis identifies and discusses cross-patterns across the individual cases (Eisenhardt, 1989). The cross-case analysis of this study rotates around the five main constructs of the conceptual framework (Figure 11). These are: the categories of lean paradoxes (Inputs), the strategies used for dealing with lean paradoxes (Processing activities), the factors influencing the management of the paradoxes (Environment) and the outcomes (Output). Moreover, the cross-case analysis covers the dynamic and circular aspects of the management of paradoxes (Feedback or circular causality).

The next sections answer the two research questions by relating them to the five constructs of the conceptual framework. Moreover, the next sections present three propositions which are used for the discussion of the findings of the study and for outlining the main contributions of the thesis. The first two sections answer the first research question of the thesis while the remaining three sections are dedicated for answering the second research question.

6.4.1 Lean paradoxes (Inputs)

Literature lists four categories of organizational paradoxes representing core activities of organizations: learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes), and performing (goals) which are expected to be found in any type of organizations (Smith and Lewis, 2011). Lean organizations are no exception as lean implementation has ignited and created the four categories of paradoxes in the three case companies (Smith and Lewis, 2011; Eisenhardt and Westcott, 1988; Seo et al., 2004). Table 10 summarizes the categories of paradoxes encountered in each of the three companies.

However, there are some peculiarities among the lean paradoxes identified in the three companies which are worth mentioning. First, there are striking similarities regarding the organizing and the performing paradoxes identified in the three companies. In fact, the organizing paradoxes identified in the three companies rotate around the same tensions between standards and autonomy/creativity. On the one hand, companies implement standards in order to increase efficiency and productivity. On the other hand, companies rely on employees' autonomy and creativity in order to respond to unexpected challenges. In fact, the organizing paradox has emerged in the three companies as they attempted to introduce standards in their operations.

The implementation of standards is something to be expected in lean companies because standards increase efficiency and support the elimination of waste (*muda*) which is core feature of lean philosophy. However, the timing of standards implementation varies among the three companies. While companies A and C have introduced standards from the

very beginning of the lean journey, company B has decided to postpone the implementation of standards because of the learning gaps (learning paradoxes) which were present and hindering the implementation of standards.

As for the performing paradoxes (Companies A and B), they also rotate around the same tensions related to the duality of “*investing time in lean projects*” versus “*investing time in daily activities and projects*”. On the one hand, companies demand that their employees dedicate a part of their time for lean improvement projects. On the other hand, companies frequently shift priorities and move resources from lean projects to production projects, which can offer quicker return on investment.

As for the belonging paradoxes, it is possible to note differences among them across the three companies. In companies A and B, the belonging paradoxes are ignited by tensions emerging between two functions with different roles (the creative people and the technicians at company A; the mechanics and the traffic planners at company B). On the other hand, the belonging paradox at company C emerges as the same people take on new role. These differences are something to be expected as the paradox literature suggests that the belonging paradoxes are ignited by tensions related to different elements such as roles, values and identities (Smith and Lewis, 2011).

Moreover, as expected from the paradox literature (Lüscher and Lewis, 2008), various categories of lean paradoxes can emerge simultaneously and interact among each other. For instance, the implementation of standards at Company A has generated various types of paradoxes as there are various reasons and motivations for people to resist standards. In fact, people may resist the implementation of standards because: (1) standards can limit their

autonomy (organizing paradox); (2) standards clash with their work identity based on creative non-repetitive approaches to problem solving (belonging paradox), and (3) standards are time consuming and can shift focus from meeting projects deadlines (performing paradox). Thus, the same lean practice at company A has generated simultaneously three lean paradoxes which interact among each other and cause confusion and frustration for managers attempting to deal with them.

The interaction among paradoxes was also present at company B as the learning paradox and the organizing paradox were interacting. Learning paradoxes reveal the need for framing new knowledge, rather than using the extant knowledge (Smith and Berg, 1987), and they surface as companies attempt to change by building upon as well as destroying existing knowledge and resources (O'Reilly & Tushman, 2008). There are various citations in the interviews indicating that the learning paradox was present in company B as employees attempted to deal with the implementation of standards (organizing paradox). In fact, in dealing with the organizing paradox, team leaders and employees had to learn new ways of approaching and solving problems based on the introduction of scientific method and data analysis into their decision process. Based on these learning gaps, company B decided to postpone the implementation of standards and started an encompassing training program which aimed at improving the problem solving skills of the employees.

In summary, the above cross-case analysis answers the first part of the first research question (What are the paradoxes emerging from lean implementation?) as the four categories of organizational paradoxes and their interactions are found in the three investigated lean organizations. This finding confirms learning from the organizational theory which state that

organizational paradoxes are core activities of any organization (Smith and Lewis, 2011) and lean organizations are no exception.

Table 10 - Summary of the categories of paradoxes identified in the three case companies

	Company A	Company B	Company C
The organizing paradox	Emerges from the tension of standards versus creativity/autonomy.	Emerges from the tension of standards versus creativity/autonomy	Emerges from the tension of standards versus creativity/autonomy
The performing paradox	Rotates around investing time in lean projects versus investing time in daily activities and projects.	Rotates around investing time in lean projects versus investing time in daily activities and projects.	Not identified
The belonging paradox	Emerges as the implementation of standards clashes with roles and values of the more creative employees in R&D.	Emerges from the tensions between the roles of mechanics and traffic planners.	Emerges as employees take on new roles and values.
The learning paradox	Not identified in the interviews at company A.	Identified through the interaction with the organizing paradox as people have to learn how to incorporate formal tools into their jobs.	Identified through the interaction with the belonging paradox as team leaders have to learn how to manage people and operations according to the new role.

6.4.2 The strategies used for dealing with lean paradoxes (Processing activities)

As for dealing with the various organizational paradoxes in lean, the analysis shows that both the rational approach (resolution strategy) and the paradoxical approach (alternation between acceptance and resolution strategies) were used (Table 11). Following the first row in Table 11, one can observe that at company A the iteration between the acceptance and the resolution of the organizing paradox (standards versus autonomy) has contributed to the creation of new mental frame. The reframing of the relationship between the two poles of the paradox has materialized through the concept “*standards that make sense*”, which entails the standardization of the repetitive processes that may be understood differently by the employees.

At company B, the “*give and take*” represents the two opposing strategies (acceptance and resolution) in dealing with the belonging and organizing paradoxes. “*Give*” represents the acceptance of the paradox as employees learn from tensions and come up with ideas for dealing with the paradoxes. “*Take*” represents the resolution strategy which entails taking actions to implement the ideas and improve the performance. It is through iterations between “*give and take*” that the company has achieved positive outcomes with the belonging paradox. In fact, one director described the paradoxical strategy used for dealing with paradoxes at company B as a long sequence of give and take: “*one ought to empower employees in order to take ownership and come up with new ideas; afterwards, one should follow up on the ideas and implement them ... It is a long process that we are working with today and that we are going to work with for a long time... motivate*

people to take ownership and give ideas for improvement...but sometimes we need to give some push for people to act” (transcript 12).

Finally, at company C, it is through the alternation between the top down push from managers (resolution strategy) – as managers set strict guidelines for implementing lean - and the bottom up approach (acceptance strategy) - as managers act as facilitators for experimentation, involvement and learning - that the company achieves positive outcomes in dealing with the organizing and belonging paradoxes.

Following the second row of Table 11, it is possible to notice that the rational strategy has resulted in negative outcomes at company A as employees get frequently frustrated for not been able to allocate the needed time for lean projects, although their managers are requesting the allocation for 20% of their time in lean projects. As for company B, the use of the rational approach for dealing with the performing paradox has not changed the status quo as employees still believe that standards implementation is time consuming and that its benefits are unclear. Finally, there are no citations indicating the exclusive use of the rational approach in dealing with lean paradoxes at company C.

However, it is important to mention that the adoption of the paradoxical perspective through the alternation between acceptance and resolution strategies was not pre-planned by the management at company A and B; rather the adoption of the paradoxical perspective has intensified according to the learning curve as companies faced various setbacks during lean implementation. In fact, it is fair to say that companies A and B followed the rational strategy in the beginning of lean implementation as they attempted almost exclusively the resolution of the paradoxes by favoring the top down approach. However, the increasing dissatisfaction and attrition

among employees made the companies rethink lean implementation allowing for more employees' participation which increased the acceptance of the paradoxical tensions.

In summary, the above cross-case analysis answers the second part of the first research question (What are the strategies used for dealing with the organizational paradoxes in lean?) as both the rational and the paradoxical strategies were used in dealing with lean paradoxes in the three companies. Moreover, there is support in the empirical analysis showing that the paradoxical perspective based on the alternation between two opposing strategies is more likely to generate positive outcomes.

The next three sections answer the second research question of the thesis, which is: *How and why will the adoption of the paradoxical perspective facilitate lean management and contribute to lean sustainability?*

Table 11 - Summary of the strategies used for dealing with paradoxes in the three case companies

	Company A	Company B	Company C
The paradoxical strategy	Positive outcomes through the reframing of the organizing paradox “ <i>standards that make sense</i> ”.	More success in dealing with the belonging paradox; yet it was too early to evaluate its impact on the organizing paradox.	Positive outcomes in dealing with the organizing and belonging paradoxes.
The rational strategy	Negative outcomes when dealing with the performing paradox: increased frustration among employees.	Status quo unchanged as employees still struggling with the acceptance of the performing paradox.	No sufficient data from the interviews regarding the use of the rational approach in dealing with lean paradoxes at company C.

6.4.3 The management of the interaction among lean paradoxes (Processing activities)

Organizational paradoxes interact among each other which poses considerable challenges for their management (Lüscher and Lewis; 2008; Smith and Lewis, 2011). Moreover, the management of the interactions among paradoxes is important for the success of organizational change (Bloodgood and Chae, 2010) and Smith and Berg (1987, p. 229) state that “*we almost always are dealing with paradoxes within paradoxes*”. In fact, it has been identified during the analyses that the implementation of one of lean practices, such as standardization, is likely to ignite various lean paradoxes simultaneously which interact among each other posing considerable challenges for the managers attempting to deal with them.

For instance, company B offers an example of managing simultaneously the learning paradox and the organizing paradox. In fact, as company B starts the implementation of standards in its daily operations (organizing paradox), it soon realizes that some team leaders and employees lack basic skills and that some learning is needed in order to replace the mindset related to problem solving and decision making processes. As an attempt to prepare the ground for the management and to facilitate the acceptance of the organizing paradox, company B starts an encompassing training program for its employees and team leaders, before initiating the implementation of standards in its operations.

As for company C, the simultaneous management of paradoxes is also present as the learning paradox influences the management of the belonging paradox. In fact, most team leaders at company C seem to accept the change in their roles within lean environment. However, they lack the knowledge and the skills which can facilitate the transition from the old role (as

technical expert in their field) to the new role (as process and operations manager). Therefore, Company C has invested heavily in the training and support of its employees as it closely observes the learning progress of each team leader and employee. Once again, dealing with the learning tensions seems to facilitate the acceptance of the belonging paradox as team leaders become more confident in their abilities to take on the new role.

On the other hand, the lack of simultaneous management of the various paradoxes at Company A has increased frustration among employees and delayed the positive outcomes of lean conversion. For instance, in dealing with the performing paradox at company A, managers suggested that employees dedicate a part of their available time to improvement projects. However, there are citations in the interviews suggesting that time allocation might not be the only issue or the solution for the paradox. For instance, one employee cited that *“I can find time for improvement; I would rather have autonomy to adjust lean to our local needs”* (transcript 3). For this employee, having autonomy and adapting lean to local needs (organizing paradox) is the issue, rather than the time available for lean projects (performing paradox). Similarly, there are other citations in the interviews indicating that the belonging paradox was interacting with the organizing paradox, as the creative people might resist standards because they clash with their inner work identity based on creative and non-repetitive approaches to problem solving (belonging paradox). Yet, there was no indication in the interviews that managers at Company A were taking into consideration the interactions among paradoxes and attempting to manage them simultaneously.

In summary, the above cross-case analysis supports the view advanced by scholars of organizational theory (Lüscher and Lewis; 2008; Smith and

Lewis, 2011; Bloodgood and Chae, 2010; Smith and Berg, 1987), which state the importance of the management of the interaction among paradoxes. In fact, this study shows that the simultaneous management of lean paradoxes and of the interactions among them is more likely to increase the success of lean conversion.

However, the above cross-analysis indicates that establishing priorities in dealing with the various organizational paradoxes in lean is important for the success of the management of organizational paradoxes and the interaction among them. For instance, as company B was struggling with the organizing paradox, it realized that the employees involved in the change lacked some basic skills (learning paradox), which was hindering the management of the organizing paradox. In fact, the major issue at company B was related to the new way of organizing tasks and activities (based on standards) without eliminating the autonomy and creativity of the employees. But, in order to support the management of this paradox, a new set of skills was needed, which ignited the learning paradox. Still the first priority of managers at company A was to sustain the new way of organizing and learning new skills was considered as a mean for dealing with the organizing paradox, rather than a goal in itself.

As for company C, the priority was dealing with the belonging paradox as most team leaders at company C experienced a fundamental change in their roles within lean environment. However, they needed new knowledge and other skills (learning paradox) which can facilitate the transition from the old role (as technical expert in their field) to the new role (as process and operations manager). Therefore, Company C invested heavily in employees' training in order to support the belonging paradox. But still the priority at

company C was to deal with the belonging paradox and training was a mean for achieving this goal.

On the other hand, the analysis shows that the management of lean paradoxes at company A had not prioritized the relevance and impact of each paradox on the different groups of employees. For instance, managers at company A considered that the performing paradox was top priority in the company and focused all their energy in order to deal with this paradox. More precisely, managers required that their employees dedicate 20% of their time for improvement projects. However, there are citations in the interviews suggesting that time allocation (performing paradox) might not be the most important issue for all groups of employees. In fact, for some employees, having autonomy to adjust lean practices to their local needs (organizing paradox) was top priority because they believed it would be crucial for the success of lean initiative. Yet, data analysis shows that managers at company A were not taking into consideration the differentiated impact of the various paradoxes on each group of employees. As consequence, they were not prioritizing the right sequence for dealing with organizational paradoxes, which was hindering the success of the paradox management.

This leads us to the first proposition of this study:

Proposition 1: The conversion to lean ignites the four categories of organizational paradoxes which have differentiated impacts on the various groups of individuals. Establishing priorities for dealing with these paradoxes according to the needs of each group of individuals is important for the success of lean conversion.

6.4.4 The cyclical and dynamic management of lean paradoxes (Feedback or circular causality)

There are various indications in the data showing that every iteration between acceptance and resolution of the paradoxes increases the likelihood of success in dealing with lean paradoxes as it creates new mental frames among individuals and accumulates knowledge about how to accommodate paradoxical tensions and deal with them. In fact, the management of the organizing paradox at company A “*standards versus autonomy*” followed a cycle or pattern of iterations between acceptance and resolutions strategies. Each oscillation or iteration between acceptance and resolution added to and refined the reframing of the paradoxical situation. Hence, after the second iteration between acceptance and resolution, the synthesis “*standards that make sense*” suggested not only activities that have been repeated; rather, it also meant repetitive activities that might be understood differently among employees. In fact, drawing on the self-organizing models of the complexity science as described in section 2.6, each oscillation or iteration increases the energy within the social system (organization) until the point where small perturbations may be responsible for pushing individuals and organizations from the current equilibrium (old mental frame) toward a new attractive point of equilibrium (new mental frame).

Within the same context, the paradoxical perspective used for dealing with lean paradoxes at company B followed a sequence of iterations between “*give and take*”. “*Give*” represents the acceptance of the paradox as employees live with the paradox and learn from it. “*Take*” entails taking actions and following up on plans in order to resolve tensions. It is through iterations between “*give and take*” that the company creates the energy that pushes the social system towards the new equilibrium. That is, the

reframing of the paradox. As for company C, there are consistent patterns across the interviews indicating that dealing with paradoxes is a long term effort and that the oscillation between acceptance and resolution is more likely to produce positive results and to achieve the desired lean transformation. One lean consultant describes the transformation process, by stating that “*one should keep on trying until it succeeds... if you have the right tools and the adequate approach then you can succeed everywhere ... you should keep on*” (transcript 21). In fact, each attempt or each alternation between acceptance and resolution increases the level of energy within the system until it reaches the new equilibrium. These findings also answer the second research question of the thesis as they explain that the alternation between acceptance and resolution facilitates change by increasing the energy in the social system (the “why” and “how” of the second research question). This leads to the second proposition of the thesis.

Proposition 2: Every cycle of iterations between acceptance and resolution strategies increases the likelihood of success of the change as it accumulates the energy within the organizations needed for the creation of new mental frames or the reframing of lean paradoxical tensions.

6.4.5 Contextual factors (Environment) and outcomes (Outputs)

As mentioned in Chapter 2 (sections 2.3 and 2.5), the mental models of the individuals involved in the change initiative can accelerate or hinder the success and the positive outcomes of the management of paradoxes. More precisely, it is known from the literature that cognitive and behavioral consistency hinder the acceptance of a paradox and contribute to vicious circles of resistance and inertia. On the other hand, cognitive and behavioral complexity contribute to view organizational phenomena from “both/and” perspective. The both/and perspective creates virtuous circles of change and facilitate the acceptance of paradox by promoting the reframing and the transcendence of the link or the relationship between the two opposing poles. In fact, the behavioral and cognitive complexity of the managers at company C has contributed to the positive outcomes by promoting simultaneously the acceptance and the resolution of the paradoxes.

On the other hand, in the case of the performing paradox in companies A and B (“investing time in lean projects” versus “investing time in daily activities and projects”), the mental model of the top management of the company – prioritizing projects with quick return on investment – was hindering the management of the performing paradoxes as employees get frustrated by the ambiguity associated with the allocation of time to lean projects. In fact, this ambiguous message regarding the allocation of resources to lean projects is a typical example of anti-lean behavior as lean philosophy entails a long term investment and unshaken commitment from leadership to lean conversion (Womack and Jones, 2003).

Having this in mind, it is argued in section 2.3 that mental models play a double role in the management of paradoxes. On the one hand, mental

models are the contextual factors that influence the creation and the management of paradoxes (Environment in Figure 3). On the other hand, mental models are the outcomes of the management of paradoxes (Output in Figure 3). In fact, there is strong support in the paradox literature that the acceptance strategy can contribute to the reframing of the paradoxical situation and to the creation of new mental frame (Lewis, 2000; Van de Vena and Poole, 1988), and that the iteration between acceptance and resolution creates the energy for the reframing among individuals (Smith and Lewis, 2011).

In fact, the analysis of this study gives a more precise role for reframing as it shows that reframing can be considered as a necessary condition for the transition from acceptance to resolution strategy. In other terms, findings from the interviews indicate that attempting to resolve the paradox, without achieving the reframing (the creation of a new mental frame) of the paradoxical situation during the acceptance phase, is less likely to contribute to positive outcomes. In fact, in dealing with the organizing paradox at company A, the understanding of the relationship between the two poles achieved during the acceptance phase has led to the reframing of the paradoxical situation, which prepared the ground for successful and consistent resolution of the paradox. This reframing is best represented by the frequent and consistent mention of the expression “standards that make sense” during the interviews, which was generally accepted and adopted by organizational members as new mental and guideline for the resolution of the paradox. As a consequence, each time an employee faces the paradox of standards versus autonomy, he or she uses the frame “standards that make sense” as a new mental frame and as a lens to accommodate the paradoxical situation and to act and solve the tension. Hence, employees use the

both/and mental frame “standards that make sense” in identifying the activities and processes which are repetitive and which can be understood differently, and then they use standards to streamline these activities and processes and reap the benefits. In other terms, the resolution of a paradox is less likely to succeed if the reframing of the paradoxical situation resulting from the acceptance phase of the paradox is not well established among individuals.

Within the same context, in dealing with the belonging paradox at company B, the understanding of the relationship between the two poles (the role of the mechanics versus the role of the traffic planners) achieved during the acceptance phase has led to the reframing of the paradoxical situation, which has prepared the ground for successful and consistent resolution of the belonging paradox. The shift from the old mental model “us against them” to the new mental frame “we are like a family” indicates the reframing which has guided the resolution of the paradox. In fact, the reframing has facilitated the resolution of the paradox and enhanced the quality indicators of the company as people attempted to find synergies between the two functions and to take ownership of the potential problems, rather than to blame each other.

Furthermore, the acceptance of the belonging paradox at company C has led to the reframing of the mental model in relation to the new role of team leaders as team leaders have realized that it is possible to regain their prestige within the company by succeeding in this new role. This fact has facilitated the resolution of the belonging paradox because team leaders took on more proactive roles in relation to the dissemination of lean mindset and the use of lean tools in their respective areas when the training period was over.

In summary, the above analysis emphasizes the role played by the reframing as a mediator between the two opposing strategies: acceptance and resolution. Note that the literature recommends that the acceptance precedes and prepares the ground for the resolution of paradoxes (Smith and Lewis, 2011; Poole and Van de Ven, 1989), without elaborating on factors or conditions that may facilitate the alternation or the transition between acceptance and resolution. However, the above analysis of the three cases shows that the acceptance phase of the paradox is more likely to lead to the successful resolution of the paradox when the reframing of the paradoxical situation intermediate the transition from acceptance to resolution. That is, when the extant mental frame is replaced by the new mental frame reflecting the new level of understanding of the link between the two opposing poles of the paradox. Hence, the reframing resulting from the acceptance phase of the paradox acts as a guideline and pre-condition for the effective resolution of the paradox.

In fact, at company A, it is not until the new frame “*standards that make sense*” replaces the extant mental frame that standards hinder creativity, that employees implement and follow standards successfully. At company B, the success in dealing with the belonging paradox is achieved only after the employees had abandon the old mental frame “*us against them*” and incorporate a new mental frame based on “*the company is a family*”. Finally, at company C, the management of the organizing paradox “*standards versus autonomy*” achieves positive outcomes only after the employees realize that creativity is not hindered by standards as employees are able to channel their creativity toward improving the standards, rather than be creative in case handling. This above cross-case analysis answers the second research question of the thesis as it introduces reframing as

necessary condition that explain how and why the adoption of the paradoxical perspective is effective in facilitating change. This leads to the third proposition of the thesis.

Proposition 3: Reframing is a necessary condition for the transition from acceptance to resolution of lean paradoxes, which contributes to a more effective resolution of lean paradoxes.

6.5 Summary and conclusions of the chapter

This chapter has presented the empirical analysis of the three case companies of this study and answered the two research questions of the thesis. The analysis shows that the four categories of organizational paradoxes in lean – organizing, performing, belonging and learning - are present in the three lean companies. As for the strategies used for dealing with paradoxes, the analysis claims that, although companies have used both the rational approach and the paradoxical perspective in dealing with paradoxes, the paradoxical strategy is more likely to achieve positive outcomes.

As for the why and how the paradoxical strategy is more effective, the analysis finds that the iterations between acceptance and resolution strategies facilitate change and transformation by creating the necessary energy that pushes the social system towards the new mental frame (reframing). Moreover, the analysis points towards the important role played by reframing as a mediator of the transition between acceptance and resolution strategies. Within this context, the reframing is considered a necessary condition for the transition from acceptance to resolution which contributes to the effective resolution of the organizational paradoxes and increases the likelihood of generating positive outcomes.

Together with answering the two research questions, this chapter has generated three propositions which are the basis for the contributions and discussions of the findings of this study. Based on the cross-case analysis and the three propositions, the next chapter presents and discusses the contributions of the study and the limitations of the findings, and indicates future research opportunities.

Chapter 7 – Discussions, contributions, limitations and future research opportunities

This chapter reviews and discusses the research questions and the three propositions of the study, and contains the contributions/recommendations for theory and practice, the limitations of the findings, and the future research opportunities.

7.1. Discussions and contributions of the study

Many models of organizational change view change as a rational problem which solution involves a predefined number of steps. These models are generally based on the idea that the problem of change is solved through diagnosis of the gaps between current and future states with focus on the forces of resistance to change accompanied by a strategy or plan for action. It is implicit in these models that change can be planned for and resistance dealt with by following an appropriate strategy. However, *“the difficulty with problem-based models of change is that they overemphasize the rational and consequently do not take into account the complexity, ambiguity and paradox acknowledged to be an integral part of organization”* (Vince and Broussine, 1996).

Within the same context, Smith and Berg (1987) argue that the rational approach tend to ignore or suppress the paradoxical tensions that can give meaning to the change process. The authors argue that change does not only occur as a result of diagnosing and solving problems; but also by staying with the paradoxes and discovering the link between oppositions which gives meaning to the apparent contradictions in the experience and challenges the ways in which we think about ourselves and others. As Starbucks (1988) points out, every thesis in a social system tends to initiate an antithesis. Yet, our bounded rationality and cognitive limitations make individuals to ignore the oppositions in a social system and the polarities within organizations and to see only the elements filtered by our perception (Quinn 1988).

Managing paradox involves struggling with our natural inclination as human beings to attempt to resolve paradoxes and to transform them into

something familiar and rational. Managers need to learn to live with and learn from tensions and contradictions provoked by the paradoxical phenomena. However, living with and learning from paradoxes is difficult because it requires counterintuitive reactions (Quinn and Cameron, 1988). In fact, counterintuitive reactions are core elements of the paradoxical leadership which can be crucial for the effectiveness of organizations: “*Effective managers, too, not only act logically and rationally but also illogically and irrationally*” (Quinn and Cameron, 1988, preface). And, successful performance in most organizational settings requires coping with or even creating paradox (Eisenhardt and Westcott, 1988).

It is important to note, however, that by managing paradoxes, the role of change agent or manager is best viewed as sense-maker who recognizes, makes salient, and reframes current mental patterns, rather than creating change and changing meaning systems (Weick and Quinn, 1999). Moreover, the management of paradoxes enables both first-order and second-order change. First-order change refers to changes aimed at increasing skill and knowledge or solving determined problems, while second-order change connotes efforts aimed at changing organizational members’ frame of reference or the way they understand key components and functions of organizations (Seo et al., 2004).

Having this in mind, this thesis adopts the view that considers lean as an approach for organizational change (Eisenhardt and Westcott, 1988), and contributes to the literature on lean sustainability through the management of the organizational paradoxes in lean. An important feature of the management of paradoxes adopted in this thesis is that dealing with paradoxes is itself paradoxical and involves alternation between two opposing yet complementary strategies: acceptance and resolution. In order

to outline its contribution to lean implementation and sustainability, this thesis has advanced and answered two research questions, which are:

- 1) What are the paradoxes emerging from lean implementation and what are the strategies used for dealing with them?
- 2) How and why will the adoption of the paradoxical perspective facilitate lean management and contribute to lean sustainability?

Moreover, the study has generated the following three propositions:

Proposition 1: The conversion to lean ignites the four categories of organizational paradoxes which have differentiated impacts on the various groups of individuals. Establishing priorities for dealing with these paradoxes according to the needs of each group of individuals is important for the success of lean conversion.

Proposition 2: Every cycle of iterations between acceptance and resolution strategies increases the likelihood of success of the change as it accumulates the energy within the organizations needed for the creation of new mental frames or the reframing of lean paradoxical tensions.

Proposition 3: Reframing is a necessary condition for the transition from acceptance to resolution of lean paradoxes, which contributes to a more effective resolution of lean paradoxes.

The next sections review and discuss the three propositions of the study by relating them to the two research questions and present the contributions and recommendations for theory and practice.

7.1.1 Lean paradoxes and their prioritization (Proposition 1)

The mutually exclusive yet mutually reinforcing characteristics of paradox suggest that the two opposing poles of a paradox coexist and reinforce each other and that paradoxes are inherent and latent in the social system (Smith and Berg, 1987; Quinn and Cameron, 1988). However, the latent and inherent paradoxes are made salient by environmental forces such as organizational change (lean implementation) with the mediation of social interaction and human cognition (mental frames). Thus, during organizational change actors are more likely to perceive the paradoxical situations within organizations and react to them (Smith and Lewis, 2011).

Moreover, existing theory mentions that the four categories of organizational paradoxes represent core activities of organizations: learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes), and performing (goals) and are expected to be found in any type of organization (Smith and Lewis, 2011). In fact, organizations and the act of organizing are inherently paradoxical because the two opposing elements of a paradox are mutually exclusive, yet mutually reinforcing. And, paradoxes exist because processes and actions that tend to change some characteristics of our social world also tend to activate opposing processes and actions that affect these characteristics oppositely (Starbuck, 1988).

Furthermore, the four categories of paradoxes can emerge simultaneously and interact among each other which challenges actors attempting to manage them (Lüscher and Lewis, 2008). In fact, Lüscher and Lewis (2008) argue that paradoxes do interact and ignite each other, and that coping with one paradox may enable coping with related paradoxes. Within the same

context, Smith and Berg (1987, p. 229) state that “*we almost always are dealing with paradoxes within paradoxes*” and Bloodgood and Chae (2010) cite that managers should be aware of the variety of paradoxes present in their organization and that the simultaneous management of the various paradoxes and of the interaction among them is important for the success of organizational change.

This study claims that the four categories of organizational paradoxes are present in lean organizations as the implementation of lean practices or tools create or ignite the various categories of paradoxes (organizing, performing, learning and belonging). Moreover, the analysis shows that the four categories of paradoxes interact among each other which demands simultaneous attention from managers attempting to deal with them. However, the analysis indicates that the success in dealing simultaneously with various lean paradoxes has depended on whether managers had prioritized correctly and focused on the most relevant paradox for each group of employees within the company (Proposition 1).

For instance, in dealing with the organizing paradox (emerging from the implementation of standards), company B had to deal with the learning paradox in order to support the organizing paradox. However, the main issue at company B was dealing with the organizing paradox which is directly related to the duality standards versus autonomy. Within this context, dealing with the learning paradox through intensive training and involvement was designed to support the organizing paradox as each group of employees needed different set of skills in order to work with standards, and some of the employees didn't even need any formal training at all to company with standards.

The same issue existed at company C where the management of the learning paradox supported the management of the belonging paradox. In fact, in dealing with the belonging paradox at company team leaders had to take on new roles within lean environment. However, they lacked the knowledge and the skills which could facilitate the transition from the old role (as technical expert) to the new role (as process manager). Therefore, Company C invested heavily in the training and support of its employees as it closely observed the learning progress of each team leader and employee. Once again, dealing with the learning tensions facilitated the acceptance of the belonging paradox as team leaders became more confident in their abilities to take on the new role.

However, the analysis shows that, unlike company B and C, company A had not prioritized what paradox was primary concern for each group of employees, which caused confusion and hindered the success of change. For instance, the introduction of lean tool (standards) at company A has generated three lean paradoxes: organizing, belonging, and performing. Individuals in the company have different reasons and motivation to resist or comply with standards. Some individuals may resist standards because they believe standards can limit their autonomy (organizing paradox); other individuals argue that standards clash with their work identity based on creative non-repetitive approaches to problem solving (belonging paradox), and finally, for another group of employee, standards are time consuming and can shift focus from meeting projects deadlines (performing paradox). However, there is evidence in the data showing that company A demanded that all employees invest 20% of their time in lean projects which frustrated mostly two groups of individuals: those who valued autonomy and those who had a strong identity based on creative work environment.

Based on the above discussion and as recommendation for practice, this study proposes that managers should not rush to dealing with lean paradoxes before understanding the differentiated impact of lean implementation on different group of individuals. This is because the identification and the understanding of the type of paradoxes is the stepping stone for the effective management of the paradoxes and for the generation of positive outcomes (Lewis, 2000). This recommendation for practice is supported by the study of (Vince and Broussine, 1996), who encourages managers to work and stay with the paradoxical complexity and uncertainty long enough to accumulate the required knowledge about its effect on people's emotional stability. Moreover, Vince and Broussine mention that an important factor of the individual is the attachment to a particular mental frame. The nature and strength of attachment is fundamental to people's ability to manage change and deal with the potential loss associated with the change.

Based on this, in order to increase the likelihood of success in dealing with lean paradoxes, managers at Company A should have respectively focused on the belonging paradoxes when people had stronger attachment to their work identity, on the organizing paradoxes when individuals valued their work autonomy and, on the performing paradoxes as people prioritized project deadlines. By staying long enough with uncertainty and not rushing to the resolution of paradoxes, managers are able to identify and understand the nature and strength of attachment of each group of individuals, and as consequence be better prepared for dealing with the relevant paradoxical tensions for each group of individuals.

7.1.1.1 Top down versus bottom up approach?

The reviewed lean studies show that the rational strategy (resolution strategy) is the dominant approach for dealing with lean paradoxes. Within this context, rationality entails a tendency to eliminate the inconsistencies emerging from paradoxical situations by attempting to solve them. It is important to note though that not all problems and dilemmas are paradoxical. For instance, a technical problem, no matter how intricate and serious, demands a logical solution or either/or trade-off approach, with each option having its advantages and disadvantages (Ackoff, 1978). In contrast, paradox denotes tensions that are interrelated and persistent. In paradoxical situations, individuals may feel stuck as they are unable to reach a solution or make a trade-off because each option triggers the need for its opposite (Smith & Berg, 1987).

While the analysis identifies the presence of four categories of organizational paradoxes in the three lean companies, it also shows that by adopting a paradoxical perspective (through the alternation between acceptance and resolution), lean managers are more likely to avoid simplistic solutions to paradoxes. Although the resolution of the paradox may generate short term benefits, it will - if exclusively pursued - undermine people motivation and lead to the exhaustion of the social system in the long run. As consequence, the study finds that the adoption of the paradoxical perspective as strategy for managing the four categories of the lean paradoxes is more likely to achieve positive outcomes.

However, the study shows also that adoption of the paradoxical perspective has not been pre-planned from the outset of lean implementation. Rather, the adoption of the paradoxical perspective has intensified in the

investigated companies as the rational strategy adopted in the beginning of the lean journey failed to achieve positive outcomes. For instance, the analysis shows that the top down push (resolution strategy) for implementing lean at company A started to shift to a more bottom-up participatory approach (acceptance strategy) after the first round of lean implementation and the attrition between employees and the external consultancy.

Within this context, Seo et al. (2004) state that companies must be aware of the paradoxical tensions generated by the duality (top down versus bottom up) during organizational change and manage them. The authors they note that some of the ways of handling dualities have shortcomings that can influence the outcomes of planned change. For instance, selecting the “top down approach” can culminate in problems as people want and need a more participatory approach in order to learn and adjust change to their local needs.

As recommendation for practice, this study states the importance of combining the top down approach with the bottom up approach in implementing lean. In other terms, managers should not expect that strict plans be the only effective way for implementing and sustaining lean in their companies. Rather, lean implementation programmes should contain buffers where people can learn and adjust lean tools and practices to their needs. Findings from this study show that companies started lean implementation exclusively with top down approach, then adjusted their course by adopting a more participatory bottom up approach. The shift of focus from top down to bottom up approach consumed a considerable time window resulting in delays between 1 to 2 years in lean conversion. By balancing the top down approach with the bottom up approach from the

outset of lean implementation, companies are likely to minimize this time window loss.

The next two sections discuss propositions 2 and 3 and present the related recommendations for theory and practice.

7.1.2 The cyclical and dynamic management of lean paradoxes (Proposition 2)

The analysis draws on the self-organizing models of complexity science as a metaphor for explaining and clarifying why the paradoxical strategy is more successful in dealing with lean tensions and paradoxes than the rational strategy. The main argument is that the adoption of the paradoxical perspective through iteration and oscillation between two opposing strategies – acceptance and resolution of the paradox - creates the necessary energy that pushes the social system towards a new equilibrium. In dealing with paradoxical situations, the new equilibrium corresponds to the reframing of the situation as individuals transcend the relationship between the two opposing poles of paradox, which is equivalent to a second order learning. In fact, the adoption of the paradoxical strategy creates the necessary energy within the system to move to a new equilibrium reflecting the reframing of the paradoxical situation.

Since dealing with paradoxes is a long time effort (Poole and Van de Ven, 1989), it is to be expected that positive outcomes will take time to consolidate. In fact, each iteration between acceptance and resolution increases the energy until the point where the system moves to the new equilibrium point. For instance, the “give and take” strategies at company B represent the acceptance and the resolution in dealing with the belonging and organizing paradoxes. It is through iterations between “give and take” that the company has created the energy and achieved positive outcomes with the belonging paradox. Based on these findings, lean managers are encouraged to alternate and repeat acceptance and resolution strategies as frequently as needed when paradoxes remain unacknowledged and people unresponsive. Each repetition increases the understanding of the paradoxical

tensions among individuals until they reach the new equilibrium (the new mental frame).

As recommendation for practice, this analysis stresses the importance of the cyclical and paradoxical management of change instead of the rational approach, which views change as a rational problem which solution involves a predefined number of steps. If, for example, one of the steps of the rational approach is to overcome resistance to change by identifying the various stakeholders and targeting them, then the cyclical and paradoxical approach suggests that managers should not rush to overcome resistance or move to next step. Rather, the paradoxical approach entails that managers should hold on tensions and learn from the resistance to change. Then, the next action might be to review one of the previous steps, such as redefining the scope of change, before moving to the next step. Each cycle of review of previous steps adds to the understanding of the resistance to change which pushes the social system towards the new equilibrium reflecting the reframing of the paradoxical situation (Proposition 2). This reframing contributes to more effective resolution of paradoxes during the implementation of the next step of change.

7.1.3 The role of reframing (Proposition 3)

This study emphasizes the crucial role of the reframing as a necessary condition/factor for the alternation between the two opposing strategies for dealing with paradoxes: acceptance and resolution (Proposition 3). In other terms, attempts to solve organizational paradoxes without achieving the necessary reframing will be restricted.

According to the paradoxical perspective, resolution strategies attempt to solve a paradox by clarifying the relationships and differences between the two opposing poles, reaching a synthesis that enable individuals to deal with the paradoxical tensions, or selecting one of the poles over the other. On the other hand, acceptance strategies don't attempt to separate opposing poles of a paradox or reach a synthesis between its two opposing elements; rather acceptance considers paradoxes as an opportunity for learning and assumes that individuals and organizations can learn a great deal from juxtaposing contradictions and tensions. However, the extant literature has not focused on the process of transition between the two strategies as it doesn't elaborate on when, why and how to shift from acceptance and resolution strategies.

In fact, the conceptual framework of this study (Figure 11) depicts the paradoxical perspective as a process of alternation between acceptance and resolution strategies without mentioning any intervening variable that might facilitate the transition between the two strategies. However, this study advances a new conceptual model (Figure 12: Sustaining lean: The role of reframing) which improve the conceptual framework (Figure 11) by adding "*reframing*" as an intervening variable between acceptance and resolution strategies. Thus, this lean study adds to the extant paradox literature by

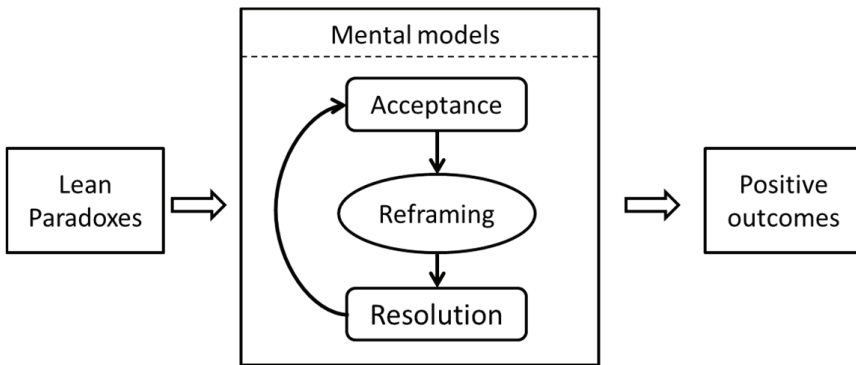
proposing reframing as a necessary condition for the successful transition between acceptance and resolution.

The role of reframing in mediating the transition also indicates that a rush to the resolution of the paradox, without achieving a sufficient and consistent level of understanding of the paradoxical situation and its implications on the individuals involved in the change, is less likely to succeed and achieve the desired outcomes. This observation is supported by Vince and Broussine (1996), who recommend that when attempting to deal with paradoxes, managers are encouraged to stay with the uncertainty long enough to enhance learning, and not to automatically solve the paradox or deny the feelings associated with it.

Furthermore, Argyris and Schön (1974) state that reframing is a second order or double loop shift in the understanding of some domain and it occurs if an individual adopts a qualitatively different opinion than previously. Within the same context, Bartunek (1988) cites that reframing enables organizational members to develop their own understanding of and responses to organizational tensions and problems. Thus, reframing can facilitate the relation between the acceptance of paradox and the resolution of the paradox as individuals attempt to act and accommodate tensions. In other words, attempting to resolve a paradox, without achieving the reframing or the transcendence of the link between its two poles is less likely to produce positive outcomes. Thus, reframing can be used as an indicator as to when to switch from promoting the acceptance of the paradox to a more challenging strategy which involves the resolution of the paradox.

The practical implication of this new model for lean managers is that the exclusive focus on the resolution of paradoxes without achieving reframing might not yield the expected results. Thus, managers are encouraged to hold on to paradoxical tensions and to promote the acceptance of paradoxes, which tend to counterbalance the tendency to solve rationally the paradoxes and eliminate their inconsistencies. More importantly, reframing should be considered as a necessary pre-condition for shifting from acceptance to the successful resolution of the paradox. In other words, if managers rush to solve the paradox without achieving the reframing of the paradoxical situation, the likelihood that the change is successful will be restricted.

Figure 12 - Sustaining lean: The role of reframing



Source: Author

7.2 Limitations of the study and future research opportunities

It is recognized in the literature that there is some ambiguity involving the definition of paradox, and in organizational life, paradox tend to be equated with other concepts such as dilemma, tradeoff and inconsistency (Quinn and Cameron, 1988). Moreover, conceptual confusion emerges as dilemmas, tradeoffs, and paradoxes overlap. A dilemma may prove paradoxical, for instance, when over time the contradictions resurface, suggesting their interrelatedness and persistence (Smith and Lewis, 2011). Thus, the extensive triangulation is important in order to increase the constructs validity by distinguishing paradox from other similar concepts.

As mentioned in the data collection, semi-structured interviews were the main data collection method. Yet other sources of evidence such as site visits and direct observation of group discussions or projects meetings were also used, however to a limited extent. More extensive participation in projects and group discussions would increase the trustworthiness of this study as it would enhance the triangulation, much needed to counterbalance the conceptual confusion related to organizational paradoxes and their management.

Moreover, this study is retrospective and cross-sectional covering historical events at one point of time. The advantage of using retrospective study is that case selection can be more controlled. However, one drawback with using retrospective study is that the interviewees have difficulty in defining causality from reconstructed events. In a longitudinal study, the trustworthiness of the study is enhanced because researcher is more able to track the observed events. Since the management of the organizational paradoxes is related to the process of change and its temporal outcomes, then

a longitudinal study would enhance the credibility of the study by allowing multiple observations and triangulations over a longer period (Leonard-Barton, 1990).

As for future research opportunities, there is a mention in the literature that paradoxes are likely to appear in sequence. For instance, Smith and Berg (1987) argue that the belonging paradox is more likely to be encountered before the other paradoxes. However, there is lack of empirical studies investigating the validity of such claims. Thus, the empirical validity of whether paradoxes are encountered in sequence and what type of paradox is more likely to be encountered before other paradoxes should be investigated, because it can be the steppingstone for advising more effective strategies for dealing with lean paradoxes (Bloodgood and Salisbury, 2001; Smith and Berg, 1987; Vince and Broussine, 1996). Moreover, the sequence of the appearance of the various paradoxes is related to the simultaneous management of paradoxes which helps managers prioritize their efforts in dealing with paradoxes (Proposition 1).

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Appendix

Appendix 1 - Case protocol/Contact summary sheet

Sustaining lean:

Strategies for dealing with tensions and paradoxes

A CBS PhD project

Invitation to participation in interview

You were selected by your company to participate in this PhD research project with Copenhagen Business School.

Introduction to the research:

We are conducting a research project regarding the management of lean tensions and paradoxes that emerge during the implementation of lean philosophy and tools within your department. An example of paradox that emerges frequently during lean implementation is related to the tension between standards and creativity/autonomy. On the one hand, employees are required to follow standards in order to increase the efficiency of the operation. On the other hand, employees want to keep a certain level of autonomy in performing their tasks. Thus, the “standards versus autonomy” paradox emerges.

The structure of the interview

The interview will last around one hour and will revolve around the three following questions.

1. What are the main objectives of implementing lean in your department?
2. What are the tensions and paradoxes that you face when implementing lean? Give examples
3. How do you deal with these tensions and paradoxes? Please, give examples of real situations

The interview will be sound-recorded and transcribed. The questions can be answered in English or Danish.

Confidentiality:

The final recommendations of the research will be presented without the revelation of the source (names or positions of the employees involved in the interviews will be omitted).

Sincerely,

Malek Maalouf (PhD Researcher)

Britta Gammelgaard (Professor)

Appendix 1 contains the case protocol/invitation letter used during the interviews. First, it introduces the scope of the project, and then it presents the three research questions of the study. The case protocol contains also information about the use of sound recorder and the languages used in the interviews. Finally, the case protocol presents the confidentiality clause of the study. Both the PhD researcher and the advisor of the project sign the invitation. As it is mentioned in the data collection section, the case protocol is a dynamic tool as more questions are added to the three open-ended questions during the interviews in order to enhance the validity and the generalizability of the study.

Appendix 2 - Start list of codes per variable

Variable	Code	Comments
Lean paradoxes	Organizing	The four types of paradox are identified according to the descriptions for each paradox in section 2.4.
	Performing	
	Learning	
	Belonging	
Strategies for dealing with paradoxes	Acceptance	As mentioned in sections 2.5 and 5.2, the focus on the resolution strategy denotes the rational approach, while the alternation between acceptance and resolution represents the paradoxical strategy.
	Resolution	
Factors influencing the management of paradoxes	FPositive	FPositive and FNegative represent respectively the organizational factors influencing positively and negatively the management of lean paradoxes (sections 2.5 and 5.2).
	FNegative	
Outcomes	OPositive	OPositive and ONegative represent respectively the positive and negative outcomes of the management of lean paradoxes (sections 2.5 and 5.2).
	ONegative	

As it can be observed in appendix 2, four codes represent the four categories of organizational paradoxes – organizing, performing, learning and belonging – related to the inputs in the conceptual framework in Figure 11. Two codes represent the two strategies used for dealing with paradoxes: the acceptance and the resolution strategies (Processing activities in Figure 11). Furthermore, one code represents the factors influencing the management of paradoxes (Environment in Figure 11). Finally, two codes represent the outcomes (Outputs in Figure 11) of the management of lean paradoxes: one code is

related to positive outcomes while the second represents the negative outcomes.

Appendix 3 - Overview of the interviews

	Job title	Duration of the interview	Date	Transcript number
Company A	Department Director	01:00:35	16/8/2011	Transcript01
	Project leader	01:09:57	16/8/2011	Transcript02
	Team member	01:03:51	17/8/2011	Transcript03
	Team leader	00:54:53	17/8/2011	Transcript04
	Laboratory technician	00:54:12	18/8/2011	Transcript05
	Team member	00:43:48	18/8/2011	Transcript06
	Team leader	00:58:18	18/8/2011	Transcript07
	Vice president	00:48:03	24/8/2011	Transcript08
	Team leader	00:51:38	24/8/2011	Transcript09
Company B	Lean manager	00:52:48	23/1/2012	Transcript10
	Lean director	00:49:46	23/1/2012	Transcript11
	Director	00:43:29	27/1/2012	Transcript12
	Team leader	00:23:22	27/1/2012	Transcript13
Company C	Department director	00:59:43	21/5/2012	Transcript14
	Lean consultant	00:47:07	21/5/2012	Transcript15
	Team leader	00:46:11	21/5/2012	Transcript16
	Lean consultant	00:47:01	22/5/2012	Transcript17
	Team leader	00:25:33	22/5/2012	Transcript18
	Team member	00:57:06	23/5/2012	Transcript19
	Program manager	00:25:34	23/5/2012	Transcript20
	Lean consultant	00:22:29	23/5/2012	Transcript21
	Team leader	00:35:38	24/5/2012	Transcript22
	Director	00:57:12	25/5/2012	Transcript23
Team leader	00:23:33	25/5/2012	Transcript24	

Appendix 3 contains the list of the interviews of the empirical study by company. Column 1, 2 and 3 contain respectively the job title of the participant in the interview, the duration of the interview in format (hours: minutes: seconds), and the date of the interview. Column 4 contains the transcript number - appearing after every citation in the text of the thesis – which allows tracing the citations of each participant back to the original transcript.

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