

**Emergence of Strategic Direction, Organizational Structure and
Employee Integration:
A Framework for the Dialectic Organization**

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ABSTRACT

The main objective of this thesis is to develop a system dynamics model of organizational change. The Organizational Studies, Strategic Management and System Dynamic fields will be reviewed, concluding that there are gaps in the extant literature: none of them has been successful in defining the minimum set of processes and variables required to characterize organizational change. Through an exploratory study using a comparative-case study analysis, it was found that, on the one hand, under low requirements for change (i.e. stable organizational-environment fit), organizations tend to increase their inertia (i.e. tend to be more bureaucratic). On the other hand under high requirements for change (i.e. unstable organizational-environment fit), organizations tend to try to reduce their inertia (i.e. increasing their ability to change), as a way to adapt themselves to the environment. Through an analysis of previous simulation models of the organization and environment interface, it was found that the inertia-performance relationship follows an inverted U-shape. When this relationship is included in current models of organizational change, they become highly instable. Through the development of a system dynamics model, it was found that the stability of the system is achieved through the inclusion of two additional sectors: employee motivation and employee integration. Thus, this exploratory study establishes that apparently three main processes are required, as a minimum, to characterize organizational change: the emergence of strategic direction, the emergence of organizational structure and the emergence of employee integration. Within this view, the organization could be seen as a *double-edged reduction of complexity system*: on the one hand the organization needs to reduce the complexity of the environment in order to create an “internal order”. But on the other hand, it needs to reduce the complexity of the employees in order to motivate them to participate in its internal processes. We define this system as a “Dialectic Organization”.

Keywords: Organizational Change, System Dynamics, Organizational Studies, Strategic Management, Organizational Inertia, Organizational Structure, Employee Motivation, Dialectic Organization.

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1. Introduction

“Man lives and works within social systems. His scientific research is exposing the structure of nature’s systems. His technology has produced complex physical systems. But even so, the principles governing the behavior of systems are not widely understood.”

Jay W. Forrester. Principles of Systems, 1968.

Human organizations are deeply linked to human development. In order to cope with the complexity of the tasks involved to support such development, organizations offer a natural way to develop answers to the most simple and, at the same time, to the most complex problems of our modern society. But what are the main characteristics of organizations? How humans have been studied this paradigm and how organizations have changed over the course of technological progress?

Organizational Studies is not the only field of study that is trying to explain how an “organization” emerges. Theoretical biology, with its study of “living systems”, also represents a way of “organizing”. Following this line of thinking, Francisco Varela, a Chilean neurobiologist, wrote during the 70’s: “... The ever present question is: What is common to all living systems that allow us to qualify them as living? There is no clear understanding or formulation of such an organization. In fact, the very question is odd to most biologists... because the great developments in molecular biology have led to an overemphasis on isolated components, and to disregard questions pertaining to what makes the living system a whole, autonomous unity.” (Francisco Varela, 1979, p.4-5).

This approach to err on the side of isolated components and particular phenomenon - instead of a systemic explanation of the phenomenology of living systems - have been experienced in the organizational arena as well. The most “classic” and “prominent” authors in the field of organizations have been analyzing the possibility to integrate the research carried out in this field in a more comprehensive and systematic approach. Robert K. Merton explained that “... I attempt to focus attention on what might be called *theories of middle range*: theories intermediate to the minor working hypotheses evolved in abundance during the day-by-day routines of research, and the all-inclusive speculations comprising a master conceptual scheme from which it is hoped to derive a very large number of empirically observed uniformities of social behavior... There are some who talk as though

they expect, here and now, formulation of *the* sociological theory adequate to encompass vast ranges of precisely observed details of social behavior and fruitful enough to direct the attention of thousands of research workers to pertinent problems of empirical research. This I take to be a premature and apocalyptic belief. We are not ready. The preparatory work has not yet to be done... Perhaps sociology is not ready for its Einstein because it has not yet found its Kepler.” (Robert Merton, 1957, p.5-7). In this way, R. Merton was asserting, 60 years ago, that cumulative research is a fundamental requirement to advance in science. Without such an underlying base, the emergence of breakthrough theories (i.e. singularities in the scientific-theoretical domain) would be more difficult.

The main purpose of this thesis is to study the organizational change phenomenon - why it emerges and how it unfolds over time. The particular emphasis will be based on an exploration of the factors that foster the stasis and impede change and the factors that foster the adaptability within organizational systems. In order to pursue this objective, the next section of this thesis will define the research methodology. The methodology will be based, first, on a review of the extant literature in order to find research gaps. These gaps could help us to define the research hypotheses, which in turn will be tested with the final goal to develop theory from case-studies (Eisenhardt, 1989; Yin, 1981). The theory developed will be used as the basis for the development of a System Dynamics model of Organizational Change.

1.1 Research Objective

The main research objective of this thesis is to gain more insights in terms of what are the factors that foster organizational change, in particular their relation with the organizational-environment fit, the amount of structure that an organization possess and its level of internal inertia.

In order to address this objective, two questions arise as potential research focus: on the one hand, the question of “how organizations change?” is related to how this process unfolds within organizations. On the other hand, the question of “why organizations change?” is focused on the organization - environment interface, in particular what factors trigger an organization to change? Both approaches encompass different focus and different causal mechanisms. As Jim March pointed out: “The routine processes of organizational adaptation are subject to some complications, and a theory of change must take into account how these processes can produce unusual patterns of action. Yet, in its fundamental structure a theory of organizational change should not be remarkably different from a theory of ordinary action.” (James March, 1981, p.564). Then, if we were to analyze the process of organizational

change, we should look also into the process of how an organization creates (and recreates) their actions. Thus, in order to understand organizational change, it is important to recognize that the questions of “why organizations change?” and “how organizations change?” represents a duality of the same phenomenon: one cannot analyze the internal view of the processes involved in the definition of new structures within organizations without a proper understanding of what characteristics of the environment could trigger variation within them. In order to start defining the problem, a research framework will be developed in the following section.

1.2 Research Methodology

Developing a proper understanding of the factors that foster (or not) the adaptability to changes within organizations could be a daunting and complex task if we take into account the vast literature and the different approaches that have been developed over the years in the organizational arena. Thus, a robust definition of research methodology should be pursued. Kathleen Eisenhardt, from Stanford University, explained that “Sound empirical research begins with strong grounding in related literature, identifies a research gap, and proposes research questions that address the gap.” (Eisenhardt, 2007, p.26). In this particular case, the stages of the research methodology proposed in this thesis are depicted in Figure 1-1 below. The starting point will include literature review and the identification of research gaps (Chapter 2). Through an analysis of the Organizational Studies, Strategic Management and System Dynamics fields, it will be found that a gap exists in the extant literature: none of them has successfully characterized the variables and processes that could explain the process of organizational change.

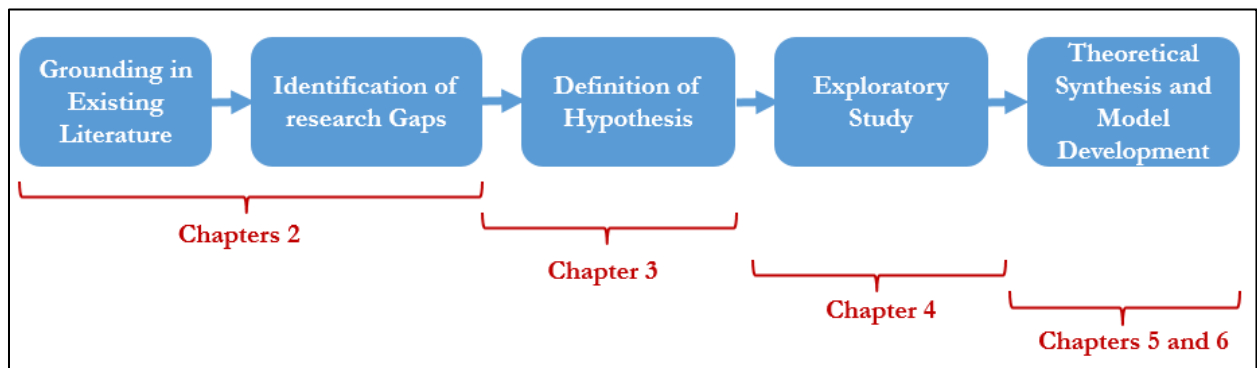


Figure 1-1, Overview of the Research Methodology¹

¹ Developed and Modified from Eisenhardt, 2007.

With the gap defined, a research hypothesis will be established in Chapter 3, specifically with the objective to study the relationship between the organizational-environment fit and the amount of inertia that an organization possesses. Chapter 4 will include an exploratory study through a comparative case analysis between an old and bureaucratic organization and a young entrepreneurial organization, concluding that, in these cases, the factors that foster adaptation are deeply related to the amount of inertia that these organizations exhibit. In Chapters 5, a Theoretical Synthesis of the potential minimum processes to characterize organizational change are integrated in a definition of the dialectic organization. In Chapter 6, A System Dynamics model of organizational change is developed, concluding that previous models do not include an inverted U-shape relationship between inertia and performance and do not include employee motivation or integration as a factor that drives adaptability to changes. The System Dynamics model will be developed with the objective to replicate the high adaptability to changes shown by young organizations and the low motivation exhibit by old organizations. The main conclusion of this thesis will be presented in Chapter 7.

2. Grounding in Existing Literature

“...organizations are complex combinations of activities, purposes, and meanings; they accomplish coordinated tasks that would be inconceivable without them, and without which it is difficult to imagine a modern developed society. This impressive integration of formal organizations should not, however, obscure the many ways in which organizations are loosely coupled. Behavior is loosely coupled to intentions; actions in one part of the organization are loosely coupled to actions in another part; decisions today are loosely coupled to decisions tomorrow... Such loose coupling does not appear to be avoidable. Rather, limits on coordination, attention, and control are inherent restrictions on the implementation of rationality in organizational action.”

James G. March. Footnotes to Organizational Change, 1981.

The starting point of this thesis will be to review the vast literature of organizational phenomena with a particular focus on organizational change. In particular, the overall objective will be to review the Organizational Studies and Strategic Management fields. Figure 2-1 below shows where this chapter lies in the research methodology defined for this thesis.

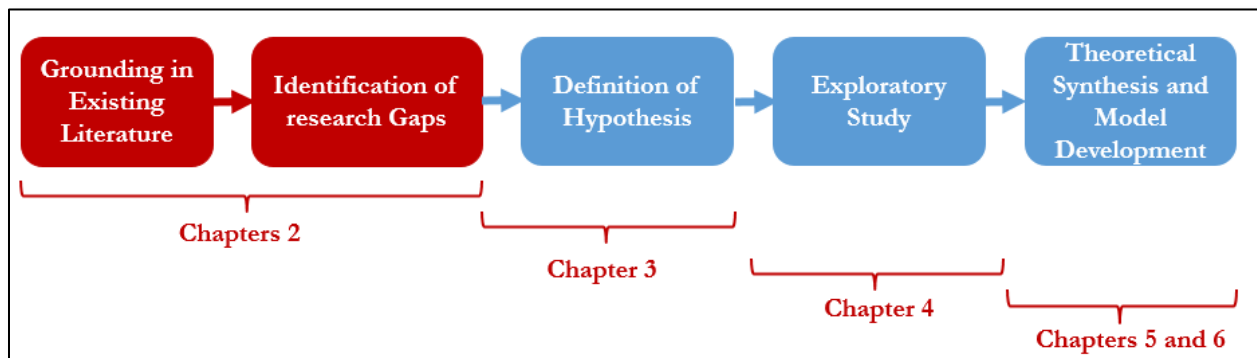


Figure 2-1, Literature Review and the Research Methodology

In order to structure the literature review of both fields, it is important to understand where the different contributions lie in the causality chain of organizational phenomena. What phenomenon are they trying to explain? And what these theories are defining in terms of the relationship among the

elements of an organization? The starting point of this chapter will be to define a conceptual framework to review the extant literature of Organizational Studies and Strategic Management fields.

It is important to note that this chapter will comprise three main sections: first, the definition of a conceptual framework for the literature review; second the actual literature review which will begin with the Organizational Studies field, followed by the review of the Strategic Management Field; and finally a synthesis of research gaps found in the review.

2.1 Literature Review: Conceptual Framework

In order to review the extant literature, and due to the different nature of the focal point of the authors, a comparative framework for literature review, based on the idea that the Organization is a System that is comprised by individuals and interacts within an environment, is presented in Figure 2-2 below. Three levels could be clearly identified: individuals, organization and environment. The simplicity of this framework will help us to clarify where the different authors are positioned in the causality chain of the organizational phenomena².

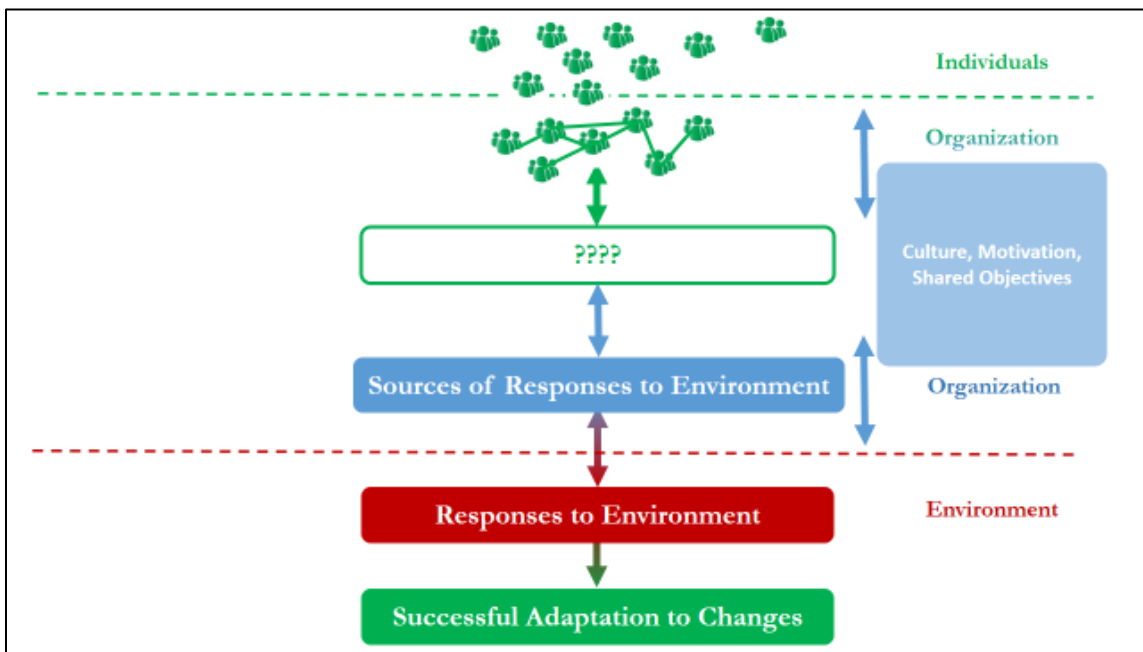


Figure 2-2, Comparative Framework of an Organization

The rationale of the framework is as follows: the individuals decide to be part of an organization, sharing common objectives and creating the actions required by the organization. These individuals form

² Framework developed within the context of this thesis.

groups, which in turn create collective actions (through a particular mechanism, depicted by the question mark in Figure 2-2). These collective actions are the source for creating the responses to the environment. These responses are compared with the opportunities available, establishing if the response was successful or not. Through this framework, we will be able to establish what phenomenon and in which level different authors are focused on.

A missing link is represented in the center of the organization: if the organization will create a response to the environment, what would be the “source” of this “response”? Clearly, the individuals (through their interaction) create solutions that could be used to interact with the environment, but how this process is viewed at the organizational level? Moreover, how does this process unfold over time and what are the conditions that establish –and secure that this process will be created consistently and coherently with the organizational goals? This question will remain unanswered for now: we will propose tentative solutions throughout the literature review.

2.2 Answers from Organizational Studies

Starting with Ronald Coase and his seminal paper “The nature of the firm” (Coase, 1937) where he explained that firms exist as a formal way to reduce transaction costs, several sociologists, psychologists and economists have been studying organizations outside the formal “strategic management and business field”.

The starting point was to take a “rational” view of the organization (where rational actors take decisions inside rational – efficiency seeking organizations). During the 40’s, Max Weber studied the bureaucracy as a formal way of defining organizations (Weber, 1947). During the 60’s, Richard Cyert and Jim March (from the Carnegie School) developed the “Behavioral theory of the firm” (Cyert and March, 1963), in which they explained, based on economic and decision making frameworks, that the behavior of the firm is related to the concept of how an organization defined its goals with different individuals (with personal goals too). They defined the notion of coalitions inside the organizations, where sub-groups share the same goal as a way to resolve this “inherent” conflicting objectives. This “rational” view was confronted by a “human relations” view which emerged from studying workers’ performance under different situations. This human relations view changed the way of seeing organizations: the individual was no longer a machine; thus, a new way of seeing individual members emerged.

Organizational scholars then tried to see the relationship between environments, organizations and individuals through different lenses, for example, through “power struggles” (J. Pfeffer and G. Salancik,

1978). They explained that the power dependencies between and inside of firms is a critical factor to understand organizational behavior. Other authors saw organizations as “structurally inert” entities, in which the existence of an organization is explained by the “selection” mechanism rather than by an “adaptation” mechanism (i.e. we can explain why so many organizations exist through the death and the creation of organizations): this idea was developed, during the 80s, by Michael Hannan and John Freeman from through their “organizational ecology” model (Hannan and Freeman, 1977, 1984, 1989, 2003, 2007). Hannan and Freeman also studied the relationship between structural inertia and organizational structure: “...to claim that organizational structures are subject to strong inertial forces is not the same as claiming that organizations never change. Rather, it means that organizations respond relatively slowly to the occurrence of threats and opportunities in their environments. Therefore, structural inertia must be defined in relative and dynamic terms... In particular, structures of organizations have high inertia when the speed of reorganization is much lower than the rate at which environmental conditions change. Thus the concept of inertia, like fitness, refers to a correspondence between the behavioral capabilities of a class of organizations and their environments.” (Hannan and Freeman, 1984, p.151).

Another stream of research has been labeled “neo-institutional” theory of organizations, in which the authors tried to answer the question “what makes organizations so similar?” through an analysis of the institutions that exist in the environment. Their core argument is that institutional forces pushed the organization in order to develop “culturally acceptable” forms (Meyer and Rowan, 1977; Di Maggio and Powell, 1983).

In a different level of analysis, the structuration theory of Anthony Giddens (Giddens, 1979, 1982, 1984), similarly to the Theory in Practice of Chris Argyris (Argyris 1974, 1973), is a field of studying organizations that mainly differs from other approaches in that it focuses on the process rather than in concepts (in the arrows than in the conceptual boxes in a process diagram). Words like structuration, embodiment, enactment, instantiated, reification are used widely to express the importance of the mutual definition of the interaction and the recurrent actions that the organizational structure defines. The basic principle is that “...social life is an ongoing production and thus emerges through people’s recurrent actions.” (Feldman and Orlikowski, 2011, p.1240). Social life is characterized by structures that shape the actions and the interactions of people. Stephen Barley explains that “... organizational structures are, by definition, descriptions of and templates for ongoing patterns of action.” (Barley and Kunda, 2001, p.76). Barley’s main argument is that new organizational structures alter the nature of

work, but on the other hand, the work itself shape the structures that shape the work. Hence, these relations are mutually constitutive³. Feldman and Orlikowski define that the mutually constitutive characteristics of relations as one of the principles of practicing theory: the other two are “... that situated actions are consequential in the production of social life ... [and] that dualisms are rejected as a way of theorizing.” (Feldman and Orlikowski, 2011, p.1241).

Due to the fact that the practice theory lens is focused on the actual interactions between rules, processes and the actions that are shaped by them, the natural research focus is on what people actually do, on what are the characteristics of the work that they perform, and how this work shapes the structure that shapes it. This ongoing pattern of interaction is what establishes finally the emergence of the structure, meaning that the existence of structure is not an end by itself: it is only reified through its use. As the authors pointed out, this concept is also related to the idea that the focus of this type of research should be (as Karl Weick defined during the 80s) in the *organizing* (i.e. the process), rather than in the *organization* (i.e. the concept).

As it was discussed previously, the practice theory lens focus (based on the structuration theory) is on the processes inside an organization, the pattern of actions that enact (and re-create) the emergent structures of an organization. The process of “emergence of structures” then acts as the link between the interaction of people and the rules within an organization, serving also as the foundation for the organization’ s responses to the environment (this focus is shown as the missing link in Figure 2-2 above).

After this brief review of the most relevant organizational approaches, it is not difficult to see where the others existing organizational theories lie in the diagram. Figure 2-3 below depicts this integrated framework and the relationship between the practice theory approach and the existing paradigms in organizational theory.

³ This “way” of defining the interaction between structure and the “components” that are structured is similar to the concept of *Aufhebung* (or Sublation) in Hegel’s Dialectic, where he explains that when two different “things” interact, they don’t cancelled each other; rather, they shape and re-shape each other, creating a new instance of reality, a new level of progress. This is also related to other principles of practice theory: this is a way of explaining the duality (instead the dualism) of things.

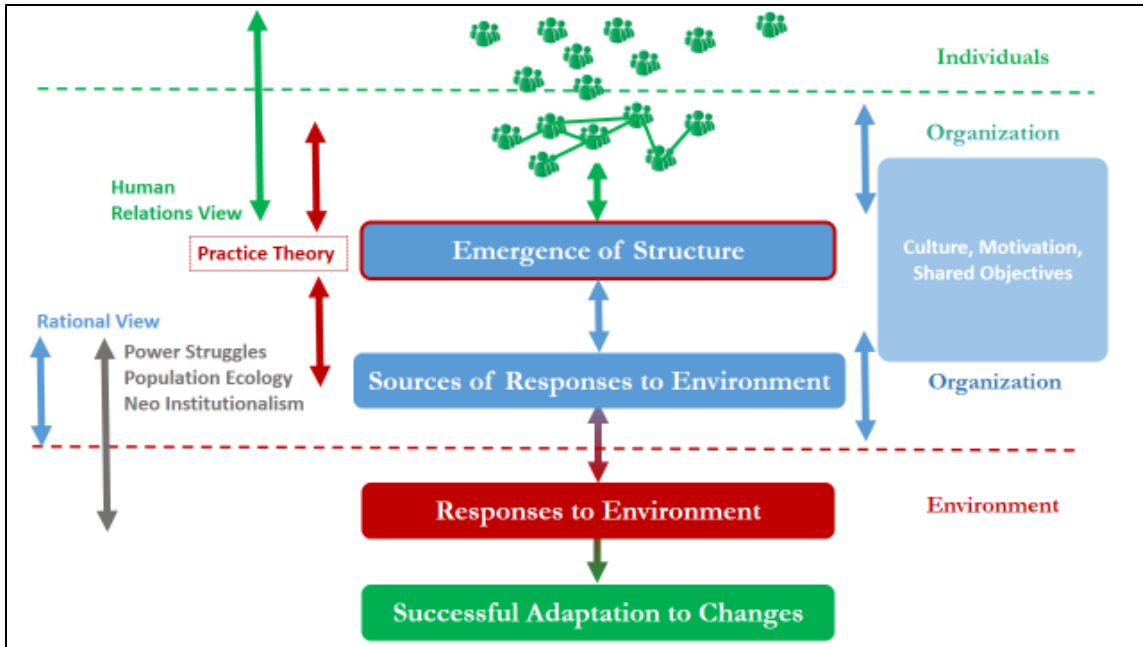


Figure 2-3, Organizational Theory, different approaches and the causality chain

As a summary, even though the existing approaches to understand organizations focus on different phenomena, all of them are part of the same “system”: they are trying to develop a better understanding of organizations. The main difference between the structuration theory and the other paradigms is that the focus is on the process instead of the concepts: we cannot understand organizations (in detail) if we do not understand (in detail) the nature of the work and how it may be changing. As Stephen Barley pointed out, “Because organizations are composed of people who react or fail to react to perceived changes in the environment, it is the activities of people that determine how organizations become structured. Human action generates organizational variation.” (Barley and Kunda, 2001, p.79). As we can see in Figure 4-2 above, this type of view could help us to integrate the existing paradigms in a comprehensive framework for understanding organizations.

2.3 Answers from Strategic Management

Pankaj Ghemawat established that the concept of ‘Strategy’ “... can be traced back to the ancient Greeks, for whom it meant a chief magistrate or a military commander in chief. The use of the term in business, however, dates only to the twentieth century, and its use in a self-consciously competitive context is even more recent.” (Ghemawat, 2002, p.37). The Strategic Management Field, as such, started with the industrialization of the nations, when the business context forced firms to develop and implement formal tools to compare, analyze and evaluate business decisions based on market and

competitor's characteristics. Even though the business strategy literature started with case analysis (such as General Motors and Ford during the 20s), a more formal approach was only started after World War II, in Harvard, when Kenneth Andrews developed the SWOT analysis of industry structure. Consulting firms also developed different techniques in order to analyze organizational learning curves and product portfolios (e.g. growth-share matrix by Boston Consulting Group). All of these developments helped to enrich the formal tools required by managers to manage the complexity existing at that time.

During the 80s, a major shift in the field emerged. Michael Porter with two seminal works, *Competitive Strategy* (1980) and *Competitive Advantage* (1985) developed first a framework to analyze industry attractiveness (i.e. Porter's Five Forces Framework) and a model to understand how a competitive advantage could be created (i.e. Porter's Value Chain Model). Porter was one of the first authors to propose a formal way to understand strategy: he did not only analyze the environment but also turned the lens to the inner part of organization, linking "internal" activities with "external" market forces. With this type of analysis, the first notion of strategic alignment was implicitly presented in a systematic way.

During the 90s, the rise of world-connectivity started to influence the business landscape. The firms started to realize that the task of finding attractive industries was turning more and more difficult. Then, the strategy scholars started to analyze the question of "given the same dynamic environment, why some firms outperform others?"

The strategy field turned to an inner view of organizations, trying to answer these questions through an analysis of what are the inherent characteristics that could explain these differences. Some answers were related to the firm knowledge, firm fixed resources and even capabilities. Finally, an integrated view of all of this "internal aspect" of organizations was developed: the Resource Base View of the Firm (Wernerfelt, 1984; Peteraf, 1993). In this "view", the internal resources and capabilities of organizations are the differentiators. If these resources are valuable, rare, inimitable and non-reproducible, a competitive advantage will emerge (under proper markets). This view was seen as "complementary" to the "external view" presented by Porter during the previous decade. Additionally, within the Resource Based it can be found the concept of dynamic capabilities defined as the firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources- to match and even create market change (Teece, 1997; Helfat, 2007).

During the 2000s, another way of seeing strategy was developed at MIT: the Delta Model (Hax, 2010). Professor Hax and a team of collaborators created an integrated model of how to apply strategy. They expanded Porter's strategic positioning from 2 to 8 standard possible strategic positions, integrating them into a triangle (hence, the creation of the concept "delta" model) which served as the basis for the framework. The core idea is that rivalry should not be the center of attention. Rather, the delta model integrates the definition of strategy through the delta triangle (what markets to serve and how to serve them) with strategic planning having the base idea of achieving "customer bonding" through cooperation. This new view of seeing the strategy definition was a departure from the previous frameworks.

In addition to the strategic concept evolution, an interesting way of analyzing organizations has been developed by strategy scholars too: the comparison between the environment's characteristics (i.e. high-low velocity, level of uncertainty, complexity) and its relationship to the amount of structure of an organization. Kathleen Eisenhardt, from Stanford, analyzed tech firms under high-velocity environments. She and her colleagues found out that these firms create a "dance" between the amount of structure and flexibility within an organization, defining that the definition of the strategy of an organization should be seen as a process of "structured chaos", in which some strategic rules should exist (in order to have a sense of direction), but also organizational flexibility should complement the rules in order to allow creativity and innovation to emerge. This type of analysis complement the previous frameworks in analyzing the relationship between environment, strategy and organizational structure through a novel way.

Following the same approach as with the Organizational Studies field, all of these contributions can be analyzed with the systemic framework presented previously. Figure 2-4 shows how the Strategic Management field has been focused more on the interface between the environment and the organization. Even though this field can be seen as a coherent study of business organizations, the integration of the actual organizational processes (i.e. organization's structure) and the human beings has been neglected so far.

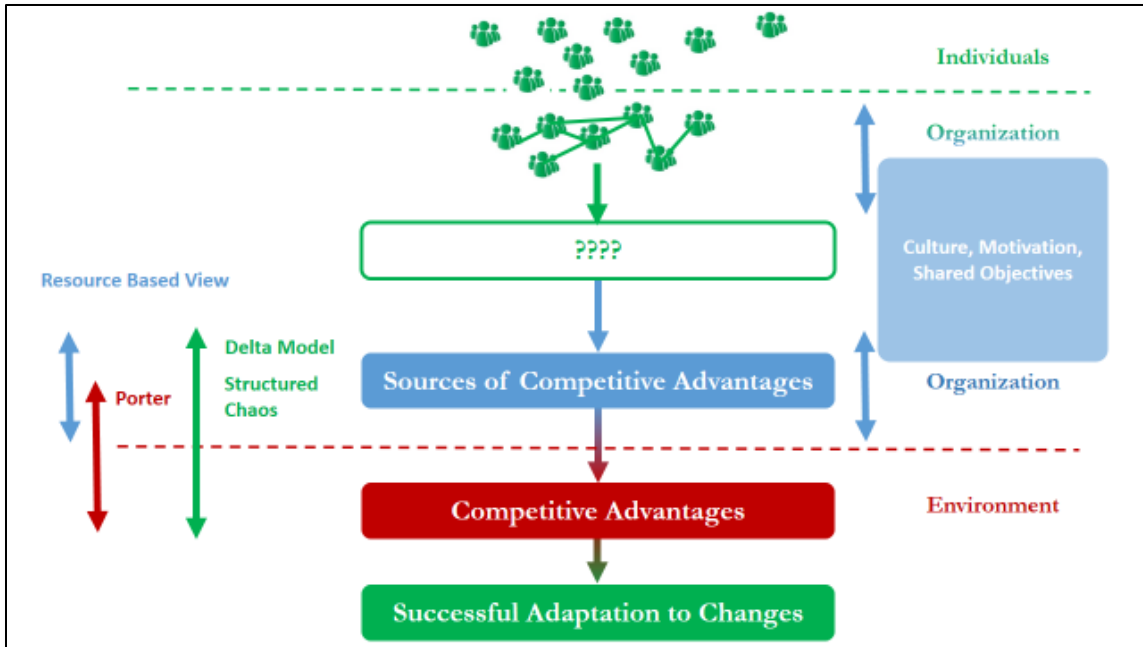


Figure 2-4, The Strategic Management Field, different contributions and the causality chain

2.4 Simulation Models, System Dynamics and Organizational Change

Another important field of study has been the development of simulations methods as a way to understand the organization – environment relationship. Even though “... simulation has become an important methodology, its value for theory development remains clouded and even controversial.” (Davis, Eisenhardt and Bingham, 2007). Despite being an advocate of simulation methods, this initial opinion also has being shared by the seminal organizational scholar James G. March: “By the mid-1960s, a plausible expectation about the future might have been that computer simulation would relatively quickly either come to be accepted as part of the canon of social science methods or come to be archived as a methodological and theoretical dead end... Neither event has happened. Rather, simulation entered a state of intellectual limbo, neither adopted nor discarded...” (Foreword by James G. March in Lomi and Larsen, 2001).

Even though they shared a pessimistic view, these authors created seminal works that have been advanced management practice as a whole. For example, Jason Davis, from MIT Sloan School of Management, and Kathleen Eisenhardt, from Stanford School of Business, developed a stochastic model based on different environmental conditions with different organizational structures (Davis, Eisenhardt and Bingham, 2009). They found that the relationship between organizational structure and

performance follows an inverted U-shape: “Less structure opens up the organization to the possibility of addressing a wider range of opportunities that serendipitously occur, but it also hinders the rapid, mistake-free execution of those opportunities. Conversely, more structure enables the efficient execution of particular opportunities that can be anticipated. But too much structure is more than just too rigid. It also narrows the range of possible opportunities, suggesting that structure is most valuable when similar opportunities are available.” (Davis, Eisenhardt and Bingham, 2009, p.437). We will get back to the discussion of the structure-performance relationship in the following sections.

Different simulation methods have been used to understand and analyze human behavior within organizations: system dynamics, genetic algorithms, cellular automata and stochastic processes. Table 2-1 below, shows a comparison of each simulation approach.

Simulation Approach	Focus	Common Research Question	Theoretical Logic
System Dynamics	Behavior of a system with complex causality and timing	What conditions create system instability?	Objective: Description Core concept: the behavior, regarding different inputs, of a system of interconnected feedback loops, stocks and flows
Genetic Algorithms	Adaptation of a population of agents (e.g. organizations) via simple learning to an optimal agent form	What affects the rate of adaptation or change? When an optimal form emerges?	Objective: Optimization Core concept: Adaptation of a modular system using search strategies to find an optimal point on a fitness landscape
Cellular automata	Emergence of macro patterns from micro interactions via spatial processes	How does the pattern emerge and change?	Objective: Description Core concept: Interaction among agents that produce the emergence of macro behaviors

Simulation Approach	Focus	Common Research Question	Theoretical Logic
Stochastic processes	Flexible approach, not a single focus	No specific research questions	No specific theoretical logic

Table 2-1, Comparison of Simulation Approaches (adapted from Davis, Eisenhardt and Bingham, 2007)

According to this comparison, the method best suited to simulate these interdependent organizational processes is System Dynamics: the dynamics of organizational systems are based on the idea of stability-instability (i.e. the effects of organizational changes triggered by the environment), and the existence of inherent complex causality and timing of the processes within them.

System Dynamics allows to analyze different feedback structures that drive the behavior of the system (Forrester, 1971, 1999). According to Forrester, "... systems can be classified as 'open systems' or 'feedback systems'. An open system is one characterized by outputs to respond to inputs but where the outputs are isolated from and have no influence on the inputs. An open system is not aware of its own performance. In an open system, past action does not control future action. An open system does not observe and reacts to its own performance... A 'feedback system', which is sometimes called a 'closed' system, is influenced by its own past behavior. A feedback system has a closed loop structure that brings results from past action of the system back to control future action. One class of feedback system – negative feedback – seeks a goal and responds as a consequence of failing to achieve the goal. A second class of feedback – positive feedback – generates growth processes wherein action builds a result that generates still greater action." (Jay W. Forrester, 1971, p.1-5).

Then, organizations are open or closed systems? This is an important point to discuss. Organizations are a combination of positive and negative feedback loops that are intrinsically bonded to the structure of the very same organization. In this way, we can see organizations as "closed systems", but not because they are not aware of what is happening in the environment. In fact, it is quite the opposite: the organization cannot exist without the environment and the environment cannot exist without the organization. It is a mutually reinforced system in which the organization continually "senses" the environment and reacts to it.

In what follows, first, an analysis of the relevant system dynamics models of organizational change will be developed: "An essential feature of theory building is comparison of the emergent concepts, theory, or hypotheses with the extant literature. This involves asking what is this similar to, what does it

contradict, and why..." (Eisenhardt, 1989, p.545). Second, gaps in the extant literature will be identified with the goal of defining dynamic hypotheses to be tested using a comparative case study.

2.4.1 Punctuated Equilibrium Model by Anjali Sastry

Anjali Sastry developed a model of organizational change in her PhD. Dissertation at MIT Sloan School of Management in 1995. Her main focus was to examine three contrasting views: the adaptive organizational learning perspective (Levinthal and March, 1981); the population ecology conception, which emphasizes structural inertia as a concept that constrains organizational change and adaptation (Hannan and Freeman, 1984); and the punctuated change model, in which deep change takes place only during relatively rare reorientations (Tushman and Romanelli, 1985) (Sastry, 1995).

Levinthal and March are part of the "organizational adaptation school", in which the main argument is that "...managers can survey the organization and its environment to establish an organizational strategy (structure, products, processes, culture, etc.) to match the environment" (Sastry, 1995).

The population ecology model focus mainly on studying why it can be seen so many different types of organizations under the same environment (i.e. organizational variability in population of organizations). They are focused more on the selection phenomenon: "Clearly, leaders of organizations do formulate strategies and organizations to adapt to environmental contingencies. As a result at least some of the relationship between structure and environment must reflect adaptive behavior or learning. But there is no reason to presume that the great structural variability among organizations reflects only or even primarily adaptation." (Hannan and Freeman, 1977, p.930). By analyzing population of organizations⁴, they concluded that most of the variability in organizational structures comes about through the creation of new organizations and organizational forms and the replacement of old ones, mainly because it is too difficult for organizations to change its internal structure due to the inertia associated with its existence.

Between these two extremes it can be found different theories that try to suggest that "...organizations typically exhibit behavior inconsistent with either extremes of ready adaptation or inertia-driven stasis... the punctuated equilibrium model (Tushman & Romanelli, 1985) offers one of the well-developed theories to explain how both stability and change are features of organizational evolution... Tushman

⁴ According Hannan and Freeman, "...the term population ... refers to aggregates of organizations rather than members. Populations of organizations must be alike in some respect, that is, they must have some unit character" (Hannan and Freeman, 1977, p.934).

and Romanelli attempted to reconcile the adaptation and population ecology schools in their 1985 study of organizational evolution by developing a revolutionary model of organizational change... organizations are viewed as resistant, but not impervious, to change.” (Sastry, 1995, p.39).

Sastry developed further this approach as a way to focus on the theory of punctuated organizational change, finding that under a wide range of conditions, organizations appear to fail following reorientation. The author added a routine for monitoring organization-environment consistency and a heuristic that suspends change for a trial period following a reorientation (Sastry, 1997). Through a textual analysis of Tushman and Romanelli’s 1985 paper (T&R), the author identified four state (or stock) variables: strategic orientation, inertia, perceived performance and pressure to change, as a representation of T&R theory. A summary of these states variables is represented in Table 2-2 below.

Construct (State Variable)	Key Elements	Description	Potential Measures
Strategic Orientation	Core values, beliefs. Products, markets & technologies. Control systems.	“It answers the question: what is being converged upon?”; defines the firm “in terms of what business [it] is in and how it competes” (T&R: 176)	Identify organizational characteristics on scales: e.g. centralized vs decentralized.
Inertia	Strength of relationships with buyers, suppliers, financial backers. Extent to which commitments by internal participants are solidified into institutional norms.	“a resistance to all but incremental change”; impedes “radical or discontinuous change”; determines the firm’s competence (T&R: 177). Has both structural and socially anchored dimensions. High inertia impedes firm’s ability to reassess its environment and to substantially change social and structural relationships (T&R: 177).	Examine relationships with related organizations; measure strength of norms and organizational culture.

Construct (State Variable)	Key Elements	Description	Potential Measures
Perceived Performance	Perceived performance is a function of performance, which is in turn determined by appropriateness and competence.	Performance is determined by the consistency of activities, both internal and external, and by the organization's efficiency (T&R: 177). Performance is perceived and interpreted by the executive leadership (T&R: 180)	Organization's assessment of overall performance (e.g. stock performance, profits, costs).
Pressure for Change	Performance pressures. Anticipated need to change (omitted in the current model)	Result of "sustained low performance due to lack of consistency among activities... or changes that render a prior strategic orientation no longer effective" (T&R: 197-202)	Customer complaints. Stock analysts' evaluations. Evaluations, directives issued by board.

Table 2-2, State Variables in the Punctuated Change Model⁵

As Sastry explained, "...according to Tushman and Romanelli (1985: 197), it is these 'opposing pressures of performance and inertia' that give rise to discontinuous change. In this model, change is produced by a negative, or self-correcting loop. Convergence is the result of positive feedback or self-reinforcing processes." (Sastry, 1997, p.242). In Sastry's model, the relevant variables that characterize the organization at birth are the level of inertia, strategic orientation, appropriateness (which measures how well the organization's strategic orientation matches the strategic orientation required by its environment), and competence in executing the strategic orientation. In this particular case, the dynamics of the system is as follows: when an organization is first formed, the level of inertia is necessarily low: Internal relationships, external networks, and socialization have yet to develop.

⁵ Table from Sastry, 1997.

Organizations then start to build social and structural inertia over time, depicted in the “inertia build-up” reinforcing feedback loop in Figure 2-5 below.

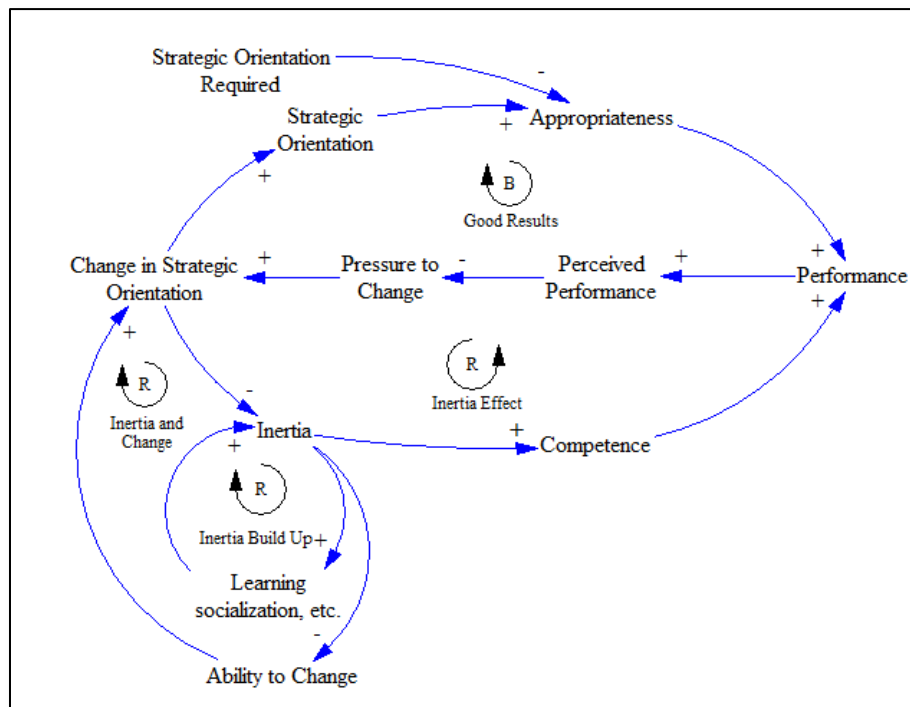


Figure 2-5, A. Sastry's Causal Loop Diagram of Punctuated Change Theory (1997)⁶

As the organization develops, its ability to change decreases. “Ability to change is inversely related to inertia: the higher the level of inertia, the lower the organization’s ability to change. When inertia is high enough, organizational managers are less able to recognize and respond to the need for a change. Managers of a relatively young organization, with less socialized members and fluid external relationships, are able to recognize and react quickly to signals of poor performance. As inertia builds up, however, signals of poor performance must be stronger for the organization to react, as organizational members are slower to perceive discrepant signals of poor performance after a long period of convergence and new ideas are more difficult to assimilate into an organization that has not changes in a long while. Thus ability to change declines. When the organization fails to respond to pressure to change, this allows inertia to build up even more, further reducing the ability to change. As a result, inertia increases further and ability to change falls in a self-reinforcing feedback loop...” (Sastry, 1997, p.244).

⁶ Based on Tushman and Romanelli (1985) paper.

The other two sectors depicted in the causal loop diagram are the strategic orientation and the inertia-competence-performance sectors. The strategic orientation sector is defined in the “good results” balancing feedback loop: if the organization has a good fit in terms of strategic orientation with the environment, the appropriateness will be increased. If we increase the appropriateness, the performance and perceived performance will increase, reducing the pressure to change and the change in strategic orientation, stabilizing the system if there is no additional change in the strategic orientation required by the environment.

On the other hand, the inertia-competence-performance loops is described by Sastry as follows: “Inertia has direct consequences for the organization. The first, competence, is a result of ‘emergent social and structural processes [that] facilitate convergence on a strategic orientation’ (Tushman and Romanelli, 1985: 177). Convergence, in turn, leads to a high degree of competence by increasing standardization and reducing ambiguity within the firm. Competence, defined as the firm’s ability to execute a strategic orientation, increases over time as inertia grows: ‘holding the external environment constant, the longer and less turbulent the convergent period, the more effective the organization’ (Tushman and Romanelli, 1985: 195).” (Sastry, 1997, p.249). According to Sastry, Inertia has a second and an important effect: when inertia is low, ability to change is at its maximum value. At high levels of inertia, ability to change falls close to zero. These concepts will be further reviewed in the model proposed in this thesis.

2.4.2 Further Development by Ozge Pala and Jac Vennix

After the model proposed by Anjali Sastry, Ozge Pala and Jac Vennix presented in the “The 19th International Conference of The System Dynamics Society”, during July 2001 in Atlanta, Georgia, their paper “Dynamics of Organizational Change” (2001). In this paper, the authors build on two previous models in this area, including the model developed by Sastry (1997) discussed in the previous section. The main focus of the authors was to build a model with explicit relationships between strategic orientation, completed changes, changes in the organization-environment fit, performance and ability to change.

Even though the main concepts are similar to the Sastry’s model (e.g. same definition of organizational inertia based on the definition used by Tushman and Romanelli, 1985), Pala and Vennix depart from Sastry’s approach in two main points. The authors explain: “In Sastry’s model, performance is determined by competence and appropriateness. Whereas the appropriateness is correctly determined by the organization-environment fit of the strategic orientation, the cause of competence is not

correctly represented. In her model, competence is caused by inertia... However, this is not a correct representation since competence is built as a result of processes that also lead to the generation of inertia... the relationships should be represented as 'social and structural processes → inertia' and 'social and structural processes → convergence on a strategic orientation → competence' rather than 'inertia → competence'." (Pala and Vennix, 2001, p.5).

Additionally, Pala and Vennix explain that there is also a problem with the representation of strategic orientation: it is modeled as a unidimensional state variable, arguing that "... how can we quantify [the required and actual strategic orientations] and subtract them from each other to find the [appropriateness]? We believe that what should be operationalized is not the strategic orientation itself but the fit of the strategic orientation." (Pala and Vennix, 2001, p.5).

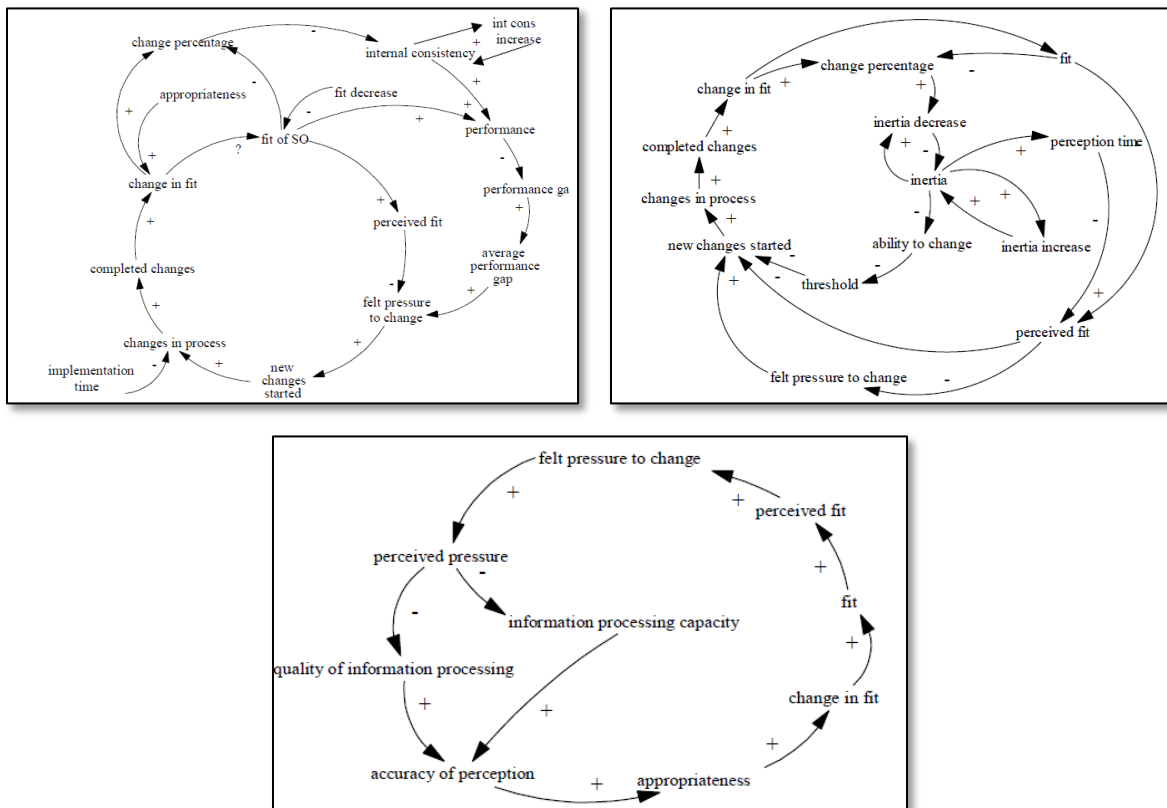


Figure 2-6, Pala and Vennix Model (2001)

Figure 3-3 above shows the different sectors developed in Pala and Vennix' model: the strategic orientation sector, the inertia and ability to change sector, and the appropriateness of strategy sector. The state variables defined in this model are: Inertia, Average performance gap, Pressure to Change, Internal Consistency, Change in process, and Fit of Strategic Orientation. In this model, the organizations

can be distinguished as young and old depending on the initial value of their inertia and internal consistency. A young organization has low inertia and low internal consistency, whereas an old organization that has not changed for a long time has a high inertia and high internal consistency.

The Pala and Vennix model is based on the idea of having the "... [Fit of strategic orientation] is the important aspect of strategic orientation for organizational change" (Pala and Vennix, 2001, p.5). The authors added the concept of "completed changes", which in turn are determined by a felt pressure to change, which in turn is determined by the perceived fit and the average performance gap. The reasoning is as follows: if we increase the fit of strategic orientation, the pressure for change will be reduced, no new changes will be initiated and the overall fit will be stabilized. Additionally, the performance is determined by how well the organization fits the environment (fit of SO) and how consistent the internal operation of the organization is (internal consistency). Inertia, in turn, only influences negatively the ability to change and the perception time for the perceived fit.

Pala and Vennix argue that without changes in the environment there is no changes within the organization. The main difference of this model with the model of Anjali Sastry is that it allows no changes in the performance levels if there are no changes in the environment: performance is only influenced by inertia when ability to change matters. Thus, as an organization gets old in a stable environment, Inertia will not play a role in its performance. On the other hand, Anjali Sastry's model described a direct relationship between inertia and performance: if inertia increases, competence increases and, subsequently, the performance. This issue will be one of the central issues in the development of the model presented in the following sections.

2.5 An Integrative Approach and Research Gaps

In order to analyze a possible integration, it is important to understand the key common concepts that can be seen across fields. First, the environment: without an environment, one cannot distinguish that an organization exists. Second, the organization's structure, which defines what products to serve and how to serve them through the strategy definition, and also defines how to organize the internal processes through its actions and procedures. And third, the individuals: the basic component of an organization. These three concepts could be seen in both fields, with different degrees of concentration.

Figure 2-7 shows that, while the strategic management field main focus is on competitive advantages, organizational scholars' main focus is on adaptation to the environment. But even though both fields

have different approaches in understanding the same phenomenon (the relationship between individuals-organizations-environment), the link between these components is not clear: how the responses to the environment (i.e. “sources of competitive advantages”) are created? For example, if the strategic positioning defined for the organization is “low cost”, through strategic planning the organization will develop formal plans and tasks to achieve this objective. But, if we have all the strategic planning (and the respective metrics) defined, how can we actually motivate people to achieve the organization’s objectives through the formal plans developed under the strategic planning process?

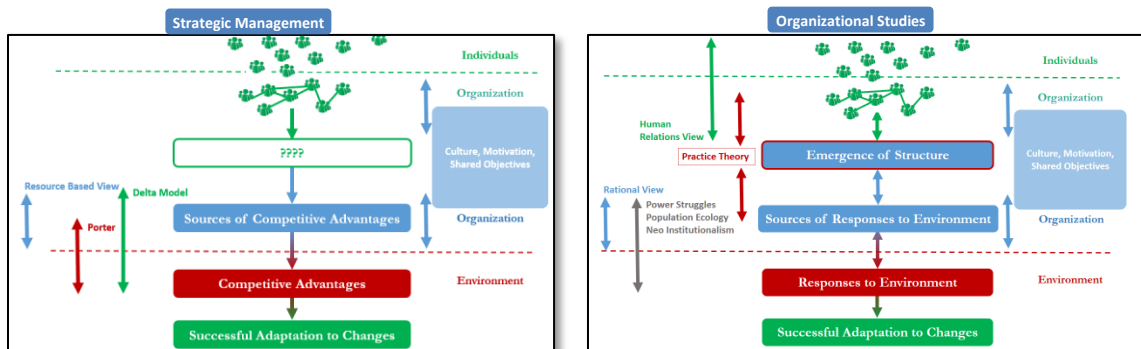


Figure 2-7, Strategic Management and Organizational Studies Fields

Apparently, this missing “integration” has been largely neglected in the research agenda of both fields. Thus, with this idea in mind, these different organizational processes could not be studied separately: the environment, the strategy definition and strategic planning, the organization’s structure and the individuals are all part of the same interconnected “system”. With this type of analysis, formal tools could be implemented through modelling the relationships among the components of the system. For example, if we want to pursue a “low cost” positioning, process efficiency should be the main driver. But with this approach, what consequences will be seen in the employee motivation? If we want to change the approach to “differentiation”, organization’s structure should migrate to a loose-coupled organization, where the creative process could be unfolded. But again, what are the conditions, at the individual level, that could be taken into account in order to support creativity as an organizational goal?

Within the system dynamics field, two important system dynamic models of organizational change were analyzed. Both of them, through different approaches, modeled the relationship between the environment, inertia, strategic fit and performance.

Figure 2-8 below shows that Sastry and Pala-Vennix' s models are mainly focused on how the organization reacts to different changes in the environment. Even though these models integrate the same concept of inertia, their explanation of where the inertia comes from appears to be incomplete. Moreover, the relationship between personal motivation and organizational performance is not clear.

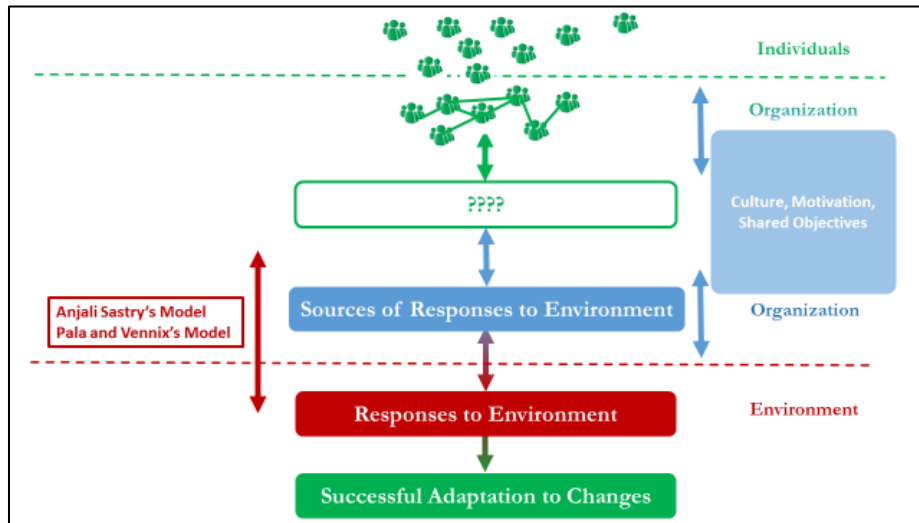


Figure 2-8, Sastry (1997) and Pala-Vennix (2001) main focus

It is important to note that, even though Pala and Vennix criticized Sastry's model for the relationship between inertia and competence, they did not take into account the direct effect of "building up" inertia in organizational settings (i.e. is inertia always a good thing if a change is not required?). Additionally, both Sastry and Pala and Vennix models explain that the causal mechanism of inertia increase is the idea of a "...'convergent period' [which] represents 'resistance to all but incremental change'. During the convergent period, the organization strives to get competence, increase internal coordination, external accountability, and predictability. Generation of these leads to increased structural and social complexity and interdependence, convergence around a strategic orientation, and resistance to fundamental change. Thus, as the organization converges around a strategic orientation to become more and more competent, inertia is generated." (Pala and Vennix, 2001, p.9). But again, are old organizations always more competent due to the fact that they have more inertia? If this is true, why real-world organizations don't appear to be more competent over time? This would mean that more bureaucracy, typically seen in old organizations, leads to more competence? These questions are not directly addressed in both models.

Moreover, what is the relationship between the employees, inertia and organizational performance? How can include other processes (e.g. emergence of strategic direction, emergence of organizational structure and emergence of employee integration) in more comprehensive way?

Chapter 3 will define the dynamic hypotheses (including a definition of organizational structure and inertia), and an exploratory study based on a comparative case analysis will be developed in Chapter 4. Chapter 5, 6 and 7 will present a theoretical synthesis, a system dynamics model and the conclusions of this thesis, respectively.

3. Hypothesis Definition

Having reviewed the Organizational Studies, Strategic Management and the System Dynamic fields, the next step will be to define the hypothesis of the current thesis. The hypothesis definition and its place on the research methodology is shown in Figure 3-1 below.

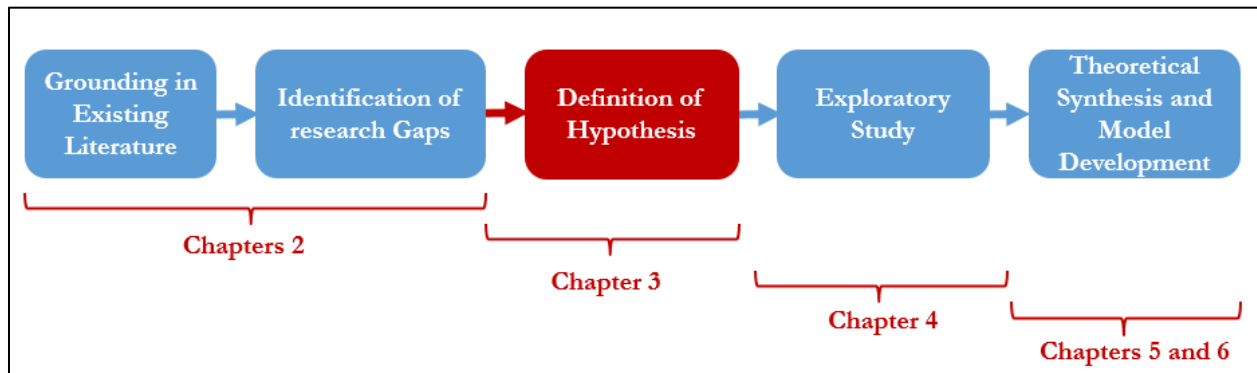


Figure 3-1, Hypothesis Definition and the Research Methodology

3.1 Towards Common Organizational Processes

Within the previous chapters, it was found, through literature review using a conceptual framework, that the Organizational Studies and Strategic Management fields represent different sides of the same phenomenon: the “organizational system” has an interface with the environment and also with its internal elements, but neither of the previous work has been focused on a complete integration of the different processes that are defined within an organizational system nor has defined the minimum variables to characterize organizational change. Following this line of thinking, it appears that the authors in these fields were studying particular phenomenon associated with different situations as a way to tackle how the organization is dealing with different problems. Theory development, with the objective to understand the nature of the organizational change, seems a difficult task to achieve.

After a brief review of previous models of system dynamics models of organizational change, it can be seen that a gap exists in the extant literature. The underlying question that has not been answered is “what are the minimum variables that allows a proper characterization of organizational change?” Previous developments have been focused on the process required to pursue a strategic fit with the environment, but what are the consequences of organizational reorientations? (I.e. if the organization is going to develop a new product or service in order to meet a new market demand, what would be the

consequences within the organization?) Moreover, what are the internal characteristics of an organization that allows it to develop these responses to the environment? These questions are still unanswered.

The hypotheses to be developed in this thesis will try to address this problem. In this case, the main focus will be placed in the relationship between the amount of change required by the environment and how the organization reacts to it. The starting point will be to define organizational inertia, organizational structure and environmental change.

3.2 Organizational Inertia and Organizational Structure

For purposes of this thesis, Hannan and Freeman's definition of structural inertia (reviewed in Chapter 2) will be utilized. For them, organizational inertia is a constraint on organizational change in organizations: ". . . for wide classes of organizations there are very strong inertial pressures on structure arising from both internal arrangements (for example, internal politics) and from the environment (for example, public legitimation of organizational activity). To claim otherwise is to ignore the most obvious feature of organizational life." (Hannan and Freeman, 1977, p.957). This definition is also shared with the approach followed by Tushman and Romanelli and, subsequently, in Sastry and Pala and Vennix models also reviewed in Section 2. The authors also added that "...creating an organization means mobilizing several kinds of scarce resources. Organization builders must accumulate capital, commitment of potential members, entrepreneurial skills, and legitimacy... Once such resources have been invested in building an organizational structure, they are difficult to recover. Although one can sell the physical assets of a disbanded organization and sometimes its name, most resources used to build it are lost when it is dissolved. Not only are the costs of starting an organization nontrivial, but organizations continually use substantial portions of their resources in maintaining and reproducing their structures rather than in performing collective action. Just as in the case of biotic creatures, there is a substantial metabolic overhead relative to the amount of work performed". (Hannan and Freeman, 1984, p.152).

The relationship between organizational inertia and structure then becomes an important focus of research. As it was reviewed in Chapter 2, the practice theory lens (based on the structuration theory of Anthony Giddens) is focused on the pattern of actions that enact (and re-create) the emergent structures of an organization. The process of "emergence of structures" then acts as the link between

the interaction of people and the rules within an organization, serving also as the foundation for the organizational' s responses to the environment.

In particular, we will try to understand what “structure” means in organizational settings, with a particular application to technology use, as a way to understand the link between organizational inertia and structure in real life.

According to Anthony Giddens, the “...structure of an organization... is the rules and resources, or sets of transformation relations, organized as properties of social systems... an [organizational] system is the reproduced relations between actors or collectivities, organized as regular social practices... [and] structuration are the conditions governing the continuity or transmutation of structures, and therefore the reproduction of social systems.” (Giddens, 1984, p.25).

As we reviewed previously, a practice lens will implicitly assume a focus on the study of work, on the actual practices that shape the structures that shape them (Orlikowski, 1999). This idea is explained by Orlikowski as following: “Because a structurational perspective is inherently dynamic and grounded in ongoing human action, it indeed has the potential to explain emergence and change in technologies and use. However, realizing this potential will require augmenting the current structurational perspective on technology – specifically the notions of embodied structure and user appropriation.” (Orlikowski, 2000, p.405). In doing so, the idea that the embodied structure is complemented by the idea of **emergent structures**, in which the structures are only instantiated in practice through the regular human-technology interaction. As the interaction unfolds, a **social practice** is created, through which a particular structure of technology use is produced (and reproduced). User appropriation also needs to be complemented with the idea of “enactment of structures”: instead of seeing people actively selecting how technologies are used, the practice theory approach focused on the idea that “...through their regularized engagement with a particular technology... users repeatedly enact a set of rules and resources which structures their ongoing interactions with that technology... These enacted structures of technology use, which I term *technologies-in-practice*, are the set of rules that are (re)constituted in people’s recurrent engagement with the technologies at hand” (Orlikowski, 2000, p.407). Figure 3-2 below depicts the process of how the emergent structures unfold from the social practice (interaction) between people and technology (and some or all of its inscribed properties).

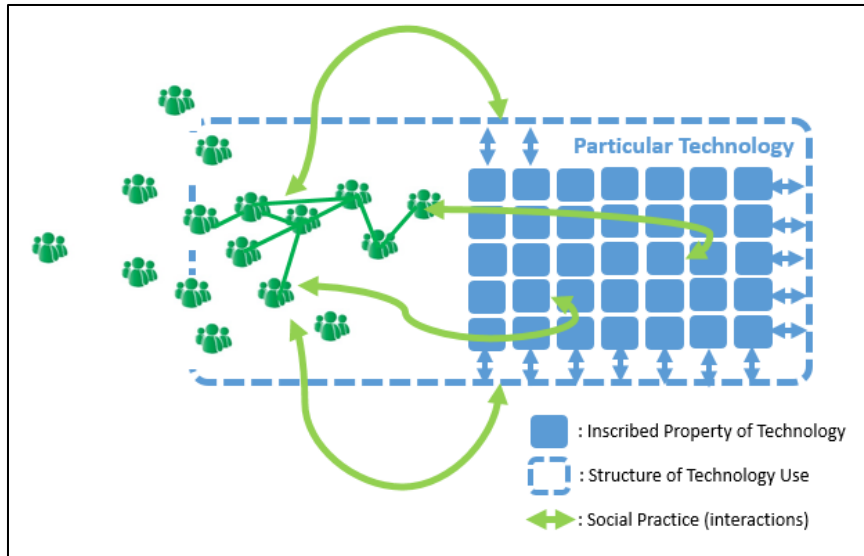


Figure 3-2, People-Technology Interaction and Emergent Structures

In particular, it is through people's action with the structure where these structures are being modified. This instantiation also builds up the reinforcement of the very same structure that is being instantiated. If the action continues to act on the same structure, the structure continues to solidify itself. Thus, there exists a feedback process between organizational structure and this "solidification" (i.e. Organizational Inertia). **This process explain the relationship between organizational structure (based on the definition developed by Anthony Giddens), and organizational inertia (based on the definition developed by Hannan and Freeman).**

The process described above implies that a detailed understanding of the interaction between people and the structures that support their action should be obtained. And not only that: also it will be central to understand how this interaction will shape the set of rules and resources (structures) that shapes its interaction and how inertia builds up within the organization. But this analysis will be incomplete if we don't analyze how this "emergent structure" interacts with other components at the organizational level, and how this emergent structures shape our understanding of the organization as a whole. Moreover, given that we defined an organization as a collection of emergent structures, how this "emergent organization" interacts with the individuals and with the environment? What feedback structures are present in this system of emergence, enactment and re-creation of structures?

3.3 Hypothesis Definition

After having reviewed the organizational inertia and organizational structure definition, it will be important to link these concepts to the capability of an organization to adapt to changes triggered by the environment. Hannan and Freeman also explained that “...our definition of structural inertia implies that a particular class of organizations might have high inertia in the context of one environment but not in another. For example, the speed of technical change in the semiconductor industry has been very high over the past twenty years. Firms that would be considered remarkably flexible in other industries have not been able to reorganize quickly enough to keep up with changing technologies.” (Hannan and Freeman, 1984. P.52). This means that different organizational structures react differently to different levels of environmental changes.

Thus, the central point of this thesis will not be related to the idea to study every organizational change phenomenon within every environment. This thesis will be particularly focused on the characteristics of the internal change triggered within organizations due to changes in the organizational-environment fit. In doing so, it will not be required to characterize the actual characteristics of the environment, instead the critical factor will be to analyze how changes in the organizational-environment alignment affects the internal inertia and structure of an organization.

Therefore, in this thesis, the dynamic hypotheses are defined as follows:

H1: Under low requirements for change (i.e. stable organizational-environment fit), organizations tend to increase their inertia (i.e. tend to be more bureaucratic).

H2: Under high requirements for change (i.e. unstable organizational-environment fit), organizations tend to try to reduce their inertia (i.e. increasing their ability to change), as a way to adapt themselves to the environment.

In order to analyze possible answers to this hypothesis, an exploratory study through a comparative case analysis method will be developed between two firms: a large multinational company and a young entrepreneurial firm. The exploratory study is developed in Chapter 4, followed by a theoretical synthesis in Chapter 5 and a System Dynamics model of organizational change is developed in Chapter 6.

4. Exploratory Study

The exploratory study will be based on a comparative case study design: its place within the research methodology is shown in Figure 4-1 below.

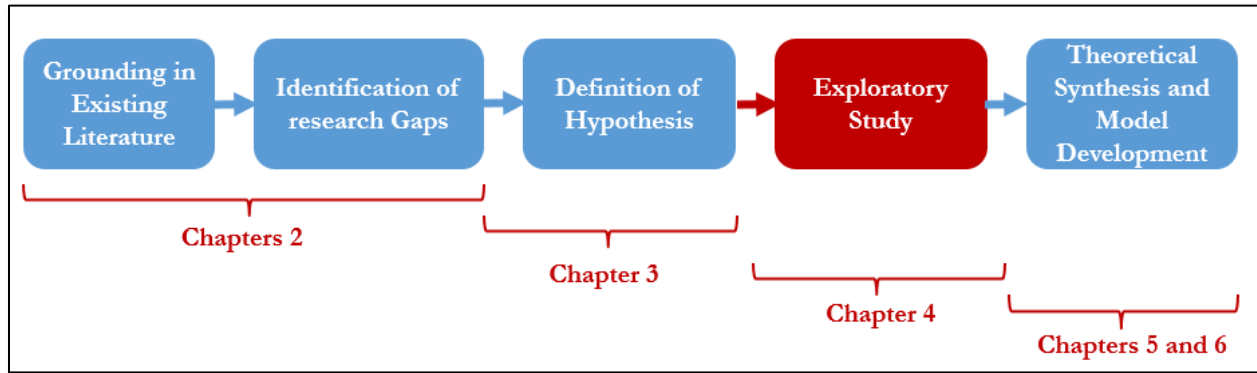


Figure 4-1, Exploratory Study and the Research Methodology

The main objective of using case study research will be to find the relationship between the organizational-environment fit and the organizational structure and inertia characteristics that could help us to understand the process of organizational change. Case study research is particularly useful when the relationship between phenomenon (i.e. organizational change) and context (i.e. the interplay between organization-environment fit and organizational structure and inertia) are not clearly evident (Yin, 1981). In this particular case, the focus will be based on two case studies. Kathleen Eisenhardt, from Stanford University, pointed out that "... a major reason for the popularity and relevance of theory building from case studies is that it is one of the best (if not the best) of the bridges from rich qualitative evidence to mainstream deductive research. Its emphasis on developing constructs, measures, and testable theoretical propositions makes inductive case research consistent with the emphasis on testable theory within mainstream deductive research. In fact, inductive and deductive logics are mirrors of one another, with inductive theory building from cases producing new theory from data and deductive theory testing completing the cycle by using data to test theory." (Eisenhardt, 2007, p.25). In what follows, theory building based on a comparative case study research will be explored.

4.1 The Comparative Analysis Method

In order to develop an exploratory study of the relationship among environment-organization fit and organizational structure and inertia, a comparative analysis will be performed as a way to understand

the underlying phenomena associated with organizational change. But why it is important to choose a comparative case study instead a single case? In order to answer this question, first it is important to establish what types of designs of case studies exist: “The ... four types of designs for case studies are (Type 1) single-case (holistic) designs, (Type 2) single-case (embedded) designs, (Type 3) multiple-case (holistic) designs, and (Type 4) multiple-case (embedded) designs.” (Yin, 2009, p.92).

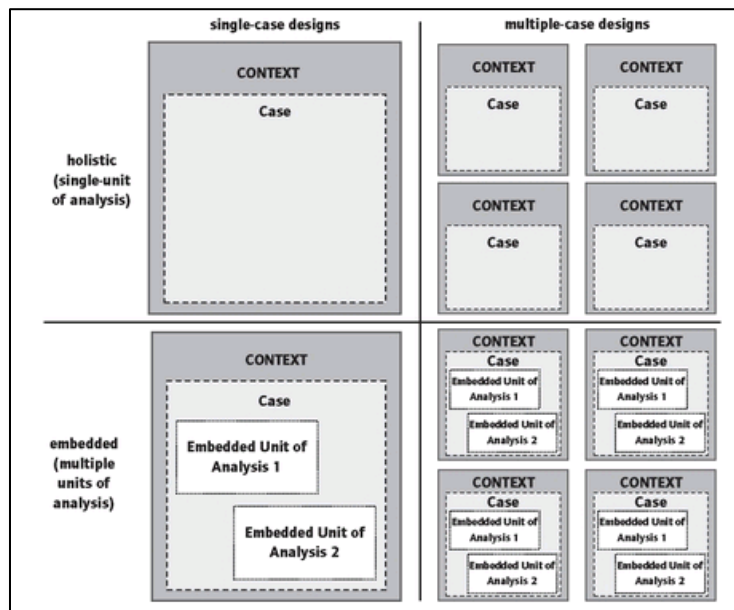


Figure 4-2, Case Study Design Comparison⁷

Then, what are the main differences between single and multiple case studies analysis? Single-case design is appropriate when: i) when it represents the critical case in testing a well-formulated theory, ii) where the case represents an extreme case or a unique case, iii) when the case is the representative or typical case, iv) when is the revelatory case (when an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to social science inquiry) or v) when the theory of interest would likely specify how certain conditions change over time (longitudinal case). In this case, the exploratory study will have the objective to develop a theory, so it will be important to be focused on a multiple-case design, under a comparative study approach.

Multiple-case designs have distinct advantages and disadvantages in comparison to single-case designs. The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust: “... upon uncovering a significant finding from a single

⁷ From “Case Study Research Design and Methods” (Yin, 2009, p.92)

experiment, an ensuing and pressing priority would be to replicate this finding by conducting a second, third, and even more experiments. Some of the replications might attempt to duplicate the exact conditions of the original experiment. Other replications might alter one or two experimental conditions considered unimportant to the original finding, to see whether the finding could still be duplicated. Only with such replications would the original finding be considered robust.” (Yin, 2009, p.99).

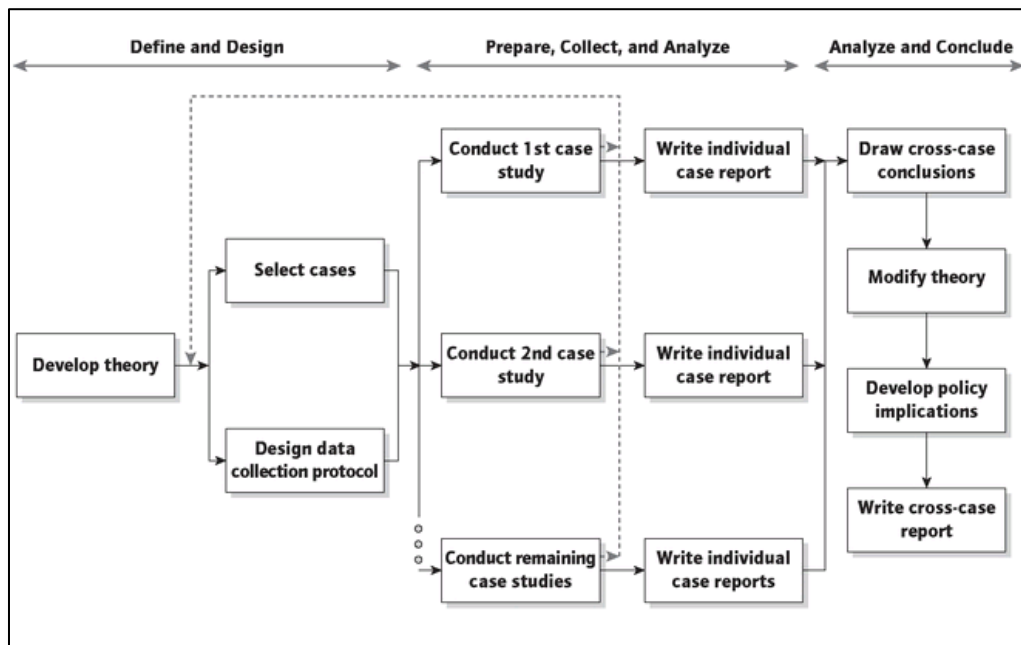


Figure 4-3, Multiple Case Study Method

It will be followed the diagram depicted in Figure 4-3 above with the objective of developing theory and to modify it. The first step will be the case selection and the design of the data collection protocol.

4.1.1 Case Selection and Design of Data Collection Protocol

The previous section was developed in order to explain why a comparative case study was chosen over a single case study. The main objective of the current section is to define the case selection design and to define the data collection protocol. The overall objective of the case study review will be to find the processes that characterize organizational change (i.e. environment-organizational fit and its relationship with organizational structure/inertia) within a large multinational corporation (with over 100 years of history) and then compare these processes with a completely different young and entrepreneurial type of organization (which lasted only 5 years).

This approach was defined due to the fact that “...one strength of theory building from cases is its likelihood of generating novel theory. Creative insight often arises from the juxtaposition of contradictory or paradoxical evidence.” (Eisenhardt, 1989, p.546). In this way, contrasting two extreme cases in the organizational spectrum could shed light of the inherent structural set of processes that characterize the organizational change phenomena. Table 4-1 below depicts the main characteristics of these two extreme cases.

Cases Studies		
Case Study #1	Old Multinational Corporation (“Company A”)	Engineering and Construction company. Strong organizational structure with an operation based on projects. Organizational Performance based on projects compliance. Over 100 years of history.
Case Study #2	Young Entrepreneurial Company (“People Express”)	People Express Airline. Incorporated in 1980 and in bankruptcy in 1986. Grew to become the 5 th largest airline in the world. Low level of organizational structure. High flexibility allowed internally.

Table 4-1, Case Studies Definition

The data collection protocol will be based on the characteristics of each company. First, due to the fact that Company A is a well-known multinational corporation, public information and employee’s interviews will be used. Second, in the case of the young and entrepreneurial company, and due to the fact that People Express is a well-studied case in the Management field, existing written information will be used. Additionally, an interview with the former CEO of People Express, Donald Burr, was held and documented on March’14. Finally, in order to synthesize the information gathered in this stage, an integrative analysis will be performed with the objective to find the processes required to characterize change within organizational systems.

4.2 Case #1: A Multi National Organization and its Change Processes

4.2.1 Company Background

With more than 100 years of history, Company A⁸ is an Engineering & Construction multinational company with offices in 5 continents and more than \$35 billion in revenues in 2013⁹. Company A is comprised of 6 divisions divided by industrial sectors.

⁸ Due to confidentiality reasons, the name of this Company is protected.

⁹ Company A annual report, 2014.

In order to execute projects in different regions of the world, Company A is organized under a matrix structure which allows a strong standardization across different geographical locations and within different Global Business Units.

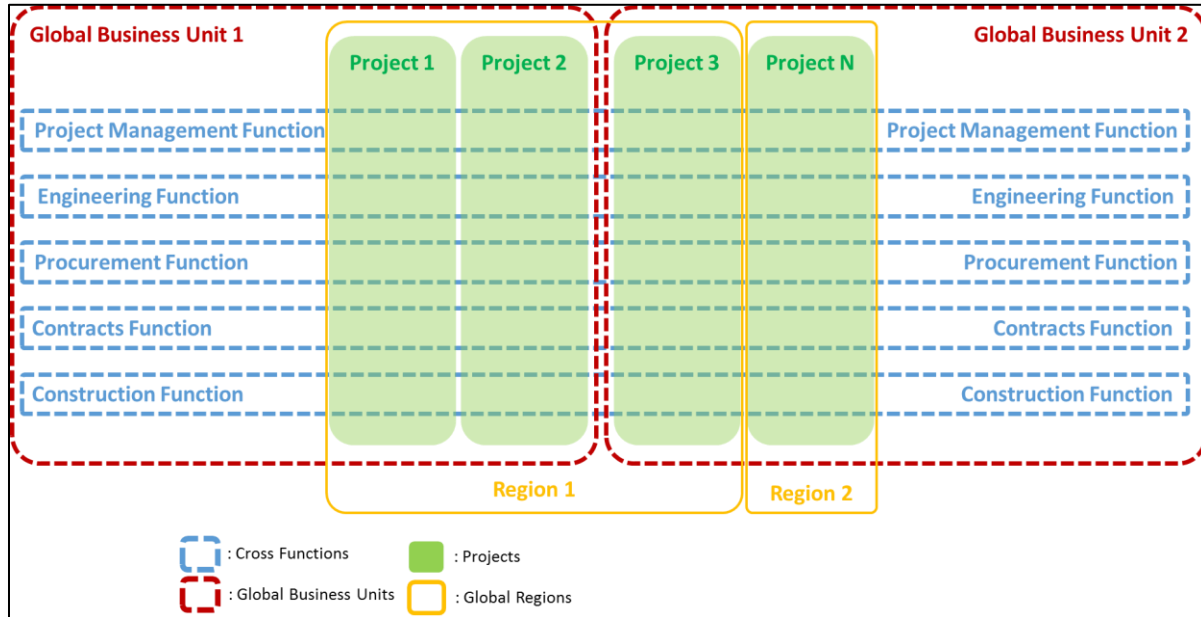


Figure 4-4, Matrix Structure of Company A

It is important to note also that even though Company A shows a high degree of standardization, each GBU acts, operationally, as an independent unit of the parent company, but functionally, it reports to the corporation. Specific projects typically reports operationally to the region in which they are embedded, and functionally to the GBU. In this way, a high level of control is exercised for each project, ensuring standardization not only across projects, but also across regions.

4.2.2 Strategic Direction and Organization/Environment Fit

At the corporate level, the overall vision of Company A is:

“To be the world’s premier engineering, construction, and project management Company.”¹⁰

“...Building on a history that spans over 100 years, we will continue to be privately owned by active management and guided by firmly held values: Excellence, Fair Return, Mutual Respect, Ethics, and Safety”.

¹⁰ Company A’s annual report

These precepts help us to shed light regarding Company A's organizational culture. It is a culture driven by the owners and by top management. In this case, it is a culture that foster, first, efficiency in terms of resource utilization. Second, project performance and customer satisfaction. And finally, safety and ethical standards. The overarching goal of top management is to increase the profits of the company, due to the fact that top management (1% of the employee population) participates in the equity of Company A.

At the GBU Level, the Strategic Direction of Company A is given by senior management. In this case, the direction of the company is related to the decisions of what projects to serve and for which markets. A particular project is screened among senior managers and different documents are prepared. The level of authority required to decide to pursue a new project is well defined under procedures that serve to analyze the risk factors of every new endeavor. Additionally, these procedures serve for different types of projects: no matter what type of project is under review, the same screening procedure is utilized, allowing again high levels of standardization.

On the other hand, the process of implementing the project is carefully controlled by the region and by the GBU. Corporate Management is responsible for the overall performance of the company, authorizing the strategic projects within each region. Thus, if a market opportunity is sensed in the environment, Company A will screen it, deciding if it will pursue this opportunity or not. Within this view, the organization/environment fit is given by new market opportunities and the decision of Company A to pursue this new opportunity by implementing a new project in a particular region of the world. It is important to note that this new project development will follow the same standard processes and procedures that have been proved to be successful in delivering expected results. The implication of this type of implementation will be reviewed in the next section.

4.2.3 Organizational Structure and Inertia

The matrix structure of the organization is based on the assumption that the procedures established to rule each function can be implemented globally. During 100 years of operation, Company A has come about with a standard organizational design for each different stage of a project: from the engineering phase to the actual execution and construction of the project.

The actual operation of Company A is executed in this level of the "system": when a project begins, different functions start to define the level of deployment regarding the level of resources currently available. In this case, leadership plays a central role defining the key staff to be relocated to the project

region. At this early stage of deployment, Company A relies heavily on the capabilities of these “leaders”, who in turn deliver high levels of commitment with the Company.

After this initial stage, in which the set-up of the standard core of processes and procedures takes a central position, the preparation of the initial documents and the development of the first activities kicks-off with the execution of the project. Metrics are defined in conjunction with the clients and followed-up closely.

As the project progresses, the inertia of the organization starts to build-up, and the reliance on the procedures starts to become stronger. The project change management process is also defined within the context of the corporate processes and procedures, ensuring high standardization even after changes in the project direction.

The characteristics described above have a profound influence on the organizational culture and on employee motivation. On the one hand, the organization gains agility in terms of operational efficiency under repetitive activities, but on the other hand, the organization loses flexibility and innovation potential. Due to the nature of the tasks associated with mega-projects, this type of organization, working under an environment that offers a premium to ensure reliability and project results, shows a good fit with market conditions.

4.2.4 Employee Integration

There are no procedures defined for employee integration. The human resources function acts as a liaison between employee requirements (compensation, health packages and training) and the company, but not directly in terms of employee motivation and integration. Moreover, employee integration is not defined on a strategic level. The overall understanding of employee integration by top management can be seen more clearly in the following comment from a Company A’s Manager:

“We really care about our employees... but we will get results if we follow our procedures”

The actual employee motivation is related to the idea that the procedures need to be followed (and not changes). This situation is defined more clearly in an extract from an interview with an employee:

“... There are procedures for everything, even we have procedures for changing procedures... we cannot change things here...we don’t feel motivated because there is no innovation...”

However, it is important to note that, due to the increasing median-age of the key employees, Company A is focused on leadership development in order to have a strong resource base of key-staff capable of handling the major challenges of the future. This development is tied with a discrete effort to increase employee's motivation in the workplace. The employees interviewed explained that, even though Company A is participating in the *Great Place to Work*® surveys, no difference can be found in day-to-day activities. This situation creates lacks of commitment by employees: even though each project is unique and has unique challenges, if the important objective is to follow procedures, each employee feel that he or she can be replaced easily, because there is no differentiation. The complexity of the tasks carried out by mid and low level employees are low: only top management is in charge of the complex decisions. Overall, the motivation, and, subsequently the integration of employees into the business' landscape is limited.

4.2.5 Incremental Change in Company A: How to Manage Replication for Growth?

Company A is strategy is replicating its business model in order to implement different projects in different business lines in order gain more diversification, reducing risk. If the set of standard processes and procedures establishes at the core of the project operation does not change from project to project, Company A could achieve high efficiencies and certainty of outcome, one of the central requirements by the clients in these type of markets. But how is this process viewed internally within the organization?

The way in which Company A decide to pursue a project and the way in which develops it follow the same pattern over and over again. In this way, it could be argued that Company A manage its replication strategy as a causal mechanism for economic growth. But if this is the case, one could characterize the environment-organization fit as stable: the perturbations triggered by new projects are in some sense "expected", embedded in the way this company acts. The incremental change that could be seen in this organization is given mainly by the new requirements of the industry, which, in general, are small modifications that don't trigger changes within organizational settings that could change the structure or the inertia of the organization.

4.2.6 Case #1 Summary

Company A is one of the leading companies in the world in its field. While its configuration allows a quick response for standard tasks, it does not foster employee motivation nor integration, characteristics required for innovative approaches. Additionally, this configuration serves well for dealing with incremental change (i.e. the change that is embedded into organizational settings- instead

of radical - punctuated change, like the one typically described in a strategic reorientation). At a high level, Company A’s ability to change can be described using the processes described in Table 4-2 below.

Company A Processes	Description
Environment-Organization Fit	Strategic direction defined by top management. No participation of mid-level managers or regular employees. Employees are assigned and relocated by top management in order to staff-up the projects within different business units. Mid-level managers are in charge of local project decisions.
Organizational Structure and Inertia	High levels of inertia and a strong organizational structure. Processes and procedures for every activity as a way to ensure replication of projects across the globe. Top management performs oversight of projects compliance on a regular basis.
Employee Integration	Employee integration is inherent to the business in which each project is embedded. This means that the company offers market salaries, with good compensation packages for harsh-working conditions (e.g. high altitude projects, projects located in risky countries, etc.).

Table 4-2, “Company A” Minimum Processes to characterize Change

How this company evolves over time can be described using the three processes described above. For example, if Company A’s top management decides to pursue a project in a difficult location, the ability of this organization to fit its internal structure to this new project will be defined by its internal structure. This situation will trigger different modifications in the internal organization: allocation of resources, development of new assessments, etc... Company A’s capability to adapt to the strategic change triggered by senior management will be mainly defined for the capability of top management to replicate the processes and procedures in the new location. Due to this important situation, key employees and leadership play a central role in Company A’s activities.

While standardization allows efficiency to emerge, solidify even more the organizational structure, increasing the organizational inertia and reducing the employee motivation.

4.3 Case #2: People Express Airline and its Change Processes

"I guess the single predominant reason that I cared about starting a new company was to try and develop a better way for people to work together... that's where the name People Express came from. Most organizations believe that humans are generally bad and you have to control them and make sure they work. At People Express, people will be trusted to do a job until they prove they definitely won't"

Donald C. Burr in "People Express Airlines: Rise and Decline", Harvard Business Review, 1993

"When the industry suffered through years of record losses, when other carriers struggled with deregulation, fuel shocks, the air controllers' strike, and the recession, People Express prospered. Some began comparing Burr to Henry Ford: like Ford with automobiles, Burr had made airline transportation available to millions of new customers"

"People Express Airlines", Harvard Business Review, 2012

The rise and fall of People Express (PE) Airlines is a well-studied and documented case, mainly because it represented an organization that became an instant success, grew exponentially and disappeared quickly. Despite the fact that a lot of attention was given to this case, the understanding of the underlying causes of rapid success are not well developed. Instead, some publications have been focused on explanations of the demise of the company, including the concepts of "uncontrolled growth" and "employee burnout"¹¹, and "unintended products of a de-regulated industry"¹². On the other hand, practitioners of the System Dynamics field have been focused on how the structure of the system drives the behavior (John Sterman, 1988; Peter Senge, 1990; John Morecroft, 2002). The focus of this review will be to discuss first the company background and history, second the different strategies and policies adopted by the organization and finally to integrate these concepts with an interview held with the CEO of the People Express Company, Mr. Donald Burr.

¹¹ Denver Business Journal, 2006, <http://www.bizjournals.com/denver/stories/2006/10/30/smallb9.html?page=all>

¹² The Rise and Fall of People Express, by Eric Kochneff, 2013 <http://www.airliners.net/aviation-articles/read.main?id=68>

4.3.1 Company Background

People Express (PE) Airlines was incorporated in 1980 as a venture dedicated to be an airline by the people, for the people. Its founder, Donald Burr, worked in the airlines industry for several years (president of National Aviation Corporation in 1972, chairman of Texas Airlines - now Continental Airlines - in 1973 and president in 1979). His idea was to create an organization in which people could decide their roles. This self-management idea was rejected in Texas Airlines, situation that represented one of the major reasons for him to leave the organization.

PE was one of the first airlines that implemented successfully low cost fares. “Certainly the fastest-growing airline ever, possibly the fastest-growing business, People Express set the country’s skies ablaze. From its opening in 1981 to its last full year of independent operation, revenues soared by an annual compound growth rate of more than 90%.” (Holland and Beer, 1993, p.9). Even though the company was an instant success, PE only lasted 5 years, representing one of the most emblematic cases known in the airline industry. Table 6-1 below shows the evolution of PE from 1980 to 1986.

Date	Highlight
1980, April	Incorporation of PE
1980, October	PE went public, raising \$24 million and purchasing 17 used Boeing’s 737s
1980, December	15 professionals in management team (all from Texas Airlines)
1981, April	PE began service with 250 employees total, serving three cities
1985, February	PE flew to 49 cities, yearly revenues of ~\$1b with an average of 3,500 full time employees
1986, August	Potential bankruptcy of PE
1986, September	PE sold to Texas Air Corporation (former Texas Airlines)

Table 4-3, Evolution of People Express Airline

4.3.2 Strategic Direction and Organization/Environment Fit

Driven by the original intention of Donald Burr of creating a better business organization, Donald Burr started to define the core concepts that would drive PE. “[D. Burr] was tired of the ‘politics’ and the ‘beat them and they’ll do more’ ... He wanted to design a new kind of airline, one that would provide both better and cheaper service, and be an exciting and rewarding place to work.” (Holland and Beer, 1993, p.2). Donald Burr, along with his 14 colleagues, during the first year of “strategic implementation”, defined the 6 precepts that would guide PE behavior. It is important to note the importance of the precepts in the conception of the company: “we spent an entire year defining these concepts” (Donald Burr, April 2014 interview). It is important to note that maximization of profits was defined in 6th place: to take care of customers and people is number one.

Order of Importance	Precept
1	Service; commitment to the growth and development of our people
2	To be the best provider of air transportation
3	To provide the highest quality of leadership
4	To serve as a role model for others
5	Simplicity
6	Maximization of Profits

Table 4-4, 6 Guiding Precepts of People Express

These precepts represented the core vision of the company. According to Donald Burr's words, the precepts allowed him to mix strong leadership with freedom: leadership for setting direction and freedom in how people would organize the details of their actions. "[An airline is a] very dynamic system... it is not controlled... You have people all over the world at 50,000 feet, 10,000 feet, and at airports all over the world. They have to be their own internal system, you can't control them, supervise them and so forth" (Donald Burr in Holland and Beer, 1993).

Besides these precepts, the "overarching" purpose of PE was defined by Donald Burr: "You've heard of MBWA [Managing by Walking Around]... well, one day while running I decided that what we should have was MABW – Making a Better World... thus, PE purpose was defined: become the leading institution for constructive change in the world." (Donald Burr in Holland and Beer, 1993). By setting a higher purpose, Donald Burr continued, even the least motivated wants to contribute to the organization.

Additionally, one important factor to consider is the concept of growth. For Donald Burr, growth was a critical factor for success. His reasoning was the following: growth would help people develop, and as they developed, they could better grow the company. But apparently, he did not take into account that growth cannot be sustained forever: there are only a finite number of people of potential customers.

The precepts, the purpose and the growth paradigm were at the central core of PE's strategy. But how these concepts were integrated in the decisions of what markets to serve and how to serve them? In particular, these decisions were discussed between the management team and the final decisions were made ultimately by the CEO. Following the growth paradigm, Don Burr thought that an airline had to reach a 'critical mass', or the size, roughly of American Airlines, to survive (i.e. there was a target size). Not achieving that size would leave PE vulnerable to attacks by the big players – one of the reasons PE, at least at first, stayed away from the routes already occupied by the giants (Holland and Beer, 1993). This strategic direction was crystallized during the entire life of PE: the objective of growth can be seen also in the rapid increase in the fleet and financial indicators, shown in the table below.

PE General Statistics	1982	1983	1984	1985	1986 ¹³
Number of cities served	16	20	33	49	49
Aircraft in Service	20	40	66	76	71
Total Revenue Passenger Miles ('000s)	1,554,626	3,668,366	7,700,944	10,961,871	8,700,295
Full time employees	1,020	2,596	3,962	3,402	2,944
Part time employees	909	1,641	2,018	1,116	2,121
Number of managing officers	7	7	6	11	15
Number of general managers	9	9	10	30	38
Financial Indicators	1982	1983	1984	1985	1986 ¹⁴
Total operating revenues	\$138,859	\$286,589	\$586,802	\$977,864	\$1,008,632
Total operating expenses	\$128,399	\$266,962	\$566,638	\$954,415	\$1,140,503
Income (loss) from operations	10,460	19,627	20,164	23,449	(131,871)
Net Income (loss)	1,002	10,434	1,648	(27,537)	(245,360)

Table 4-5, Selected People Express Operating and Financial Statistics¹⁵

It is important to note that, even though the number of employees grew from 1,000 in 1982 to 3,900 in 1984, the number of managing officers and general managers did not follow along. This would mean that, apparently, the growth of this company did not have the supporting managers required to replicate the standard of service delivered during the first years of operation. This concept is related with the structure required to run a company: PE's idea of organizational structure will be reviewed in the next section.

4.3.3 Organizational Structure and Inertia

Since its inception, PE was focused on how to unlock people's potential. The constructs developed to define the organizational structure were the following: minimal hierarchy, self-management and job rotation.

PE had three levels of hierarchy: seven managing officers (including the CEO) who were responsible for 13 functional areas; eight general managers who provided day-to-day leadership, implementation and planning in a functional area; and the rest of employees were plan "managers": flight managers ('FM' - pilots), maintenance managers ('MM' - mechanics) and customer service managers ('CSM' - flight

¹³ From 1/30 to 9/30, 1986. After that, PE was sold to Texas Corporation.

¹⁴ From 1/30 to 9/30, 1986. After that, PE was sold to Texas Corporation.

¹⁵ Source: Thomas R. Eisenmann, 2012, People Express Airlines case study, Harvard Business Review.

attendants). PE employee no executive assistants or clerical staff (Eisenmann et al, 2012). Figure 6-2 shows the overall organization chart in 1982.

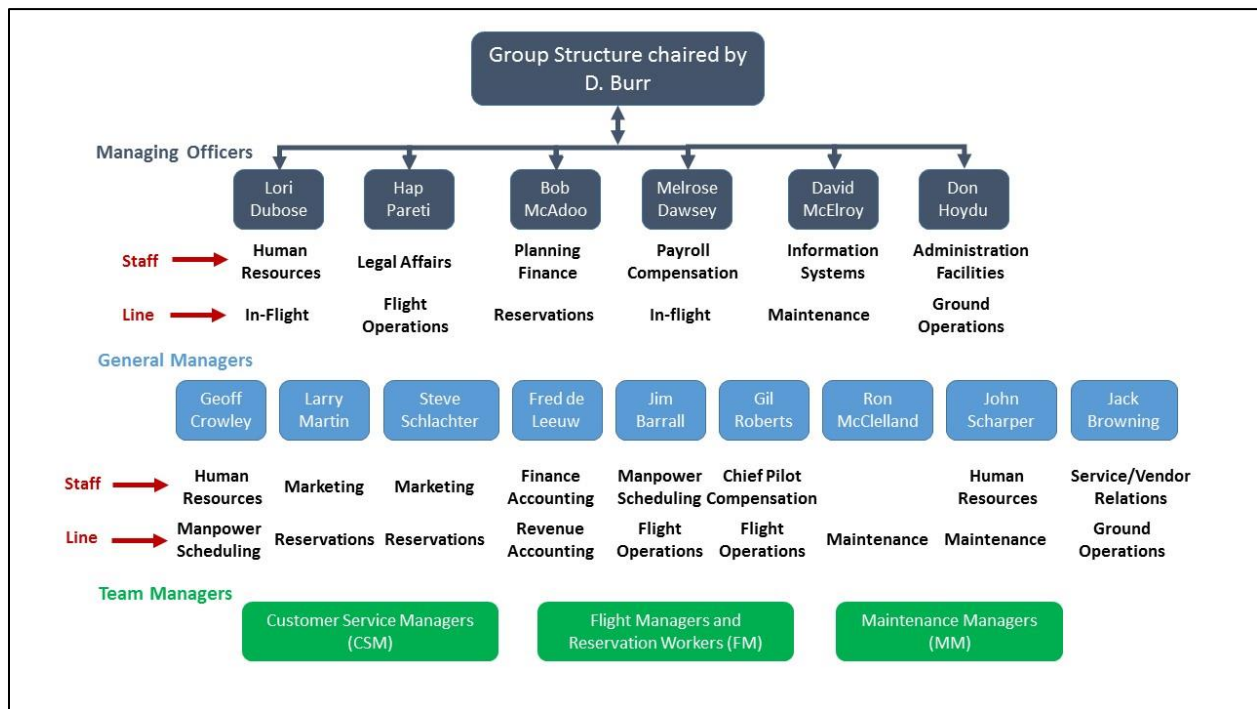


Figure 4-5, People Express' Organization, November 1982¹⁶

Though Burr was the ultimate decision maker, top management decisions were made by “management teams” with the assistance of “advisory councils”. The managing officers, aside from being responsible for at least one of the functions, also served on one or more other management teams. The management teams (depicted in Figure 4-5 above), were grouped under “staff committees” (Figure 4-6 below). Management teams met once a week and became one of the central units of organizing. On the other hand, the staff committee played the “integrative role” with the employees: each staff committee had its own “advisory council”, formed by elected CSMs, FMs and MMs. Two members of each council joined together in a “coordinating council” and met with the CEO to inform and recommend policy. Aside from the structure described above, people formed ad hoc committees and task forces to solve particular problems, conduct studies or develop proposals (Holland and Beer, 1993).

¹⁶ Modified from Whitestone and Schlesinger, 1983

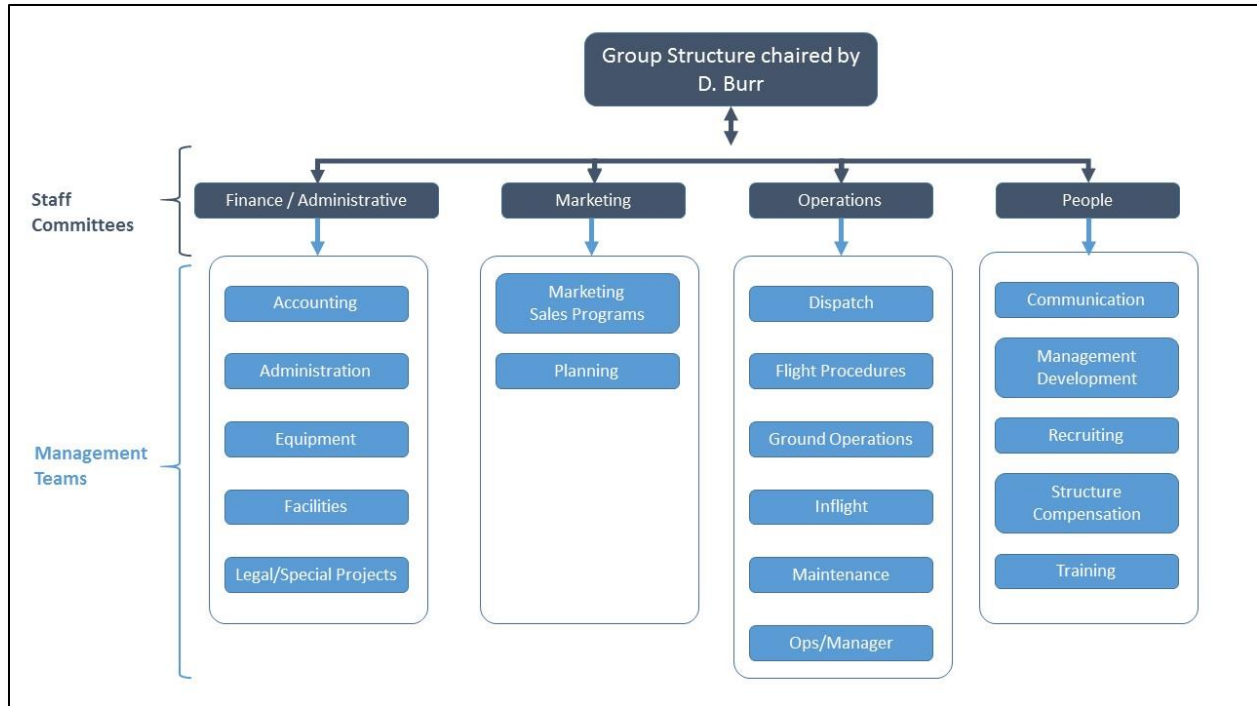


Figure 4-6, People Express' Staff Committees and Management Teams, 1982¹⁷

4.3.4 Employee Integration

The employee integration of PE was achieved through different policies that enhanced people's commitment to the company. Self-management, cross-utilization, equity ownership and recruiting practices were at the heart of the effects on employee integration. In this section these concepts will be reviewed.

Even though PE explicitly defined organizational charts, one important approach that PE defined was the "self-management" characteristic of the company: the CEO and all the managers expected his people to practice self-management: the particular objectives of the work were set up by the team and the decision making also was decentralized. Burr expected his people to self-manage, by (Eisenmann and Barley, 2012):

- 1) Setting specific, challenging but realistic objectives
- 2) Monitoring and assessing their own performance
- 3) Self-correcting
- 4) Finding the resources/information/assistance needed to achieve objectives.

¹⁷ Modified from Holland and Beer, 1993.

In addition to self-management, “cross-utilization” represented one of the core concepts associated with the flexibility that PE achieved in terms of operational efficiency. No one at PE was assigned to do the same work all the time. “Everyone, including managing officers, was expected to rotate between in-flight and ground operations and /or between line and staff functions. It also was a way to keep costs low and flexibility high: as it turned out, PE used roughly 50 people to staff each aircraft, about half those needed by the competition.” (Holland and Beer, 1993, p.7). Additionally, cross-utilization led to simple procedures, since no one had much time to learn them or make them complicated (Eisenmann and Barley, 2012).

Regarding equity participation and compensation, everyone in a permanent position at PE was a shareholder: it was a requirement condition of employment to buy, at a greatly discounted price, a number of shares of common stock, determined on the basis of his/her salary level. PE’s four part compensation package consisted of the following: base competitive salaries, 100% medical and dental coverage and life insurance, a transparent earnings-sharing program (tied to the company’s fortunes) and stock option bonuses (with discounts ranging from 25%-40% of market value) (Whitestone and Schlesinger, 2000).

In order to ensure consistency among the employees, the recruiting practices needed to be really stringent: the potential risk of having someone who does not share the company values was high. As a mitigation tool, PE’s recruiting process was very selective: only 1 out of 100 CSM applicants was selected to participate in the training program, which lasted for five weeks, six days a week, without pay. At the end, candidates went through a role-play, oral competency and written exams. Those who tested at 90 or above were offered a position. These recruiting strategies were the spear head of the bottleneck for PE’s growth.

4.3.5 Radical Change in PE: How to Manage Explosive Growth?

The low-cost strategy of the company, in conjunction with high flexibility and high motivation resulted in a meteoric growth. In a little over two years, 250 employees grew over 3,000; three 737s turned into a fleet of 34 planes; three cities served by 24 flights a day grew to 264 nonstop flights daily to 20 destinations, including London; and an initial loss of \$9 million on revenues of \$38 million became an operating profit of \$1 million on revenues of \$139 million in 1985. PE’s cost per available seat mile (\$.05) was the lowest in the industry. By July 1983, PE had carried out roughly 10 million customers and had an 84% load factor, compared to an industry average of 60%. People’s rapid growth occurred despite a

severe economic recession, stiff fare wars, and a crippling national air-traffic-controllers strike that led many airlines to incur large operating losses (Eisenmann and Barley, 2012).

These impressive results resulted in high pressure in the existing organizational structure. Problems started to arise, mainly due to the fact that a low number of designated leaders started to manage a company with more than 1,000 employees. In response, a new level was added to the organizational structure: 85 team managers, serving as liaisons between the manager teams and the managing officers and general managers. The CEO continued the strategy of growth: "We are not sitting around here counting roses. This is capitalism. People are getting rich here. .. The company planned on a long-term growth rate that entailed adding almost two planes a month and a revenue that would 'hit a billion dollars in a couple of years'." (Eisenmann and Barley, 2012, p.5). Thus, PE changed its organizational structure as a way to deal with the radical change that it was experienced in its organizational-environment fit function.

With the continuous growth strategy and PE's inability of handling high levels of demand, customer and employee dissatisfaction mounted. PE became known for lengthy delays and for overbooking flights, leaving passengers stranded in airports for hours. During 1984, PE's load factor slipped 7% from the year before, to 71%. Internally, people complained about to fee opportunities for self-management and personal growth and also about being overworked and underpaid (Eisenmann and Barley, 2012). In response, instead of limiting growth, a restructuring process started to take shape, driven by the conviction of Donald Burr: "...to stop moving forward altogether is not the answer... There had to be a balance. Stress is okay if the tension is right... too much today, a little less tomorrow. We had a high level of stress because of our objective." (Holland and Beer, 1993, p.5).

The idea of the restructuring was to re-create the small, close groups of the early days. Managers, after an elaborate process decided which operational group to join, each about 300 people. Each operational group was like a "mini-airline": there was six 727 groups, three 737s and one 747. Each was led by a managing officer, with the support of three general managers, 15 to 18 team managers, 60 team leaders and about 200 CSMs, FMs and MMs.

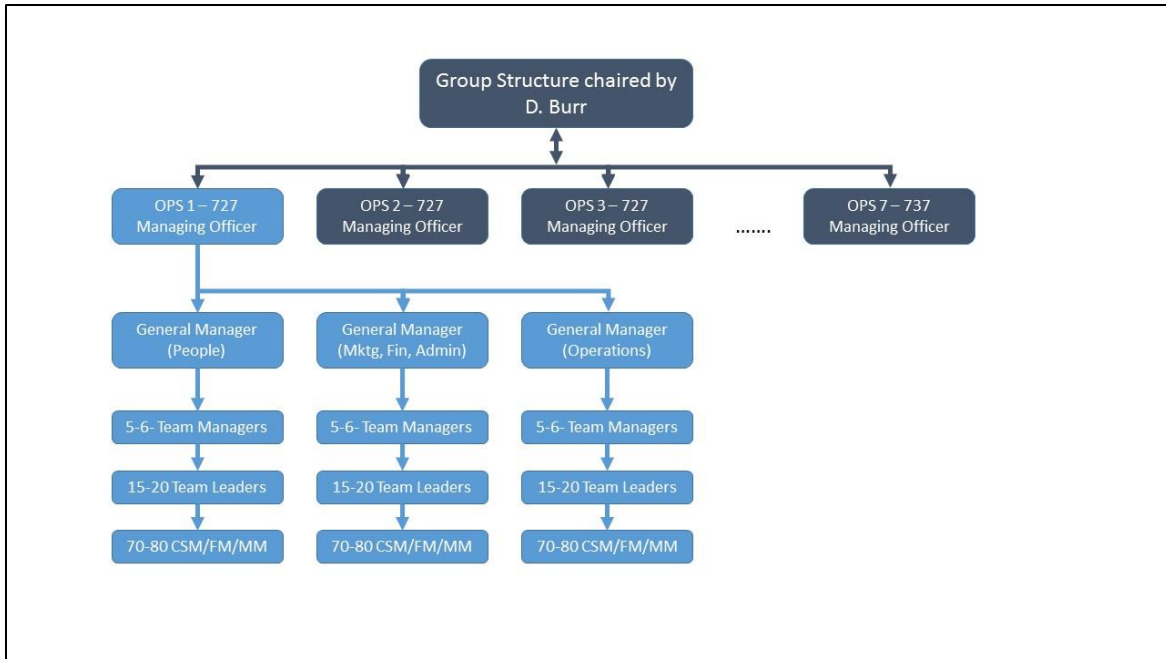


Figure 4-7, People Express' Organization, 1985¹⁸

The restructuring process did not have the time required to probe its effectiveness: in January, 1985, American Airlines announced its Ultimate Super Saver fare, which was based on a program designed to put multiple-priced seats on the same flight. This fare allowed American Airlines to mimic PE low fares in its own routes through yield management. "Soon after this move PE began to lose market share, up to 50% on some routes, by the end of 1985. Something had to be done, quickly." (Holland and Beer, 1993, p.17).

As a way to keep up with the pace of the industry, PE bought Frontier Airlines, a regional carrier based in Denver. Donald Burr stated that he "needed Frontier's yield management system, frequent flyers programs, and management team". But Frontier was acting in a competitive market and the integration of an airline with high operating costs and a unionized work force with PE represented a high complex problem. Subsequently, PE bought Britt Airways, a very large regional commuter carrier serving 33 Midwestern cities and also Provincetown-Boston Airline, a small and bankrupt commuter line serving northeast and Florida.

In Denver, United and Continental airlines were destroying Frontier. During summer 1986, Burr put Frontier into bankruptcy, discontinued service in some routes and joined American and United

¹⁸ Modified from Holland and Beer, 1993.

reservation management systems in order to book PE's flights. But all of these changes were not enough: "...the downward momentum was too great to stop, and on the night of September 14, PE's board of directors decided to accept Frank Lorenzo's offer to purchase PE for \$125 million and Frontier Airlines for \$176 million..." (Holland and Beer, 1993, p.18), situation that was defined as the end of People Express company.

4.3.6 Interview with Donald Burr

The People Express case has been widely studied in Business Schools across the globe: its management practices and innovative structure represent one of the emblematic cases in Human Resource Management. In March 2014, an interview with Donald Burr was held as a way to deep dive into his understanding of the processes required to describe change within organizations.

The central aspects of this interview can be seen in the following assertions.

"after my MBA, I did not like the typical top-down structure that characterized the airline industry... it was about getting this done and getting money and did not matter who got hurt in the process... people were a means to an end."

"I started People Express with the sole purpose of saying that business does not have to be that way... People Express was really about to create a place where people could work together in a good way."

"The big mistake that we committed was 'overtrust', or 'unconditional trust', like in a family".

Donald Burr explained that, when the company started to become more and more successful, they thought that people, if motivated enough, could take up the challenge to adapt the organization to the new characteristics required to serve more and more customers. This "unconditional trust" in people's ability was not balanced with proper supporting systems or infrastructure associated with these new levels of service. In Donald Burr own words:

"The philosophy was so powerful that it created this 'awesome' rate of growth... you got this firm going at a rocket speed and you can't control it... and just went right off the tracks"

"We outgrew our ability to cope with the situation... I overdid what I was good at [people], so as a result the other disciplines suffered tremendously. The supporting structure simply was not there."

“We had a company that was way over weighted on people and way under weighted on the structure. In People Express were there all weak links except from people.”

4.3.7 Case #2 Summary

People Express grew, in only 4 years, to become the 5th largest airline in the world. With the strong leadership of Donald Burr, PE quickly was become in one of the most controversial cases in innovation in Human Resources management. On the one hand, while PE was experiencing a striking success, the radical policies were studied in the most prestigious Management schools across the globe as a way to understand how these policies could be implemented in other organizations and industries. But on the other hand, due to the fact that PE failed to cope with the explosive growth because the company did not pay attention to the organizational structure required to support this growth, PE was declared in bankruptcy in 1986, and it was absorbed by its nemesis, the top-down, highly structured, Texas Airlines.

It is important to note that the interview with Donald Burr provided with important insights regarding the processes required to manage organizational change. First, he acknowledge that growth cannot be successfully achieved solely on the basis of employee motivation. Apparently, the motivational force is not strong enough to help an organization to address change. Second, he also acknowledge that one of the most important factors that PE failed to account for was the organizational structure required to support the change triggered by the new strategic direction of coping with an explosive demand: instead of limiting the levels of demand, Donald Burr decided to buy more airplanes without taken into consideration the stress signals that the organization was emitting.

It is interesting also to note that intuitively, Donald Burr depicted the same three organizational processes analyzed in the previous case of Company A: Strategic Direction, Organizational Structure and Employee Motivation. Figure 4-8 below shows the these three processes in the intuitive representation of People Express' organizational model: the “View” as the Strategic Direction (i.e. Environment-Organization Fit), the “How” as the Organizational Structure and the “Why” as Employee's integration.

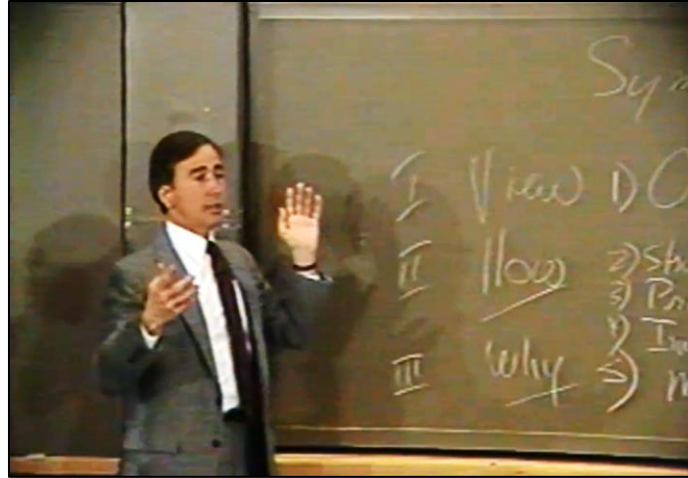


Figure 4-8, Donald Burr and the Three Emergent Processes

In Donald Burr's words:

"I tried to simplify everything down... You just can find everything in People Express in turn to three systems... Here you got three deals:

*i) **you got the view, or the vision, or the objectives...** the precepts... this is one of the key reasons why PE does well... it is critical that you have direction... without it you are nothing... this is absolutely essential... to knowing what you are doing, communicating...*

*ii) then you want to free-up people, you want to free the individual as much as possible in any structure that you are in... you empower the individual by giving him direction helping to understand where you are going then you enable him with **good structure and processes and implementation systems...** this is the how you go about of doing things...*

*iii) **you got to have alignment of spirit...** the good alignment creates focus... you align the spirit in the why, which is the strategic direction brought down to making a better world [meaning] that is not good enough to be a commercial success... you need to go beyond making money... and my definition of that is creating a better world and I cared a lot about that... and that's how you get alignment of spirit by the way...*

...and I tell you folks, I think that this [system] is lined up with nature... I think this is a very natural human system. When I look at the world and I look at what people do and what people say and how people act, I think that the world is headed that way, I think that is the human condition. And I think that People Express has answered -and I have never said this before in any forum, I think that the reason People Express is a good damn success is because it's got alignment with the natural system that exists in the

world, which is human nature, and human nature's desire, sometimes perverted, is to make a better world, to improve the species... And I think People Express got that alignment."

Donald Burr, Question and Answer Session with an MBA Class, January 15, 1985.

The extract above shows that Donald Burr intuitively defined PE system with three organizational processes. He also explained that the organizational structure is critical to actually perform the activities defined by the direction of the firm. In summary, PE's rise and fall also be explained with the three processes established in the case of Company A. These organizational processes are described in Table 4-6 below.

People Express Processes	Description
Environment-Organization Fit	Strategic direction defined by top management. Mid managers participated in decisions concerned about what markets to serve and how to serve them, but the overarching decision of grow or to stabilize service quality was defined by the CEO.
Organizational Structure	Low levels of structure. Processes and procedures were defined as required by the situation. Top management did not perform oversight of compliance: it was based on "trust".
Employee Integration	Employee integration is fundamental to PE. Employees were required to buy PE's stocks at a reduced price: this means that the employees were owners and designers of the organization.

Table 4-6, People Express' Minimum Processes to characterize Change

Then, using the processes depicted above, People Express' demise could be explained as follows: the strategic direction set out by Donald Burr was to cope with the exponential demand. Instead of supporting the organizational structure, he "over trusted" on people's ability to cope with the internal change. This situation started to create stress within the organization, situation that, initially, was absorbed by the high levels of motivation and integration of the employees. But due to the fact that the burnout started to accumulate faster and faster and also due to the fact that the strategic reorientation takes place with significant delays in the system, the lack of structure started to become a central characteristic of the operation, leading the way to an imminent collapse.

In the next section, it will be presented the conclusion of the cases analyzed.

4.4 Results, Analysis and Conclusions

In this chapter, the main objective was to conduct an exploratory study of the relationship between environment-organizational fit and organizational structure and inertia.

Company A and People Express are two organizations that dealt with the environment and with employee integration in different ways. On the one hand, Company A shows a strong strategic direction through replication and standardization of projects. This strategy is aligned with its fit with the environment and it is allowed, in part, for its leadership capital (leaders in management positions were responsible for the implementation and standardization). Additionally, as the standardization starts to play a central role in new projects, organizational inertia starts to build up quickly (situation that is reinforced by the same organization). The high levels of inertia created as a result of standardized projects resulted in low levels of employee motivation and therefore, low levels of integration: mid and low level employees feel that they are easily replaceable.

On the other hand, People Express shows a loose-coupled type of organization, in which the employee could choose his role, increasing the complexity of the required level of organizational structure to support the operations, but also increasing employee motivation and morale. Additionally, the employee alignment, through stock participation, showed high degree of commitment, situation that allowed the organization to innovate and to achieve high levels of performance while the company's results are promising. But at PE, the required level of organizational structure was never met, and the over trust on people's ability to cope with internal change was the main explanation of the demise of this organization.

In summary, both Company A and People Express, even though represent completely different organizations, both of them could be characterized by three main organizational processes: the organizational-environment fit (given by the strategic direction), the organizational structure required to achieve the required direction and the employee integration (given by the level of employee motivation).

As an exploratory study, for these two cases, there exists some important insights that could be expanded in future research. On the one hand, for Company A it was found that, under an stable organizational-environment fit, no radical changes are triggered within the organization, reinforcing the organizational structure defined to deal with projects through standardization and replication of processes and procedures. While this mechanism allows a quickly set up of complex projects, this reinforcement increases the level of organizational inertia, reducing the employee motivation in the long run.

On the other hand, the People Express case shows an example in the opposite side of the organizational spectrum: a young and entrepreneurial organization that lacked the organizational structure required to support radical changes triggered by a combination of market and internal decisions. During the initial years of PE, high levels of employee alignment increased employee motivation, situation that allowed to achieve high levels of results even though they did less resources required to perform their tasks in comparison to the other airlines. But when the organizational-environment fit changed, instead of analyzing how to deal with this change to adapt to it, the former CEO reduced the fit even more by buying more airplanes, introducing high levels of stress in the system.

Apparently, there exists a minimum level of organizational structure that allows an organization to function. If this minimum level is not achieved, this could result in organizational demise, situation that was shown in the PE case. But if the organization has sustained levels of organizational structure, and these levels are reinforced by the organization, the inertia start to build up quickly, reducing employee motivation. In both of these cases, the role of leadership is fundamental: In PE Donald Burr was one of the main motors of employee motivation (PE’s main characteristic) and in Company A case, leadership was the factor that allowed the replication and standardization across projects (Company A’s main competitive advantage).

The summary of the findings are shown in Table 4-7 below.

Processes	Company A	People Express
Environment-Organization Fit (Strategic Direction)	Stable environment-organization fit reinforces the organization’s dependence on existent structures, reducing the number of internal changes required to pursue a good fit.	Unstable environment-organization fit triggers internal reorientations, reinforcing the idea that low levels of structure will support organizational flexibility.
Organizational Structure (Processes and Procedures)	A highly structured organization under a stable environment-organization fit foster the build-up of organizational inertia, through an organizational reinforcement process.	Low levels of organizational structure under unstable environment-organization fit could lead to organizational demise. There exists a minimum level of organizational structure that support the organizational capability to deal with organizational reorientations.
Employee Integration (Motivation)	High levels of inertia reduces the motivation and	High levels of motivation as defined in the core values of

Processes	Company A	People Express
	the employee integration. Employees feel “replaceable”.	the company. Low levels of inertia helped to create opportunities to design ad-hoc organizational structures that increased employee motivation.

Table 4-7, Summary of Comparative Cases Study Findings

This exploratory study was developed to analyze the relationship between environment-organizational fit, organizational structure and organizational inertia within two specific cases. But could this analysis be extrapolated to other cases? According to Robert K. Yin, “... An important step in all of these replication procedures is the development of a rich, theoretical framework. The framework needs to state the conditions under which a particular phenomenon is likely to be found (a literal replication) as well as the conditions when it is not likely to be found (a theoretical replication). The theoretical framework later becomes the vehicle for generalizing to new cases, again similar to the role played in cross-experiment designs. Furthermore, just as with experimental science, if some of the empirical cases do not work as predicted, modification must be made to the theory. Remember, too, that theories can be practical and not just academic”. (Yin, 2009, p.99). In order to

In what follows, with the insights gained through this exploratory study, a theoretical framework of the processes required to analyze organizational change will be proposed. The testing of the hypotheses defined in Chapter 3 for other type of organizations could start with the theory presented in Chapter 5, but will be left for future research. Chapter 6 will take the insights gained in the comparative case study analysis and the theory developed from it to develop a System Dynamics model of organizational change. The conclusions of this thesis will be presented in Chapter 7.

5. Theoretical Synthesis through Systems Thinking

This is an entrepreneurial company, dedicated to growth and change. That's what we do best. When that ended, a piece of what we are ended with it. Sometime... we switched from being a new venture to being an established company. People started going home to sleep. We lost the momentum. And we're not particularly good at maintenance. I know I'm not good at it; it doesn't engage me.

Donald Burr, People Express top managers meeting, 1982¹⁹

Even though Donald Burr acknowledged that PE was an entrepreneurial company dedicated to growth and change, the three organizational processes defined in Chapter 4 that are required to cope with punctuated changes were unbalanced. Chapter 5 will develop an initial framework that was started to emerge after the case study analysis. The theoretical Synthesis and its place in the research methodology is shown in Figure 5-1 below.

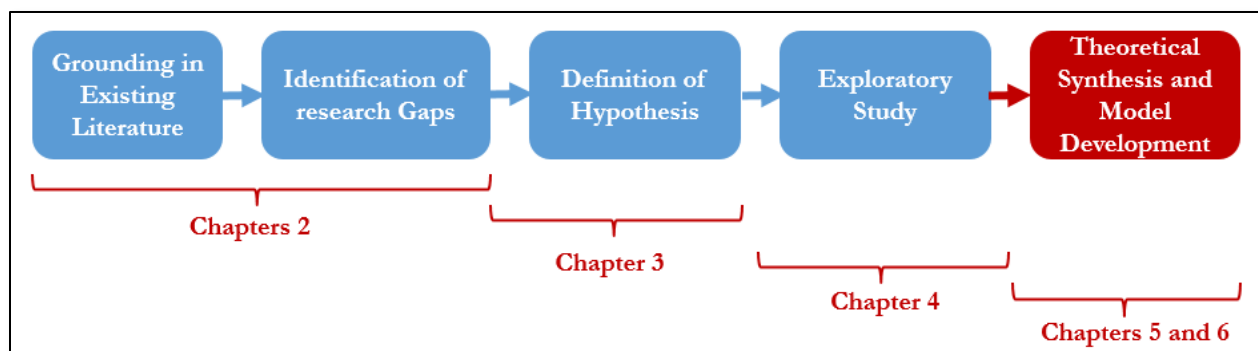


Figure 5-1, Theoretical Synthesis and the Research Methodology

A Systems approach allow us first to understand that the organization does not exist in an isolated state. It is a collection of internal processes that interacts with other systems as well. The result of these complex interactions will be non-linear behaviors, which are typically experienced in real life. Following the same framework defined for the literature review and the insights gained from the comparative case analysis, we could model three levels of analysis in the organizational system: the interface with the environment, the internal organizational structure and the interface with the individuals. As it was discussed with the comparative case study analysis, these three “levels” allows a proper analysis of the complex interaction between the critical variables that help us to understand organizational change in the cases reviewed: i) environment-organizational fit and ii) organizational structure and inertia and iii)

¹⁹ People Express Airlines: Rise and Decline, Harvard Business Review, 1993.

employee motivation, which emerged as an additional variable that was critical to characterize both organizations.

As a way to continue developing the theoretical foundation of the System Dynamics model that will be proposed in Chapter 6, it would be required to define these three levels more accurately. Due to the fact that the processes seen in People Express and in Company A are similar by definition, we continue using the same names utilized before. The core idea in the next section will be to analyze how the organizational system reduces the complexity of the environment in order to create stable organizational processes, and how these organizational processes (grouped in the organizational structure) interacts with the individual's integration to the organization. Each one of these levels represents a dialectic process, in which a new level of reality or evolution is created via different changes triggered within the system. The foundations of a dialectic system will be reviewed in the next section.

5.1 The Basis of the Dialectic Organization

The dialectic management in three levels (between the organization and the environment, between internal rules and emergence of structures, and between the organization and the human being) is what defines the Dialectic Organization. The three levels will be described below.

5.1.1 First Level: Dialectic between Organization and Environment (Emergence of Strategic Direction)

In this level, the perturbations are defined by the continuous changes in the society. As the world changes, the organization's internal order is given by the strategy definition. This process could be seen as an "emergent definition of the strategy", in which the organization defines what markets to serve and how to serve them. The organizational-environment fit will be defined as how well the organization's response to the environment is aligned with what the environment requires.

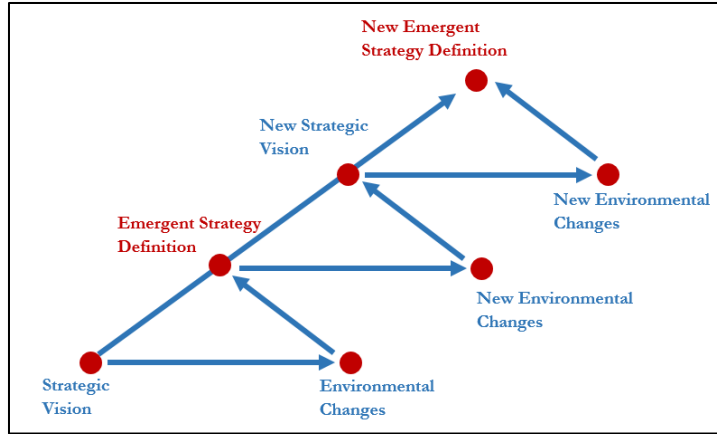


Figure 5-2, Emergence of Strategic Direction

5.1.2 Second Level: Functional Dialectic between Internal Order and Chaos (Emergence of Organizational Structure)

In this second level of analysis (Figure 5-3 below), the formal strategic planning related to each stage of strategy definition should be combined with the enabling factors of human interaction which lead to knowledge creation. This interaction will lead to a new emergent structures that support the ongoing pattern of action. Is not only about rules, processes and procedures: as we reviewed with the example of technologies in use defined by W. Orlikowski, the structuration process rests heavily in human involvement with the “formal structure”. In this case, it will be important to model how human interaction shape formal structures, and how the quality of those interactions influence the organizational outcomes.

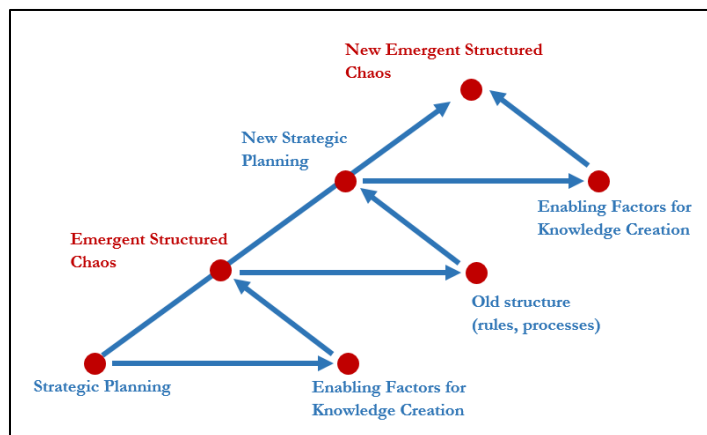


Figure 5-3, Emergence of Organizational Structure

5.1.3 Third Level: Dialectic between the Organization and the Human Being (Emergence of Human Integration)

Finally, the organization needs to deal with how to integrate the human being in the organization. The characteristics of the human being will depend also on the environment characteristics (i.e. social characteristics). Thus, the integration of employees will be continuously created and recreated within the organizational system through the integration of the social changes within the organization.

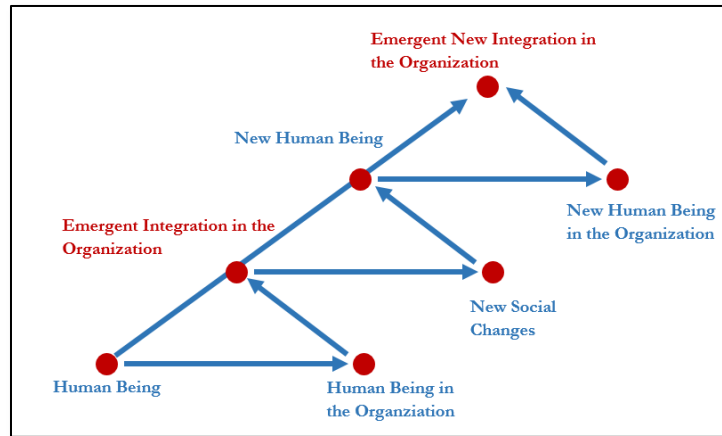


Figure 5-4, Emergence of Human Integration

5.2 A Framework for the Dialectic Organization

5.2.1 The Duality between Two Dimensions

The three processes previously discussed exist in the dimension of the activities, structures, processes and procedures: in summary, in the practical world. But what are the conditions that enable this reality, this organization, to emerge? It was stated previously that the motivation, climate and the more subtle factors that are associated with the human condition rest on a different dimension, on a dimension characterized by the connection that “emerges” between people. This dimension, that could be described as energy (as a metaphor with a living system), is the place where the connection between the three practical levels of organization emerges. In this way, the energy that allows an organization to emerge could be seen as a stock that accumulates over time. Eventually, when morale is low and the individuals don’t feel that their participation “make sense” to them, the energy drops and the capability of the organization to change, as a whole drops too. Figure 5-5 depicts a representation of these two dimensions of the organization: the three levels of the practical dimension and the energy that influences the emergent processes in each one of the practical levels described before.

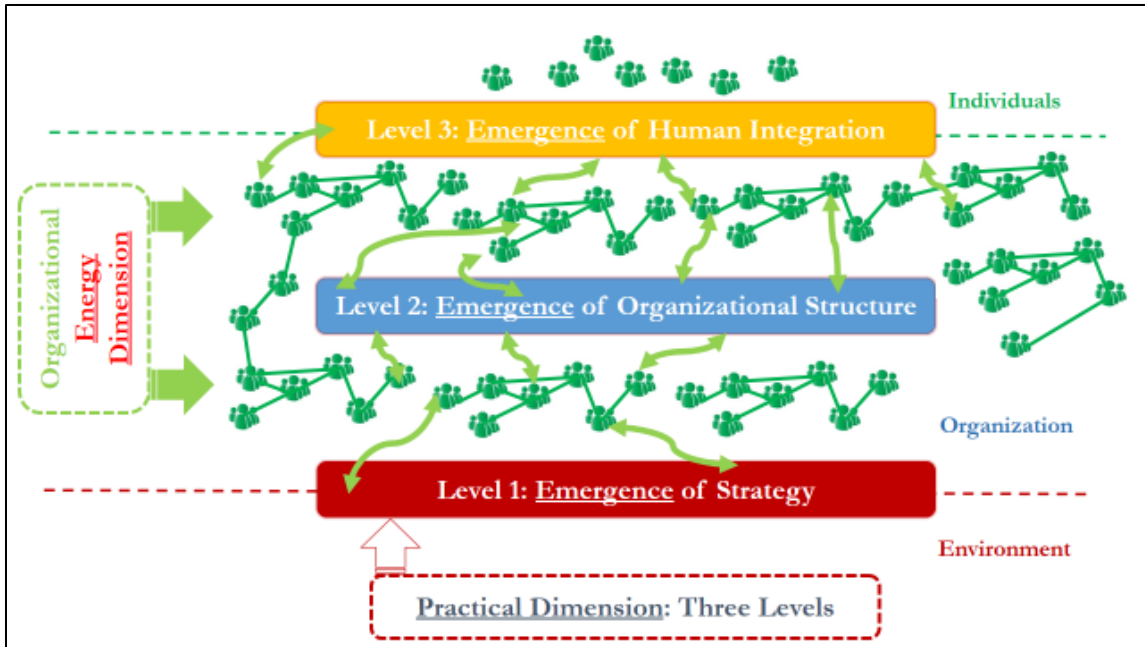


Figure 5-5, The Minimum Three Emergent Process to describe Organizational Change and the Two Dimensions of the Organization

6. The Organization as a Living System: A System Dynamics Model of Organizational Change

“The greatest constant of modern times is change. Accelerating changes in technology, population, and economic activity are transforming our world... The challenge facing us all is how to move from generalizations about accelerating learning and systems thinking to tools and processes that help us to understand complexity, design better policies and guide change in systems from the smallest business to the planet as a whole.”

John D. Sterman, Business Dynamics, 2000.

In Chapter 2, it was analyzed the different models that have been studied organizational change through computer models. In this chapter, taking Anjali Sastry’s model as a starting point, it will be presented a model of organizational change based on the three organizational sectors described in the previous chapter as a way to replicate the interactions among environment-organizational fit, organizational structure and inertia and employee motivation analyzed in the comparative case study. Finally, a discussion of the results will be presented, concluding that the analysis of the potential effects of different environmental requirements to the organization cannot be studied without including organizational structure (i.e. inertia) and employee motivation. This Chapter and its place on the Research Methodology is shown in Figure 6-1 below.

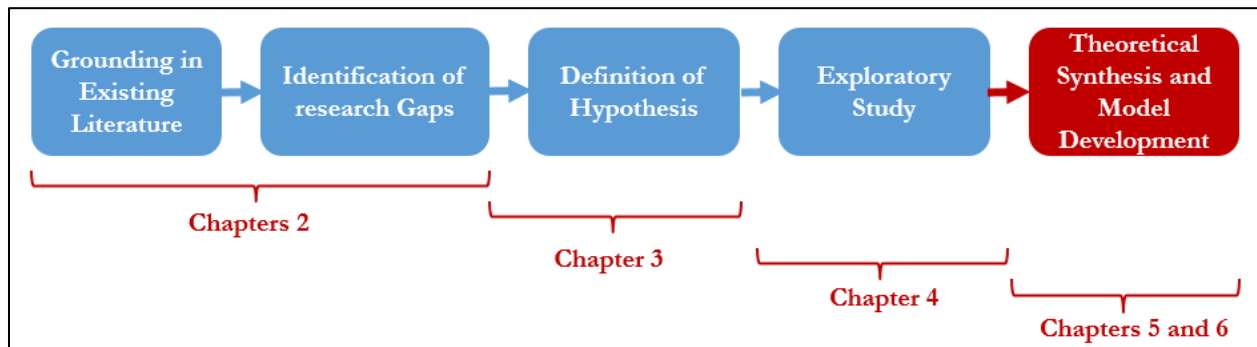


Figure 6-1, Model Development and the Research Methodology

In this section, a system dynamics model of organizational change will be proposed, with a particular focus of integrating different results from different modelling techniques associated with the change phenomenon in general. It will be concluded that the existing models don't take into account people's motivation and integration, central aspects of real organizational phenomena. Additionally, it will be found that three organizational sectors are required to describe the process of organizational change: emergence of strategic direction, emergence of organizational structure and emergence of employee integration. Finally, a discussion of the results will be presented, concluding that the analysis of the potential effects of different environmental requirements to the organization cannot be studied without analyzing organizational structure, organizational inertia and employee motivation.

Following the hypotheses described in the previous section, the model will try to test if organizations that are older have high levels of organizational inertia and low levels of motivation in the long run. On the other hand, the model will try to test if organizations that are young and entrepreneurial balance their structure and inertia as a way to manage the constant changes that it faces from the environment. Thus, the model's final objective will be to show that an effective organization needs a constant evaluation of the environment, organizational structure and employee integration as a way to ensure proper alignment of organizational goals.

6.1 The Emergence of Strategic Direction Sector: A. Sastry's Model revisited

The model of Anjali Sastry provides a good starting point of the emergence of the strategic direction sector (i.e. organizational-environment fit). Pala and Vennix (2001) established that, instead of subtracting the required strategic orientation (by the environment) to the actual strategic orientation (from the organization), it is more robust to use the actual "fit of strategic orientation", arguing that is more difficult to quantify the strategic orientations separately. This formulation can help to reduce the complexity of the problem, but does not eliminate the fact that the "fit" should be measured anyway. The problem of how to operationalize the fit with the environment represents a high degree of complexity too. Thus, as a way to keep the concepts separate in order to analyze the real causal mechanisms in the organizational change phenomena, the model in this sector will follow Sastry's conceptualization and will have separate strategic orientations (i.e. required strategic orientation by the environment and actual strategic orientation from the organization).

6.2 Relationship between Inertia and Competence: Inverted U Shape

One of the first major modifications that are required to include in Anjali Sastry's model is the fact that the relationship between Inertia and Competence appear to be non-linear. As Inertia builds-up, competence starts to increase, but it reaches a point in which too much structural inertia becomes dangerous and degrades the performance (through a decrease in the competence triggered by a decrease in employee motivation). The causal link under analysis is shown with a question mark in Figure 6-2 below.

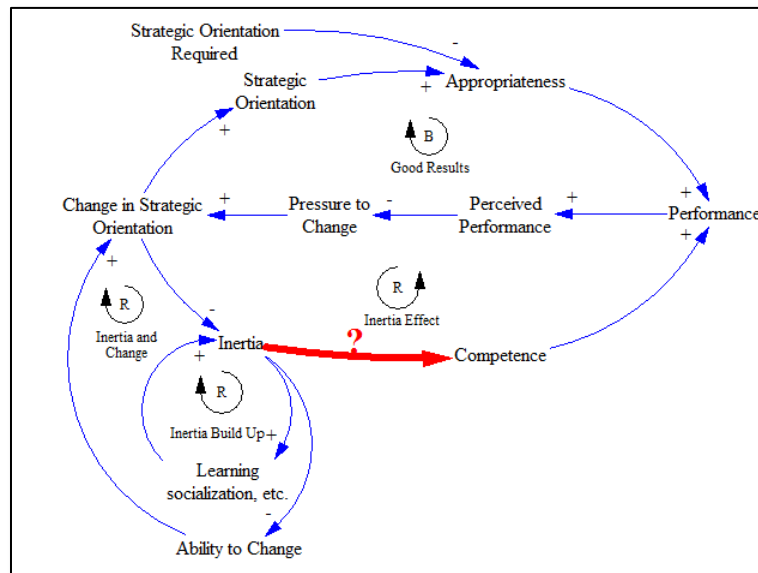


Figure 6-2, Relationship between Inertia and Competence

This relationship was empirically tested by Davis, Eisenhardt and Bingham in 2009. They found supporting empirical evidence (through simulation methods) that performance has an inverted “U-shape type of relationship” with the amount of structure. The authors defined performance as the sum of all payoffs from every opportunity created by the environment and successfully executed by the organization (i.e. their definition of performance is analogous to the concept of organizational-environment fit discussed in this thesis). Additionally, “... the relationship between the amount of structure and performance is unexpectedly asymmetric: performance gradually fades with too much structure but drops drastically with too little. Thus structure and performance do not have an [exact] inverted-U relationship, as argued previously. Rather, efficiency and flexibility are distinct functions that change slowly when structure is high. In contrast, efficiency and especially flexibility change rapidly when structure is low, creating a more acute tradeoff between efficiency and flexibility. The

consequential implication is that it is safer to err on the side of too much structure (efficiency) than on the side of too little (flexibility)” (Davis, Eisenhardt and Bingham, 2009, p.437). Figure 6-3 shows the relationship between structure and performance found by the authors.

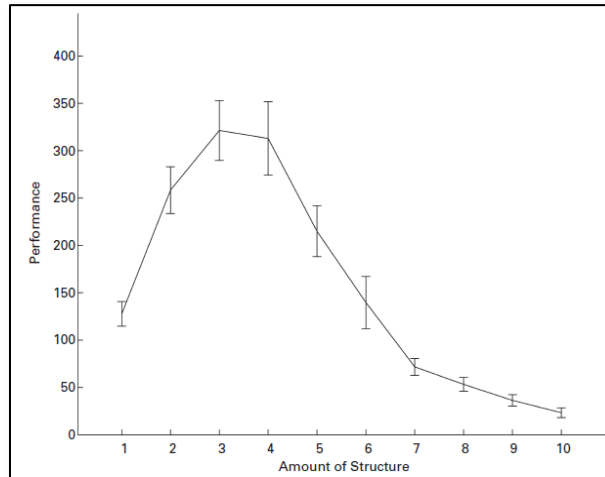


Figure 6-3, Relationship between the amount of structure and performance²⁰

Going back to Anjali Sastry’s model, if the linear relationship between Inertia and Competence shown in Figure 6-2 is changed to a non-linear relationship, the model becomes highly unstable: when the organization reaches the tipping point in which the amount of structure becomes important to reduce the performance, the competence and the performance start to have a balancing decline type of behavior. The development of Tushman and Romanelli’s theory (and thus Anjali Sastry’s model) does not take into account how this behavior could be avoided.

Moreover, if we take into account that inertia is continuously building up and the only process that allows inertia to decrease is the “change in strategic orientation”, the instability of the system (when the linear relationship depicted in Figure 6-2 is removed) becomes evident: in order to avoid a catastrophically failure, the inertia needs to be continuously reduced through changes in the environment, but these changes need to be in perfect synchrony with the relationship between inertia and performance. If not, the most probable outcome would be organizational demise.

The behavior depicted above is far from what is seen in reality: organizations exist everywhere, in almost every geographical location and under different economic environments. Thus, organizations seem much more robust that the unstable system described before.

²⁰ Source: Jason Davis, Kathleen Eisenhardt and Christopher Bingham, 2009: “Optimal Structure, Market Dynamism and the Strategy of Simple Rules”.

Then, how it is possible that organizations show a high level of resilience, despite the fact that, nowadays, the changes are ubiquitous in our modern society? In this thesis, it has been argued that, in order to analyze the stability of the organizational system, one cannot study only one sector of the system: the emergence of strategic direction needs to be analyzed in conjunction with the emergence of organizational structure and the emergence of employee integration. The next section will present the first attempt to reconcile these intrinsically connected domains.

6.3 The Balance among Strategic Direction, Organizational Structure and Employee Integration

As it was discussed previously, the emergence of strategic direction cannot be studied as a standalone process: it is necessary to include all the levels that could help to characterize the change process within an organization: the emergence of strategic direction, the emergence of organizational structure and the emergence of employee integration. One cannot exist without the other. This result becomes evident with the analysis of the strategic sector in the previous section: the non-linear relationship between structure and performance caused the model based on Tushman and Romanelli to become highly instable. In order to represent a more real organizational system, it is required to expand the boundaries of the model and to include explicitly how the inertia is built over time, and what effects this situation have in terms of organizational performance.

Then, what is the relationship between organizational structure and inertia? In developing the Theory of Structuration, Anthony Giddens defined that “...According to the notion of duality of structure, the structural properties of social systems are both medium and outcome of the practices that recursively organize... Structure is not to be equated with constraint, but is always both constraining and enabling.” (Giddens, 1984, p.25). **In this case, organizational structure (that, through the practice dimension of human activity, solidify itself building up inertia) represents a constraint but also a medium: enables the organization to perform the tasks, but at the same time restrict it in terms of its very own boundaries.** Thus, it is important to analyze how Inertia limits the ability to change of an organization. In this case, if inertia builds up, it is most difficult for the organization to create novel solutions to the new requirements of the environment. But the question is why? In this thesis it will be introduced the concept of people’s motivation: when people are motivated, they can modify the structure of an organization and trigger changes within it through an increase in its ability to change. The opposite also occurs: as the inertia starts to build up excessively (as the analysis of Company A shows – see Secion 4),

the motivation falls, limiting the ability to create new things. Therefore, there appears to exist a direct relationship between employee motivation and organizational inertia: if the inertia increases too much, the level of motivation decreases, but on the other hand, a minimum level of organizational structure that will lead to a minimum level of organizational inertia is required for the organization to function properly.

Then, if employee motivation is the link between organizational inertia and ability to change, how employee motivation affects competence? At this point, the solution to this problem seems to appear by itself: there is no a direct link between inertia and competence; the relationship is between employee motivation and competence. If inertia starts to build up from zero, employee motivation will increase and then falls, causing the same behavior in the competence associated with the performance of the tasks involved. But this is not the only consequence of a reduction in employee motivation. Besides reducing organizational competence, a reduction in motivation decreases the level of organizational climate (i.e. it does not only reduces the capacity to perform tasks, but also what others are doing influences the individual behavior as well). Both effects ultimately decreases organizational performance. Additionally, as it was discussed in Section 4, leadership is fundamental to increase employee motivation (e.g. People Express) and also is fundamental to increase the alignment with the organization (Company A). Figure 6-4 shows the processes (in green) described in the previous paragraphs, integrated in the modified model of Anjali Sastry.

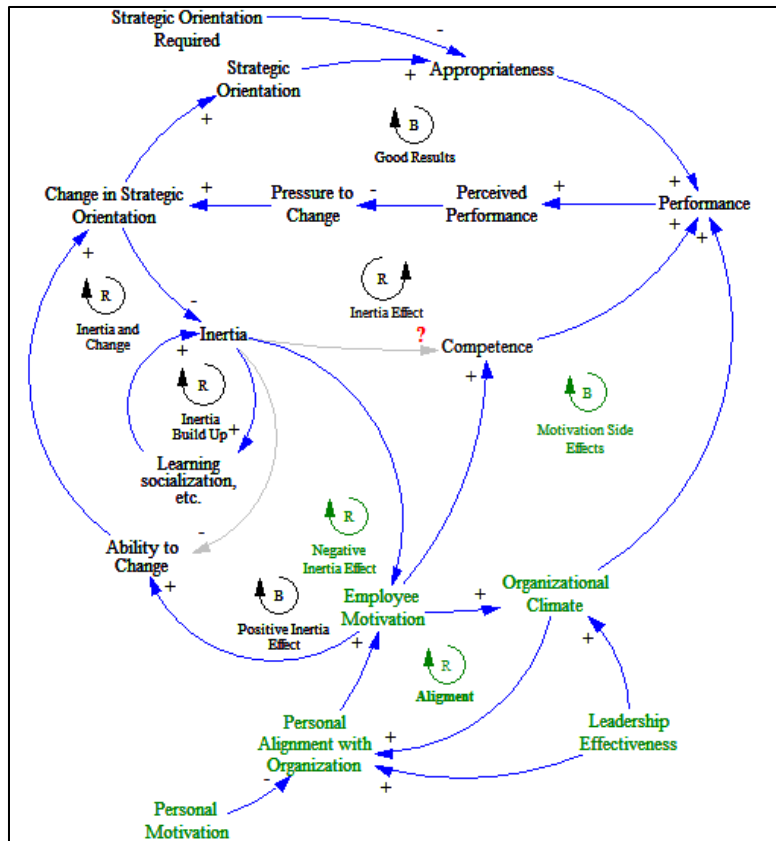


Figure 6-4, Balance among Strategic Direction, Inertia and Motivation

Additionally, it is important to note that there is a reinforcing loop when the employee motivation is increased: If we increase employee motivation, the organizational climate is also increased, motivating others to be more aligned with the organization. This alignment is a strong force that helps to integrate the employees within the organization. If, in this case, the alignment with the organization is increased, the employee alignment shortfall will be reduced, increasing again the levels of employee motivation.

With the simple diagram described in this section, one could argue that the three emergent processes described in the previous chapters are interacting with each other within an organization, and the factor that “holds the system together” is the employee motivation.

6.4 Formalizing the Model

The stock and flow model that depicts the relationships described in the previous sector is comprised by three main processes: the strategic direction (represented by the fit with the environment), the organizational structure (represented by its effect on the inertia of the system) and the employee

integration (represented as a combination of employee motivation and employee alignment with the organization).

In this section it will be reviewed the additional components that allow a proper interaction within the system. One important concept to define is organizational performance. In this case, the definition from Sastry’s model will be modified: organizational performance now is a combination of competence, appropriateness (i.e. strategic fit with the environment) and the quality of the organizational climate. Thus, as the performance decreases, more pressure is sensed by the organization, triggering changes in the strategic direction, reducing the inertia but increasing the appropriateness.

This section will discuss the main sectors of this system: strategic orientation, organizational performance, pressure to change, inertia, employee motivation and finally, employee alignment. The interactions among these sectors are described in the high level causal loop diagram analyzed previously (Figure 6-4 above). The starting point of this model was to replicate the original equations developed by Sastry in her model. The complete set of equations that fully described the stock and flow model can be found in Appendix 1.

6.4.1 Strategic Orientation

Following Sastry’s implementation of this sector, Strategic Orientation is a “... state variable that is changed by decisions made in the organization. Change in strategic orientation is determined by two factors... pressures due to poor performance [Pressure to Change] ... and the ability to change.” (Sastry, 1997, p.250).

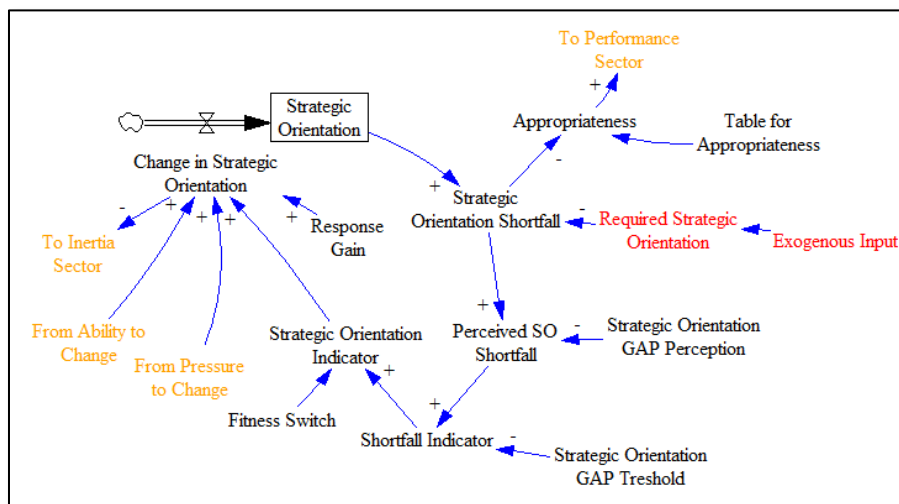


Figure 6-5, Strategic Orientation Stock and Flow Diagram

Strategic orientation, in turn, determines the organization appropriateness: the required strategic orientation is the orientation required to achieve high performance. The difference between the required strategic orientation and the actual strategic orientation defines the shortfall or gap. Sastry defined that this shortfall determines the appropriateness through a table function as follows, since a small gap means high appropriateness and a low gap means low appropriateness.

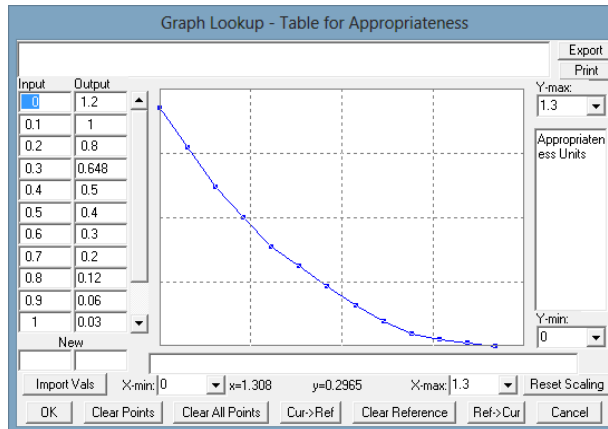


Figure 6-6, Table Function for Appropriateness

The strategic orientation shortfall also has an impact on the change in strategic orientation: if the shortfall is high, the decision makers within in an organization will increase the change in the strategic orientation as a way to increase the fit with the environment. Sastry added the “fit measurement routine” represented by the auxiliary variable “strategic orientation indicator” in Figure 6-4 above. Thus, the Strategic Orientation is given by the following formula:

$$Strategic\ Orientation = \int Ability\ to\ Change\ x\ Pressure\ to\ Change\ x\ SO\ Indicator$$

6.4.2 Performance

In the previous model, organizational performance was defined as the multiplication of competence and appropriateness; and competence was defined as proportional to organizational inertia by a factor of 1.2. In the current formulation, competence is proportional to the level of motivation of the employees, which in turn depends on the level of inertia involved in the internal processes of an organization.

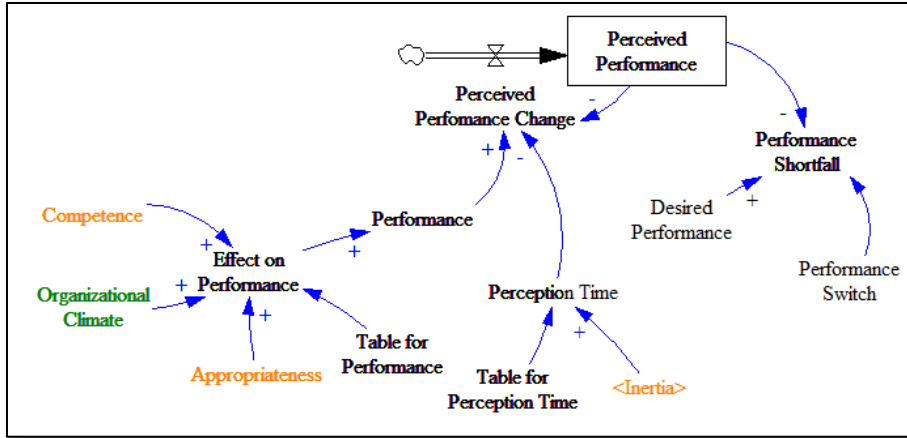


Figure 6-7, Organizational Performance Stock and Flow Diagram

In this model, organizational performance is dependent on competence, organizational climate and appropriateness. Following Sastry’s formulation, these variables will have a linear effect on performance until saturation over 100%. This relationship is depicted in non-linear relationship depicted in Figure 6-8.

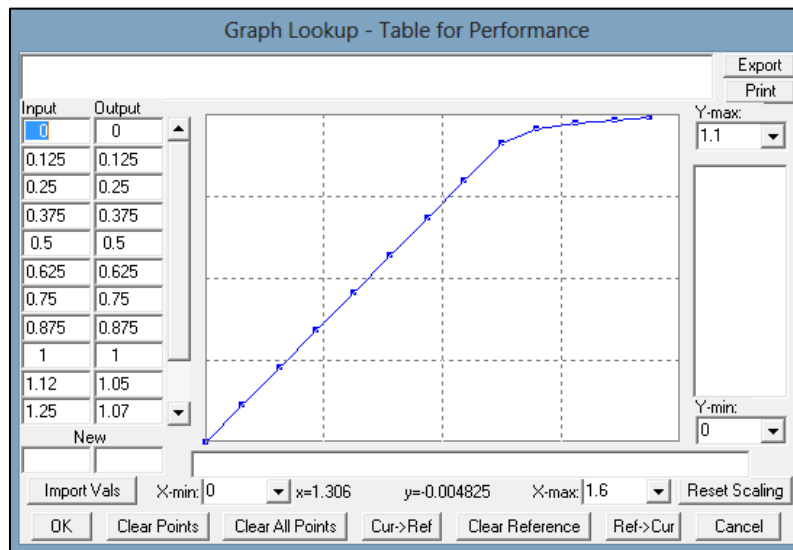


Figure 6-8, Table for Performance

The organizational performance will not be directly sensed by the organization. Following Sastry’s model, it will have a delay which depends on the organizational inertia: “The time constant governing this adjustment process is itself a function of the state of the organization. As inertia increases, the time required to perceive anomalous or new information increases.” (Sastry, 1997, p.251). The rate of increase of perceived performance in this case is given by:

$$\text{Perceived Performance Change} = \frac{\text{Performance} - \text{Perceived Performance}}{f(\text{Inertia})}$$

Where $f(\text{Inertia})$ is an s-shape curve which describes the effect of the inertia in the time required to perceived the performance within the organization.

6.4.3 Pressure to Change

Figure 6-9 below is a perfect representation of Sastry’s model. The Pressure to Change is increased by Performance shortfall and decreased if a change in strategic orientation is initiated. Sastry developed a trial routine as a way to avoid continuous re-orientations: if the perceived strategic orientation change goes above a certain threshold, the trial routine is activated for a period defined by the trial period length. If the trial period is activated, the inflow rate in the pressure to change stock equals the outflow. This means that the organization does not take into account new information when a change adjustment routine is currently in progress within the organization. Hence, this is an important routine that prevents continuous re-orientations²¹.

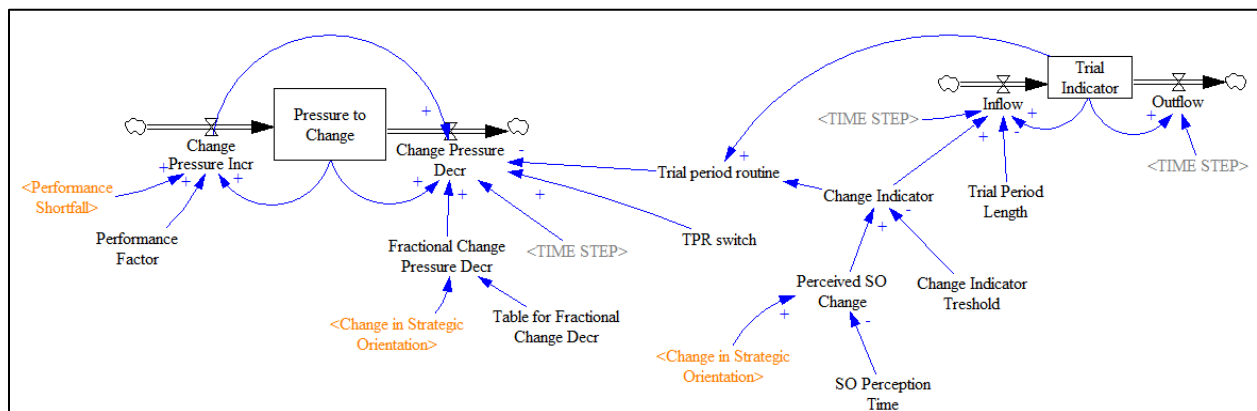


Figure 6-9, Pressure to Change Stock and Flow Diagram

6.4.4 Inertia

The Organizational Inertia Sector follows the same formulation in developed in Sastry’s paper. In this formulation, all else equals, the inertia increases at an increasing rate. This means that the organization, through its usual processes and routines, starts to build inertia through socialization and learning. “When inertia is low, socialization... is weak... At this point inertia grows by only a small increment, although the fractional rate of increase is high.... Eventually, these processes reach a point of

²¹ For a complete formulation of the trial period routine, see Appendix 1.

diminishing growth: once organizational members are homogenous, adding another similar member does little to further increase the level of homogeneity; once internal and external relationships are solidified, they cannot be elaborated much more.” (Sastry, 1997, p.248). The overall stock and flow diagram and the table function just described are depicted in Figures 5-8 and 5-9 below.

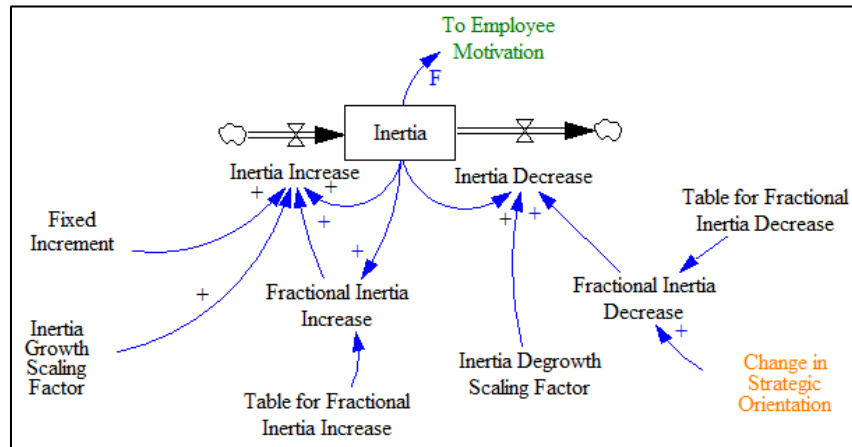


Figure 6-10, Organizational Inertia Stock and Flow Diagram²²

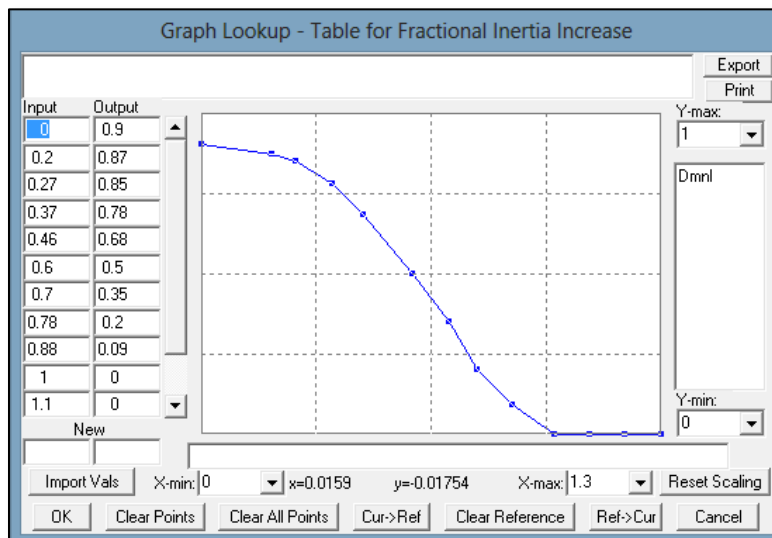


Figure 6-11, Inertia Growth Table

On the other hand, inertia decreases only when the organization changes its strategic direction. In this case, the nonlinear function defined by Sastry has the following shape:

²² The “F” in the causal arrow between inertia and motivation denotes the fact that a nonlinear function exists to describe this relationship.

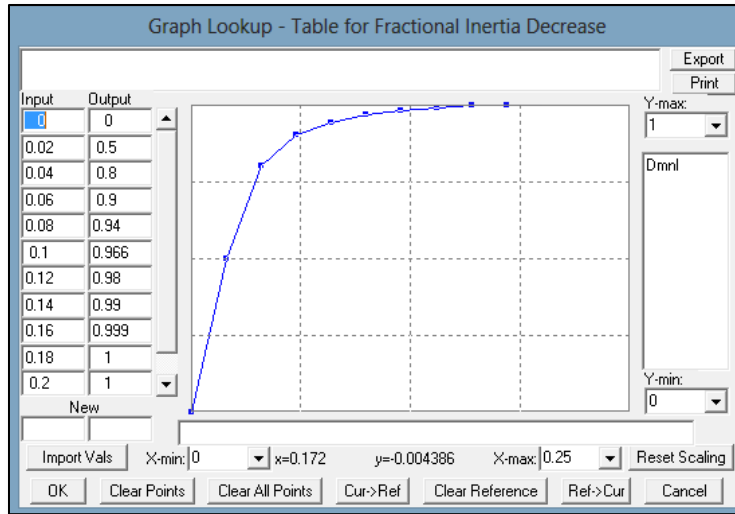


Figure 6-12, Inertia Decrease Table

It is important to note that in this case, it was added a causal relationship between organizational inertia and employee motivation. This causal relationship will be reviewed in the next section.

6.4.5 Employee Motivation

As discussed previously, employee motivation influences the level of competence (and thus, the level of performance within an organization). On the other hand, Inertia and employee alignment will have an influence both in the increase and also in the decrease rates of employee motivation. The stock and flow model of this sector is shown in Figure 6-13 below.

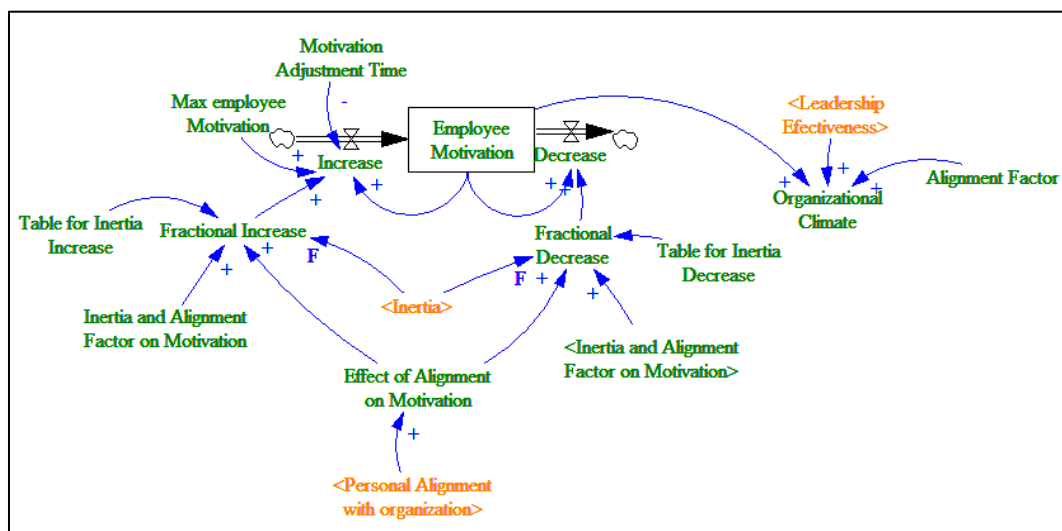


Figure 6-13, Employee Motivation Stock and Flow Diagram

The Fractional Increase of Employee Motivation is defined as the sum of the effects of Inertia and Employee Alignment, as follows:

$$\text{Fractional Increase} = \text{Table}(\text{Inertia}) + \text{Effect of Alignment on Motivation}$$

The nonlinear relationship between Inertia and Motivation Increase follows the table function depicted in figure 6-14 below.

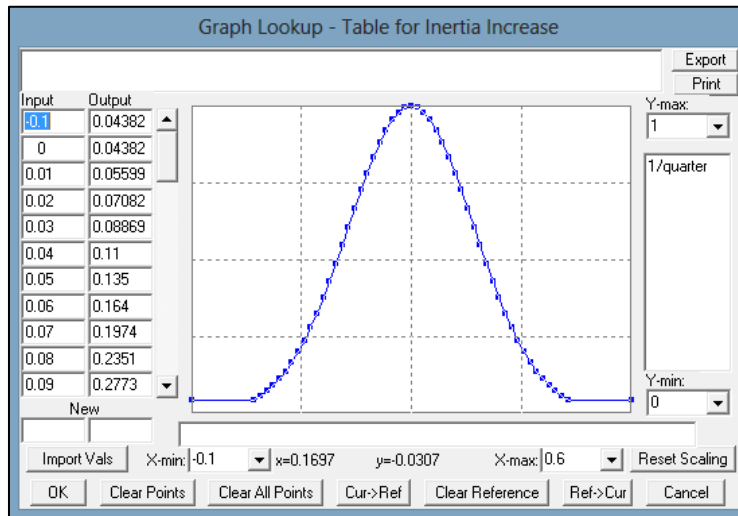


Figure 6-14, Table for Motivation Increase as a function of Inertia

In this case, following the nonlinear relationship (inverted U-shape) between inertia and performance developed by Davis et al (2007) described in Section 6.2 of this thesis, at low levels of inertia, the rate of performance increase increases quickly. In this thesis it has been argued that an increase in employee motivation leads to an increase in competence, which in turns leads to an increase in performance. Thus, if inertia is at a low level and starts to increase, the effect on the rate of increase of employee motivation starts to builds quickly, until it reaches a maximum after which the rate of motivation increase falls to minimum levels.

Due to the fact that the stock of employee motivation does not react immediate to changes in Inertia and Alignment, the Increase Rate of Employee Motivation is defined, following a first order control, as follows:

$$\text{Increase Rate} = \text{Fractional Increase} \times \frac{\text{Max Employee Motivation} - \text{Employee Motivation}}{\text{Motivation Adjustment Time}}$$

On the other hand, the effects of Inertia and Alignment follows a similar pattern on the rate of motivation decrease, but with a different nonlinear relationship between Inertia and Motivation Decrease, as depicted in Figure 6-15 below. In this case, the formulations are as follows:

$$\text{Fractional Decrease} = \text{Table}(\text{Inertia}) + \text{Effect of Alignment on Motivation}$$

$$\text{Decrease Rate} = \text{Fractional Increase} \times \text{Employee Motivation}$$

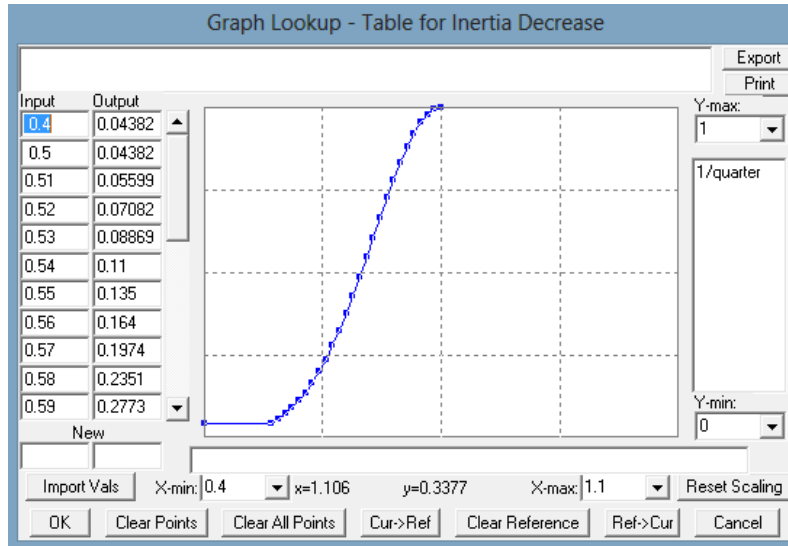


Figure 6-15, Table for Motivation Decrease as a function of Inertia

In this case, as inertia starts to build up, employee motivation starts to decrease. The decrease rate will rise until reach a maximum. If inertia increases further, the rate of motivation decrease will be sustained at high levels (i.e. more inertia will demotivate even more the employees).

In addition, Employee Motivation will increase Organizational Climate, which also will be affected by how effective are the leaders within the organization in aligning the employees with the organization's goals. This alignment sector will be discussed in the next section.

6.4.6 Alignment

The alignment sector represents an important effect within organizational settings. On the one hand, organizational climate represents the idea of how well the social networks within the organization function. This concept represents an upper bound to how aligned could be the employees with the organization. If the capacity of social networks is low, the maximum potential effect of employee alignment will be defined by the maximum potential defined by the capacity of the organizational social

networks (i.e. organizational climate). If climate is high, the effects of having a high alignment within the organization could also be high.

In this sector has been added a noise function to include the idea that each individual employee has different objectives. Then, how to take into account this variability? The Maximum Alignment will carry the noise signal as a representation of the embedded social networks within the organization.

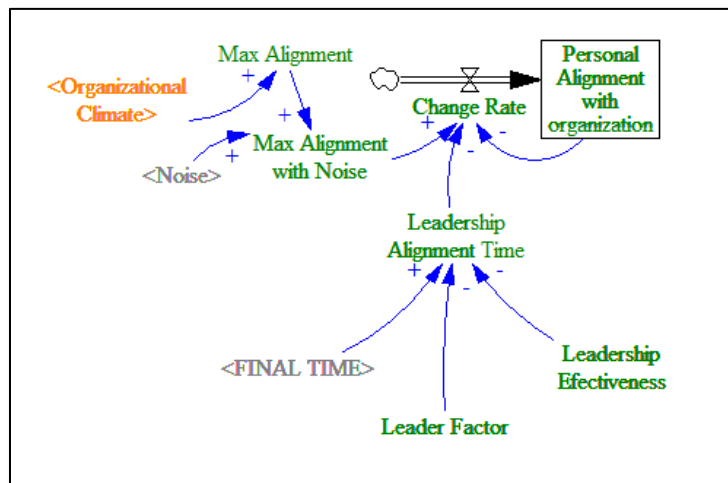


Figure 6-16, Alignment Stock and Flow Diagram

The dynamics of this sector will be defined as follows: if leaders are more effective, the alignment process will take less time, reaching the maximum alignment (i.e. reaching the maximum organizational climate) quickly. On the other hand, if leaders are not effective, the alignment process will take a long time, reducing the potential effect of a good organizational climate in the overall results from the organization.

The main equations for this sector are as follows:

$$\text{Change Rate} = \frac{(\text{Max Alignment with Noise} - \text{Personal Alignment with organization})}{\text{Leadership Alignment Time}}$$

$$\text{Leadership Alignment Time} = \frac{\text{FINAL TIME}}{\text{Leader Factor} \times \text{Leadership Effectiveness}}$$

In what follows, the overall interaction among the sectors previously reviewed will be analyzed.

6.5 Simulating the Model

The initial step in the simulating process is to ensure dimensional consistency. All the variables were set up accordingly²³, as it can be seen in Figure 6-1 below. For additional reference, the complete documented model is included in Appendix A.

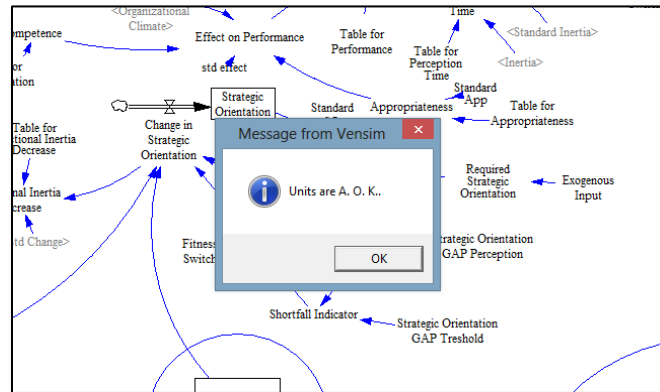
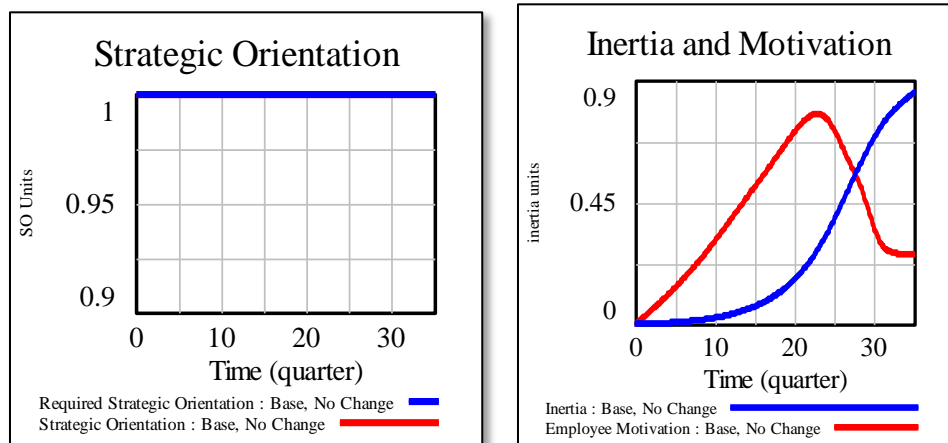


Figure 6-17, Units Consistency

6.5.1 Initial Equilibrium Tests

The initial equilibrium test will examine if the model behavior follows the expected pattern. In this case it is important to note that it is expected that, without the influence of external inputs (i.e. without changes in the environment-organization fit), the organization starts to build inertia. This would mean that the initial equilibrium will show change within the inertia stock variable and the associated variables.



²³ Due to the conceptual nature of the variables of this model, additional variables were added to ensure dimensional consistency.

Figure 6-18, Dynamic Equilibrium

In this case, starting with zero Inertia and Motivation, Inertia starts to build up. While Inertia is low, motivation continue to rise, until reaches a threshold, after which the motivation starts to plummet. This relationship is in line with the overall expected behavior.

In what follows, it will be analyzed the results of the simulation based on the dynamic hypotheses previously defined in Section 3. The hypotheses are shown below for reference:

H1: Under low requirements for change (i.e. stable organizational-environment fit), organizations tend to increase their inertia (i.e. tend to be more bureaucratic).

H2: Under high requirements for change (i.e. unstable organizational-environment fit), organizations tend to try to reduce their inertia (i.e. increasing their ability to change), as a way to adapt themselves to the environment.

6.5.2 H1: Tests under Stable Organizational-Environment Fit (no exogenous changes) – Company A

The system dynamics model presented shows 5 main level variables or stocks: Strategic Orientation, Inertia, Employee Motivation, and Pressure to Change and Perceived Performance. If no changes are required in the environment, no change in strategic orientation is required, therefore the strategic orientation remains at a constant level (i.e. stable organizational-environment fit). With this condition, it can be seen that the organization starts to build inertia. On the other hand, employee motivation shows an inverted U-Shape type of behavior with respect to inertia, stabilizing when inertia stops to rise. Under this type of behavior, performance is given mainly the employee motivation that drives organizational competence and organizational climate.

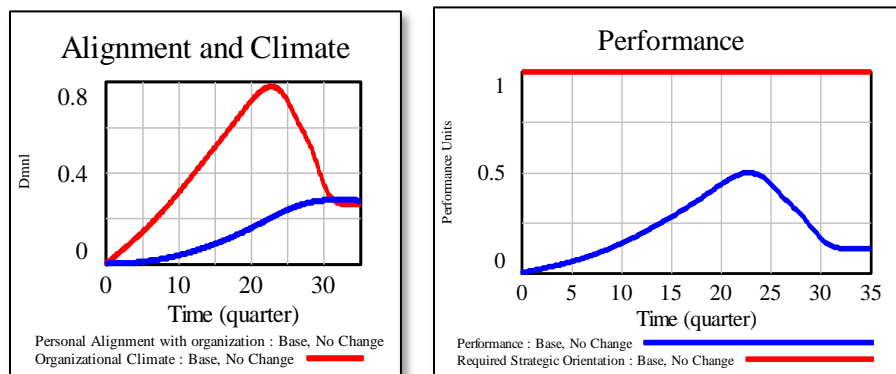


Figure 6-19, Alignment, Climate and Performance

Additionally, it is interesting to note that the non-linear behavior in the relationship between inertia and performance is shown also in the output graphs for performance: as the inertia starts to increase, the performance also increases, but reaches a maximum. If the inertia increases further this point, the performance starts to be reduced. Therefore, under a stable environment, in which no changes are required, building inertia is the main mechanism that explains why performance is reduced in the long run.

In order to analyze the impacts of inertia in the other variables, a sensitivity analysis, through Monte Carlo simulation, has been carried out. The range for inertia varied from 0-0.3 under a random uniform distribution. Figure 6-20 shows the results of the simulation for two other stock variables: employee motivation and perceived performance.

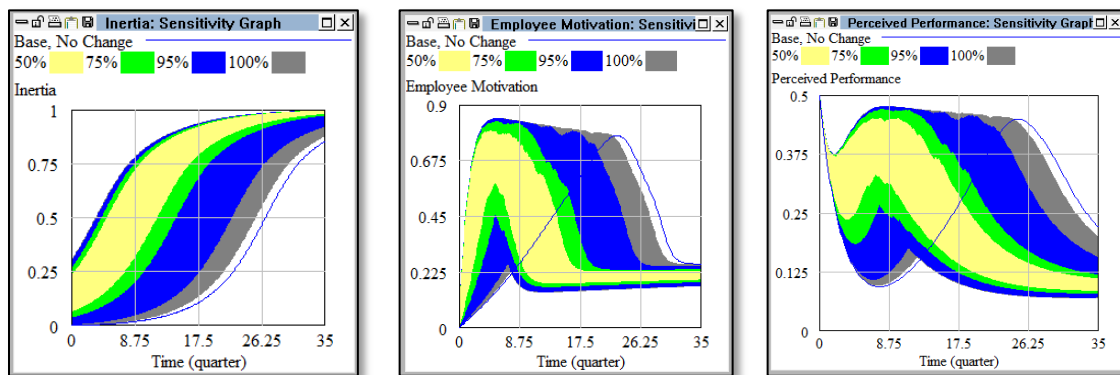


Figure 6-20, Sensitivity Analysis, Inertia from 0-0.3

The simulation runs show that the model is highly sensitive to changes in organizational inertia: varying the initial inertia from 0-0.3 led to a wide range of results. Thus, in order to develop simulation runs for different types of organizations according to their inertia values, low values of initial inertia need to be taken for young entrepreneurial type of organizations and higher values of initial inertia need to be taken for old and bureaucratic type of organizations.

6.5.3 H2: Tests under Unstable Organizational-Environment Fit (exogenous changes as sine wave) – People Express Rise

The unstable environment will be simulated with a sine wave input, with 65% of sine amplitude and with a period of 20 quarters. A sine wave could be thought as continuous internal reorientations due to poor environment-organizational fit (e.g. radical changes experienced by People Express). This means that, at the sine start time, a reorientation of 65% will be triggered. In this case, it will be reviewed the case of a

typical young organization, with 50% Initial Motivation, 50% Leadership effectiveness and 0.15 Initial Inertia.

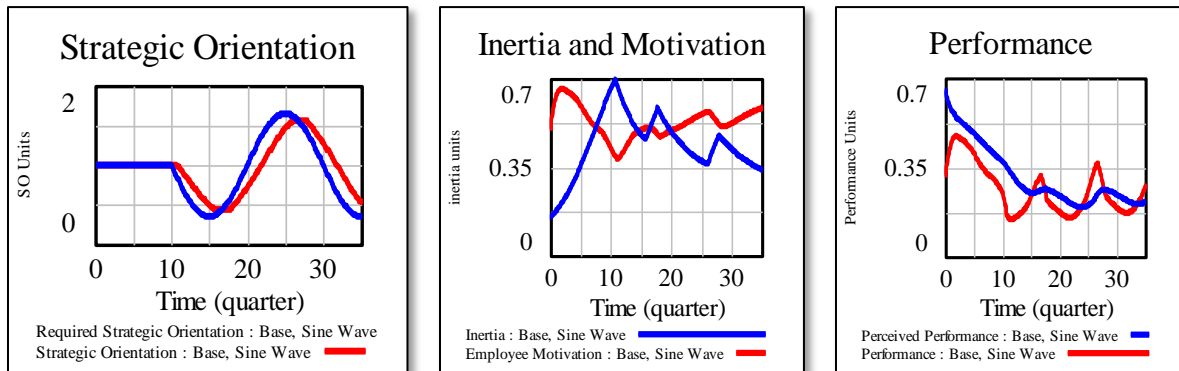


Figure 6-21, Young Organization under a high velocity environment

The graphs show that a young organization can cope with high levels of changes in the environment. Even though inertia starts to build quickly, as soon as the organization starts to experience the changes in the environment, the organizational inertia starts to decrease, but the motivation will start to increase slowly. On the other hand, performance will be reduced in the short term, but will be stabilized in the long run. In this case, the model shows that this young organization has been able to cope with the changes triggered in the environment. It is important to note that the change indicator is in 0.2. This would mean that the organization will not enter the trial period until reaches a perceived change in Strategic Orientation above 20%. In this case, the trial period routine is not active: this means that the organization deals with the changes continuously.

6.5.4 Tests under Unstable Organizational-Environment Fit (exogenous changes as sine wave) – People Express Demise

If we increase the level of changes in the environment with an additional ramp input (that could be thought as an additional reduction in organizational-environment fit due to management policies (i.e. buying more airplanes), the model shows that there is a limit in which the organization is not able to deal with the continuous changes in the environment.

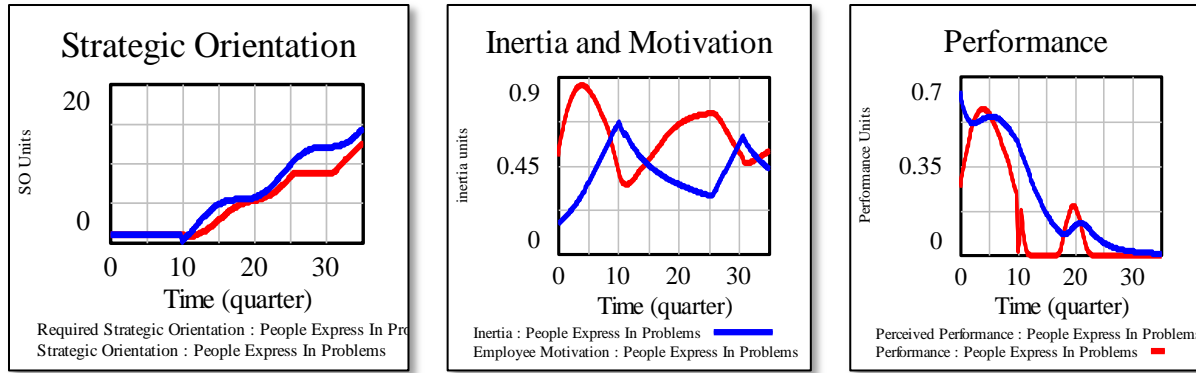


Figure 6-22, People Express In Problems

In this case, the organization continuously changes its strategic orientation (due to internal and external pressures), the motivation drops to less than medium levels, with a really poor performance. This condition is not stable in the long run: low levels of performance will finally trigger the organizational demise.

6.5.5 High Levels of Initial Inertia and its Effect on Motivation and Performance

If we go back to the original level of changes in the environment (sine amplitude: 65%, sine start time: 10 quarters, sine period: 20 quarters), it could be interesting to see how an organization with different characteristics could deal with these changes.

In particular, the initial level of organizational inertia will be increased (0.8), representing a bureaucratic organization. Because of the inherent characteristics of this type of organization, the threshold for the trial period routine should be reduced: this means that the organization does not have the capability to continuously deal with changes within the environment. This is, when the organization is in a change process, the pressure to change felt by the organization will not increase, even though in reality the required strategic orientation shows a different effect. In this case, setting the “change indicator threshold” to 0.15, initial motivation of 0.2, leadership effectiveness of 0.15 and noise standard deviation of 0.6 (i.e. difficult to achieve a proper employee alignment where there is no incentives to perform), represent factors related to an old and bureaucratic organization.

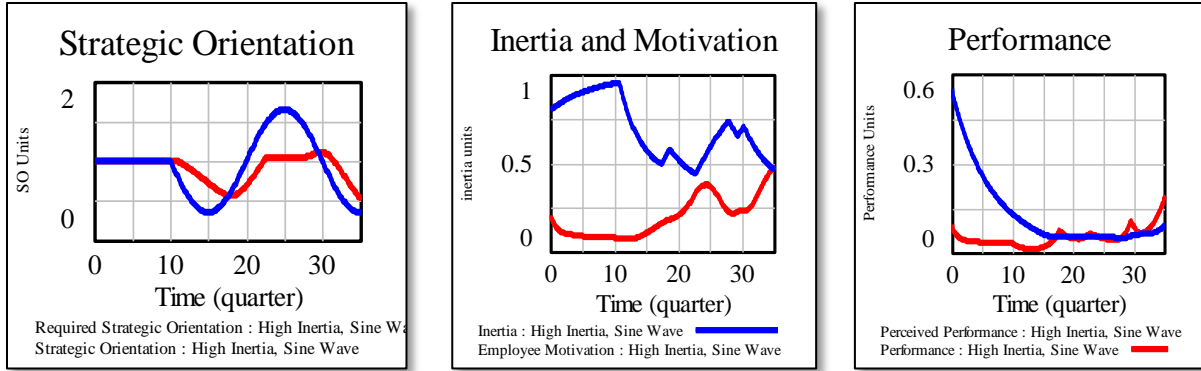


Figure 6-23, High Inertia (Old Organization) and Sine Wave

The Strategic Orientation Graph shows that the strategic orientation felt by the organization does not mimic the required strategic orientation. This would mean that the organization is currently on the trial period, busy dealing with the current re-orientation process. This situation can be seen clearly in the behavior of the trial period routine shown in figure 6-24 below.

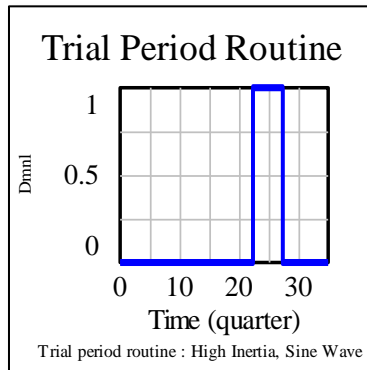


Figure 6-24, Trial Period Routine, High Inertia Organization

7. Discussion and Implications

Based on the Research Methodology defined in Figure 7-1 below, in Section 3 it was found that a research gap existed in the extant literature of System Dynamics models of organizational change. Even though different and important contributions have been developed in order to understand this process, none of the contributions or models studied has been successful in defining the minimum set of processes required to characterize organizational change and its influences on the organizational system.

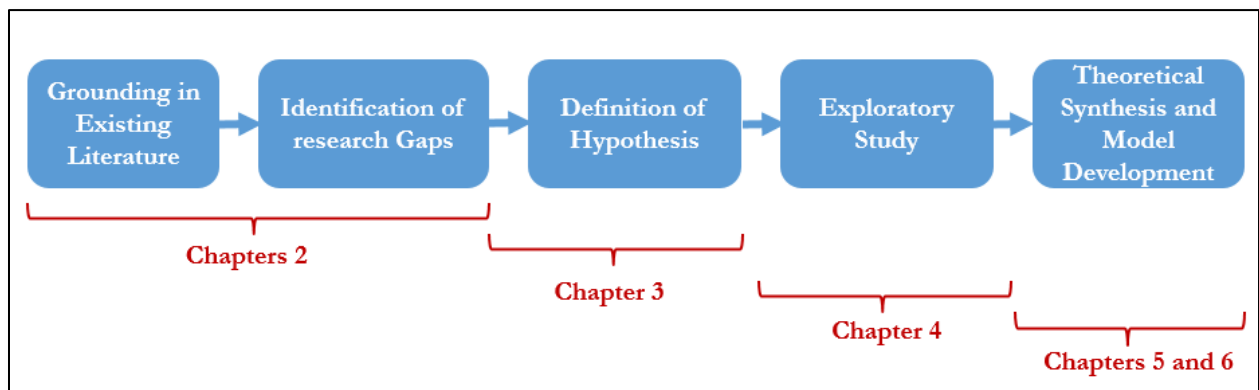


Figure 7-1, The Research Methodology and Final Discussion

In Section 5 there were defined two dynamic hypotheses: H1: Under low requirements for change (i.e. stable environment), organizations tend to increase their inertia (i.e. tend to be more bureaucratic) and H2: Under high requirements for change (i.e. unstable environment), organizations tend to try to reduce their inertia (i.e. increasing their ability to change), as a way to adapt themselves to the environment.

In Section 4 an exploratory study was conducted through a comparative-case study analysis. The organizations studied were a large and old multinational corporation with more than 100 years of history and a young-entrepreneurial company (represented by People Express airline). From the comparison of these two cases it was found that there exist important insights that could be expanded in future research. On the one hand, under a stable organizational-environment fit, no radical changes are triggered within the organization, reinforcing the organizational structure through standardization and replication of existing processes and procedures. While this mechanism improves efficiency, this reinforcement increases the level of organizational inertia, reducing the employee motivation in the long run. On the other hand, a young and entrepreneurial organization is more prone to demise due to the fact that lacked the organizational structure, and hence, inertia, required the adaptation to radical

changes. Apparently, there exists a minimum level of organizational structure that allows an organization to function. If this minimum level is not achieved, this could result in organizational demise, situation that was shown in the PE case. But if the organization has sustained levels of organizational structure, and these levels are reinforced by the organization, the inertia start to build up quickly, reducing employee motivation. In both of these cases, the role of leadership is fundamental: In PE Donald Burr was one of the main motors of employee motivation (PE's main characteristic) and in Company A case, leadership was the factor that allowed the replication and standardization across projects (Company A's main competitive advantage).

In Section 5 and 6, a synthesis through a system dynamics model was developed. Previous System Dynamics models (Sastry 1997 and Pala and Vennix, 2001) represent good progress in terms of theory development, but failed to model the non-linear relationship between inertia and organizational performance. Additionally, these models failed to include a central process in organizations: employee motivation and their integration into the organizational processes. As expected, the system dynamics model developed is highly dependent on employee motivation, allowing to test the hypotheses previously defined.

The Implications of this thesis are two-fold: on the one hand, it was found that, within the cases studied, three processes are required, as a minimum, to characterize change within organizational systems: the emergence of strategic direction, the emergence of organizational structure and the emergence of employee's integration. These three processes need to be analyzed as a whole, in order to take into account the feedback processes inherent of complex systems. This thesis defines that the variable that hold these processes together is the employee motivation. Additionally, it was found that existing System Dynamics models need to be extended in order to include the three processes previously described. The development of the integrated model presented in this thesis could be defined as a starting point for future developments with the final objective to define formal tools to analyze change within organizational settings. For example measuring employee motivation and organizational inertia could be defined as a proxy for an organization's ability to change, but further research is required in order to empirically obtain the non-linear relationships deductively defined in the model presented on this thesis.

References

- Allen, P., Maguire, S., & McKelvey, B. (2011). *The SAGE handbook of complexity and management* Los Angeles; London: SAGE, 2011.
- Argyris, C. (1993). *Knowledge for action: A guide to overcoming barriers to organizational change / chris argyris* San Francisco: Jossey-Bass, c1993; 1st ed.
- Argyris, C., & Schön, D. A. (1974). *Theory in practice: Increasing professional effectiveness / chris argyris, donald A. schön* San Francisco: Jossey-Bass Publishers, 1974; 1st ed.
- Barley, S. R., & Kunda, G. (2001). Bringing work back in. *Organization Science*, (1), 76.
- Burr, D. (1985). Question and answer with an MBA Class. Harvard Business School. DVD.
- Brown, S. L., & Eisenhardt, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, (1), 1.
- Coase, R. H. (1937). The nature of the firm. *Economica*, (16), 386.
- Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm [by] richard M. cyert [and] james G. march. with contributions by G. P. E. clarkson [and others]* Englewood Cliffs, N.J., Prentice-Hall, 1963.
- Davis, J. P., & Eisenhardt, K. M. (2011). Rotating leadership and collaborative innovation: Recombination processes in symbiotic relationships. *Administrative Science Quarterly*, 56(2), 159.
- Davis, J. P., & Eisenhardt, K. M. & Bingham, C. B. (2007). Developing theory through simulation methods. *Academy of Management Review*, 32(2), 480.
- Davis, J. P., Eisenhardt, K. M., & Bingham, C. B. (2009). Optimal structure, market dynamism, and the strategy of simple rules. *Administrative Science Quarterly*, 54(3), 413.
- DiMaggio, P. J. (1995). Comments on 'what theory is not'. *Administrative Science Quarterly*, (3), 391.
- DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147-160.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *The Academy of Management Journal*, (1), 25.

- Eisenmann, T. & Barley, L. (2012). People Express Airline. Harvard Business School case.
- Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science*, (5), 1240.
- Forrester, J. W. (1971). *Principles of systems / jay W. forrester* Cambridge, Mass.: Productivity Press, between 1971 and 1994].
- Forrester, J. W. (1999). *Industrial dynamics / jay W. forrester* Waltham, MA: Pegasus Communications, c1999.
- Ghemawat, P. (2002). Competition and business strategy in historical perspective. *Business History Review*, 76(1), 37.
- Giddens, A. (1979). *Central problems in social theory: Action, structure, and contradiction in social analysis / anthony giddens* Berkeley: University of California Press, 1979.
- Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration / anthony giddens* Berkeley: University of California Press, 1984.
- Giddens, A., & Dallmayr, F. R. (1982). *Profiles and critiques in social theory / anthony giddens ; chapter 2 contributed by fred dallmayr* Berkeley: University of California Press, c1982.
- Hannan, M. T., & Freeman, J. (1977). Population ecology of organizations. *American Journal of Sociology*, 82, 929-964.
- Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*, 49, 149-164.
- Hannan, M. T., & Freeman, J. (1989). *Organizational ecology / michael T. hannan, john freeman* Cambridge, Mass.: Harvard University Press, 1989.
- Hannan, M. T., Pólos, L., & Carroll, G. (2007). *Logics of organization theory: Audiences, codes, and ecologies / michael T. hannan, lászló pólos, glenn R. carroll* Princeton, N.J.: Princeton University Press, c2007.
- Hannan, M. T., Pólos, L., & Carroll, G. R. (2003). Cascading organizational change. *Organization Science*, (5), 463.
- Hax, A. C. (2010). *The delta model [electronic resource]: Reinventing your business strategy / arnoldo C. hax* New York: Springer, 2010.
- Helfat, C. E. (2007). *Dynamic capabilities: Understanding strategic change in organizations* Malden, MA: Blackwell Pub., 2007.

- Holland, P. and Beer, M. (1993). People Express Airlines: Rise and Decline. Harvard Business School Case.
- Levinthal, D., & March, J. G. (1981). A model of adaptive organizational search. *Journal of Economic Behavior and Organization*, 2, 307-333.
- March, J. G. (1981). Footnotes to organizational change. *Administrative Science Quarterly*, 26(4), 563.
- Merton, R. K. (1957). *Social theory and social structure* Glencoe, Ill., Free Press, 1957; Rev. and enl. ed.
- Meyer, A., Frost, P. J., & Weick, K. E. (1998). The organization science jazz festival: Improvisation as a metaphor for organizing: Overture. *Organization Science*, (5), 540.
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83, 340-363.
- Morecroft, J. D. W., Sanchez, R., & Heene, A. (2002). Systems perspectives on resources, capabilities, and management processes Amsterdam ; New York : Pergamon, 2002; 1st ed.
- Orlikowski, W. J. (1999). *Technologies-in-practice: An enacted lens for studying technology in organizations* Cambridge, MA: Sloan School of Management, Massachusetts Institute of Technology, 1999].
- Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, (4), 404.
- Palla, O. & Vennix, J. (2001). Dynamics of Organizational Change. Presented in the 19th International Conference of The System Dynamics Society.
- Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179-191.
- Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective / jeffrey pfeffer, gerald R. salancik* New York: Harper & Row, c1978.
- Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors / michael E. porter* New York: Free Press, c1980.
- Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance / michael E. porter* New York: Free Press; London: Collier Macmillan, c1985.
- Sastry, A. (1995). Time and tide in organizations: Simulating change processes in adaptive, punctuated, and ecological theories of organizational evolution. PhD thesis.

- Sastry, M. A. (1997). Problems and paradoxes in a model of punctuated organizational change. *Administrative Science Quarterly*, (2), 237.
- Senge, P. M. (1990). *The fifth discipline : The art and practice of the learning organization* / peter M. senge New York : Doubleday/Currency, c1990; 1st ed.
- Sterman, J. (2000). *Business dynamics : Systems thinking and modeling for a complex world* / john D. sterman Boston : Irwin/McGraw-Hill, c2000.
- Sterman, J., Mosekilde, E., & Larsen, E. (1988). Experimental evidence of deterministic chaos in human decision making behavior / john sterman, erik mosekilde, erik larsen Cambridge, Mass. : Sloan School of Management, Massachusetts Institute of Technology, 1988; Rev. June 1988.
- Sutton, R. I., & Staw, B. M. (1995). What theory is not. *Administrative Science Quarterly*, (3), 371.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509.
- Tushman, M. L., & Romanelli, E. (1985). Organizational evolution: A metamorphosis model of convergence and reorientation. *Research in Organizational Behavior*, 7, 171.
- Varela, F. J. (1979). *Principles of biological autonomy* / francisco J. varela New York: North Holland, c1979.
- Weber, M., 1864-1920. (1947). *Max weber: The theory of social and economic organization* Glencoe, IL.
- Weick, K. E. (1995). What theory is not, theorizing is. *Administrative Science Quarterly*, (3), 385.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- Whitestone, D. and Schlesinger, L. (2000). Harvard Business School Case.
- Yin, R. K. (1981). The case study crisis: Some answers. *Administrative Science Quarterly*, 26(1), 58.
- Yin, R. K. (2009). *Case study research: Design and methods* Los Angeles Sage Publication 2009; 4TH ED.

Appendix A – Venism Model Equations

Max Alignment with Noise=

Max Alignment*(1+Pink Noise)

~ Dmnl

~ |

Required Strategic Orientation=

Input*Exogenous Input

~ SO Units

~ |

Sine Start Time=

10

~ quarter

~ |

Input=

1+STEP(Step Height,Step Start Time)+

(Pulse Quantity/Pulse Duration)*PULSE(Pulse Time,Pulse Duration)+

RAMP(Ramp Slope,Ramp Start Time,Ramp End Time)+

STEP(1,Sine Start Time)*Sine Amplitude*SIN(2*3.14159*Time/Sine Period)

~ Dimensionless

~ Input is a dimensionless variable which provides a variety of test input patterns, \ including a step, pulse, sine wave, and random noise.

|

White Noise = Noise Standard Deviation*((24*Noise Correlation Time/TIME STEP)^0.5*(RANDOM 0 1\

() - 0.5

))

~ Dimensionless

~ White noise input to the pink noise process.

|

Pulse Quantity=

0

~ Dimensionless*quarter

~ The quantity to be injected to customer orders, as a fraction of the base value of \ Input.

For example, to pulse in a quantity equal to 50% of the current value of \ input, set to .50.

|

Pulse Time=

0

~ quarter
~ Time at which the pulse in Input occurs.
|

Change in Pink Noise = (White Noise - Pink Noise)/Noise Correlation Time

~ 1/quarter
~ Change in the pink noise value; Pink noise is a first order exponential smoothing \ delay of the white noise input.
|

Ramp Slope=0

~ 1/quarter
~ Slope of the ramp input, as a fraction of the base value (per year).
|

Ramp Start Time=

0
~ quarter
~ Start time for the ramp input.
|

Pulse Duration=

1
~ quarter
~ Duration of pulse input. Set to Time Step for an impulse.
|

Step Height=

0
~ Dimensionless
~ Height of step input to customer orders, as fraction of initial value.
|

Step Start Time=

0
~ quarter
~ Time for the step input.
|

Sine Amplitude=0

~ Dimensionless
~ Amplitude of sine wave in customer orders (fraction of mean).
|

Pink Noise = INTEG(Change in Pink Noise,0)

~ Dimensionless
~ Pink Noise is first-order autocorrelated noise. Pink noise provides a realistic \

noise input to
models in which the next random shock depends in part on the previous \
shocks. The user
can specify the correlation time. The mean is 0 and the standard deviation \
is specified
by the user.

|

Ramp End Time=1e+009

~ quarter
~ End time for the ramp input.

|

Sine Period=

20
~ quarter
~ Period of sine wave in customer demand. Set initially to 4 years to \
simulate the business cycle

|

Noise Correlation Time=

7
~ quarter
~ The correlation time constant for Pink Noise.

|

Noise Seed=

2
~ Dimensionless
~ Random number generator seed. Vary to generate a different sequence of \
random numbers.

|

Noise Standard Deviation=

0
~ Dimensionless
~ The standard deviation of the pink noise process.

|

Standard SO=

1
~ SO Units
~ |

Appropriateness=

Table for Appropriateness($ABS(\text{Strategic Orientation Shortfall}/\text{Standard SO})$)*Standard App
~ Appropriateness Units

~ |

std Change Pressure Increase=

1
~ quarter
~ |

std effect=

1
~ (Appropriateness Units*competence units)
~ |

std Effect on Motivation=

1
~ Dmnl
~ |

std Inertia=

1
~ inertia units
~ |

Change Pressure Incr=

if then else(Performance Shortfall>0, Performance Shortfall*Performance Factor, MIN(\
Performance Shortfall*Performance Factor
, -1*Pressure to Change/std Change Pressure Increase))
~ Pressure Units/quarter
~ |

Decrease=

Fractional Decrease*(Employee Motivation-Min employee Motivation)/Motivation Adjustment
Time
~ Motivation Units/quarter
~ |

Effect of Alignment on Motivation=

Personal Alignment with organization/std Effect on Motivation
~ Dmnl
~ |

Effect on Performance=

Appropriateness*Competence*(1+Organizational Climate)/std effect
~ Dmnl
~ |

Fractional Inertia Decrease=

Table for Fractional Inertia Decrease(ABS(Change in Strategic Orientation/std Change\
)
~ Dmnl

~ |

Perception Time=

Table for Perception Time(Inertia/std Inertia)

~ quarter

~ |

Fractional Change Pressure Decr=

Table for Fractional Change Decr(ABS(Change in Strategic Orientation/std Change))

~ 1/quarter

~ |

Fractional Decrease=

((Inertia and Alignment Factor on Motivation)*Table for Inertia Decrease(Inertia/std Inertia\)))+Effect of Alignment on Motivation

~ Dmnl

~ |

Fractional Increase=

((Inertia and Alignment Factor on Motivation)*Table for Inertia Increase(Inertia/std Inertia\)))+Effect of Alignment on Motivation

~ Dmnl

~ |

Min employee Motivation=

0

~ Motivation Units

~ |

Fractional Inertia Increase=

Table for Fractional Inertia Increase(Inertia/std Inertia)

~ Dmnl

~ |

Standard App=

1

~ Appropriateness Units

~ |

std Change=

1

~ SO Units/quarter

~ |

Change Rate=

(Max Alignment with Noise-Personal Alignment with organization)/Leadership Alignment Time

~ Dmnl/quarter

~ |

Organizational Climate=
 Alignment Factor*Employee Motivation*(1+Leadership Efectiveness)
 ~ Dmnl
 ~ |

Leader Factor=
 30
 ~ Dmnl
 ~ |

Change Pressure Decr=
 if then else(TPR switch*Trial period routine=0,Pressure to Change*Fractional Change Pressure
 Decr\
 ,(Pressure to Change/TIME STEP)+Change Pressure Incr)
 ~ Pressure Units/quarter
 ~ |

Inflow=
 if then else(Change Indicator>0:AND:Trial Indicator=0,Trial Period Length/TIME STEP,\
 0)
 ~ Dmnl/quarter
 ~ |

Leadership Alignment Time=
 FINAL TIME/(1+(Leader Factor*Leadership Efectiveness))
 ~ quarter [50,1000,50]
 ~ |

Max employee Motivation=
 1
 ~ Motivation Units
 ~ |

Increase=
 Fractional Increase*(Max employee Motivation-Employee Motivation)/Motivation Adjustment
 Time
 ~ Motivation Units/quarter
 ~ |

Leadership Efectiveness=
 0
 ~ Dmnl
 ~ |

Motivation Adjustment Time=
 1
 ~ quarter

~ |

Alignment Factor=

1
~ 1/Motivation Units
~ |

Max Alignment=

Organizational Climate
~ Dmnl
~ |

Personal Alignment with organization= INTEG (

Change Rate,
0)
~ Dmnl
~ |

Competence=

Factor Motivation*Employee Motivation
~ competence units
~ |

Table for Performance(

[(0,0)-(1.6,1.1)],(0,0),(0.125,0.125),(0.25,0.25),(0.375,0.375),(0.5,0.5),(0.625,0.625\
,(0.75,0.75),(0.875,0.875),(1,1),(1.12,1.05),(1.25,1.07),(1.38,1.08),(1.5,1.09))
~ Dmnl
~ |

Performance=

Std Performance*Table for Performance(Effect on Performance)
~ Performance Units
~ |

Ability to Change=

Employee Motivation*Factor Motivation Change
~ Dmnl
~ |

Factor Motivation Change=

0.5
~ 1/Motivation Units
~ |

Factor Motivation=

0.3
~ competence units/Motivation Units
~ |

Inertia and Alignment Factor on Motivation=

0.6
~ Dmnl
~ |

Table for Inertia Increase(

[(-0.1,0)-(0.6,1)],(-0.1,0.04382),(0,0.0438207),(0.01,0.0559863),(0.02,0.0708176),(0.03\
,0.0886865),(0.04,0.109959),(0.05,0.134977),(0.06,0.16404),(0.07,0.197375),(0.08,0.235123\
) ,(0.09,0.277302),(0.1,0.323794),(0.11,0.374319),(0.12,0.428421),(0.13,0.485465),(0.14\
,0.54463),(0.15,0.604927),(0.16,0.665213),(0.17,0.724229),(0.18,0.780635),(0.19,0.833062\
) ,(0.2,0.880163),(0.21,0.920675),(0.22,0.95347),(0.23,0.977607),(0.24,0.992381),(0.25\
,0.997356),(0.26,0.992381),(0.27,0.977607),(0.28,0.95347),(0.29,0.920675),(0.3,0.880163\
) ,(0.31,0.833062),(0.32,0.780635),(0.33,0.724229),(0.34,0.665213),(0.35,0.604927),(\
0.36,0.54463),(0.37,0.485465),(0.38,0.428421),(0.39,0.374319),(0.4,0.323794),(0.41,\
0.277302),(0.42,0.235123),(0.43,0.197375),(0.44,0.16404),(0.45,0.134977),(0.46,0.109959\
) ,(0.47,0.0886865),(0.48,0.0708176),(0.49,0.0559863),(0.5,0.0438207),(0.6,0.04382))
~ Dmnl
~ |

Employee Motivation= INTEG (

Increase-Decrease,
Initial Motivation)
~ Motivation Units
~ |

Initial Motivation=

0
~ Motivation Units
~ |

Table for Inertia Decrease(

[(0.4,0)-(1.1,1)],(0.4,0.04382),(0.5,0.0438207),(0.51,0.0559863),(0.52,0.0708176),(0.53\
,0.0886865),(0.54,0.109959),(0.55,0.134977),(0.56,0.16404),(0.57,0.197375),(0.58,0.235123\
) ,(0.59,0.277302),(0.6,0.323794),(0.61,0.374319),(0.62,0.428421),(0.63,0.485465),(0.64\
,0.54463),(0.65,0.604927),(0.66,0.665213),(0.67,0.724229),(0.68,0.780635),(0.69,0.833062\
) ,(0.7,0.880163),(0.71,0.920675),(0.72,0.95347),(0.73,0.977607),(0.74,0.992381),(0.75\
,0.997356))
~ Dmnl
~ |

Trial Indicator= INTEG (

Inflow-Outflow,
0)
~ Dmnl
~ |

Inertia Decrease=
Inertia*Fractional Inertia Decrease*Inertia Deg Scaling Factor
~ inertia units/quarter
~ |

Outflow=
if then else(Trial Indicator>1,1,Trial Indicator/TIME STEP)
~ Dmnl/quarter
~ |

Inertia Deg Scaling Factor=
0.2
~ 1/quarter
~ |

Std Performance=
1
~ Performance Units
~ |

Performance Shortfall=
Performance Switch*(Desired Performance-Perceived Performance)
~ Performance Units
~ |

Performance Switch=
1
~ Dmnl
~ |

Initial Inertia=
0
~ inertia units
~ |

Strategic Orientation Indicator=
Fitness Switch*Shortfall Indicator
~ SO Units
~ |

Fitness Switch=
1
~ Dmnl

~ |

Trial period routine=

if then else(Change Indicator>0:OR: Trial Indicator>1,1,0)

~ Dmnl

~ |

Performance Factor=

1

~ Pressure Units/(Performance Units*quarter)

~ |

Perceived SO Shortfall=

SMOOTH(Strategic Orientation Shortfall,Strategic Orientation GAP Perception,0)

~ SO Units

~ |

Change Indicator=

if then else(Perceived SO Change<Change Indicator Treshold,0,1)

~ Dmnl

~ |

Change Indicator Treshold=

0.05

~ SO Units/quarter

~ |

Strategic Orientation GAP Treshold=

0.1

~ SO Units

~ |

SO Perception Time=

0.5

~ quarter

~ |

Exogenous Input=

1

~ SO Units

~ |

Strategic Orientation GAP Perception=

0.25

~ quarter

~ |

Trial Period Length=

6
~ Dmnl
~ |

TPR switch=

1
~ Dmnl
~ |

Table for Fractional Change Decr(

[(0,0)-(0.25,1.2)],(0,0.2),(0.0167,0.28),(0.0333,0.36),(0.05,0.44),(0.0667,0.52),(0.0833\
,0.6),(0.1,0.68),(0.117,0.76),(0.133,0.84),(0.15,0.92),(0.167,0.97),(0.183,0.99),(0.2\
,1))
~ 1/quarter
~ |

Perceived SO Change=

DELAY1(ABS(Change in Strategic Orientation),SO Perception Time)
~ SO Units/quarter
~ |

Pressure to Change= INTEG (

Change Pressure Incr-Change Pressure Decr,
0)
~ Pressure Units
~ |

Change in Strategic Orientation=

Ability to Change*Pressure to Change*Response Gain*Strategic Orientation Indicator
~ SO Units/quarter
~ |

Perceived Performance= INTEG (

Perceived Performance Change,
(Performance+Desired Performance)/2)
~ Performance Units
~ |

Desired Performance=

1
~ Performance Units
~ |

Table for Appropriateness(

[(0,0)-(1.3,1.3)],(0,1.2),(0.1,1),(0.2,0.8),(0.3,0.648),(0.4,0.5),(0.5,0.4),(0.6,0.3\
,0.7,0.2),(0.8,0.12),(0.9,0.06),(1,0.03),(1.1,0.012),(1.2,0))
~ Dmnl
~ |

Response Gain=

$$\frac{2}{1/\text{quarter}/\text{Pressure Units}}$$

Shortfall Indicator=

$$\text{if then else}(\text{ABS}(\text{Perceived SO Shortfall}) < \text{Strategic Orientation GAP Treshold}, 0, \text{Perceived SO Shortfall})$$

Strategic Orientation= INTEG (

$$\text{Change in Strategic Orientation, Required Strategic Orientation})$$

Strategic Orientation Shortfall=

$$\text{Required Strategic Orientation} - \text{Strategic Orientation}$$

Perceived Performance Change=

$$\frac{(\text{Performance} - \text{Perceived Performance})}{\text{Perception Time}}$$

Table for Perception Time(

$$[(0, 2.5) - (1, 7)], (0, 3), (0.0833, 3), (0.167, 3), (0.25, 3.2), (0.333, 3.5), (0.417, 4), (0.5, 4.5), (0.583, 5), (0.667, 5.5), (0.75, 5.8), (0.833, 6), (0.917, 6), (1, 6))$$

Inertia Increase=

$$(\text{Fractional Inertia Increase} * (\text{Inertia} + \text{Fixed Increment})) * \text{Inertia Growth Scaling Factor}$$

Table for Fractional Inertia Decrease(

$$[(0, 0) - (0.25, 1)], (0, 0), (0.02, 0.5), (0.04, 0.8), (0.06, 0.9), (0.08, 0.94), (0.1, 0.966), (0.12, 0.98), (0.14, 0.99), (0.16, 0.999), (0.18, 1), (0.2, 1), (0.2, 1))$$

Fixed Increment=

$$0.005$$

~ inertia units
~ |

Inertia= INTEG (
Inertia Increase-Inertia Decrease,
Initial Inertia)
~ inertia units [0,?]
~ |

Inertia Growth Scaling Factor=
0.2
~ 1/quarter
~ |

Table for Fractional Inertia Increase(
[(0,0)-(1.3,1)],(0,0.9),(0.2,0.87),(0.27,0.85),(0.37,0.78),(0.46,0.68),(0.6,0.5),(0.7\
,0.35),(0.78,0.2),(0.88,0.09),(1,0),(1.1,0),(1.2,0),(1.3,0))
~ Dmnl
~ |

.Control
*****~

Simulation Control Parameters
|

FINAL TIME = 35
~ quarter
~ The final time for the simulation.
|

INITIAL TIME = 0
~ quarter
~ The initial time for the simulation.
|

SAVEPER =
TIME STEP
~ quarter [0,?]
~ The frequency with which output is stored.
|

TIME STEP = 0.125
~ quarter [0,?]
~ The time step for the simulation.
|