

Holm Andreasen, Peter

**Doctoral Thesis**

## The Dynamics of Procurement Management: A Complexity Approach

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**The Dynamics of Procurement Management**

# The Dynamics of Procurement Management

- A Complexity Approach

**Peter Holm Andreasen**

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**- A Complexity Approach**

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PhD School LIMAC  
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Frederiksberg, January 2012



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# 1 Introduction

“How can we understand the dynamics of procurement management?” An answer to this question has predominantly been explained by procurement management experiencing dissatisfaction with the status quo, where the procurement organisation was viewed from other entities in the company as an insignificant, reactive and an administrative part of the business. The potential, however, for the procurement organisation to be significant in the company was argued to be vast (Ammer 1989, Ellram & Carr 1994, Van Weele 2005). In order to change the situation of the procurement organisation, procurement management was informed that they should in gradual steps develop the procurement organisation towards more sophistication and significance (Reck & Long 1988) producing strategies that were aligned with the overall company strategy including the development of policies, procedures, systems, tools and processes (Cousins 2002, Cousins et al 2008). This process changed the perspective of the procurement organisation which among other things, allowed the procurement entity to contribute to the implementation of the concept of supply chain management (Freeman & Cavinato 1990). Ever since I first got familiar with the practices of procurement and its management, I have been puzzled by its complexity. At the same time, I have wondered about how the same space of complexity in the procurement management domain literature has explained the same practices by reductionism, smoothness and simplicity as just described.

This thesis is going to take a complexity science perspective in order to absorb and understand the dynamics of procurement management as a professional entity in connection to the broader processes of supply chain management relating supply and demand, production and consumption. The thesis adopts and further develops a complexity science approach with a critical notion of dealing with oppositions and contradictions to comprehend this complexity of procurement management. Furthermore, drawing on the distinction between exogenous and endogenous processes, this study explores how closed system designed procurement management technologies travels in an endogenous complex process. The study, therefore, yields insight into the degrees of freedom and the degrees of determinism operating at the same time for the dynamics of procurement management and the potentiality for agency, where procurement management operates in a contradiction of effectiveness (doing things right) and efficiency (the use of minimum resources doing the right things).

### ***1.1 Problem Statement***

Procurement being linked to the strategic development of the company is a well-established claim in the literature (Cousins et al 2008) that has been going on for many decades (e.g. Lewis 1946, Ammer 1974, Farmer 1975). Nevertheless, procurement has been given a new outlook by the agenda of outsourcing, globalisation and companies operating on a global scale, involving not only that of serving customers around the world, but also that companies source and supply from global markets (e.g. Monczka et al 2006, Christopher et al 2006, Mentzer et al 2001). That is, as companies outsource manufacturing and non-strategic activities, the dependency of their supply base increases for input into their goods and service offerings, as well as the 'spend' with the supply base exceeding the 'spend' for internal salaries and labour (Carter et al 2005). The coordination is concerned about managing a large supplier base (in-suppliers) and monitoring supply markets (out-suppliers) (Moeller et al 2006) in order to comply in the midst of a variety of internal stakeholders with external supply (Brundin et al 2005). Because of the responsibility of supply, procurement has also been portrayed as an important element in realising the ideas in supply chain management (Chen & Paulraj 2004, Lambert et al 2005, Storey et al 2006).

Fleming (1967) argues that the best term to describe procurement activities is by "complexity" and "change":

"The dynamic explosion of technology, the shifting demands of consumers, and the new structures of markets combine to convert the world of purchasing into one of change and innovation...The purchasing agent of today is a specialist, a technologist, and above all, a skilled and competent manager. He must understand the complexity and change which surround his task" (Fleming 1967:45).

Also, authors such as Robinson et al (1967), Mogee & Bean (1976), and Novack & Simco (1991), underline the complexity of procurement in several aspects. For example, Novack & Simco claim that procurement processes are complex because they involve the completion of a series of activities, such as qualifying new suppliers, procuring different types of inputs, and monitoring supplier performance, that cut across both functional boundaries (intra-firm) and organisational boundaries (inter-firm). We can therefore, as Dumond (1994) points out, think of procurement as having a boundary-spanning role that can make an impact through two major linkages: internal interactions and external involvement.

Some contemporary empirical studies indicate that procurement to some extent is moving towards a more important and strategic part of the company (e.g. Carter, et al 2007, Kocabasoglu & Suresh

2006, Johnson & Leenders 2004a). Nonetheless, although, Cousins & Spekman (2003) find in their study that there is a development of competences and professionalism in procurement organisations, they also find that it is a slow process with a number of internal barriers, including the mind-set of procurement itself. Historically, procurement has also been perceived as the least entrepreneurial part of the company both by themselves and other functions (Morris & Calantone 1991). Overall, therefore, even though academia has been praising a strategic contribution from procurement and provided frameworks for why it is important (e.g. Ellram & Carr 1994), and what procurement should do in order to do things right (Monczka et al 2010, Van Weele 2005, Cousins et al 2008), there is reason to conjecture that there is a misrepresentation between what procurement are expected to do from the conventional wisdom and what it actually does in its practice (cf. Ramsay 2004, Ramsay & Croom 2008).

An examination of the procurement literature exhibits first of all a massive interest in developing managerial guidance to how procurement can organise change from being reactive and clerical to proactive and strategic. However, when looking closer at the literature in terms of addressing change, transformation, development, and innovation of procurement processes (what we in this thesis will refer to as procurement dynamics) the literature becomes remarkably silent. Van Weele (2005) says this about the knowledge of developing procurement organisations:

“...Is the process of development in purchasing a rational process...or rather an irrational one? Does purchasing development really take place as a process of continuous change or is it in reality characterized more by step-changes and discontinuity? What change strategies underlie purchasing development processes in organizations? Do all organizations follow the stages identified or can some be skipped? To what extent are purchasing managers the most decisive actors in the process of purchasing development? Or are they rather receptive in general and are the real change agents coming from other disciplines? More research is warranted in order...for guiding purchasing and supply's organizational development” (Van Weele 2005:97).

Also, interestingly, looking at the early literature of procurement several decades ago, there is already, as mentioned, an awareness of complexity; and ‘change’ and ‘innovation’ are words applied in a procurement context. However, as Van Weele points out, the dynamics of procurement is not elaborated to a sufficient extent. Paradoxically, it seems that along with increased globalisation, which we would expect to increase the focus on complexity, there is more emphasis on the appropriateness to managerial control than there is to acknowledging the issue and understanding procurement management dynamics and its complexity. This is supported by Mol (2003):

“A point of interest for future research is the nature of theory formation in purchasing management. It can be observed that purchasing management textbooks...put up a wide variety of practical frameworks that are fairly easy to apply for managers. Arguably, the same can be said for most of the scholarly articles in the field. However, these frameworks are best seen as managerial heuristics rather than theories describing the way in which purchasing management helps a firm to obtain sustainable competitive advantage. To date there appears to be too great a need among purchasing management researchers to come up with their own frameworks of what the world looks like. This leads both to fragmentation of the field and a lack of theoretical rigor. It appears that this is one pressing issue researchers in the fields of purchasing management need to tackle...” (Mol 2003:49)

Without going into the discussion of rigor vs. relevance here, Mol nevertheless points out that it becomes problematic to create a knowledge field of procurement, if it is only build on management heuristics and frameworks, reducing complexity. However, when viewing the domain literature of procurement it is puzzling how an area that is responsible or connected to such a large part of a company’s ‘spend’ and discernible by complexity does not seem to be treated with the same kind of professional outlook, as other areas of the company (e.g. Ammer 1989, Cousins & Spekman 2003). It raises the question of how the role and value of procurement is understood in terms of how it is organised and developing its practices. Overall, these considerations have led to a conjecture that we do not have a satisfactory conceptual, theoretical, and empirical understanding of procurement management. Addressing the above challenges have led to the following research question:

### **How can we understand the dynamics of procurement management?**

- 1. How can we understand change of procurement organising?**
- 2. How and why do new practices of managing procurement emerge?**

The research question and the two sub-questions are highly interrelated and interpenetrate each other. The focus is upon procurement management as a professional entity and the procurement organisation carrying out a process of activities in the company. The two sub-research questions reflects this focus by addressing how procurement management organises and how new practices as management technologies are introduced and unfolded in time-space. Dynamics is concerned with processes of motion; change, development, transformation and innovation are possible epistemological metaphors relating to dynamics. Moreover, the notion of dynamics is a central one of the thesis, as it covers the theoretical problem of approaching how the interaction of different entities

constitutes the complexity of procurement. The research question is answered through both reviewing existing research on procurement, investigating management literature on change and innovation, as well as it involves an empirical inquiry of three qualitative case studies, which is a relevant form when the aim is to study complex relations (Flyvbjerg 2006, Ellram et al 2002). Importantly, as a theoretical lens, the thesis will apply a complexity science perspective – a development of the systems approach - in order to inform analysis of the research question. A complexity science approach enables insights into the dynamics of management and processes (e.g. Van de Ven & Poole 1995) and is therefore appropriate for answering the overall research question. In this thesis, the complexity science approach, in particular, allows us to regard contradictions as the primary means, and follow the claim by Stacey (2007) that the way we understand contradictions is highly interrelated to the way we understand dynamics.

A key objective of this study is to develop a theoretical grounding of the complexity and dynamics of procurement management in relation to larger relations of supply and demand, production and consumption. Thus, the study by its application of complexity science aims to contribute to the development of understanding the complexity of supply chain management, where procurement is one of the central entities, as well as to the development of the procurement domain itself. From this also follows a contribution to strengthen the application of complexity science as a means to address analysis of management and organisation studies. Another objective of importance of this study is to guide a consequential praxis to procurement managers.

## ***1.2 Positioning the Study: Supply Chain Management***

It is possible to approach procurement from different perspectives and theoretical standpoints; most dominant, however, has been operations and in particular marketing. This thesis links procurement as an activity to the supply chain management perspective. In both procurement and supply chain management the theoretical departure is strongly influenced by the systems approach/thinking (Mentzer et al 2001, New 2004). That is, supply chain management address activities that cut across intra- and inter organisational entities concerned with demand (and consumption) and supply (and production). Procurement, thus, is part of a greater system of linkages and interdependencies. However, where the systems approach itself has undergone a development to provide a stronger backbone for analysis, the domains and sub-domains of supply chain management maintains primarily a functionalistic systems approach. For example, Bechtel & Jayaram (1997) identify four schools in supply chain management that each has their researchers and perspectives. However, characteristic

for all of these schools is the functionalistic paradigm, where one unit (function) is explained by the *one* role it performs to the whole. The parts can be explained by its function and measured by the contribution it performs to the system as a whole.

New (1997) points to supply chain management as a field that has been dominated by a “normative tension” indicating that we are interested in intervention. That is, the field has tried to describe concrete managerial guidance, but without as such taking departure in these managers’ reality (for example procurement management). The normative tension of supply chain management is also characterised by so-called “best practice” studies as it sets a standard that other company’s should follow. Numerous examples have been brought forward such as Zara (e.g. Ferdows 2004) IKEA (Barthélemy 2006) and B&O (Skjøtt-Larsen & Jespersen 2005). Common for such examples is that they present a range of innovative practices that has made the end-customer more satisfied and the companies in the chain more successful by integration and positive synergy effects.

The conjecture throughout this thesis is that supply chain management primarily has been explained and understood by a traditional systems approach, where keywords such as “fit”, “synergy”, and “integration” explain the ambition and ideal of supply chain management. If we follow the schools of Bechtel & Jayaram, as well as the innovative “best practices” examples, management of procurement is reduced to an effect of the overall design of the supply chain that is assumed to be a pre-fabricated whole. By perceiving the ‘supply chain’ rather as a co-evolutionary space for how the relation of production/consumption is organised and investigating management of procurement, we may end up knowing more about how procurement management enables and constraints supply-demand interdependencies.

### ***1.3 Introduction to a Complexity Science Perspective***

Analysis of a given phenomenon is in the traditional scientific community expected to be an either-/or decision between a macro (structural) or micro (human agency) level of explanation. However, the last decades has brought more attention to dealing with this apparently dichotomy in new ways (Flyvbjerg 2001). For example, through a relational perspective to social science (Emirbayer 1997), and deciding between different methodological positions in the same analysis (e.g. Jackson 2000). According to Slappendel (1996) there are, in terms of complexity, several disadvantages, by applying the traditional individual or structural analysis and argue that it is important to address and apply new theories of the action-structure relationship to inform analysis. Slappendel mentions such example as



the structuration theory by Giddens (1984), while the ideas and theories from complexity science also has been highlighted as an approach to study dynamic processes (Van de Ven & Poole 1995).

Using the classical dichotomy of science, that is the micro-macro issue as referred to above, the most prominent example in approaching and “overcoming” methodological concilience is perhaps Weber, who advocated that a combination of positivism and idealism could provide a methodology and contribute to social theory. In dividing social action into two levels; the “external” governed by social rule behaviour (the positivistic part) and the “internal” sphere that relates to individual behaviour in terms of actor meaning based on the idealist emphatic interpretation (*verstehen*) (King 2001:21). From this follows that “social rules”, which are external, and “actor meaning”, which are internal, are analytically apart and that an idealistic beginning had to be verified by positivistic ends in the final of the analysis (Ibid). From this follows, according to King, that Weber’s methodology is a problematic one and in the worst case an irreconcilable one (2001:22).

A complexity science does not try to “overcome” the human agency-structure issue (or the micro-macro) but regards the levels as intertwined with structural constraints and the capacity of human agency as co-constructing, co-evolving, and intertwining each other. Discrete levels of analysis are an illusion and not an analytical possibility from the complexity sciences. As the thesis is going to illustrate in chapter 4, this choice is necessary in order to absorb complexity, and dualities and dichotomies are unwarranted in a complexity science analysis as well as the distinction between external and internal boundary is a problematic one. Thus, the claim is that we avoid such dichotomy traps as for example Weber may have ended up in. It also means that a quite radical approach to traditional open systems theory is taken and how we are to understand boundaries of complex systems. These aspects have encouraged me to apply the complexity sciences to the domain of procurement, because we are dealing with relations between entities and change process in organisational patterns that are characterised by multiple relations and interdependencies. Applying complexity science in this context - as also King (2001) claims – is with the ambition to eventually inform practice or necessarily entail an appropriate, consequential praxis.

### **1.3.1 Work Definition and a Framing of Complexity Science**

To introduce complexity science a broad working definition of complexity science is pursued along with an introduction to existing research on complexity science. In a general context, complexity science argues that the emergent order of a system is a co-evolutionary process arising from the interaction between heterogeneous agents in the system and characterised by constant change and

mutual dependence between agents (Holland 1998). Waldrop (1992) argues that complexity as a new and wide-ranging subject has been difficult along with its boundaries. One way to encapsulate complexity science is to divide it into branches. For example, Stacey (2007) encapsulates complexity science in terms of three theories; Chaos Theory, Dissipative Structures, Complex Adaptive Systems (CAS), and then his own radical interpretation of Complex Responsive Processes (CRP). Another approach, which may be complementary is to look at what properties that are attached to complex systems. Hence, Cilliers (1998) provides the following ten properties as the closest we are coming to an initial working definition of complex system (p. 3-5):

- (i) Complex systems consist of a large number of elements.
- (ii) A large number of elements are necessary, but not sufficient. In order to constitute a complex system, the elements have to interact, and this interaction must be dynamic.
- (iii) The interaction is fairly rich, i.e. any element in the system influences, and is influenced by, quite a few other ones.
- (iv) The interactions themselves have a number of important characteristics. Interactions are non-linear and are a precondition for complexity.
- (v) The interactions usually have a fairly short range, i.e. information is received primarily from immediate neighbours. Long-range interaction is not impossible, but practical constraints usually force this consideration.
- (vi) There are loops in the interactions. The effect of any activity can feed back onto itself, sometimes directly, sometimes after a number of intervening stages. This feedback can be positive (enhancing, stimulating) or negative (detracting, inhibiting).
- (vii) Complex systems are usually open systems, i.e. they interact with their environment. It is often difficult to define the border of a complex system. Closed systems are usually merely complicated.
- (viii) Complex systems operate under conditions far from equilibrium. Equilibrium is another word for death.
- (ix) Complex systems have a history. Not only do they evolve through time, but their past is co-responsible for their present behaviour.
- (x) Each element in the system is ignorant of the behaviour of the system as a whole, it responds only to information that is available to it locally. This point is vitally important. If each element 'knew' what was happening to the system as a whole, all of the complexity would have to be present in that element.

Maguire et al (2006) point to three different types of application of complexity science for organisation studies: agent based modelling (ABM), narrative method and complexity thinking. So far the approach has been dominated by an either/or approach where one approach has been advocated; particularly concerning ABM against the interpretative (narrative) method. Maguire et al (2006) also identify four broad clusters of work that has been the focus of existing complexity work

in organisation studies: Introductions, Foundations, Applications, and Reflections. They provide a broad review of complexity science because as they note, both narratives, computational and mathematical descriptions contribute to our understanding complex systems. These four clusters are illustrated in the following figure, which should be interpreted from the bottom and up:

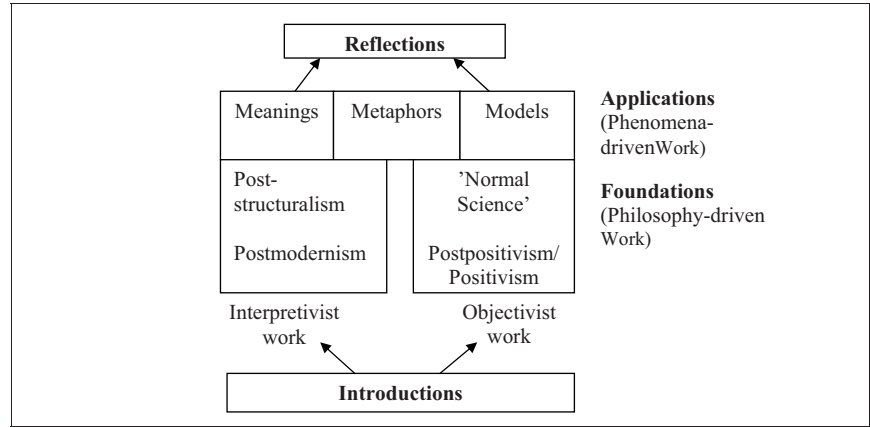


Figure 1: “A map of the field of complexity science and organization studies” (Maguire et al 2006:174)

‘Introductions’ constitute descriptions of complexity but rarely develop formal theories or models, and is dominated by enthusiastic and optimistic promises of the ideas from complexity science. They are characterised by describing complexity where real examples are raised illustratively to point out a fit between organisational phenomena and complex systems. ‘Introductions’ work is therefore, perhaps not surprisingly, dominated by resemblance thinking, where arguments are provided by analogies and rarely empirical work (Maguire et al 2006). Foundations incorporate explicitly issues of ontology, epistemology and methods and covers philosophy driven work, which either takes an objectivist or an interpretive position; it involves considerations about ontology and epistemology, and to some extent methodology. As such, this level of complexity science is important if the aim is to provide a frame of reference for analysis, as is the case here. Furthermore, when an objectivist approach is applied the general method is complexity-simplification while it in the interpretive method can be termed complexity-absorbers.

Maguire et al’s categorisation of the ‘Application’ domain in their model refers to agent-based modelling (ABM) and computer based simulation-based models to predict a complex system’s behaviour. Here we find what is often solely synonymous with what is labelled complexity science

(or complexity theory). Finally, 'Reflections' review and reflect upon work in the field of complexity science. For example, Richardson & Cilliers (2001) are sensitive to the benefits and limitations of soft and hard approaches and advocate a third way 'complexity thinking', which they describe as a revised philosophic stance that implies methodological pluralism and explicit recognition of limits to our knowledge about complex phenomena. The four clusters do not necessarily mean that research takes place in either one of the four clusters, although this is often the case; in particular as mentioned in the 'application' and 'introductions' categories. Although this thesis does not recognise the sharp dichotomy between objectivist and interpretivist work, we can from the table, position this thesis as concerned with analysing meanings of complexity science. The thesis approach here relies on in particular the works of Cilliers (e.g. 1998), King (2001) and also to some extent Stacey (e.g. 2007) and although these authors operate with different aspects of complexity science they support the ambition to understand 'meanings' of complexity models at the expense of developing and applying analytic complexity models.

The framework also suggests that complexity science can be applied both as a methodological and as a theoretical approach. From this follows that methodology is the "the know how of know why" while theory only concerns the "know why" (Flyvbjerg 1991:79); theory is to be tested, which is not the case with methodology. For this thesis, complexity science is important for the theoretical argument, but also in relation to how to approach the study; that is, it has implication for the ontology, epistemology, human nature, and thereby also the methodology (Burrell & Morgan 1979).

#### ***1.4 Research Design***

Chapter 2 is concerned with reviewing existing literature dealing with the dynamics of procurement management. The purpose is to identify how this study contributes to its domain as well as to analyse and (de-) construct how existing literature has approached the dynamics of procurement management. Chapter 3 brings together insight from frameworks of process, change, and innovation of organisational and management studies. The chapter extends the scope of the different possibilities to understand dynamics, and the focus of process, change, and innovation is inspired by Van de Ven (and colleagues) although the chapter is not confined to it. Moreover, it simultaneously enables the chapter an analysis of the strength and weakness of the existing approaches to development of the dynamics of procurement management where processes become a central notion drawing a distinction between endogenous and exogenous processes.

Chapter 4 addresses how complexity science is able to inform analysis through a frame of reference of its constituent elements; and eventually guide a consequential praxis for understanding the dynamics of management. Complexity science is a relatively new approach based on fragmented viewpoints; therefore, the chapter is concerned with argumentation to the value and content of a complexity science analysis. Chapter 5 is the research methodology, which is a result of the ontological and epistemological considerations derived from chapter 4 as well as the concrete considerations of doing qualitative case-studies. The purpose of this chapter is to operationalize the complexity science approach in terms of furthering the methodological guidance per se and which methods that is appropriate to conduct the concrete empirical analysis with.

Chapter 6, 7, and 8 is concerned with the case-studies. The common vantage point for the cases is a procurement organisation in the company respectively with the common reference that they have global operations. Chapter 6 concerns a procurement organisation in a middle-sized private company that participated in an innovation project where the focus was a particular dominating supply chain and improving a specific supply relationship. Chapter 7 concerns a procurement organisation in a large conglomerate private company that had invested compressively in new procurement management technologies to professionalise its approach in order to become a competence centre in the company and to its business units. Chapter 8 concerns a procurement organisation in a large public company that had initiated a supply chain strategy which should enable them to go from reactive to proactive, from clerical and administrative activities to address strategic issues in the overall company strategy. Chapter 9 is the discussions and findings with focus on a consequential praxis, and hence the chapter work as a conclusion for the thesis.

## **2 Existing Research – The Dynamics of Procurement Management**

The objective of this chapter is to establish an understanding of how the dynamics of procurement management has been discussed and investigated in existing research. The purpose of making such a review is to create a platform from which the present study can identify its contributions, but also in particular to understand how existing literature understand the dynamics of procurement management. Hence, the aim is to construct and eventually de-construct procurement domain literature and challenging its claims and how it draws boundaries. Moreover, there are several issues that can confuse such a review especially because different words and concepts can be argued to cover this concern and the dynamics of procurement management has a broad encompassment that further underlines the need to set boundaries around the review. The chapter, therefore, begins with a framing of the literature subjects in focus of the review combined with considerations on the literature process and a work definition of procurement. Next follows two sections in terms of procurement organising and innovation perspectives that deal with the development of procurement professionalism. The chapter ends with a discussion of the existing literature's assumptions on how it understands and explains the dynamics of procurement management by separating oppositions.

### ***2.1 Frame for Approaching the Dynamics of Procurement Management***

The focus on the dynamics of procurement management is connected to a broad comprehension of the field and interests where specific activities could exclusively be objects for study; for example, how supplier relations can drive innovation in the buying company or how procurement professionals can be viewed as entrepreneurs in value-creation. Being concerned with the dynamics of procurement management, the framing of this review is constructed by the research question in order to investigate the procurement domain literature. The framing takes its starting point in asking the two questions from the sub-research questions: (1) how can we understand change of procurement organising? (2) How and why do new practices of managing procurement emerge? When taking these questions into the investigation of the procurement domain literature, several areas emerge, which together produce issues that are relevant to the concern of this thesis.

Maturity models accompanied with a strategic discourse on how procurement can and should change from something clerical to something strategic, has dominated the procurement domain literature. The maturity models set a claim that procurement organising started out with being a reactive phenomenon and then changed through passages of more and more sophistication and strategic outlook. This claim in particular evolves around the subjects of how procurement is measured, and it

measures distribution of procurement activities, and work models for procuring. The second part of the review is also related to the maturity model framing, where the innovation aspect is divided in two sub-domains of the literature in terms of procurement’s participation in innovation and how procurement in itself is innovative. The latter is particular identified in the literature that deals with entrepreneurship and procurement. The framing of approaching the dynamics of procurement management and how the procurement domain literature approaches professionalising procurement are illustrated in the following figure:

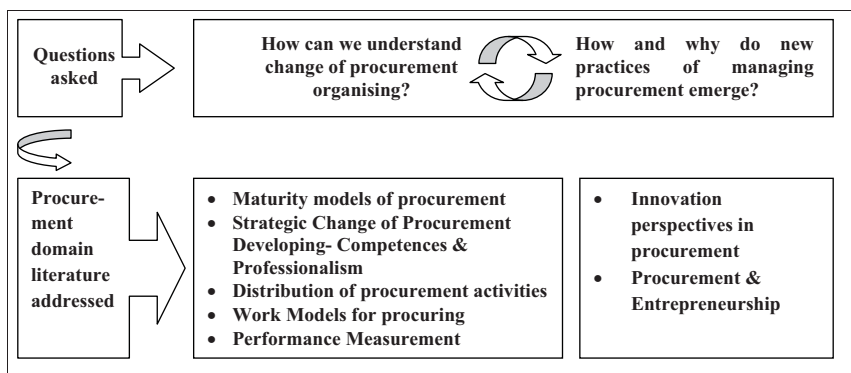


Figure 2: “Framing the dynamics of procurement management” (Author)

It is neither the intent nor the ambition to confirm or validate this framing/figure; rather the ambition is to discuss and challenge existing procurement management viewpoints. In particular what is being analysed in this chapter is how the procurement domain literature separates oppositions in order to manage procurement activities.

### 2.1.1 Work definition of Procurement and Domain Literature Boundaries

There is a general divergence in the language applied in the domain literature when defining procurement. For example, purchasing and procurement is often used interchangeably, while supply management is applied as synonymous with the former two but also understood as a broader organisational process. Concerned with applying procurement or purchasing, the discussion at least dates back to Lewis (1946) who identifies a general ambiguousness to what the phenomenon should be called. Contemporary textbooks take a linear perspective to the matter; for example, Cousins et al (2008) describe it historically as going from ‘buying’ to ‘purchasing’ to ‘procurement’ and contemporary it is called supply management. The tendency to applying new words to describe the

field seems to be done in order to signal more sophistication and strategic orientation. For example, Axelsson et al apply the word sourcing that is defined as: *"managing the external resources of the firm, aimed at acquiring inputs at the most favourable conditions"* (2005:16) and also suggest a supplementary pragmatic definition of saying that sourcing simply is involving all activities that lead to an incoming invoice (ibid). Thus, Axelsson et al aim to signal that sourcing involves strategic aspects of resource acquisition at the expense of focusing on operational matters and what happens after the invoice.

Cousins et al (2008) argue that 'supply management' appears to be the word that has survived and perhaps has the fewest connotations to deal with: *"...ensuring that the enterprise is supplied with what it needs so that it can provide what it sells to its market would appear to be a simple and clear description of the economic activity on which we are focusing"* (2008:7). Thus, it is because of connotations that we should use the label of supply management and not so much because of content. Buying as implying a matter of spending money in acquiring an item is actually a good term to describe what is going on; however, as also Cousins et al also claim, connotations let it down. Monczka et al (2010) argue that there is a need to recognise the differences between purchasing (they explicitly interchange the terms "purchasing" and "procurement") and supply management. Procurement is a functional group as well as a functional activity and performs many activities to ensure value to the organisation such as supplier identification and selection, buying, negotiation and contracting, supply market research, supplier measurement and improvement, and purchasing systems development. Monczka et al then go on to stress that 'supply management' is a more inclusive (i.e. strategic) concept than purchasing/procurement. Hence, supply management deals with planning and acquiring the current and future needs of an organisation through four elements: 'strategic orientation', 'supply base management', 'cross-functional groups', and finally a 'process-driven approach'. Supply management also include 'strategic sourcing', which is a cross-functional process that concerns a broader organisational scope including engineering, quality, design, manufacturing, accounting, strategic planning, etc. (Monczka et al 2010:11).

This thesis applies the notion of procurement in order to make a connotation and bias to professionalism of procurement competences that involves many activities around acquisition before and after the invoice. Procurement then can be involved in sourcing processes, cross functional groups etc.; however, it will be the concrete company context that will determine to which degree professionalised procurement competences are participating and in general the activities it performs.



Thus, for example, sourcing literature and early-supplier-involvement/integration/inclusion (ESI) literature is not included if it does not involve procurement practices as a professional process; for example as Schiele points to *"The role of purchasing has been largely ignored in the main body of research on early supplier inclusion, presumably with the implicit assumption that other functions will fulfil purchasing tasks"* (2010:139). When referring to the procurement domain literature in this study, it refers to the literature that addresses procurement and its management as profession and process within in the company. It does not cover what is written about supplier management processes, sourcing processes, procurement tools and so forth.

The considerations regarding the literature study process follow a generic model of literature studies proposed by Sørensen (2004), which includes three different strategies: (1) the domain-based that try to achieve completeness and where validity is based on the evaluation the researcher; (2) trusted source, which assumes validity but where completeness is an option; and (3) the snow-balling strategy, where validity is based on the evaluation by the researcher, completeness is not relevant and the searching process is not precisely defined (Sørensen 2004). To decide which strategy to apply require considerations about validity criteria (methods applied, study type), selection criteria (key words, subject, authors), relevance criteria (academic level, "fit" with research question), "completeness", and what literature domains to include. The strategies can be combined to achieve the right combination between resources and validity (Ibid).

Section 2.2 on organising procurement has primarily relied on the "snow-ball" strategy; although it has started with a trusted-source strategy with a few numbers of references that referred to other references etc. Specifically, the search domain for section 2.2 has started with leading textbooks of procurement, such as Cousins et al (2008) and Van Weele (2005) that have been reviewed as they also seem to have particular representation in developing the field (Mol 2003). Search databases have then been applied to the literature study process in terms of EBSCO, Web of Science, and the CBS Library. After this literature search had been conducted, a review of documented other sources relating to procurement and supply were undertaken, including: IPSERA (The International Purchasing and Supply Education and Research Association) Conference Proceedings and CAPS<sup>1</sup> (Center of Advanced Purchasing Studies). The review in section 2.3 on procurement and innovation

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<sup>1</sup> CAPS Research is an independent non-profit organization and has since 1986 provided critical research data to procurement professionals and organizations. The information is distributed to the widest possible audience (Giannikis et al 2004). CAPS Research provides data in regard to benchmark reports, critical issue reports, and focus studies in a procurement context.

has started with a domain-based strategy in order to obtain information of what has been written explicitly about procurement and innovation. The key search word has been “innovation”, and later “entrepreneurship”, combined with “purchasing”, “procurement”, and “supply management”, and secondary “sourcing”, and “supply”. The latter two terms cover a great deal of interest from various sources and only titles and keywords have been examined here, if necessary also abstracts, in terms of looking for articles with relevance to this study. Overall, the search was not per se delimited to specific domain journals inside procurement and supply chain management although they were the main focus. That is, the domain is understood by whether it is concerned with professional procurement practices or not as defined previously.

## ***2.2 Organising Procurement***

The section follows the structure outlined in figure 2 on framing the dynamics of procurement management denoting that we start with maturity models followed by the strategic change discourse of procurement as the two dominant parts. Hereafter follows the sections; distribution of activities (incl. centralisation/decentralisation of procurement organising), work models for procuring, and finally performance measurement in a procurement context.

### **2.2.1 Maturity Models of Procurement**

Maturity models have a dominant focus as part of the discussion of procurement changing from clerical tasks to a strategic contribution. It starts with Van Weele (1984), who identify, from an empirical survey of 72 Dutch firms, that management can view procurement along a continuum from a low clerical level to a high strategic level involving corporate planning processes. However, probably the most referred maturity model is conducted by Reck & Long (1988) providing an explanation by a phase-model from where procurement is considered as “passive” developing into being an “integrative” function. According to Reck & Long’s model stage I, the passive stage, involves characteristics where purchaser’s time is spent on quick-fix, routine operations, and supplier selection is based on price and availability. Procurement’s linkage and visibility to other functions is low, top management regards the major contribution from procurement as efficient handling of purchase requisitions, and procurement is located at the bottom of the organisational structure. Level four IV, the integrative stage, in the other end of the spectrum, refers to procurement being fully integrated into the firm’s competitive strategy and integrated with other functional peers to formulate and implement a strategic plan. Characteristics are for example cross functional training of procurement professionals, permanent lines of communication, and that procurement performance is measured in terms of contributions to the company’s success. In between these two stages are

‘independent’ and supportive’ providing intermediary stages for whether procurement is a strategic function or not. The four procurement levels are presented in the following figure:

Passive	Independent	Supportive	Integrative
<ul style="list-style-type: none"> <li>• No strategic direction</li> <li>• Reacts to the requests of other functions</li> <li>• Time spent on quick-fix and routine operations</li> <li>• Supplier selection based on price and availability</li> <li>• Purchasing function and individual performance are based on efficiency measures</li> <li>• Little inter-functional communication takes place because of purchasing’s low visibility.</li> </ul>	<ul style="list-style-type: none"> <li>• Adopts the latest purchasing techniques and practices, but its strategic direction is independent of the firm’s competitive strategy.</li> <li>• Performance is primarily based on cost reduction and efficiency measures.</li> <li>• Coordination links are established between purchasing and technical disciplines.</li> <li>• Top management recognizes the importance of professional development and opportunities in contributing to profitability</li> </ul>	<ul style="list-style-type: none"> <li>• Supports the firm’s competitive strategy by adopting purchasing techniques and practices strengthening the firm’s competitive positions.</li> <li>• Purchasing are included in sales proposal teams</li> <li>• Suppliers are a resource which is carefully selected and motivated.</li> <li>• People are considered a resource with experience and motivation.</li> <li>• Markets, products, and suppliers are continuously monitored and analysed.</li> </ul>	<ul style="list-style-type: none"> <li>• Fully integrated into the firm’s competitive strategy and constitutes part of an integrated effort among functional peers to formulate and implement a strategic plan</li> <li>• Cross functional training of purchasing professionals-executives is made available</li> <li>• Permanent lines of communication are established among other functional areas.</li> <li>• Professional development focuses on strategic elements of the competitive strategy.</li> <li>• Purchasing performance is measured in terms of contributions to the firm’s success.</li> </ul>

**Table 1: “Strategic stages in the development of a purchasing function” (Reck & Long 1988:4)**

Reck & Long’s (1988) main claim concerns the power of strategy for developing its own capabilities in order for procurement being integrated with other functions. This can initiate a positive movement for the procurement function:

“As the purchasing function gains expertise and experience focusing on decision areas such as suppliers, personnel, and information, it begins to make positive contributions toward improving the firm’s competitive effectiveness. Over time, the purchasing function becomes an integral part of the firm’s competitive success.” (Reck & Long 1988:8).

This line of contemplation is augmented in their key observation of common characteristics of procurement’s development into strategic contributors. First, they argue that the developmental process of the procurement function is neither evolutionary nor revolutionary; indicating that the change does not happen by itself with the passage of time. In particular, the change depends on top management changing existing attitudes and perhaps misconceptions of procurement. Secondly, it is very difficult to skip stages because it requires changes in people’s attitudes as well as increased levels of sophistications in such areas as cross-functional activities, supplier relationships, information systems, and procurement skills. The best result comes from a gradual developmental

process unless management is willing to take drastic measures. Thirdly, the procurement function appears to move up and down the development continuum, depending on the amount and type of stress placed on it by the organisation and the external environment. To secure that procurement does not move backwards; policies, attitudes and skills must be established (1988:8). The methodology Reck & Long has applied is based on interviews with different companies at one point in time and thus does not as such have an empirical inquiry of how procurement organisations change; although they triangulate the interviews with two small case examples. What is observed are different procurement organisations varying in sophistication; however, it is the normative part of their work that has gained most influence in the procurement domain literature where procurement is facilitated by strategy developing linearly and gradually from a clerical stage to a strategic contributor.

Freeman & Cavinato (1990) draw from strategic management literature in order to explain how procurement changes over time. They stress that the evolutionary process must be planned carefully and structured according to roles, humans skills, and aligned with the evolution of the firm itself. If this structuring and planning fails – Freeman & Cavinato argue – it can make procurement extremely vulnerable during periods of downsizing and reorganisation because those functions that contribute significantly to the welfare of the firm are to remain intact. Concerning the stages in the model, Phase I is purely administrative, and because procurement here is reactive, it fosters cost minimising behaviour; that is, *“designed as a cost center, the department and personnel may be rewarded for cost optimization”* (p. 9). In phase II cost is still in the vocabulary but in addition to this, there is also a forward looking perspective, which requires personnel to possess some skills in managing processes. Freeman & Cavinato point out that defensive issues deter procurement from developing to phase III. These issues are often a concern over the scope of the procurement function, back-door buying by others in the company, and traditional measures of the procurement department’s power (size of department and issues of decentralisation). About such cost-centre issues, Freeman & Cavinato point to:

“...such concern tend to hinder progression to subsequent phases because they often lead to measurement of development in terms of headcount, budget size, procedures, and so on, rather than in terms of purchasing innovation” (Freeman & Cavinato 1990:9).

The question that arises from this quotation is whether procurement innovation and for example headcount and budget-size really is separated in time and space? In Phase III we have a situation where procurement is no longer concerned with costs; at least is the word cost left out of the equation. Procurement now pursues profit-seeking ventures and has a full range of commodity responsibilities,

which can extend to managing outsourcing relationships. Supply chain management and maximum contribution to the line of business becomes the focus of the department. Phase IV incorporates the broad concept of supply management and the department is fully proactive, aiming at providing input to the creation of corporate values and plans (1990:9). This means that procurement here is responsible for everything that involves inbound of materials and services. Freeman & Cavinato find in their empirical work that sophisticated procurement is operating and measured as profit centres instead of cost minimisation. A challenge in the profit centre situation, however, were business managers performing back door buying because it was more expensive to utilise their own firm's procurement department. Nevertheless, following the logic of the model, as procurement becomes more and more strategic, it gradually becomes more proactive concerned with coordination, more entrepreneurial and long-term in relation to focus. Although it is stated that organisations are dynamic, it is claimed that the study has revealed a fairly consistent patterns in regard to the validity of the model. Freeman & Cavinato do not open up to the possibility that a procurement entity can be at two different levels although it is possible to have a mix of the four phases in multi-tiered procurement organisations. For example, a field buying site that reports to a plant manager having phase I characteristics, might exist in the same firm that has a strong central purchasing group involved in strategic activities of the company (1990:10). Finally, Freeman & Cavinato's empirical evidence comes from field interviews in a wide range of industries and locations in the US and Canada with selected personnel from 142 corporate procurement departments. Thus, bear similarity with Reck & Long's method discussed previously.

Keogh (1993) provides a similar framework as those outlined previously but complements the model with being industry specific. That is, Keogh's model assumes a causal relationship between the industry in which the company is in and the stage of development in procurement. The movement between the sophistication levels is by Keogh a conceptual claim explained by cumulative competences, which are to bridge the barriers in order to achieve successful procurement. Keogh's model consist of five steps where 'serve the factory' is the first and 'world-class supply management' the fifth. As other maturity model work, Keogh (1993) draws a quite clear boundary between what is the strategic leverage and what is associated with being un-attractive; i.e. traditional procurement. The strategic leverage (up-stream activities) is develop/challenge specifications, develop sourcing strategy, and analyse future needs/influence delivery schedule whereas traditional procurement is about negotiating contracts, obtaining quotes and placing order, and monitoring vendor performance. For example, successful specification by eliminating components from the product design is of

considerable more value than for example negotiating contracts. Van Weele et al's (1998) ambition is to develop "one" integrated procurement development model and is based on Keogh's model because of the causal relationship between industry and level of maturity. Furthermore, the model is based on the maturity characteristics such as an integrated final stage developed from a low position in the hierarchy, developing a degree of centralisation, and supply base reduction to work closer with selected suppliers. The model is illustrated in the following figure:

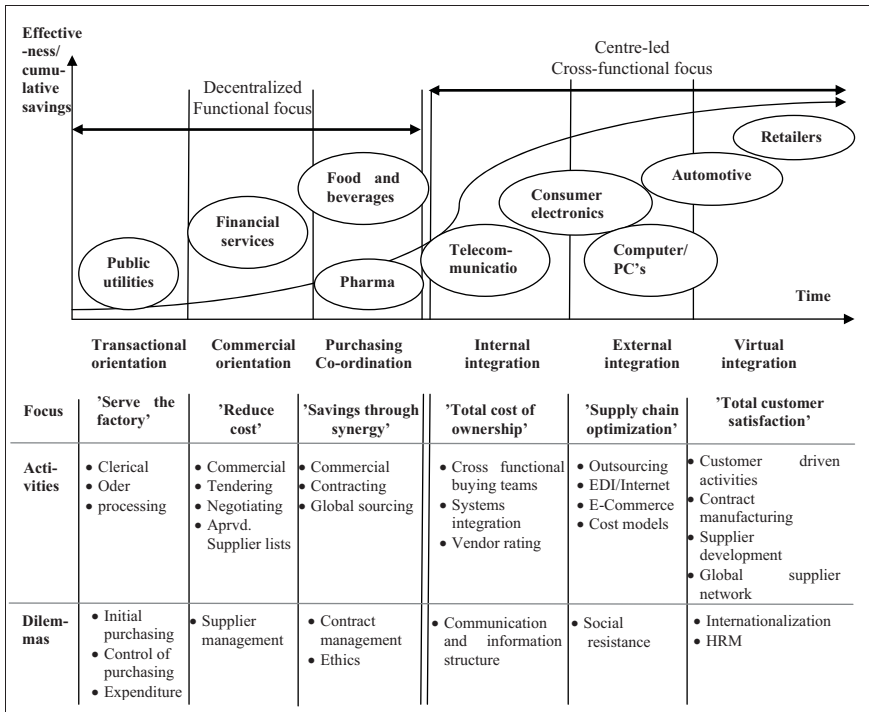


Figure 3: "Towards a coherent purchasing and supply development model" (Van Weele 2005:94)

About the warranted position of value chain integration, the functioning is based on shared vision carried by all organisational members, the culture is entrepreneurial, information systems is integrated, and, importantly, focus is on delivering value to end-customer. Although Van Weele et al link this model to organisational development (OD) and argue that theory on organisational behaviour and management of change is important, it is not a part that is elaborated and the implications, thus,

remain silent. Also, where the former models emphasised a “one best way” approach, the above model, to some extent, incorporates a contingency perspective with the inclusion of industry. The primary logic, however, stays the same where sophisticated procurement practices involve integration and a ‘center-led’ procurement organisation whereas less sophisticated procurement practices are associated with decentralisation and disintegration.

Cousins et al (2006) provide an empirical test on the configuration of procurement functions focusing on its performance outcomes and aiming to recommend potential strategies to be adopted for improving the procurement function. The four categories are ‘Strategic’, ‘Capable’, ‘Celebrity’ and ‘Undeveloped’. Four criteria decide the contribution of procurement; ‘strategic planning’, ‘purchasing skills’, ‘internal integration’, and ‘purchasing status’. The ‘strategic’ status performs high on all four criteria, the ‘capable’ has a medium to high status on all four categories, while ‘undeveloped’ only performs high on procurement skills. The result of the study, they claim, does to a large extent support the initial work by Reck & Long (1988); however, with the exception of what Cousins et al call “celebrity” purchasers. This classification has a high level of status in the eyes of top management, but contains lower knowledge and skill levels than any other cluster; there is low involvement in strategic planning and low-to-moderate integration with the rest of the business. Cousins et al speculate that such situation can be caused by an “enigmatic” leader; that is, one that is able to sell the procurement function to top management but, nonetheless, and “emperor without clothes” (2006:788). The logic of their argumentation is that ‘undeveloped’ purchasers (low organisational status but high levels of purchasing skills) can build upon their skills to engage with the rest of the organisation in order to increase the level of respect and status and become a capable purchaser. Importantly, a strategic purchaser has both a high level of skills and a high organisational status and is able to integrate them. An organisation cannot achieve the full benefits of supplier relationships without the strategic purchaser configuration (Cousins et al 2006). Cousins et al recognise a limitation in their study in terms of being a cross-sectional survey and, therefore, provide limited longitudinal insight into the evolution between the different configurations. As a result, they suggest qualitative research such as case studies to be a contribution to their study.

Schiele (2007) provides a systematic review of different maturity models, deducting his own model by five theoretical principles for procurement being strategic: procurement planning, structural organisation of the procurement function, process organisation and procurement embedded in the firm, human resources systems and leadership models in procurement, and procurement controlling

systems. The paper tests the model empirically by conducting procurement audits using a tool to assess firms' maturity level. From the study, Schiele argues for a close link between procurement maturity level and initiatives for better procurement performance. If an organisation's maturity level is too low, the introduction of best practices such as an innovative cost reduction method is more likely to fail. Therefore, companies are to invest in their procurement department's sophistication in order to experience a positive relationship between procurement maturity and performance.

Ramsay & Croom (2008) discuss some of the maturity models as portrayed in this section; however, in their analysis they arrive at a rather different conclusion. They conducted a pilot study (a small questionnaire with 21 respondents) where they found that practitioners to considerable extent may disagree with the conventional wisdom of what the given literature regards as procurement's strategic contribution. Their critique questions the following three activities that should enable the procurement function to move away from clerical to being strategic: (1) the categorisation of 'strategic' and 'non-strategic' activities; (2): biological metaphors of evolution and development; and (3): diagrams illustrating "stages of development" and the like. Therefore:

"These three elements combine, complement and reinforce each other. When they are mixed in with the belief that one of the main causes of the continuing low status of many PSM [procurement] functions is their failure to focus on activities capable of generating significant contributions to the organization's SCA [sustainable competitive advantage], the net effect may well be to create a general consensus in both sectors of the field about the way PSM [procurement] functions *should* behave. Without ever being explicitly stated in these bald terms, the current conventional wisdom – particularly the influence of the 'evolutionary' or 'developmental' models – leads to the belief that clerical and administrative activities such as order-raising and progressing, invoice payments, record filing, cost and quality control through negotiation and so on, are 'primitive' or 'undeveloped' activities, whilst more 'sophisticated' or 'developed' activities should be actively pursued in order to move the function from stage to stage, up an evolutionary development path leading to improved performance and enhanced intra-organisational status. These ideas are so widespread that it is reasonable to describe them as a generalised anti-administrative, or anti-tactical procurement activity bias" (Ramsay & Croom 2008:202).

Thus, what Ramsay & Croom point to is a self-carrying logic of maturity models and in general, as demonstrated in this section, the classification of procurement organisations has kept its popularity in the procurement domain literature, whereas the causal strength can vary. For example, Axelsson (2005) reflects on the value of maturity models and argues that at least they contribute to construct a view on a common understanding of good and bad procurement practices. Hence, in general, the maturity models claim that the dynamics of procurement go through phases where they become more integrated with internal and external entities, moving away from operational activities to strategic



activities, more centralised procurement structure, more involvement in planning and demand management, to mention some of the implications. It is this separation and polarisation element that is the main characteristic of the maturity models as an explanatory force of explaining dynamics of procurement management. Following the maturity models, procurement management is to focus on the activities that contribute directly to the company's value proposition (Van Weele 2010), leaving many indirect categories as "unimportant. Axelsson et al (2005) also point to the fact that buying of services are less exposed to more advanced procurement practices and therefore these issues are often not in focus in maturity models.

### **2.2.2 Strategic Change of Procurement – Developing Competences & Professionalism**

The process of changing procurement strategically primarily focuses on increasing the level of procurement professionalism and competence, because it is expected to increase procurement's status within the company. In particular, one reference has been extensively applied; Kraljic (1983) claims that procurement was burdened with too many routine operations and as a consequence did not have the time to do the value-adding activities that was needed. This job included securing long-term availability of critical materials and components at competitive cost in the context of risks and complexities connected to the procurement task. Thus, in order to cope with uncertainties in supply markets, companies are to change the outlook from procurement (operational) to supply management (strategic). Kraljic's argumentation, however, was not necessarily a radically new claim in the procurement literature. For example, Lewis (1946) argues that top management did not recognise and understand the importance of procurement as a major function. Rather, top management prioritised other areas and in particular marketing. Furthermore, Lewis argued that negotiation must not be restricted to price concerns; in fact this may be *the problem*: that executives judge a procurer solely on the basis of ability to get lower price. Procurement should be able to judge a purchase agreement including change in specification, follow materials, markets, prices, stocks, and suppliers; thus broadening the scope of negotiation. Applying this knowledge is the role and value of procurement, arguing that "good" procurement performance is rarely achieved by those whose primary interest, training and responsibility are in other specialist areas (1946). Lewis pays particular attention to negotiation and inventory control as primary procurement skills and he also points to clear policies and procedures as the primary activities to change its position.

Ammer (1961) claimed that one of the problems procurement faced in order to change to a strategic position was that top management did not know much about procurement and how it could contribute to company success. This lack of knowledge was primarily caused by top management having

expertise in other areas. A related challenge was that chief purchasing officers (CPO) rarely referred directly to top management. It was only effective when procurement had strong top management support and participating in top-level decisions. Ammer (1974, 1989) continues the discussion with a comprehensive survey of 500 general managers and 250 procurement managers. This study reveals several gaps between top management and procurement. Ammer found that procurement was not being respected as a profession and the problem in particular being the gap between top management and procurement, not necessarily in the entities themselves. In the survey, Ammer found that procurement professionals only in 4 out of 10 cases achieved the top positions in procurement<sup>2</sup>. Similar findings were identified by Farmer (1981) providing a longitudinal empirical research by observing strategy development in large companies over a period of ten years. He found that it was only a few companies that allowed the procurement function to make considerable contributions to strategy development. The barriers were caused by for example procurement personnel performing clerical jobs and not endeavouring strategic planning. Likewise, strategic planners did not pay attention to supply concern. There were also examples where the procurement division thought they were part of strategic planning; however at a closer look this was not the case.

Ellram & Carr (1994) identify a need to distinguish between three distinctive yet related meanings for strategy in a procurement context: 1) specific strategies employed by the procurement function, 2) procurement's role in supporting the strategies of other functions and those of the firm as a whole, and 3) The utilisation of procurement as a strategic function of the firm. From this follows that a procurement strategy not necessarily informs whether procurement is considered a strategic entity in the company. Furthermore, the procurement strategy may even point in a different direction than the overall strategy of the company. If procurement is viewed as a strategic function, it is considered as a key decision maker, a participator in the strategic planning processes of the company, and a contributor to the competitive advantage of the company. It is the latter strategy that is the final station of maturity models whereas the other two strategy types are means to achieving it. Ellram & Carr's review on development of procurement to a strategic level, classify a significant body of literature, which is primarily based on conceptual arguments. Ellram & Carr also accept the argument

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<sup>2</sup> Ammer (1961) distinguishes between two roles of procurement: (1); "One type could be called the professional purchasing man. Most of his career has been spent in procurement. When he becomes chief purchasing officer, both he and his boss tacitly accept the fact that he has reached his terminal position in the company". (2); "the second type might be called professional executive. This man has made his mark in sales, manufacturing, engineering, or finance, and has been transferred to purchasing as part of a high-level job rotation scheme designed to season him a future general management position. Purchasing is just an "exposure" for him" (1961:142).

that procurement tends to evolve and grow through stages in strategic posture. A prerequisite of this evolution, they argue, is a changing view of top management and change in attitude from procurement managers. They note that this has been a slow process in most organisations. Furthermore, the competence base remains undeveloped, which prevents procurement to contribute effectively to corporate strategy.

Cousins & Spekman (2003) also provide an overview of the evolution of procurement being a strategic element. Their work involves a longitudinal study that researched 25 ‘best practice’ firms using interview and case study techniques as well as a complementary survey that examined 750 firms and 1350 relationships. Cousins & Spekman warrant that the word strategic is often misused by business organisations and some academics: namely, rather than understanding the term ‘strategic’ literally, firms have a tendency to use ‘strategic’ as another word for ‘important’. To be strategic, they claim, requires that procurement understands the pressures on the organisation and how it will react to these pressures. They found that procurement professionals took courses in negotiation but lacked insight into relationship management, and companies engaged in collaboration were more interested in cost reduction purposes than delivery and quality. Issues such as decreasing time-to-market and joint product development were ranked even lower in terms of importance. The study was based on a model framed by Cousins (2002) called ‘the strategic supply wheel’ that begins with aligning the supply strategy to the corporate strategy, which then depends and interrelates ‘portfolio of relationships’, ‘organisational structures’, ‘performance measures’, ‘skills and competences’, and ‘total cost/benefit analysis’:

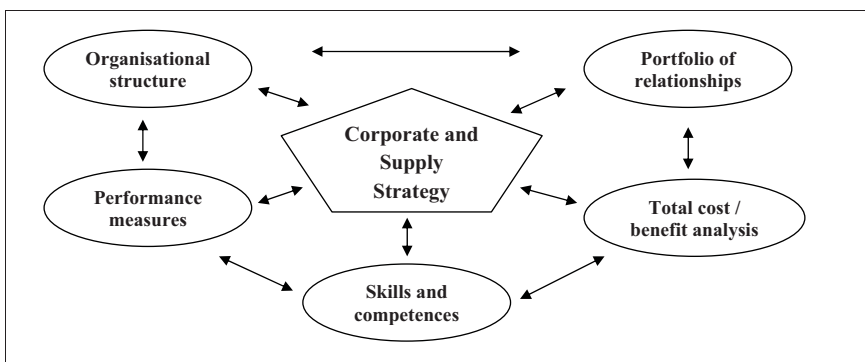


Figure 4: “The strategic supply wheel” (Cousins 2002:78)

The “Strategic Supply Wheel” is explicitly based on policy, processes and procedures. *Policy* refers to the strategy formulation itself (without policy, there is no strategic supply wheel), *procedures* concerns organisational systems (including performance measurement and total cost-benefit analysis), and *process* refers to specific organisational processes, facilitating strategy implementation (including development of appropriate skills and competences and information systems) (Cousins et al 2008). Cousins’ work was initiated by a thorough review of the existing procurement domain literature and, as such, the supply wheel is a confirmation of the work on procurement in general. Policy is the element that binds procurement competence together with how procurement links to the company and corporate strategies, and this is the starting point for procurement analysis (Cousins et al 2008). In relation to the supply wheel, Cousins (2005) goes further, claiming that instead of asking why procurement is not considered a strategic entity, we should have our point of departure in the overall corporate strategy. Corporate strategy determines the collaboration type with suppliers and business outcomes. Thus, we end up in two different approaches to procurement:

- **The cost focused approach to procurement:** achieve cost reductions, lead time reduction, increasing purchasing profiles, and developing some external relationships. The mechanism is through operational collaboration, i.e. sharing operations planning, forecast, demand for sales etc.
- **The differentiator approach to procurement:** focus is on resources and capabilities to translate strategy into managing the supply base and effectively make use of their capabilities. The main focus is strategic collaboration including relationship developments, and market collaboration including market share developments.

Cousins claims and verify in his study that in cost focused companies, the role of procurement will be based on cost-minimisation strategies and operational collaboration. A company with a differentiator focus will involve marketing collaboration and strategic collaboration. Hence, we should not expect that cost-focused companies will adopt ‘supply’ as a strategic process, whereas a differentiator in the market place would be more likely to adopt a strategic view of supply. The claim from Cousins is a contingency perspective that was a stance away from earlier discourse where procurement in “one way fits all” should become a strategic contributor to the company. Also, Ramsay (2001) provides a counter argument to the procurement domain literature, claiming that procurement does not contribute to a company’s competitive advantage based on an argument from the resource-based-view (RBV). Procurement is subjected to being only a function that can deliver operational services as is the case in other companies as well. Thus, procurement is not an organisational competence that can be applied to gain advantage over other companies. Consequently, companies cannot expect to

purchase competitive advantage on the open market; rather, such advantages are gained by the resources and competences already possessed.

Tassabehji & Moorhouse (2008) claim that skills are the centre of developing procurement practices. Their empirical study involves qualitative interviews with 18 senior procurement professionals. They find that although skills have a direct impact on the ability of procurement professionals to fulfil their role competently, the degree of organisational support and internal acknowledgement of the role's importance were major barriers to the development and progress of procurement professionals. The majority of the cases pointed out that the role of procurement was not that highly regarded and that improvements were warranted; however, one exception was a fast-moving-consumer goods manufacturer. Interestingly, in the latter case, the high estimation of procurement was not present because the supply strategy as such seemed to be aligned with corporate strategy; rather it was because the supply strategy was the corporate strategy. This can be part of the explanation why the 'retailers' industry is highly positioned in Van Weele's model (see figure 3).

Finally, Strauss (1962, 1966) conducts a study which has a very different approach than what characterises the procurement domain. Strauss' study – a longitudinal field research – presents the purchasing agent (PA) as a case example to illustrate rivalry between functional groups. Instead of looking at the large corporation as a unified organisation of employees working together in close coordination toward a common objective, Strauss chooses an alternative conception, seeing the corporation as a mass of competing power groups, each with its own interests and their own image of the company's interests (p. 466). The study gives insight into the following four processes:

1. The PA seeks to increase his status and power in the organisation; particularly he seeks to influence the terms in which requisitions are given him.
2. This leads him into conflict with functional groups which are adjacent to him in terms of workflow.
3. In this conflict the purchase agent looks instinctively for help from higher management, but higher management gives him less attention than he would like.
4. For this reason (among others) he turns to professionalism, which helps bolster his self-image and which, hopefully, strengthens his positions in interdepartmental conflict.

Strauss' observation showed that the agents wanted to expand the work area of procurement because they saw themselves as important contributors by keeping materials, sources, and price trends. For example, they did not just want to place orders in accordance with requisition; rather, they wanted to be consulted before the requisition was drawn up. Strauss goes on arguing that the PA goes into a running-encounter with other functions; in particular with engineers. Therefore, procurement's power

and status depends on how tightly specifications are worded. For example, PAs are anxious towards specifications that call for particular ‘brands’ and eager to work with functional specifications with minimum requirements. Specifications should be worded loosely enough to avoid constraining the buyer’s ability to select the supplier who offers the lowest price consistent with performance requirements; for this is one of the main criteria by which his job performance is evaluated. The PA regarded engineers as quality-consciousness – at the expense of cost – and as overestimating their specifications. Engineers, on the other hand, regarded buyers as overly cost-conscious and as someone that seeks to interfere with the engineer’s area of competence.

However, PAs did not only have conflicts with engineers, also production scheduling was a case. Here it was more a conflict over lead-time than status; for example when delivery request had too short notice, the PA had to let go of commercial interests in order to get the goods. The conflict could arise in situations of limited supply, where the PAs were forced to put pressure on suppliers due to, for example, rearranging production schedules (ramp-up and down). PAs became frustrated over the experience that production and scheduling did not understand that one must maintain a continuous relationship with supplier. Each entity threatened the other part with going to top management. While this was often an empty threat, procurement was also not getting the attention it believed it deserved. One of the problems in particular was that procurement often did not report to top management but another functional unit, often production. The PAs, thus, used a lot of time “selling” themselves to management by demonstrating the value of procurement, often by measuring its performance:

“Almost every PA [purchase agent] is interested in measuring performance. If there were objective tools to do it, purchasing’s prestige would be greatly enhanced since management would be aware of the many benefits of good purchasing” (Strauss 1966:480).

Thus, procurement wanted to achieve more status within the organisation and according to Strauss (1966), the notion of “professionalism” became a key issue. Ways to obtain professionalism happened, in Strauss’ observation, through channels of linking up to professional associations, programs of professional education, professional certification, and ethics standards.

### **2.2.3 Distribution of Procurement Activities**

An argument from the maturity models is the possibility of allocating resources based on the logic of categorising strategic and non-strategic procurement activities (Ramsay & Croom 2008) and that a centralisation of procurement activities take place (Van Weele et al 1998). Lewis (1946) used the notion ‘serialised procurement’ to indicate how the business of procurement consist of a series of

steps: determination of the proper amount to buy at any one time and of the delivery dates for those quantities, location of acceptable sources of supply, negotiation of satisfactory terms and conditions of purchase, follow-up on the order where necessary, routing, receiving, inspection, storage and, finally, settlement of the supplier's claim (p. 380). Lewis argues that in order to understand why these activities, which were not closely related administratively, required its own function, one must look at what a procurement professional needs to do:

“He must always do two things simultaneously: cultivate the goodwill and respect of a supplier and critically evaluate the evidence and the argument in terms of his own needs, comparing it with the arguments of other sellers, judging the supplier himself as well as his merchandise, drawing out additional facts regarding both, watching market trends and prices, and knowing the proper moment to say yes or no. Even after a purchase order has been placed, the purchasing officer's negotiations may still have to continue if the material is to be obtained on time or if claims are to be adjusted satisfactorily” (1946:381).

Thus, what Lewis points to is that there are several factors involved in organising procurement activities, as it both requires knowledge about the market and specific suppliers, but also knowledge about the internal business needs to which the procurement professional supplies. Importantly, it is unwarranted to have these activities performed in isolation of the company. Furthermore, it is the access to information regarding knowledge of supply markets, price trends, market conditions, and business outlook that constitute professional procurement competences and how it can make valuable contributions to the efficiency of sales, finance etc.

One of the most dominating articles that have addressed organising of procurement practices is, as mentioned, Kraljic (1983) who have been debated, cited, and applied in a variety of settings in the procurement domain. As Cousins et al (2008) point to “*Virtually every Purchasing department and consultancy firm uses this matrix today and it is the main strategic positioning tool for thinking about supply management [procurement] decisions* (p. 47). One of the reasons why Kraljic's (1983) article is popular is that it links the development procurement competences to segmentation of items. That is, a segmentation of resources and management competences that should be applied in the different supply situations. The model is illustrated in the following figure:

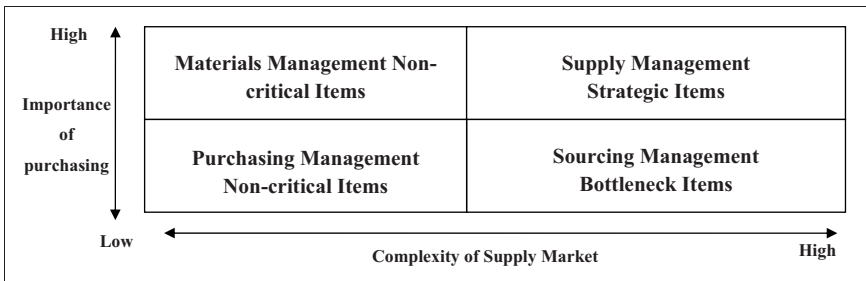


Figure 5: "Stages of purchasing sophistication" (Kraljic 1983:111)

A consequence of this model is that the organising of procurement activities must change; one part doing the transactional activities and a strategic part doing the value-adding activities in the important sourcing processes. That is, management must differ according to what is purchased and, thus, a separation of activities becomes a solution. Furthermore, contrary to how Kraljic is often cited, the above figure is not per se a portfolio model, as it illustrates four different purchase situations. Thus, it is not per se a management decision to move suppliers to one category or the other. Kraljic's link to the supply market has a strong proposition in the procurement literature where the critical task of procurement is to be able to match the supply competences with the characteristics of the supply market. Kraljic's model enables procurement to be involved in items characterised by more commercial and technical uncertainty. Therefore, the claim is also basically identical with the maturity model logic in leaving activities behind when procurement develops, as well as separating and drawing a boundary between the operating and strategic procurement activities. To some extent, an opposing view would come from Lewis and the "serialisation" of procurement activity where there must be coherence between the different activities due to the combination of external and internal requirements and conditions.

One of the archetypical discussions concerning distribution of procurement activities in the procurement domain literature, as well as how to organise procurement, is the centralisation/decentralisation issue. Axelsson et al (2005) distinguish between function (or process) and a department, where most companies have a procurement department but its role can vary considerably. The more strategic issues are taken care of by other specialists such as engineering, marketing, and general management, the more decentralised the organising of procurement is. In terms of where the procurement activity is authorised we can, from Cousins et al (2008), distinguish



between four different models of organising; centralisation, decentralisation, atomised, and federated presented in the following figure:

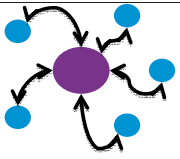
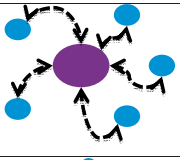
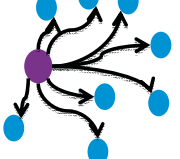
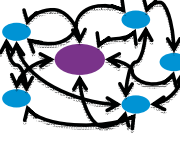
“Structure”	Illustration	Advantages	Disadvantages
<b>Centralisation:</b> A powerful central purchasing office specifies and buys on behalf of the divisions		<ul style="list-style-type: none"> <li>• Economies of scale</li> <li>• Standardisation</li> <li>• Policy deployment</li> <li>• Financial control</li> <li>• Auditing</li> <li>• Policing</li> <li>• Common ICT and systems</li> <li>• Staff exchange</li> </ul>	<ul style="list-style-type: none"> <li>• Resentment in the regions</li> <li>• Bucking the system</li> <li>• Missed opportunities</li> <li>• ‘Overweight’ overheads</li> <li>• Slow response</li> </ul>
<b>Decentralisation:</b> A central purchasing office makes policy, does corporate deals; the divisions purchase on their own behalf		<ul style="list-style-type: none"> <li>• Autonomy</li> <li>• Variety/Diversity</li> <li>• Local prudence</li> <li>• Cross-deals</li> <li>• Local satisfaction</li> <li>• Inter-divisional competition</li> <li>• Staff exchange</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers ‘divide and confuse’</li> <li>• Cost anomalies</li> <li>• Skills shortages/duplications</li> <li>• Lack of financial control</li> <li>• Local covert deals</li> </ul>
<b>Atomistic:</b> A small central purchasing office makes policy, responsibility for sourcing and supply management is to budget holders		<ul style="list-style-type: none"> <li>• Departmental autonomy and responsibility</li> <li>• Simple controls</li> <li>• Procurement cards</li> <li>• Removes budgeting anomalies</li> <li>• Purchasing as a ‘school’ or specialist</li> <li>• Quick response</li> </ul>	<ul style="list-style-type: none"> <li>• Maverick buying</li> <li>• Personal favourites</li> <li>• Suppliers divide and confuse</li> <li>• Lack of control on prices</li> <li>• Commercial risk</li> <li>• Overload on support staff</li> <li>• Systems update dislocation</li> </ul>
<b>Federal:</b> Division award power to central office to develop policy and provide necessary services to them with specific mandates		<ul style="list-style-type: none"> <li>• Agreed rules</li> <li>• Dual citizenship</li> <li>• Subsidiarity</li> <li>• Minimal central control</li> <li>• Cross-fertilisation</li> </ul>	<ul style="list-style-type: none"> <li>• Complex arrangement</li> <li>• Unclear hierarchies</li> <li>• Central bureaucrats</li> <li>• Risk of instability</li> </ul>

Figure 6: “Organizational structures of procurement” (Adapted from Cousins et al 2008:131-140)

Each of the designs in the above figure is a representation of how procurement, overall, is organized in a company. The designs do not vary by category, whether it is a global company or other contingencies. Hence, there is a single design for one organisation determined by a degree of centralisation and decentralisation; for example, in a decentralised structure there is a centralised purchasing office making policy, corporate deals etc. When centralisation and decentralisation are combined, it is, by procurement domain literature, articulated as “hybrid” structure; such as strategic activities are dealt with centrally, while operational execution is done decentralised (Monczka et al 2010). In general, the hybrid structure involves coordination and the search for synergies, which, according to Leenders and Johnson (2004a), has three outlooks: centralised hybrid, hybrid,

decentralised hybrid. In a survey conducted by Johnson & Leenders (2004a) a hybrid structure was identified as the most popular design accounting for 67% of the 284 companies in the study.

Rosemeijer & Wynstra (2005) point to two variables in order to organise procurement synergies. Firstly, corporate cohesion relates to the extent to which the different parts of the corporation operate and are managed as one entity. A company that lacks a clear corporate strategy, an integrated corporate structure, and has a weak corporate culture reflects low coherence. This can be expressed in situations where top level wants a high degree of coordination and the operative level wants to avoid it. The claim is that the less coherence, the more difficult it is to obtain strategic change. Secondly, procurement maturity is related to the level of professionalism as expressed in its role and position in the company; for example its involvement in major corporate decisions, cross-functional teamwork, and the availability of procurement information systems. Thus, a center-led approach exist when there is high maturity and corporate coherence, while federal (or local-led) is most likely with a low coherence and high maturity. In the latter design, a small number of corporate procurement staff support a number of decentralised procurement units in a voluntary effort to exploit potential synergies. From this follows that a high level of purchasing maturity is positively related to a more advanced approach to manage corporate procurement synergies than a low maturity level (Roosemeijer & Wynstra 2005:102). This supports the maturity model logic and Cousins et al's (2008) argument that one design can organise procurement in a company.

Due to changes in the supply environment and the restructuring of companies, Corey (1978) identified a trend in large American companies, as he found that many were reorganising their procurement function towards having a strong central unit that purchased key supply items and provided clear policy direction to purchasing operations at division and plant levels. Different elements of procurement remained at division and plant level; however, at the time, there was also a movement towards realisation of full centralisation of procurement. This later proved to be insufficient in tackling the challenges faced by procurement (Monczka et al 2010), among other things because there also was a centralisation of the order process (Wynstra & Rosemeijer 2005). Corey identified that procurement was centralised for various reasons such as lack of coordination in the company; divisions competed for limited capacity at the same supplier, the promise of better market knowledge when changes occurred, and attracting competent personnel. Decentralisation, on the other hand, related to lack of coordination, vague forecasting and planning, supply interruptions, and loss of cost-saving potential. Also, decentralised profit-centre managers often resisted

centralisation of procurement as it meant less authority and control of what could represent over half of their budget.

Besides Corey's attempt, there seems to be few examples of cases elaborating on the centralisation/decentralisation issue, where Johnson & Leenders' work is an exception to this. They claim that structural change in procurement is a frequent occurring phenomenon and a result of competitive environmental pressures, forcing a change to the company's organisational structure which then leads to a change in the procurement organisation's structure; i.e. an outside-in contingency theory perspective. From a multiple case study research, Johnson & Leenders (2001) identify a number of implementation issues when procurement was centralised. At the business units level there was resistance towards change because centralisation meant less freedom by the business units to manage their own supply matters. Also, a considerable change in the competence profile of procurement involved hiring new people and other individuals losing their job. The companies expected overhead cost to decrease when centralising, but in many cases they increased. Johnson & Leenders paid particular attention to the role of the CPO who had to manage the pressure of dealing with business units successfully and managing a major change project within procurement. This included the pressure of getting headcount targets and a budget for implementing the change. Johnson & Leenders (2004b) focus on the change process of decentralising procurement. The key issue here became how to dismantle the centralised structures of procurement including specialised competences/talents and where to place them. Such issue created business unit competition and, moreover, when the decision was made, the business units saw no need to coordinate their efforts. A decentralising process was often accompanied by ambitious cost reduction targets such as lower prices for purchased materials, reduction in inventories, improved quality and headcount reductions. Interestingly when comparing the two studies it seems that lower overhead cost is a benefit expected of both centralising and decentralising.

Overall, the existing literature of procurement treats the centralisation/decentralisation as a process where procurement adapts to changes in external conditions. One of these conditions is global sourcing; for example, Monczka et al (2006) and Faes et al's (2000) research points to global sourcing being strongly connected to a centralisation of procurement in terms of central coordination accompanied by sustaining a decentralised site level (referred to as a center-led hybrid). Center-led activities involve 1) identifying, evaluating, selecting, managing, and developing strategic suppliers and relationships 2) developing company-wide systems, policies and procedures 3) coordinating

global sourcing opportunities 4) negotiating company-wide contracts and 5) managing critical commodities on a worldwide basis. Decentralised activities involve such as 1) managing transactions with suppliers, 2) using e-systems to obtain standard or indirect items through catalogues, 3) sourcing items that are unique to the operating unit, 4) generating and forwarding material releases, and 5) managing accounts payable and material control (Monczka et al 2006:34). Monczka et al claim that the present center-led authority is driven by the excessive cost pressure due to globalisation and the consolidation of purchase volumes in an attempt to minimise total supply costs (2006:32). Thus, there are particular contingencies enabling centralisation rather than the in-built logic in maturity models.

### 2.2.4 Work Models for Procuring

One of the most dominant work (process) models in procurement comes from the marketing domain, in terms of Robinson et al (1967) under the label ‘industrial buying behaviour’, and serves as a foundation for later work on procurement processes. Robinson et al point to eight stages, identified in the industrial buying [procurement] process; this is illustrated in following figure:

	Buy-classes		
	New Task	Modified Re-buy	Straight Re-buy
(1) The anticipation or recognition of a problem or need;			
(2) the determination of the quality and characteristics of the needed item			
(3) a specific description of the item is needed			
(4) a search for potential sources for this needed is undertaken;			
(5) these sources are examined leading to a decision on how the item is to be purchased			
(6) the supplier is selected			
(7) the order routine is established			
(8) an evaluation of performance feedback			

Figure 7: “Analytic framework for buying situations” (Robinson et al 1967:12)

Robinson et al conceptualises three buying situations: New Task (new product, unknown suppliers), Modified Re-buy (new product from known supplier or existing product from a new supplier), and Straight Re-buy (i.e. routine buy). Robinson et al do not expect that all purchases proceed step-by-step as the model suggest; for example, it may be halted or stopped by someone from a higher organisational level. As such, the industrial buying processes represent a dynamic interaction between various people and influences focused on acquisition. The model developed by Robinson et al views the procurement process as a problem-solving process spread over time where procurement decisions are regarded as shared decisions which are subject to a variety of influences. They introduce the

notion of “creeping commitment” to draw a boundary around the decision-making process. This involves a sequence of incremental choices, each of which eliminates certain solutions from further consideration and the process results in a choice between alternatives from which a final decision is made. Based on their study of three firms, Robinson et al concluded that type of product was not as important in determining the process as the situation regarding information and experience. The importance of the buying situation, the number of people involved in the decision-making process and the reliance placed upon buying committees determined the accuracy of the “creeping commitment” (Ibid).

Although a dominant model, the research by Robinson et al was not directed towards procurement management, but rather towards suppliers who sought to become better marketers and in that regard being able to understand the procurement process. Thus, it is not as such a procurement management perspective, but rather equivalent to that of understanding end-consumer behaviour. That is, the basic marketing model may say: first the consumer becomes aware of a product, then the consumer gets interested and seeks more information; and from that follows an evaluation, a trial and finally an adoption (Wilson 1987). Wilson’s general claim about industrial buying behaviour models says: *“Although the labels are different, the main Robertson’s model is an enriched version of the basic adoption model. It is basically a consumer buying model.”* (Wilson 1987:324). An example of this stream of literature is Anderson et al (1987), who argued that the procurement process had been difficult to test because of valid data from buying companies and therefore aimed to test Robinson et al’s conceptualisation empirically. This was carried out by asking sales people and how they encounter a given circumstance and correlated the frequencies over several circumstances.

The type of work identified in the industrial marketing literature is also apparent in the network approach/IMP school (e.g. Hakansson 1982). The contribution in this school is not so much knowledge about the management of procurement as it is an argument for suppliers to create dependency. The network approach’s starting point is that dyadic relationships are not only influenced by the characteristics of the product and the involved organisations, but also a part of other organisations which again are all part of the supplier network (Van Weele 2005). Business is done, Hakansson claim, by detailed cost breakdowns (such as cost of sub-parts, labour costs, operational costs etc.) that show a high level of knowledge concerning the supplier’s cost position. Importantly, this information is a fundament for both buyer and seller to develop a common understanding of cost drivers and opportunities for cost reduction and improving business processes. Over time, this process

enables the relationship of organisations to become more intensive and collaborative, with supply integration as the result (Van Weele 2005:43-44). The network approach (or IMP school), thus, draws a boundary around social arrangements that create coherence and contentment, which advance the performance of buyer-supplier relationships and that personal relations are warranted for procurement management. As a consequence of such relations and interdependencies, the work models as portrayed by Robinson et al are less visible. Market analysis, visiting suppliers, etc. is not required because the market is excluded from the relation. In a study conducted by Gammelgaard et al (2005) with ten case studies of procurement practices in Danish companies, an increase in procurement professionalism was found; however, this professionalism was characterised by professionalised relations rather than personal based networks. For example, an increasing interest in using supplier segmentation models combined with an evaluation of their suppliers was regarded as a professional approach to procurement.

Novack & Simco (1991) adapted Robinson et al's framework to what they labelled a supply chain perspective. Novack & Simco's procurement process consists of eleven steps that are as follows: 1) identify or re-evaluate needs, 2) define and evaluate user requirements, 3) decide to make or buy, 4) identify type of purchase, conduct market analysis, 5) identify all possible suppliers pre-screen, 6) all possible suppliers, 7) evaluate remaining supplier base, 8) choose supplier, 9) deliver product/ performance evaluation, and post-purchase/ make performance evaluation (Novack & Simco 1991:147-149). The key managerial decision which Novack & Simco draw attention to concerns the proper amount of investment in the procurement process. They point to a method consisting of four steps in order to manage the procurement process. First is the determination of type of purchase, which dictates the complexity of the process. That is, whether we have a new buy, a re-buy, or a modified re-buy; the more new the purchased item is for the organising the more complex is the procurement process. Second, is the determination of the necessary levels of investment based on time (individuals involved in making the purchase) and information (internal in terms of user requirement and external in terms of environmental and potential supplier information). Problems occur if there is not a match between user's needs and investments. Thus, if we are talking about a new buy, a large amount of time is needed as well as maximum requirements about information. About effectiveness, Novack & Simco state:

“For the procurement process to be effective, the proper activities must be performed, the correct information must be collected, and the appropriate amounts of time must be expended to

exactly satisfy the user's requirements. Procurement effectiveness, then, can be called the equivalent of customer service." (1991:152)

Step three involves performing the procurement process; according to Novack & Simco this step is easy to describe but can be complex to carry out. It includes performing activities to effectively make a purchase and satisfy user's requirements. Finally, step four evaluates the procurement process: (1) were the user's needs satisfied? and (2) was the investment necessary? Novack & Simco only elaborate on step two and according to the rationale; an effective procurement process is eventually measured against whether the internal customer's needs is satisfied.

Other models have since arrived, for example Anderson and Katz (1998), who claim that 'sourcing process excellence' can be achieved through the 'sourcing value chain model'. This process model consists of a set of steps through which strategic sourcing decisions are made, in order to create value for the organisation. The claim is that the process can be applied to all purchases, although the specific approaches, strategies, and best practices vary and reflect the priorities and opportunities according to the impact of the revenue and the business risks versus procurement complexity. Anderson and Katz's primary boundary around the process model is information: the more information the organisation is able to capture, the more value and effect does the 'sourcing value chain' have. Such procurement model corresponds with the claim put forth by Kraljic and Keogh that there are activities which procurement should strive for and activities that are to be left behind. In this regard, a claim can be that these procure models must involve many professionalised procurement competences if it was to work as intended, and from a maturity model perspective indirectly projected to have causality with an increase in procurement sophistication. The more activities in the process are carried out by procurement management the higher sophistication level.

### **2.2.5 Procurement Performance Measurement**

Much of the procurement literature, in particular the maturity models, in one way or the other relates to the performance of procurement. For example, Cousins & Spekman (2003) link the relation to actual and desired level of strategic attainment to skills & competencies, performance measures, and supply strategy in respective order; thus, if you are measured tactically you will behave tactically etc. (p. 22.). Ammer (1961) argues that procurement is often measured both wrongly and too simple in order to accept procurement to change. For example:

"It seems easy to measure purchasing performance on the basis of price. When performance is good, prices drop; when performance is poor, prices rise. Unfortunately, it is not that simple, since a purchasing department's skill in selecting suppliers and negotiating prices is but one of

many factors that determine prices. In fact, the best purchasing department in the world will pay high prices in a rising market while the worst one will look awfully good in a weak market.” (Ammer 1961:138).

Thus, price in itself is a poor indicator of competent procurement professionalism. Van Weele’s (1984) claim was that we should recognise the importance of measuring output to provide visibility and use it proactively. Van Weele links the different stages of maturity levels to the kind of performances measures we would expect to be relevant at each level. If procurement is positioned low in the company, we can expect that performance measures are also less sophisticated. In turn, if purchasing is represented in top management, we would expect highly sophisticated measures such as early supplier involvement and make-or-buy decisions. Butler (1995) recommends that we should not fall into the trap in procurement of just measuring what is easiest to measure, which often involve quantitative measures such as savings (or financial contribution to profit). This is a risky approach because of its potential of conflicting with long-term cost reduction benefits (Ellram 1993). According to Butler, procurement should benefit from applying performance measurement to sell the business benefits internal in the company. Cavinato (1987) finds in his study that what people perceive as facts is more important than what facts really are. From this follows that there was little relationship between the applications of sophisticated formal procurement performance measurement systems and the image as perceived by management.

Butter & Linse (2008) argue that although procurement has increased its level of importance, the problem of measurement hinders the recognition it deserves. According to Butter & Linse, there are two reasons for this lack of acknowledgement. Firstly, it is often difficult to document procurement’s specific contributions: were the cost savings the result of skilful negotiations with suppliers or an unexpected shift in the market? The financial benefits of a favourable procurement deal often extend beyond the initial purchase price to other aspects of performance (for example, improved working capital or reduced financing costs), so there is more than one bottom line to consider. Second, the line between the responsibilities of procurement and those of other stakeholders can be ambiguous. Hence, procurement often shares whatever successes it achieves with other groups; however in failure, procurement is often hold exclusively responsible (Ibid).

The procurement literature has also incorporated ideas from balanced scorecard referred to as a Procurement-Balanced Scorecard (P-BSC) in order to measure procurement’s contribution (Wagner & Kaufmann 2004, Carter et al 2005, Cousins et al 2008). This is not surprising as there is an intrinsic causality designed to the P-BSC which therefore fits well with the domain literature on



procurement. Also, the P-BSC touches upon how procurement is organised; for example how procurement is measured by top management, what is central for interacting with internal customers and suppliers, and how procurement skills are developed. As such, it becomes a continuation of the maturity model models and the supply wheel rationale presented earlier. Finally, about performance measurement we can include with how to measure the return on investment in procurement (Axelsson et al 2005:29). In the left side of the following figure is the condition illustrated that the resources invested must generate at least the same value as it cost; thus the revenue (value) must be the marginal cost. In the right side of the figure is illustrated where the company competes with other investments:

$\frac{(\Delta \text{ value}_i)}{(\Delta \text{ costi})} > 1$	$\frac{(\Delta \text{ value}_i)}{(\Delta \text{ costi})} > \frac{(\Delta \text{ value}_a)}{(\Delta \text{ costa})}$
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**Figure 8: “Returns on procurement investments” (adapted from Axelsson et al 2005:29)**

In a broader perspective the cost/value equation concerns procurement performance constituted by efficiency and effectiveness, which is difficult to define in specific cases and the positive values are a complex assessment (Axelsson et al 2005). According to Van Weele (2010), procurement effectiveness relates to the degree to which previously established goals have been met and can refer both to operational performance as well as strategic contribution concerning materials costs/prices, product/quality (including involvement in new product development), and purchasing logistics (e.g. supplier delivery reliability). Procurement efficiency is related to the relationship between actual and planned resources in order to realise previously established goals and, therefore, concerns the performance of the procurement organisation and its personnel, management, procedures and policies, and information systems (Ibid). Van Weele & Roosemeijer (2003) argue that performance measurement as a stand-alone topic in the procurement domain is poorly developed, although, as we have seen in this section from the outline of maturity models, performance measurement is a central element in procurement management:

“Performance measurement in purchasing cannot be considered in isolation. Rather, it is a crucial part of the purchasing management process. Planning and control go hand in hand. If the purchasing function lacks a clear vision, when purchasing strategies and action plans are ill developed and management reporting is absent, systematic performance measurement and evaluation will be difficult if not impossible. Without it, a procurement organization and purchasing cannot be in control” (Van Weele 2010:321)

Also, as mentioned in Strauss' study, if it was possible to objectively measure the performance of procurement, it would be highly appreciated by procurement professionals. The question of course is whether that is possible?

### **2.2.6 Summary of Organising Procurement**

So far, this section has drawn attention to several ways of approaching procurement organising and how it has drawn boundaries around activities. From the outset of maturity models and the strategic procurement change discourse, claims are put forward which lays a rigid argument on how we are to think of the dynamics of procurement management and how new procurement practices are introduced and implemented. In particular, the normative guidance from the procurement domain literature to procurement professionals is to put effort into a development agenda, which follows a blue-print like stage model going from being clerical, administrative, cost-focused and reactive to being strategic, value-adding and proactive. Importantly, the maturity models indicate that it is when procurement practices have high sophistication that it is important and it becomes a space for the ability to integrate and develop suppliers to achieve a competitive advantage. From this follows that integration, centralisation, demand planning, and strategizing (policies and procedures) are the key arguments on how we are to understand the dynamics of procurement management. That is, sophisticated procurement management warrants integration with internal and external entities, whereas un-sophisticated and administrative activities require for example disintegration and a low resource allocation. Thus, procurement should focus on activities that are directly related to the company's value-proposition and this requires that procurement management clearly define what is important and what is not important.

The procurement domain literature has often defined 'a priori' the activities that are important and warranted. For example, Freeman & Cavinato argues that a lower level of procurement maturity are designed as a cost centre whereas cost seems to have left the equation when moving forward, denoting that there are things more important when we have "strategic procurement". Furthermore, cost issues are viewed as barriers when developing procurement competences such as budgets and head-counts. However, if we follow Strauss' claim, it was primarily the encounter-battles with other entities that were the impetus for procurement to increase its level of professionalism and competences. A key management heuristics in the procurement literature is that supply strategy should be aligned with corporate strategy. That is, if an organisation's primary value-proposition is that of innovating new products, the supply strategy should be in congruence to support this goal. For example, the rationale behind "Strategic Supply Wheel" is processes, procedures and policies

strengthening the elements of skills & competences, total cost, performance measurement, organisational structures, and portfolio of (external) relationships as the means to develop a strategic outlook of procurement. The “Strategic Supply Wheel” has a strong argumentation/discourse that carries its own logic which is difficult to be in opposition to. For example, it would be difficult to argue that if we want procurement to change the way we manage suppliers, we should not also not change the way we performance measure and do total cost analysis etc.

### **2.3 Procurement and Innovation**

Innovation as a theme for procurement is sparse although it with the inclusion of entrepreneurship has a more rigorous contribution. There are primarily two streams of work: procurement in terms of how it contributes to its company’s innovation processes, and secondly how procurement in itself is able to innovative its practices. The claim is that the two work streams are related to each other through the outline of maturity models; i.e. if procurement is participating in a company’s innovation processes, it is expected to have a high sophistication level; and how procurement itself is innovative becomes a move between stages in the model. The following section is structured by first addressing innovation perspectives and then entrepreneurship.

#### **2.3.1 Innovation Perspectives in Procurement**

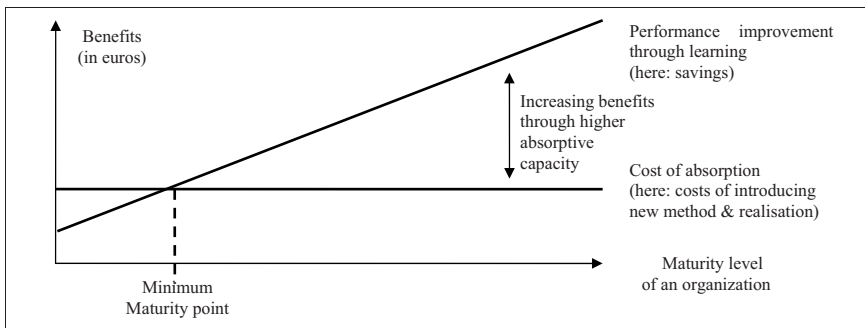
Lewis (1946) draws from Schumpeter’s theory in order to address procurement’s role in a company’s innovation. His argument is that the procurement department should, but did not, play an important role in the decision making on what to manufacture. That is, because such decision affects every major function (where procurement is part) also procurement should be part of a joined decision-making: *“...in capitalist reality [the kind of competition which count is] the competition from the new commodity, the new technology, the new source of supply, the new type of organization...competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of existing firms but at their foundation...”* (Schumpeter 1942: 84; in Lewis 1946:380). Lewis, thus, argued that the procurement department could contribute to the company with special knowledge about market conditions, prices, suppliers as well as new materials, new processes, and new sources derived from their continuous contact with suppliers. Procurement is part of innovation through its access to the supply market.

In a procurement context, Moguee & Bean’s (1976) relate innovation to companies' adoption of new technology and new or improved technological products, which frequently involve the purchase process that are new to the innovating firm. However, this does not necessarily indicate that the

purchasing agent per se is regarded as important. Hence, they point out: "*The 'really' important purchases are sometimes considered too important for the purchasing department*" (1976:221). First of all, their literature review identifies that research on adopting innovation has virtually ignored any possible role played by procurement professional and there were no cases, surveys, or reviewed articles located that addressed purchase agents in that capacity. From Robinson et al's (1967) they *conceptualise* a role for procurement in innovation of a company's products by a mechanism where technical personnel are most influential in new purchases because of its role as expert, but what they lack is the details in order to realise their plans. The technical personnel may therefore search for advice from their network, search for potential suppliers, and they may consult procurement as a role of information-provider such as with a potential list of suppliers. Production engineers initiate the purchase and the technical people generally evaluate the submissions. As commercial interests become more important in the buying process, we can expect to see more directly participation of the procurement professional. Moreover, in modified rebuys or straight rebuys, procurement can be more involved also in technical changes. Zaltman & Bonoma (1977) provide a similar argument that the more technologically innovative the item, the more decreases the role of procurement. On the other hand, it is expected that that the role increases in commodity purchasing situations. In general they identify procurement's role as expanding from merely paper work to contributing to market and business aspects (p.54).

Schiele (2010) argues that although there is an established literature on ESI, the role of procurement has been largely ignored in the domain literature of ESI. Schiele claim as mentioned, that it is probably with the implicit assumption that other functions fulfil procurement tasks. In addition, from Schiele's review there is identified a scarce focus on the organisational structure of procurement organisations within the literature dealing with ESI and procurement's role. With point of departure in a best-practice study of six companies Schiele argues that the role procurement can undertake in new product development (NPD) is dual, in order to support the process of innovation (i.e. NPD) while also being concerned with managing costs of a product's life cycle (i.e. activities that go beyond the NPD process). According to Schiele, the dual role can only be realised if the procurement organisation has internally reorganised itself, suggesting three units: advanced sourcing (interface with R&D), life-cycle sourcing (compliance to commodity sourcing strategies) and then operative procurement.

Schiele (2007) applies the concept of absorptive capacity (Cohen and Levinthal 1990) to explain what is referred to as an apparent anomaly, that more developed companies exhibited larger saving potential. From this concept, Schiele establish that the R&D departments learn more from their environment, if they have a high level of in-house competence. Applying this concept to procurement organisations, they will learn more from their environment if they have a higher maturity level. The minimum maturity point is illustrated in the following figure:



**Figure 9: “The minimum maturity point” (Schiele 2007:282)**

Thus, Schiele argues for causality between maturity and performance improvement; in this case ‘savings’. However, implicitly, the work assumes this to count for every new method introduced by procurement. The higher maturity level, the higher is the chance of adopting innovative best practices. A low maturity level, on the other hand, indicates that the effort may fail. “Purchasing Absorptive Capacity”, then, enables us to interpret how poor performance is associated with unsophisticated procurement organisations as low-learning effects. A low maturity level requires valuing new knowledge and to assimilate and utilise it (Ibid).

Carter et al (2007) identify several innovation areas in procurement, such as developing innovative category strategies. Because it is expected that more and more innovation will become dependent on suppliers delivering the innovation, companies need to identify external sources of supply, structure the commercial and working relationships with those sources, and establish how they can make those resources an integral part of the product and service processes (p.33). Similarly, Favre & Easton (2006) focus upon innovation in relation to improve procurement performance and includes new and better technology (e.g. e-sourcing), more companies and countries from which to source from (global sourcing), and new and increasingly sophisticated approaches to managing the procurement

organisation such as outsourcing procurement and leverage new technologies. Four areas of procurement are regarded to be value-adding; strategic sourcing, supplier management, category management, and performance monitoring. From Favre & Easton's work, innovation refers implicitly to changes of procurement practices through leadership, organisational structure, cross-enterprise integration, resource management and development, stakeholder relationship management, and metrics being a positive correlation to procurement performance.

According to Billington & Jager (2008), procurement groups have a much greater role to play in helping their organisations to innovate and apply the principles of open innovation and Internet-facilitated "seeker-solver" networks. They claim that procurement professionals are to recognise that procurement processes lie at the root of much innovation activity; the job consequently is to find rather than create innovative activity. Innovative procurement practices are carried out by developing new ways to define and identify needs inside the organisation and match those needs with all available external resources. The obstacles for this "revolution" of procurement demands that it, as a function, is no longer measured on price metrics; that is, a change from price reduction to revenue generation. Billington & Jager claim that innovation is created through getting rid of some of the administrative tasks procurement is doing and instead creating an "innovation" culture.

In a survey with 200 procurement managers in multinational companies, Gonzalez-Padron et al (2008) – investigate how an organisation's ethical climate effect entrepreneurial innovation in global purchasing. In their context, innovation refers to innovation in supply chains involving changes in product, process, or service that either reduce cost or improve efficiency to customer satisfaction. Because procurement managers are pressured by a variety of expectations such as balancing cost, supplier management, and corporate supplier responsibility, they are potentially led into increasingly ethical situations and this will have an effect on the ability for purchasing managers to be innovative. They claim to have found a positive correlation between a commitment to ethics strengthening the value of teamwork's influence on entrepreneurial innovation and the quality of relationships in the sourcing process. A high degree of internal and external interaction with its environment based on ethical commitment is positively related to procurement performance. The more procurement engages with the environment, the more innovative is procurement expected to become; as also Schiele claimed.

### 2.3.2 Entrepreneurship and Procurement Innovation

The first link between entrepreneurship and procurement was Morris & Calantone's (1991) work, which draws on theories of entrepreneurship emphasising behavioural and attitudinal components to the process of creating value by exploiting opportunities. They present three underlying dimensions that are related to entrepreneurship; innovativeness, risk taking, and being proactive. The claim is that because procurement represents an important element in the relationship between a company and the external environment, and because it spends a great deal of the company's revenues, it is also an abundant opportunity for innovation and change. They offer several suggestions to how procurement can be a proactive source of opportunity exploration, including, for example, managing supplier relationships, incorporating procurement related technologies, motivating suppliers to improve quality at lowest cost, and increasing the external spend by activities traditionally produced in-house. However, in their survey – 268 industrial firms in the US – on how procurement managers regard the nature of entrepreneurship and its applicability to the procurement function, they find that managers view procurement generally as the least entrepreneurial part of the firm. Finding, evaluating and selecting sources of supply appeared to be the most entrepreneurial part regarded by procurement managers; obstacles on the other achieving entrepreneurship within procurement were:

<b>Factors Rated as Biggest Obstacles</b>	<b>Percentage of Respondents Mentioning (n =268)</b>
History/Tradition/Resistance to Change	32.5%
Management Controls/Red Tape	22.8
Low Industry Growth	9.0
Lack of Leadership	7.5
Engineering Dominates	6.0
Inventory Constraints	3.4
Sole Sourcing Rules	2.2
Understaffed/Under budgeted	2.2
Management Won't Implement	1.5
<b>Suggestions for Management Action</b>	<b>(n = 260)</b>
Financial Rewards	7.1%
Top Management Support	25.0
Eliminate Restrictive Policies and Procedures	26.5
Expand Authority/Freedom Given to Purchasing	26.6
Other	14.9

**Table 2: “Constraints and solutions to achieving entrepreneurship within purchasing/materials” (Morris & Calantone 1991:7)**

Hence, the reason why procurement does not become entrepreneurial and thereby an innovative part of the company is primarily due to history, i.e. there is no tradition for viewing procurement as creating innovative value as well as management control in the company. On the other hand, the study finds that more freedom to the procurement department could be a solution to change the

situation. Procurement personnel were also asked to identify possible innovative opportunities and example of risk-taking behaviour. These examples involved the innovation of the process, not the product; such as placing quality control engineers in purchasing department, consignment programs, systems contracting just-in-time, measurement buyers on measures other than shortage performance, stockless inventory, and supplier audits. Morris & Calantone concluded their study by emphasising a development of personal qualities and developing a professional workforce by recruitment and training programmes. Also, they recommend developing goal structures, planning systems, evaluations mechanisms in order to motivate the characteristics of the entrepreneur.

Later work on entrepreneurship and procurement emphasise skills as the central element. For example, Giunipero et al (2005) combine flexibility skills, procurement skills and entrepreneurial skills to specific skills criteria for entrepreneurial procurement management: interpersonal communication, ability to make decision, influencing and persuasion, problem solving, creativity, and risk taking. Although Giunipero et al are not able to demonstrate a direct causality between entrepreneurship and procurement, they assume that acting entrepreneurially will facilitate adaptation to environmental changes. The overall argument, hence, is that the key skills of procurement management are similar to those of entrepreneurs and this involves being proactive, creative, and decisive. Giunipero et al (2006) expands the claim by arguing that entrepreneurship enables collaboration and integration of processes with those of their suppliers, to lower cost and improve process efficiency. Furthermore, they categorise a distinction between tactical buyers, who is concerned with the day-to-day activities, and strategic buyers, who focus on building relationships and lowering total costs. The two roles are separated and the latter is claimed to be most relevant in relation to entrepreneurship.

Handfield et al (2009) also combine entrepreneurship theory and procurement and identify a resemblance between corporate entrepreneurs and recent research in procurement. This involves procurement managers to become more proactive, seeking out global opportunities, identifying new technologies, and introducing these insights into the organisation. Thus, Handfield et al are interested in whether successful procurement functions behave in an entrepreneurial fashion in managing external suppliers and internal stakeholder groups. They set out to empirically test a framework that aligns key entrepreneurial characteristics with attributes of successful procurement (2009:101). To build this framework, Handfield et al draws on the early works on Schumpeter (1934) and the entrepreneurial work as driver of innovation and work such as Lawrence & Lorsch (1967) and



Thompson (1967) on establishing key structural and infrastructural variables. Four areas of procurement are identified as common properties (Handfield et al 2009): (1) supply market research and intelligence – identify needs and opportunities (2) supplier integration – skills, knowledge, capabilities, management authority, and systems to identify and act on opportunities (3) cross-enterprise integration – establish stakeholder requirements in product and process design and communicate with key suppliers regarding specification, statements of work, and customer requirements. Also, the manager is required to bring new innovative ideas from suppliers and introduce them to key product platform design; (4) supply management influence - the ability of procurement to be “taken seriously” within the firm and to build a solid business case around their approach, and influence key decision makers.

Handfield et al’s findings indicate that supply management’s influence is a good predictor of the extent to which they had a ‘seat of the table’ with other business function’s planning activities. However, their results also indicate that it was not an effective predictor of the ability to integrate suppliers into decision-making processes of the company. Handfield et al claim to have found evidence that entrepreneurial facet of entrepreneurship is an important foundation for building an effective procurement capability. Because procurement historically has been a service function a strong leader is required, who is able to introduce bold innovation in to the firm’s strategic planning processes. They draw from an interview with a senior executive:

“I always approach a business unit president or the head of a function such as HR by first introducing myself, and asking how I can help them. I then spend a lot of time visiting with them, and learning about what it is they buy it and from whom. Then I provide some suggestions as to how I can help them save money or improve their supplier’s performance through development of a category strategy. But I never try to strong-arm them into doing anything – instead, I ask if they will let me work on a small pilot project to demonstrate the capabilities of our supply management team. Once they see what we can do for them, then we are asked back again and again” (A procurement manager in Handfield et al 2009:117)

Handfield et al insist on a positive correlation between procurement performance and entrepreneurship; for example that entrepreneurship orientation is an ingredient in improving collaboration with suppliers in terms of strong supply market knowledge and networks.

### **2.3.3 Summary of Procurement & Innovation**

There are two different streams of work innovation perspectives in terms of whether it is about innovation of procurement in itself or whether it is about procurement participating in the innovation processes of the company. In relation to the latter, industrial marketing literature involves a

speculative claim that procurement professional potentially could be a gate-keeper of innovation from external sources and a support when necessary, for example with market knowledge in search of new suppliers. In terms of how procurement itself becomes innovative there are several possibilities, which first of all bring us to another distinction. Work on innovation as a concept versus work that merely regards innovation as a means to introduce new procurement trends that has a positive correlation to procurement performance.

The literature linking procurement and entrepreneurship emphasise skills and competences at the centre of their explanation. The capacity to take risk, to be creative, to be proactive, and to be able to act as integrator between internal and external demands are important virtues emphasising qualities such as relational capability and network competence. Proactive procurement management is highlighted and implies for procurement managers to work closely with business stakeholders, scan the supply market, collect market intelligence, identify opportunities to integrate suppliers with internal requirements, deliver value-added initiatives to create value, and ensure on-going collaboration with key supplier partners. Being proactive and being entrepreneurial is closely related in the procurement entrepreneurship literature. Finally, innovating procurement practices must necessarily be understood quite broad such as searching for global sourcing opportunities, identifying new technologies, outsourcing procurement, and entrepreneurial capabilities. Therefore, innovating procurement practices is highly connected to how procurement is being organised.

## ***2.4 Discussing & Framing Procurement Management Domain Literature***

This chapter has, on the one hand, established an understanding of how the existing procurement domain literature create boundaries in order to comprehend procurement management, while also, on the other hand, enabled an understanding of the complex relations which procurement management is conditioned by. The procurement domain literature has accentuated that the dynamics of procurement are a gradual movement of sophisticated archetypes, ranging from the clerical task performing only reactive administrative activities to a more sophisticated and integrative stage. Consequently, we are left to conclude that the only activities that are important are those associated with a high sophistication in the maturity models. Cost-focus, negotiations, the day-to-day coordination with suppliers becomes secondary or vanishes from the value-proposition of procurement following the logic of the maturity models. The change process is assumed to be controlled by a rational course of action guided by policies, procedures and formal processes; moreover, the progress between these

archetypes is a rather implicit notion. Also, when procurement has achieved a strategic level, we have reached the end of the explanation.

There is an in-built causality in the maturity models, which imply that the more evolved and sophisticated procurement is, the better it performs. The thinking arisen from the maturity models also affects the mind-set of the procurement domain literature in general and how new procurement practices are introduced. For example, Schiele (2007) argues that there is a positive relation between a high maturity level and success with procurement innovation introductions. The more developed procurement practices are, the more center-led is the procurement structure, and the more is procurement expected to be able to succeed in innovative initiatives. The procurement domain literature, thus, builds a strong discourse around a normative claim of integration, consistency and consensus as necessary elements for procurement management. Consequently, it will be difficult to argue against activities such as: proactive procurement that works closely with business stakeholders, identify opportunities to integrate suppliers, scan the supply market, collect market intelligence, be involved (early) in new product development processes, harvesting the opportunities in e-enabled technologies etc. Hence, the “strategic supply wheel”, for example, is designed and formulated by policies, procedures, and processes that is necessary to have in place in order to achieve strategic procurement. The primary effort of the procurement domain literature is to introduce models that have a formal representation of the procurement reality and thus it is able to guide procurement managers. Furthermore, the discourse and representation are so strong in regards to how procurement management should perform that we lose sight of the conditions under which the operations are to be carried out.

A central discussion in this chapter concerns how the existing procurement literature deals with oppositions. As claimed in the introduction, to complexity science, contradiction and the relation of oppositions are central elements in explaining dynamics. The procurement domain literature separates oppositions in time-space and often highlights one over the other. Hence, treating difference in isolated oppositions stabilises procurement management and the possibility of performance to thrive. In particular, from this review, the following oppositions can be identified in the procurement domain literature, serving as a frame of oppositions for procurement management:

<b><u>Disintegration</u></b>	<i>versus</i>	<b><u>Integration</u></b>
<b><u>Cost</u></b>	<i>versus</i>	<b><u>Value</u></b>
<b><u>Operational</u></b>	<i>versus</i>	<b><u>Strategic</u></b>
<b><u>Decentralisation (Local-led)</u></b>	<i>versus</i>	<b><u>Centralisation (Center-led)</u></b>
<b><u>Reactive</u></b>	<i>versus</i>	<b><u>Proactive</u></b>

Figure 10: “Framing oppositions for procurement management” (Author)

The five oppositions framed above should not be regarded as individual oppositions; rather, they are highly connected and all five combine the elements for how the procurement management literature explains dynamics. In terms of integration versus disintegration, the latter is a solution for activities that are not sophisticated enough to contribute to procurement performance. Integration, on the other hand, is associated with developing procurement’s strategic assets. For example, integration with strategic suppliers, where non-strategic suppliers should be kept at distance and, thus, disintegrated, between procurement strategy and organizational strategy, and integration between functions, global divisions, etc. Also, the cost-value opposition (framed by figure 8) is assumed by the maturity models to be a development where the more sophisticated the procurement organization is, the more it is able to create value. Conversely, the less is it concerned with cost of creating that value because it is accepted by top management and other entities in the company. In other words, the more effective the procurement organisation becomes, the less is the procurement organisation concerned with efficiency in terms of how much resources are spent in order to be effective.

Operational versus strategic matters are also thought of as distinct. Sophisticated procurement models start with strategy and ends with policies and tools; strategic considerations are superior to operational matters. Kraljic’s dominating model suggests that procurement organisations should separate strategic sourcing matters from operational day-to-day activities. Also, when the procurement literature emphasises alignment of supply strategy with company strategy, then those must fit each other first, in order for procurement to deliver appropriate value. In terms of the centralisation versus decentralisation debate this includes not only those who carry out the buying activities but also those who have the authority in the organisation. Center-led procurement

organisations are handling strategic issues and decentralised entities are caretaker of operational issues. The higher up we move in the maturity model, the more we can expect a center-led procurement organisation to have authority according to the rationale. Finally we have reactive versus proactive, where more maturity is connected to more anticipation and action on procurement's own initiative and therefore better planning and more effective use of resources. Therefore, according to the rationale, being reactive in terms of acting upon others demands should be avoided for procurement management. In a broader construct, all five oppositions relate to efficiency and effectiveness of procurement management. The more the oppositions are separated, the more is it expected that procurement is effective (doing things right), whereas efficiency (use of minimum resources of doing things right) vanishes from the analysis in the maturity model logic.

The maturity model's logic would suggest that the more integrative, value-oriented, strategic, proactive and center-led procurement becomes; the more successful it would perform. The first essential challenge in this regard is whether procurement management is able to setup and maintain a boundary between what is important and what is not important. Moreover, by choosing one of the poles, the procurement literature aims for stability that makes management of procurement perform well. As a result, the literature eliminates contradictions and emphasising consistency and conformity as critical elements of procurement management. Another implication of this viewpoint is the focus on integration as goal-end means to solve the problem of instability and uncertainty. This tendency is also reflected in the concrete manner in which the procurement literature addresses entrepreneurship and innovation. For example, qua the earlier introduced quotation from Handfield et al that emphasise consensus between internal customers and procurement department as the critical enabler. Also, Van Weele's maturity model regards the solving of dilemmas as the means for progressing towards more sophistication. Consequently, there may be contradiction and dilemmas at lower levels of procurement maturity; however, when procurement is strategic, dilemmas and contradictions are resolved.

### **3 Process, Change and Innovation & the Dynamics of Procurement Management**

The purpose of this chapter is to broaden the perspectives of understanding and conceptualising processes, change, and innovation in a procurement context. In order to do this, the thesis borrows from the domain literature on organisational and management studies in terms of process, change, and innovation. Van de Ven and colleagues have for several decades now worked with and popularised these concepts in a collective effort. This chapter is inspired by their approach, but not confined to it. The chapter introduces an analysis of the strength and weakness of the existing approaches of understanding the dynamics of procurement management, which from chapter 2 was understood and explained narrowly. In particular, the theoretical insight on dynamics and complexity in the procurement domain literature was inadequate. Thus, it seems relevant to make an effort to broaden the understanding on how to encompass procurement management in the management domain of processes, change and innovation.

The approach of this chapter bears similarity with the approach conducted by Flint et al (2005), which has conceptualised Logistics Innovation by literature outside of the logistics domain. Their objective was to bring together insights from innovation literature and import concepts to innovation within a logistics context. Importantly, as Flint et al emphasise, the ambition is not to completely explain logistics innovation, merely, it is the path of exploration that is important (p. 114). Flint et al (2005) regard processes as the basic unit of analysis for addressing logistics innovation, which is also the approach here, although, as we will see, processes can denote quite different things. The scope of this literature review, thus, is chosen to be wide in nature, including broad encompassing frameworks. The chapter is structured by first excavating into the process literature, then change- and thirdly, innovation literature. Hereafter, process, change, and innovation are collectively discussed and framed in a procurement management setting.

#### ***3.1 Processes***

Process theories have been viewed from a variety of disciplines in the academic literature such as organisation theory, strategic management, operations management, group dynamics, and studies of managerial behaviour (Garvin 1998). Process thinking in social science has always been subjected to different interpretations, and organisation studies as a field leaves a number of options to approach processes (Hernes & Weik 2007). Thus, there is a need to conceptualise and define what is meant by a process and which explanatory value it has. This section will demonstrate that there are several

answers to that question and that broadening the spectrum provides not only new insights, it also changes the perspective of the existing approaches for working with processes.

In general the word “process” is used to indicate that movement is taking into consideration (Hernes & Weik 2007), which leaves a number of possibilities in terms of understanding processes. Hence, it should come as no surprise that diverse and numerous typologies exist when it comes to encapsulating processes in organisation/business studies. However, a dominant discourse is especially concerned with how managers use processes through administrative systems and decision-making procedures to formulate and implement strategy content (Stacey 2007:239,261). Although process literature is highly fragmented in both understanding and substance, where one process perspective is highlighted and others made silent, there are frameworks which work with different processes at the same time. Garvin (1998, 2002) advocate for a process synthesis and Hernes & Weik (2007) leave the question of reconciliation open.

### 3.1.1 Processes as a Synthesised Concept – Garvin’s Framework

Garvin (1998, 2002) tries to encapsulate the different process perspectives that have been developed in the academic literature over time into a systematically and integrated approach. Garvin’s claim is that although processes are understood in several ways, processes can be synthesised. At the organisational process level, Garvin distinguishes between three approaches: work processes, behavioural processes, and change processes:

	Work Processes	Behavioural Processes	Change Processes
<b>Definition</b>	Sequences of activities that transform inputs into outputs	Widely shared patterns of behaviour and ways of acting/interacting	Sequences of events over time
<b>Role</b>	Accomplish the work of organisation	Infuse and shape the way work is conducted by influencing how individuals and groups behave	Alter the scale, character, and identity of the organisation
<b>Major Categories</b>	Operational and administrative	Individuals and interpersonal	Autonomous and induced, incremental and revolutionary
<b>Examples</b>	New-product development, order fulfilment, strategic planning	Decision-making, communication, organization learning	Creation, growth, transformation, decline

Table 3: “An organizational processes framework” (Garvin 2002: 17)

According to Garvin, processes provide two powerful lenses through which organisations can be understood. Firstly, processes can be viewed as an intermediate level of analysis between individual tasks/activities and the organisation as a whole; thereby avoiding the part-whole problems of analysis.

The argument is that the processes consist of interlinked tasks and that the realities of work practice are linked explicitly to the overall functioning of the firm. Secondly, a process approach emphasises links among activities that seemingly are unrelated, for example a telephone call, or a brief hallway conversation can often be part of a single unfolding sequence (Garvin 1998:34).

Work processes stem from industrial engineering and work measurement, and primarily focus on accomplishing tasks. The starting point for work processes is that organisations accomplish work through linked chains of activities, cutting across departments and functional groups. Garvin divides these processes in two categories: firstly, operational processes that create, produce, and deliver products and services that customers want, for example, new product development, logistics, and manufacturing. Secondly, administrative processes that do not produce outputs which customers want but still are necessary for running the business such as strategic planning, budgeting and performance measurement (Garvin 1998:35). Although distinctive, these two categories share several characteristics; they are both sequences of linked activities that together transform inputs into outputs with boundaries that can be defined with reasonable precision and minimal overlap. This process perspective is a dominant one and is also the perspective that characterises management concepts such as Supply Chain Management (Ibid).

Behavioural processes are defined as *“the sequences of steps for accomplishing the cognitive and interpersonal aspects of work”* (Garvin 1998:37). The behavioural process approach has roots in organisation theory and group dynamics, and focuses on embedded behavioural patterns in an organisation. Arguably, these patterns are deeply entrenched, they have enormous staying power, and they are generalisations extracted from observations of everyday work (ibid). Garvin mentions three categories of behavioural processes; decision-making, communication, and organisational learning. Decision-making as a process is traced back to the work of Barnard and Simon, who argued that instead of looking at decision-making as a discrete linear event and as a personal responsibility, decision-making is rather a shared and dispersed activity which can take a variety of forms. Communication processes can be traced back to, for example, the Hawthorne studies and Lewin; it covers a broad selection of processes and interactions including such as face-to-face, within-group, inter-group and relationships but also unconscious assumptions, routines and feelings etc. Organisational learning processes involve the creation and acquisition of new knowledge along with the build-up of shared perspectives, also called mental models (Garvin 1998: 38-40).



The change process perspective has its background in such disciplines as strategic management, organisation theory and social psychology and is overall concerned with events over time. This is the process perspective which Van de Ven & colleague's advocates for. Processes in this perspective are explicitly dynamic and inter-temporal examples of such are organisational life-cycles (Garvin 1998:40). The change process perspective has several characteristics; here processes are longitudinal and dynamic; capturing action as it unfolds. They are presented by three components "*a set of starting conditions, a functional end-point, and an emergent process of change*" (Garvin 1998:40-41). Change processes, therefore, answers the question of "how did we get from here to there" and this question is often approached with a narrative or a story. Change processes fall into two broad categories. Autonomous processes have a life of their own and proceed because of internal dynamics. These dynamics can have different implications; they can evolve naturally, and, in transitional periods, create flux, and the entity may evolve in multiple, unexpected ways. Induced processes include movements such as an organisation's evolution from informal, entrepreneurial start-up to a more structured, professionally managed firm, or a shift in technology that creates revolutionary changes in industry and organisations. The main difference, thus, between induced and autonomous processes is that the latter is created, while the former occurs naturally (2002:15, 16).

Garvin's process framework and the ambition of synthesis have some consequences for how change processes are weighted in the analysis. Furthermore, in general the ambition of Garvin seems to be a more consensus bringing, rational, and orderly approach to processes. This ambition, nonetheless, is a difficult one. Based on the premises of Garvin's work two different ways of working with processes is discussed. Davenport (1993) defines a process as "*simply a structured, measured set of activities designed to produce a specified output for a particular customer or market*" (Davenport 1993:5). On the other hand, Van de Ven & Poole (1995) argue that work processes may be at work in change processes but they are far from enough to explain processes as understood from their perspective. Thus, they understand a process as "*the progression (i.e., the order of sequence) of events in an organizational entity's existence over time*", while a process theory concerns "*an explanation of how and why an organizational entity changes and develops*" (Van de Ven & Poole 1995:512). From this follows where to draw the boundary of the process where Davenport's work process has enfolded change and behaviour in the input-output structure having primary causality; "*The term process innovation encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human and organizational dimensions*" (Davenport 1993:2). Comparing Davenport and Van de Ven & Poole work, thus, it can

be put forward that they both argue for a complete process view; however where Davenport emphasize the input-output structure of work, Van de Ven & Poole's boundary is event sequences over time in creating innovation as having primary causality.

### **3.1.2 Process as Exogenous or Endogenous – Hernes & Weik's Framework**

Hernes & Weik (2007) distinguish between two overall process approaches: (1) the exogenous view which assumes that processes takes place in a relatively stable context and processes can here mean process as 'flows' and process as 'programmes'; (2) the endogenous view assumes that stabilisation of entities resides in the process itself and processes can here denote process as 'recursive reproduction' and process as 'connectivity'. In other words, the exogenous view has an outside-in perspective, while the endogenous view has an inside-out perspective. Hernes & Weik do not provide any considerations to whether the different process perspectives can be reconciled. Furthermore, it should be noted that when stabilisation is addressed in this framework, it refers not to a stable equilibrium or any absolute; rather, it is regarded as a defined state of affairs that is sufficiently stable to admit analysis (Hernes & Weik 2007:253).

Process as 'flows' (exogenous) concerns several categories – labour, operations, transactions, materials or information – which are connected to organisation and management studies. Hernes & Weik attach the origin of the process as flows perspective to the work of Weber and its development to Weick; thus, this perspective concerns the functioning of an organisation where flows are considered to be the "fluid stuff" (2007:255). This view tends to assume that organisations create stable contexts; for example, departments are stable according to the organisation chart and the behaviour of its staff, and customers are choosy and knowledgeable, which then is communicated internally in order to stabilise operations. As a result, flows and department are different units of analysis, where the department is the context for the flows, but the flows cannot vice versa claim to affect the department (Hernes & Weik 2007:256).

Processes as programmes (exogenous) are a formalised pattern of organisational problem solving, i.e. it is recognisable and consists of structured sets of activities. Programmes are constituted around logically put together bits or actions, which are aimed to either stabilise or change organisations. They can primarily take two forms; routines or labelled formalisation of programmes. Regarding the latter, a program can be labelled by for example Total Quality Management or Process Re-engineering. That is, we are talking about coherent sets of actions in order to achieve a new stable state of the system, and importantly, these programmes can be assessed and evaluated in terms of

their cause and effect to the organisation. Thus, they concern a rather conscious approach from the actors involved (Hernes & Weik 256-257). Concerning routines, these are consisted by a more standard approach to problem-solving. For example, routines for hiring and firing people are established, because these are problems that recur in the organisation (Hernes & Weik 2007:257).

Process as connectivity (endogenous) regards the organisation as a heterogeneous mix of materials, technologies, texts and humans gathered in a single entity. Connectivity implies a relational approach to understanding organisations, where the connecting elements are not limited to the social or the physical. Actor-Network Theory is an example of a connectivity approach to processes (Hernes & Weik). The dynamics of this perspective come from the inside, that is, the network feeds on its own process of connecting. If a new element enters the network, the configuration changes, producing changes between relations of other elements. Importantly, there is no final form in this perspective; rather, the connections are formed and reformed (Hernes & Weik 258-259). As a result, we have a system that is always open and able to change according to this relational and heterogeneous mix of materials, technologies, texts and humans.

Processes as recursive reproduction (endogenous) concerns temporarily structured states of constructed and reconstructed processes. This perspective regards structures to be an empty shell, just as a process without structures is an action without direction. The works of Giddens, Bourdieu and Luhmann are prominent examples of this perspective. Structures are both the medium and the outcome of social practices; the centre of stabilisation is in the structure, produced by temporary arrangement of processes. The structure exhibits some recognisable features such as rules, budgets, plans or technology as the starting point for structures being a basis for processes. The present state of a system is not deterministically influenced; rather, the future is an open window of possible choices, which are embodied by past events, experiences and structures (Hernes & Weik 260-261).

Hernes & Weik's four process types are interesting especially because they differentiate between endogenous and exogenous types of processes. They also challenge Garvin's claim that we can talk about change processes as synthesised per se with work processes. To avoid inconsistency, we would have to assume that change processes are also exogenous decided? How organisations develop and become what they become is different if we apply an endogenous perspective. In the final section of this chapter, the qualities of endogenous and exogenous processes are elaborated and discussed.

### 3.2 *Change*

Smith (1990) argues that 'change' has become a global term, providing a canopy under which many issues are swept. Furthermore, it seems that the most favoured approach to address change is by classifying it in a duality; for example, incremental vs. radical change, continuous vs. discontinuous change, first-order vs. second-order change and competence enhancing vs. competence-destroying change (Van den Ven & Poole 1995). Characteristics for such classifications are that they all refer to an outcome of change (ibid). Another classification is to distinguish between theories of change that focus on how organisations change, including factors that produce change from theories of changing, which focus on how change can be brought about and managed in organisations (Poole & Van de Ven 2004). Hence, if we talk about change as continuous, we often address such concepts as self-organisation and organisations as emergent, while the episodic change is more characterised by infrequency, discontinuity and intentionality. This section presents frames for thinking about change; Van den Ven & Poole (1995) classify the change process before it has concluded (p. 524), and Smith (1990) addresses epistemological possibilities of change. This should allow a foundation for the purpose of broadening the perspective of the dynamics of procurement management.

#### 3.2.1 **Four Motors of Change - Van de Ven & Poole's Framework**

The four kinds of change which Van de Ven & Poole (1995, 2004) distinguish between are life cycle, teleology, dialectics, and evolution. Each kind of change has a fundamentally different explanation for how it views process, generating mechanism, unit of analysis, and mode of change (1995:518,519). The *life-cycle* model represents an entity that progresses through a necessary sequence of stages in the process of change. The event progression is linear and the potential of the prescribed stages are present at the beginning (520:1995). A *teleological* model views development as a cycle of goal formulation, implementation, evaluation, and modification of goals based on what was learned by the entity. This sequence emerges through social construction among individuals within the entity; purposeful cooperation and consensus on means are important in the teleological perspective (520:1995). A *dialectic* model consist of a development and conflict between a thesis and an opposing entity (antithesis), and the resolution of the conflict produces a synthesis that becomes the basis for a new dialectical process. However, there is no assurance that dialectical conflicts produce creative syntheses (1995:517,521). Finally, an *evolutionary* model consists of a repetitive sequence of variation, selection, and retention events among entities in a designated population. Competition for scarce environmental resources between entities inhabiting a population, generates this evolutionary cycle (21:1995).

The inclusion of two factors is important for the framework: ‘unit of change’ and ‘mode of change’. Unit of change concerns the level analysis, i.e. individual, organisation, population, and even larger communities of organisations and whether we focus on single- or multiple entities concerns. Van den Ven & Poole highlight two different angles for studying change at any given organisational level: (a) the internal development of a single organisational entity by examining its historical processes of change, adaptation, and replication, and (b) the relationships between numerous entities to understand ecological processes of competition, cooperation, conflict, and other forms of interaction. Thus:

“...if researchers decide to examine processes of change between several organizational entities, they move to either a dialectical or evolutionary theory, because they must specify laws, rules, or processes by which they interact...” (1995:522).

Mode of change concerns whether a sequence of events is prescribed a priori by either deterministic or probabilistic laws, or whether the progression is constructed and emerges as the change process unfolds. A constructive mode emphasises on unprecedented novel forms that, in retrospect, are often discontinuous and unpredictable departures from the past. The prescribed mode to change is also called first-order change, as it concerns an underlying continuity due to the immanent form, logic, program or code that drives development. Life-cycle and evolutionary theories operate in a prescribed modality, while teleological and dialectical theories operate in a constructive modality (Van de Ven and Poole 1995). One thing to be remarked here is that it becomes essential to confine what an entity is, especially if research is moving at the single entity level. This call for a discussion of it is appropriate to view entities such as social groups as capable of collective action, or whether it is only possible to talk about individual’s actions.

### **3.2.2 Epistemological Possibilities to Address Change – Smith’s Framework**

Smith (1990) distinguishes between four different kinds of change, which render quite different explanations for how change comes about. (1) Morphogenesis: change is the creation of a new form (morpho = form, genesis = creation), which alters the core of a phenomenon; however, when the change has occurred, no further energy is required to preserve the change. Smith applies the example of genetic mutation: once the change has occurred there is not a path back to the condition from its origin; it has changed forever. (2) Morphostasis: change keeps things fundamentally the same (morpho = form, stasis = stable) and therefore, change is constantly repeated in order to maintain the system. Changes are not particularly enduring and will disappear again unless change effort is continually applied. (3) Development: change is naturally occurring and takes place within a

specified trajectory; e.g. one cannot change a kitten into a duck, or a duckling into a cat. As a kitten or duckling matures, it will become a cat or duck correspondingly; it is not possible to jump across such landscapes. (4) Adaptation: change requires adjustment to a new set of forces, emancipating from its environment or inner landscape (Smith 1990:406-407).

These four concepts are all *change* of some character and, according to Smith, although they may seem discrete, any system can simultaneously engage in more than one type of change. Moreover, it may be useful to think of these change types as being enfolded into each other; “...a *morphogenetic change is often built on a formulation of morphostatic processes, which in turn are manifestations of development patterns, which rest on a foundation of adaptive dynamics and so on*” (1990:407). The consequence of Smith’s distinction is a need to address the kind of change which is built in to arguments, because of the epistemological possibilities of drawing boundaries around change. Importantly, the same epistemological concern can be claimed for processes in terms of it being characterised by movement. Hence, processes also have several epistemological possibilities that may work in concert and enfold into each other.

### **3.3 Innovation**

According to (Sundbo et al 2006) the dominant focus of innovation is the concern of how technological innovation can enhance the introduction of new products to the market, and the emphasis often lies on the outcomes of innovation. Importantly, the focus on product innovation is at the expense of the recognition that there are other types of innovation (Linder et al 2003). In a response to the dominance of product and technology innovation, new approaches have been introduced. Sundbo & Fuglsang (2002) apply the concept of “Strategic reflexivity”, which goes beyond technological and product innovation and addresses innovation in social processes. The interest and importance of social innovation processes can also be viewed in the context of the unit of analysis changing from Schumpeter’s individual entrepreneur to innovation being a complex organisational phenomenon (Sundbo et al 2006, Van de Ven & Engleman 2004). The point of departure here is to go beyond these concepts, first by introducing innovation in general and then by identifying different approaches to study and approach innovation.

#### **3.3.1 Definitions and Scopes of Innovation**

Schumpeter’s (1934) seminal work is often cited and a basic reference for innovation involving a broad comprehension. Innovation can take place in connection with a new commodity (upstream), and, a new product (downstream), as well as with new production methods and new organisation

oriented types of innovation. Recent approaches to innovation seem to take an even looser definition in use; for example, Linder et al (2003) who define innovation as “*implementing new ideas that creates value*” stating that companies can innovate in just about everything they do. In general, there is consensus in the literature when understanding innovation as involving something new, whereas there is no widely-held consensus regarding how to define innovation and how it should be operationalized (Johannessen et al 2001). That is, it is when we are addressing innovation in relation to something (a context) that the understanding of innovation is diversifying.

According to Zaltman et al (1973), the term innovation is usually employed in three different contexts in terms of being synonymous with invention, an existing innovation in an adoption process of a new adaptor, and finally referring to an idea, practice focusing on the description to why it is new. From this, Zaltman et al (1973:10) define an innovation as “*...any idea, practice, or material artefact perceived to be new by the relevant unit of adoption*”. Zaltman et al focus on the notion that adoption of innovation eventually must depend on the perception of the person(s) and who adopts the innovation. However, because the unit of adoption may be larger than the individual, not all members of an organisation may think of the item as an innovation. In this context, Sundbo & Fuglsang counter argue with functionalistic arguments to innovation, as they assume that an innovation is accepted by the market because they solve specific problems for individuals or communities. Rather, the claim is that we cannot predict which innovations will solve what problems, and it is rare that innovation solves all problems intended. Innovation can also create more problems than it solves as well as innovation contributes to solving some problems as experienced and interpreted by people (2003:8-9). Another particular problem is that innovation is biased towards being concerned with positive outcomes; that is, rarely would we call a not useful idea an innovation (Kimberly 1981).

In Zaltmann et al’s (1973) conceptualisation, innovation appears in four aspects of the organisation: products and services performed by the organisation; production-process oriented that involves both adoption of new practices by an industry as well administrative processes such as accounting; organisation-structure innovations such as management training units; and finally, people innovation in for example such ad programs on creative decision-making. Importantly, Zaltman et al stress that these four types are highly interrelated and that a successful implementation of an innovation depends on how well it performs on other innovation aspects. Another typology provided by Bessant (2004) extends the types of innovation with a ‘do different’ and ‘do better’ dimension, stressing that these innovations involve several entities. For example, a ‘do better’ innovation as the bic-ball point pencil

has required considerable inter-organisational activity; such as close work with suppliers, links to research etc. Moreover, ‘do different’ innovation in making the leap from horse to car has been achieved through a pattern of relationships between organisations, suppliers, users of knowledge, specialist skill and equipment, etc. That is, Bessant links innovation primarily to a learning process created by several entities in the supply chain.

### 3.3.2 Three Approaches to Innovation – Individualist, Structuralist and Interactive

Johannesen et al’s (2001) argue that there are primarily two units of analysis of innovation; adaptors and originators. The success of an innovation, however, is often determined more by the adaptors. That is, an innovation can arise from organisational initiatives as well as from individual inventors, but it is when the innovation is accepted and applied that we identify the newness of innovation (Johannesen et al 2001:28). A consequence of the analytical dimension of originators and adaptors introduces a complexity to innovation, given that it becomes a matter of studying the relation between them. This perspective necessarily demands that we do not just focus on the entrepreneur or the customer in terms of adoption, but rather the interaction between them. This interactive notion is addressed in Slappendel’s framework, outlined in the following figure:

	<b>Individualist</b>	<b>Structuralist</b>	<b>Interactive process</b>
<b>Basic assumptions</b>	Individuals cause innovation	Innovation determined by structural characteristics	Innovation produced by the interaction of structural influences and the actions of individuals
<b>Conceptualization of an innovation</b>	Static and objectively defined objects and practices	Static and objectively defined objects and practices	Innovations are subject to reinvention and reconfiguration. Innovations are perceived
<b>Conceptualization of the innovation process</b>	Simple, linear, with focus on the adoption stage	Simple linear, with focus on the adoption stage	Complex process
<b>Core concepts</b>	Champion, Leaders, Entrepreneur	Environment, Size, Complexity, Differentiation, Formalization, Centralization, Strategic type	Shocks, Proliferation, Innovative, Capability, Context
<b>Research Methodology</b>	Cross-sectional survey	Cross-sectional survey	Case studies, Case histories
<b>Main authors</b>	Rogers, March and Simon	Zaltman et al.	Van de Ven et al.

**Table 4: “The three innovation types” (Slappendel 1996:109)**

The individualist perspective assumes that the actions of individuals are a major source of change in organisations. Individuals are here regarded as not being constrained by external factors. Rather,



individuals are self-directing agents, who are guided by the goals they set. The perspective implicitly assumes that the actions can be separated from the activities of other individuals or from the organisation structure within which they must operate. The individual perspective includes both the literature which portray individuals as rational beings who are able to introduce innovations with relative ease; as well as the literature (such as March & Simon 1958, Nelson & Winter 1982) that places cognitive capacities of actors and thereby limits rationality (Slappendel 1996:110-113).

The structuralist perspective assumes that innovation is determined by organisational characteristics and includes such influences as structural functionalism and the derivative schools of open systems theory and structural contingency theory. It presumes that organisations have goals, of which survival is the most important one; managers' task is to manage the relation between organisation and the environment to ensure an optimal performance. Components to the external task environment involve customers, suppliers, competitors, and government. A main disadvantage from this perspective is that there is a tendency to treat organisational features as objective realities whose factual character is unchallenged (Slappendel 1996:113-118).

The interactive process research involves innovation processes that go beyond 'a stage-to-stage' conception to a dynamic, continuous conception of change over time. It involves the description and analysis of temporal sequences of activities which occur in the development and implementation of innovations. Some events and stages may relate directly to the purposive actions of individual actors, while others may emanate from external structural influences. In order to generate theories that specify the conditions under which these multi-level events will join or separate, there is an implicit need to address the complex and paradoxical relationship between action and structure. Thus, it is how structure and action interrelates that distinguish the interactive perspective from the individualistic and the structuralistic kind. An example of the challenges which are connected to the interactive perspective is how to address the underlying paradox by acknowledging the existence of both deterministic and voluntaristic aspects of social systems. New theories of the action-structure relationship can, thus, be developed and used to inform analysis (Slappendel 1996:118). The work of Van de Ven & Angle (1989) is an example of the claims set forward by applying the interactive perspective, and they found a vast gap between what the conventional innovation literature assumed and their own empirical studies. For example, an idea was regarded by the literature as one invention to be operationalized by a fixed network of people/firms working out details of an idea, carried out by a fixed set of full-time people over time available. Rather, Van de Ven & Angle found ideas to be

reinvented, proliferated, discarded, and terminated in the interaction between many participants and stakeholders with diverging interest that was fluidly distracted by engagement and disengagement.

The framework of Slappendel can be complemented with the claims put forward by Collins (1998), who argue that much literature on change and innovation tend to be explained by either under-socialised or over-socialised models. An over-socialised model stresses structures over human action, downsizing the role played by actors and the distinctive and competitive perspectives which influence how they make sense of the old. Such work is criticised for being prescriptive, lacking context and work organisations being *per se* co-operative. Under-socialised models of organisations, conversely stresses human action and activity providing managers with apparently superhuman qualities (Collins 1998). In their response to under-socialised models, over-socialised models of change and innovation, tend to overcome conflicts and contexts by the change of attitude and developing a culture. Collins claim is not to ignore the variety of influences which impact people at work, and we may claim that the interactive innovation perspective tries to dissolve the trap introduced by Collins studying processes, rather than structural and individual characters in themselves.

The case of IKEA can provide an example of the interactive innovation perspective. IKEA has redefined a number of organisational practices in the furniture business primarily by 'global product sourcing' and 'customer self-service' (Barthélemy 2006). The low-cost solutions made by IKEA are passed on to the customers in the form of low prices; these solutions include cheapest suppliers, customer pick-up transport, self-assemble by customer. According to Barthélemy (2006), certain events changed and formed the IKEA concept. For example, the decision to source furniture from Poland in the 1950s was made in response to a retail cartel, which excluded IKEA from being supplied by Swedish subcontractors. Moreover, a planned tax from the Swedish government on furniture made a rush of customers to the store, even before it was implemented. This resulted in the store manager responding by opening the warehouse to customers; which is now an ingrained part of the IKEA self-service concept (Barthélemy 2006). Moreover, IKEA created the idea that customers should pick up and assemble the goods themselves. Such an idea can only be termed an innovation, if the customers are willing to do these things (here self-assemble and self-pick-up); otherwise, it would probably just be, a bad idea, as Kimberly argued.

Barthélemy (2006) claims that the success of IKEA can be explained by 'logical incrementalism'. Obviously, such an explanation has a back-tracking rationale explaining the outcome of the

innovation. Furthermore, even though there may be a logical explanation behind the success of IKEA, it is not enough for understanding the complex interaction of what has shaped the innovation process. Interestingly, the story of IKEA has caused that the founder Ingvar Kamprad has been assigned with almost super-natural capabilities. However as presented above, many types of innovation have contributed to forming the present “IKEA-concept”; it is not only due to strategic and cognitive discovery from one unit, but rather the total concept has been influenced by the interaction of multiple other stakeholders. We may say that although an example such as IKEA is comfortably explained by an individualist perspective, this proves inadequate.

### ***3.4 Expanding the Frame of the Dynamics of Procurement Management***

The ambition is now to draw up the implications of broadening the dynamics of procurement management with perspectives from process, change, and innovation in a procurement setting. The section ends with framing exogenous and endogenous process perspectives.

#### **3.4.1 Process, Change & Innovation in a Procurement Setting**

From Garvin’s framework, procurement activities may be understood as administrative work processes that link chains of activities, which are cutting across procurement’s own departmental group, internal stakeholders and external supplier resources. The output of the procurement practices is an indirect support to the operational processes of producing and delivering what customers demand. The work processes have a structure for action and are installed to accomplish work of the organisation. Furthermore, there are clearly defined input and output to the processes. It can be claimed that such conceptualisation fits quite well with how the procurement domain literature understands processes as a control device to uphold strategies. Similarly, Hernes & Weik’s exogenous processes could refer to such formalised activities as sourcing processes, procure to pay processes, and supplier management processes. That is, routines established in order to cope with recurring phenomena in a procurement organisation. Programmes may be implemented, such as a procurement performance system that allows them to be discussed and implemented in a coherent set of actions, where the adoption of the programme is a search for a collective identity. Internal/external customers are not problematized in the procurement domain literature, so it could be a possibility to assume that they are perceived as stable entities with a capacity of being choosy and knowledgeable. An example of this is Novack & Simco, who measures the effectiveness of a procurement process in regards to whether the internal customer’s needs were satisfied, implying that the user is knowledgeable about what is appropriate.

In terms of behavioural and change processes, the examples are few in the domain procurement literature; Robinson et al (1967) and 'the creeping commitment' is an example of a behavioural [problem-solving] process. The work of Strauss (1966) could be an example of an implicit change process perspective; however, overall procurement domain literature would find most comfort in the 'work' process perspective. An endogenous process perspective is not identified or discussed in the procurement domain literature and the emerging question is what kind of effect we would expect endogenous processes to have on exogenous processes.

The way processes are understood will also have an effect on how change is understood. Following Van de Ven & Poole's framework, the procurement domain literature regards change as either a life-cycle mode or a teleological mode. For example, the goal for procurement is to become more strategic and thus perceived as being an important and influential part to the competitiveness of the company. Hence, we can regard this as teleological change that occurs in phases: Set search/interact, envision/goal, implement goals, dissatisfaction. Maturity models are described in the same manner, although these can be characterised as a life-cycle change; stage 1 (start-up, procurement is only clerical), stage 2 (grow, procurement may engage in coordination activities), stage 3 (harvest, procurement participates in important projects), and 4 (Termination of the change process, we are where we want to be). If we combine this analysis with Smith's framework, we may identify this desire of change in the procurement literature as morphogenesis. Here, the creation of a new form takes place, which alters the core of the phenomenon; but when the change has occurred, no further energy is required to preserve the change. For example, in the case of Reck & Long, there is no relation between the 'passive' and the 'integrative' procurement function; it has completely changed identity. Moreover, at the 'integrative' level, the goal is achieved and energy has left the system. This denotes that change is based on a single entity level of analysis; however, then we need to understand what is meant by an entity. The only possible way to apply life-cycle and teleological change perspectives is to change the whole organisation to become one entity. However, this will prevent us from talking about procurement management by its internal and external linkages, as that would require several entities. Arguably from this claim, evolutionary and dialectic motors should be included as perspectives of change because of the multiple entities unit of change.

The way we understand process and change will also affect the way we understand and approach innovation in procurement. Applying Slappendel's framework to existing procurement domain literature, we can identify both individual and structural explanations. Placing Moege & Bean in this

classification belong to a structural explanation, which emphasises the adoption of innovation and that it is contingencies, such as technology and the environment, that determine the innovation. Procurement's role in such a perspective is to be part of the adoption stage of external innovation, where the process is assumed to be linear. Also, Gonzalez-Padron et al provide a structural explanation to procurement innovation when they claim it is the intensive interaction with procurement's environment that is positively related to innovation. Likewise, Schiele claims that only procurement departments with a high maturity level are able to introduce innovative initiatives. Importantly, the concept of absorptive capacity was an approach to explain this phenomenon: the more we engage with our environment, the more innovative procurement becomes. When addressing the maturity models of procurement, in particular Van Weele and Keogh's version, a claim is identified that a company operating in certain industries have an increased probability of having a high level of procurement sophistication. In addition, according to Collins' framework, the procurement domain literature has an over-socialised emphasis to procurement change; for example, Billington & Jager is an example of this, when they argue for an innovation friendly culture as enabling procurement innovation.

In turn, it can be argued that the entrepreneurship and procurement literature primarily belongs to the individualist category and under-socialised, because innovation here is viewed as caused by the capacities of individuals. For example, Handfield et al describe how a procurement manager approaches internal functions to offer its services, placing the power of explanation at the individual; i.e. innovation is conceptualised by champions, leaders etc. Thus, innovation is understood as invention; it is the extent to which the procurement professional is able to be proactive, creative, risk-taking, opportunity seeking, integrators etc. and this argument seems to be consistent throughout the procurement and entrepreneurship literature. However, in general, it can be argued that procurement domain literature exhibits structural characteristics when it claims that a number of given contingencies decides procurement's progress such as top management support and acknowledgement, business strategy etc. Also, the supply development model (figure 3) links the maturity level up against industries, which also would be a 'structural' characteristic. Often, simultaneously, the procurement domain literature emphasises the necessity of procurement leadership, the ability to make policies, procedures and strategies and thereby to have managerial control of progress. Overall, however, as outlined from Slappendel's framework, both individualist and structuralist approaches to innovation are characterised by simple and linear adoption stages with static and objectively defined practices.

Another possibility that the procurement domain literature has not touched upon is to approach innovation in procurement by Slappendel's interactive process perspective. From this approach follows that we are interested in interaction of entities in such a way that innovation is not so much determined by the individual choices nor structural characteristics as the relation between them. In addition, the conceptualisation of the interactive approach is that innovation is perceived. An important link, therefore, is that of procurement management and how its connections (e.g. internal customers) perceive and adopt the services/innovations that procurement delivers. In other words, if procurement professionals create innovation in their processes, the success is not only determined by the choices and action from procurement but by its connections and whether procurement management is able to capture the value of that innovation. Hence, a procurement innovation is dependent on both adoption and originators. Importantly, the nature of an innovation can have many different 'faces' in a procurement context. From the review, innovation could happen in, for example, cost savings and better utilisation of external upstream resources to the company as well as it could involve investments in people, information technology, and business models. Hence, we can talk about management technologies (e.g. Hansen & Mouritsen 1999, Hansen 2005) that are introduced to a given promise, in order to improve effectiveness and efficiency in the organisation. The claim is represented in following figure:

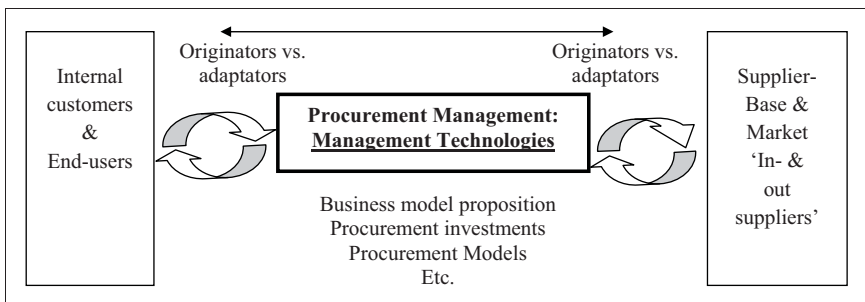


Figure 11: "Exogenous representation of an innovation model for procurement management" (Author)

The model follows the mind-set that procurement has a boundary-spanning role and that it involves inter-organisational relations, intra-department relations, and relations to internal customers. It can be argued that for procurement management to be activated, it requires a 'network' of a user, a procurement entity, and a supplier supplying an item. Furthermore, it was argued that innovation is not only dependent on the originators of an innovation but just as much on adaptors. This emphasised

the link between the procurement organisation and its internal customers. The model portrayed above can be labelled an exogenous process representation and this serves as the starting point for the next section of framing exogenous and endogenous processes.

### **3.4.2 Framing Process approaches to the Dynamics of Procurement Management**

This chapter has presented several ways to think of process, change and innovation and it has shown that the approach to research can be different than how existing domain literature of procurement has addressed dynamics. Garvin's approach to processes was that different process approaches could be synthesised into a coherent process approach; however, we also have the claim from Hernes & Weik that processes have different qualities and assumptions that are not per se compatible. Thus, when synthesised as Garvin claim, all processes become exogenous, as it is stabilised by an outside mechanism. Because the focus is so clearly dominated by an exogenous process perspective in the procurement domain literature, the question becomes what the role endogenous process perspective could have. Thus, we may posture that the strength of the exogenous process perspective is that it enables us to formulate a model such as the "the strategic supply wheel", which is established on procedures, policies, and processes (work process type). The two process approaches – endogenous and exogenous – are illustrated in the following figure:

<i><b>Exogenous Processes</b></i>	<i><b>Endogenous processes</b></i>
<ul style="list-style-type: none"> <li>• Stable context determined by an outside influence</li> <li>• Processes are Innovated</li> <li>• Routines, workflows, and programmes are installed to deal with recurrent events; the process can be repeated</li> <li>• Introduction of management technologies</li> </ul> <p><b>Dominant explanation....</b></p> <ul style="list-style-type: none"> <li>• Teleological or/and life-cycle change models</li> <li>• Processes being normative or inscribed by rules</li> <li>• Processes having assumed to have an external designer</li> <li>• Processes are innovated; e.g. administrative processes, order fulfilment</li> <li>• Sequences of activities that transform inputs into outputs</li> <li>• The process is designed typically to satisfy a customer and a structure for</li> </ul>	<ul style="list-style-type: none"> <li>• Stabilisation of entities resides in the process itself</li> <li>• Innovation through processes</li> <li>• The process is non-reversal and non-linear</li> <li>• Innovation in motion: relations and connections</li> </ul> <p><b>Dominant explanation....</b></p> <ul style="list-style-type: none"> <li>• Change as evolutionary or/and dialectic</li> <li>• Processes as sequences of events over time where different actors participate</li> <li>• A representation can be a process model that narrates events in a bounded case</li> <li>• Innovation process; how and innovation unfolds over time</li> <li>• Interactive process perspective – processes are subject to reinvention and reconfiguration</li> </ul>

**Figure 12: “Exogenous and endogenous process understandings” (Author)**

Overall, we can distinguish between processes that focus on outcome and processes that focus on interaction between heterogeneous entities. The outcome orientation corresponds with Flyvbjerg (2001) and the categorisation from Aristotle in terms of belonging to the virtue of ‘techne’, which is defined as a “*Craft/art. Pragmatic, variable, context-dependent. Oriented towards production. Based on practical instrumental rationality governed by a conscious goal. The original concept appears today in terms such as “technique,” “technical,” and “technology”*” (2001:57). Thus, a management technology/exogenous process is introduced by an exogenous quality of “improving” the system by certain instalments that over time can become a technical virtue by routines and its pragmatic intervention of dealing with recurrent issues. Importantly, the procurement domain literature is dominated by one-sided exogenous work process types, as claimed earlier. However, such an exogenous process perspective can only be regarded sufficient in itself, if it is changed by the properties of an external designer. Exogenous processes often tend to be explained by a self-carrying



logic and importantly, in this context, contradictions are outside of the boundaries of exogenous processes. Thus, when we combine the procurement models and separation of oppositions, we have extended the understanding of how the procurement domain literature explains well-performing procurement performance. In other words, upholding boundaries of exogenous processes can be regarded as an effort trying to avoid the dynamics of contradictions.

A discussion of whether to choose one or the other process type is from the outset a difficult task, because each process type enables different things. When a technology becomes a routine to solve a recurrent problem in the system, it entangles endogenous processes. These processes tell us something different about the dynamics and complexity of phenomena and this will be the exploration of chapter 4. That is what unfolds when there are no pre-determined blue-print and no external designer. The relation between exogenous and endogenous processes are a central claim in putting complexity science at work and, thus, the difference and the entanglement of the two process approaches becomes central in answering how we can understand the dynamics of procurement management.

# 4 Complexity Science

The purpose of this chapter is to make a valid claim to how a complexity science approach can inform analysis. Thus, this chapter involves how a complexity science perspective can understand systems, boundaries, and how contradictions and oppositions become central in order to understand complexity. The following figure illustrates the central concepts of a ‘complexity science perspective’ where the specific argumentation is carried out in the sections of the chapter:

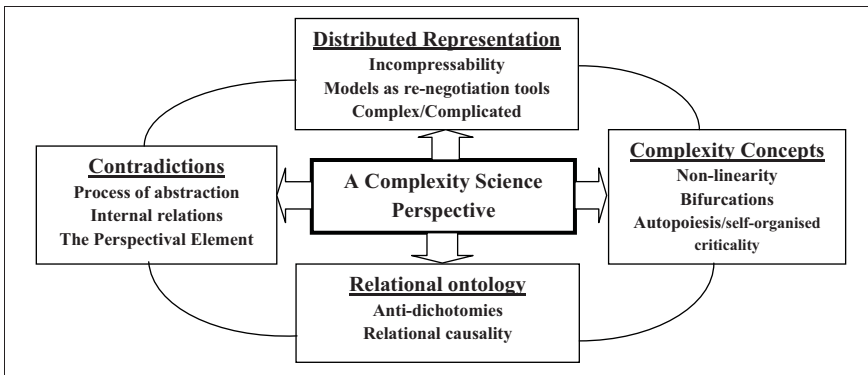


Figure 13: “Initial overview of complexity science elements” (Author)

‘Non-linearity’ is chosen as overall heading for theories and ideas of complexity science because it represents the highest level of generality for the complexity science models. That is, in the most basic version of non-linearity parts are being constructed in such a way that the output from one particular part is not necessarily proportionate to its input (see Richardson 2008). Such outline of non-linearity is able to incorporate the notions of emergence, bifurcations, and self-organisation because these concepts are by the core non-linear. The structure does, to a large extent, follow the structure of the figure although before dealing with complexity science, the systems approach in general is introduced, as it offers a basic reference point for complexity science. Thus, the section is structured by first presenting the (traditional) system approaches and how it has approached management studies. Section 4.2 addresses branches, concepts and models and section 4.3 is concerned with two important building blocks for working with complexity sciences: distributed representation and relational ontology. Section 4.4 addresses contradictions and Ollman’s interpretation of Marx’s method as an approach to analyse complexity. The final section presents a structuring of the concepts in order to mobilise complexity sciences to inform analysis.

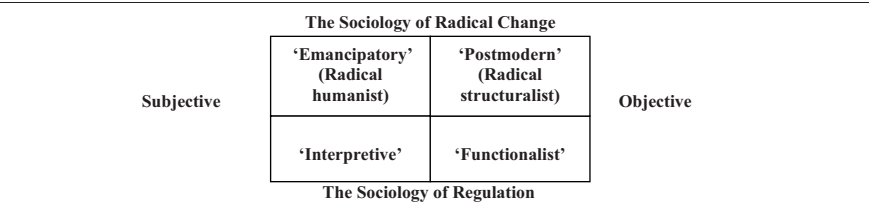
#### ***4.1 The Systems Approach***

Complexity Science can be regarded as both an extension of (Jackson 2000) and as a critique towards the traditional systems approach (Stacey 2007), which have had a dominant role in the development of supply chain management (e.g. New 1997, Mentzer et al 2001). Taken as a whole, there is no unified application of a systems approach, merely is it a movement across several disciplines in natural and social sciences that find it purposeful to study the world as systems or as if they are systems (Jackson 2000). As a consequence, according to Jackson, it is not possible to regard the systems approach as a discipline in its own right, as it is, for example, with chemistry, geography or sociology; the successful results depend on the nature of the disciplines that are applying it. Thus, the systems approach can be regarded as a cross-discipline and has its roots in especially biology, cognitive science, structuralism and functionalism. Richardson (2004) observes that much of the writing on complexity science has arbitrarily ignored the systems theory literature and goes on to say that the reason for this could either be deliberate or simply the result of ignorance. Although there are differences between systems theory and complexity science, there are also considerable similarities. Thus, the systems approach serves as a basic frame of reference of complexity science.

The systems approach has had a diverse development since it gained momentum in the 1950's (Burrell & Morgan 1979, Jackson 2000) and it has developed a language and concepts of its own (Arbnor & Bjerke 1997). Notions such as 'boundary', 'system', and 'complexity' have been central concepts for the systems approach (e.g. Boulding 1956) but along with the development of the approach, the concepts have achieved different meanings (Jackson 2000). Therefore, to apply the concepts from the systems approach, and in this context, complexity science is not only to uncover the understanding of the concept such as 'complexity' but also to be aware that complexity can have very different meanings and implications dependent on which kind of (systems) approach is chosen.

Jackson identifies three elements that characterise the systems approach's inter-disciplinary nature: (1); holism that exhibit emergent properties. (2); human beings that organise their knowledge in cognitive systems, and (3); the diversity, range, effectiveness and efficiency of the approaches themselves in relation to real-world problem management (2000:18). Again, concepts such as "wholes", "emergent properties" and "real-world problem management" can each have different meanings. In terms of the latter, early system writers, e.g. Forrester (1958) and Churchman et al (1968), were very specific about the direct recommendation to practice (managers). This aspect also includes the concept of boundary setting, sometimes also referred to as the intervention of the system.

The boundary setting between system components guides the manager in determining the most useful intervention, stressing the importance that the system picture must be very close to reality before the intervention can be useful. That is, if we follow the tradition of the systems approach and its methodology. To analyse the diversity of the systems approach, Jackson (2000) adopts the ‘four paradigms for the analysis of social theory’ model from Burrell & Morgan (1979). Jackson aims to illustrate the connection between social research approaches and systems thinking and how the most basic concepts, such as “system” and “boundary” change meaning according to different approaches to systems (p. 43). Hence, the model frames different applications of the systems approach and complexity science. The four paradigms are; functionalist, interpretive, emancipatory and postmodern, which are illustrated in following figure:



**Figure 14: "System approaches and the four paradigms for the analysis of social theory" (adapted from Jackson 2000:23, 41)**

The development of the systems approach has in particular been dominated by the ‘Functionalist’ paradigm. Inside this box, Stacey (2007) distinguishes between three different strands of thinking, which all originates from the 1950’s and 60’s: general systems theory, cybernetic systems and system dynamics. The ‘Interpretive’ paradigm has also gained much interest and focuses on social construction from individual cognition. It does not seek to study social facts and causal relations (Jackson 2000); rather, the boundary consists of two “worlds”. The “real world” is the human activity where day-to-day business and interaction is conducted; this is a highly personal world of experience, memory, emotion, and intent. The “second world” is a systems thinking world, that is, where the analyst works on abstractions derived from the real world, and which may give guidance to intervening in the real world (Pidd 2003:121). From this follows, as with the functionalist approach, that the real world system and the model of the system world must have close correspondence.

In the emancipatory approach, drawing of boundaries is crucial for determining how improvement is to be defined and for incorporating emancipatory thinking to improve a real-world problem (Jackson 2000:321). It is in this box that we find critical systems thinking that draws from such theories as

Habermas' 'discursive rationality'. It differs from the interpretive systems thinking, for example, in terms of its focus on oppressed groupings and power analysis. The post-modern approach includes the focus on conflict derived from theories from such as Foucault and Nietzsche, but is not a well-developed part of systems thinking, and Jackson only provides a few examples of this approach. Overall, both emancipatory and post-modern system approaches are not – at least not recognised by this thesis – applied to domain literature in procurement and supply chain management. Application of complexity science varies in the same manner as the systems approach in terms of the four categories. However, as will be elaborated later, the categorisation has a problematic either/or approach to dualities and the approach advocated in this thesis involves both contradiction and emancipatory thinking.

As already emphasised, what makes the systems approach somewhat complicated to apply is the different meanings that are connected to its concepts. From a functionalist perspective, the systems approach has been pragmatic and developed according to its critics. For example, it has re-interpreted different intellectual traditions by incorporating new concepts and ideas without changing the existing mind-set (Burrell & Morgan 1979). Functionalism has supplied the philosophical and sociological ground on which systems thinking could grow, whereas systems approach has provided the concepts and models that enabled functionalism to dominate social science (Jackson 2000). Especially the work of Parsons represents some of the most characteristic ideas that have been adopted to management, and he identifies four basic imperatives for the analysis of social systems; adaptation, goal attainment, integration, and latency (pattern maintenance) (1959, in Burrell & Morgan 1979:54-55). From this follows that Parsons work is positioned into a normative framework with the notion of needs or conditions implicit as 'structural mechanisms' governing the system. A boundary differentiates the system from its environment, where subsystems are characterised by identifiable boundaries and mutual interdependence. Importantly, the system is essentially processual in nature and this process can be conceptualised in terms of a basic model, which focuses upon 'input', 'throughput', 'output' and 'feedback' (Burrell & Morgan 1979). For Parsons, 'norms' guide human behaviour and systems become deterministic, evolving towards equilibrium (i.e. a higher order fixed norm that we can correlate observation by) (Hernes 2008:80-81). For functionalistic writers, then, the real-world is systemic, the search is for 'structural mechanisms' and, therefore, the boundary is already determined. Hence, the goal is determined by the system and the search on how to reach this goal, in gradual steps, becomes the centre of analysis. The process of intervention is systematic and aimed at discovering the best way to achieve a goal, conducted on the basis of expert knowledge.

Solutions are tested primarily of their efficiency (do the means use minimum resources?) and effectiveness (do the means work?) (Jackson 2000:203).

Another traditional strand of the systems approach is system dynamics, which is also regarded as one of the predecessors of complexity science; in particular, as it involves non-linear dynamics and the method of applying computer-simulations and the logistics equation (Stacey 2000). System dynamics is best known through Forrester's (1958) seminal work on industrial dynamics that modelled systematisation in how companies behaved in a distribution chain. Because of uncertainty of forecast, companies were willing to build up and keep extra stock to be sure that they could handle an increase in demand. That is, each level of the chain was trying to optimise its own situation, but this was not obtainable because of the structure of the system. In this context, structure refers specifically to information flow and feedback. The managers in each part of the systems think they optimise their own situation, but in reality they are doing the opposite; all because of how the system works. Another interpretation of the simulations provided by Forrester is that we have a system that does not learn; it is self-referential as the delays and fluctuations can continue its behaviour endlessly. I.e. the non-linear relationship in the system is referring to itself, not amplifying or damping behaviour to an outside reference point (Stacey 2000).

In regard to a traditional systems approach, the notion of "fit" relations between systems, its components, and its environment, work as a mean to ensure stability. This stability explains the ambition of the overall systems approach where contradictions are to be resolved; tension and conflicts are often not part of the analysis and dilemmas are ignored. Sameness and difference are not acknowledged to exist at the same time; e.g. organisations differ but inside the system, people are the same. As a result, success is equated with determinism whereas chance is related to failure (Stacey 2000:134). The assumption is that systems models are only efficient and effective if they can compress the reality in concern. Another element in traditional system approaches is the dualistic viewpoints adapted from Kant where it is argued that it is possible and validate to be part of the system and at the same time function as an objective observer of the system (Stacey 2007). From this follows a central element in the critique of traditional system approaches by the notion of "infinite regress". Traditional system approaches specify from an objective observers perspective and this implies that the system can only unfold what the observer has specified or enfolded in it. Therefore, any kind of transformative change has to be in the function of the observer (Stacey 2007:146).

Overall, it can be argued that the traditional systems approach, as presented here, has explanatory difficulties in at least five areas in order to address dynamics from the results of complexity science: (1) fit relations ensure stability; contradictions are therefore either ignored or to be resolved. In intervention efficiency and effectiveness are a harmonic relation. (2) It explains systems in terms of levels of analysis, where structures are considered as static and impervious to change by human agency/action. (3) Change in a system is subjected to the observers' infinite regress; an external observer can control the system by either staying outside or moving inside and outside the system. (4) It assumes compressibility between model and reality in order for the model to work. (5) Finally it assumes a deterministic boundary between system and environment. Essentially the rest of this chapter will argue that complexity science challenge these five areas; in particular, that impervious and discrete levels of analysis are not possible as systems are co-constructing, co-adapting and co-evolving.

## ***4.2 Complexity Science – Introduction to Branches, Concepts, and Models***

According to Stacey (2007) there are, as mentioned, three dominant branches; Chaos Theory, Dissipative Structures, Complex Adaptive Systems (CAS). In addition, Stacey has developed a radical interpretation labelled Complex Responsive Processes (CRP). King (2001) applies the notion 'holistic-relational sciences', which is similar to the meaning of complexity science here. King includes the versions of: chaos theory; neo-evolutionary biology; complexity theory; and self-organising criticality. However, from this thesis perspective, complexity science is not so much about any single theory or idea; merely, meanings and insights are interrelated, sometimes coherent; but sometimes also very different. Hence, the ambition of the following section is to provide evidence to the insights provided by complexity science with highlighting key concepts such as bifurcation points, self-organised criticality and a complexity view on processes. The section ends with a discussion three different approaches to apply complexity science in organisation and management studies extended from the framing from Maguire et al introduced in chapter 1.

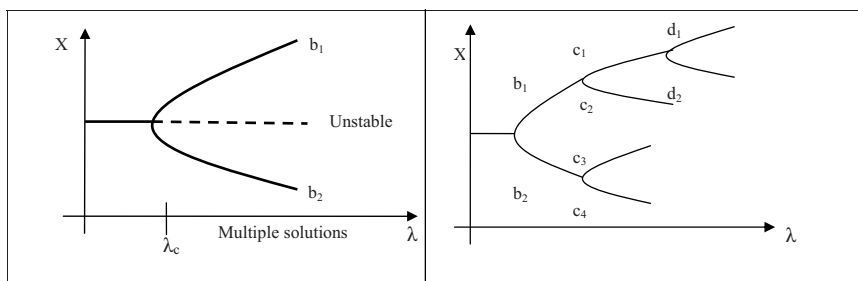
### **4.2.1 Dissipative Structures – The Work of Prigogine**

'Dissipative structures' was a theory, developed by Prigogine (and colleagues), which had a central role in the development of complexity science and it has been "applied" in numerous settings in organisational and management studies (e.g. Gemmill & Smith 1985, MacIntosh & MacLean 1999). 'Dissipative structures' was the first description of what can be labelled a 'self-organising' system with the explanation that processes are irreversible because of time. Irreversibility means that processes do not obey laws of causality and prediction (Hernes 2008:44). Prigogine's primarily

focused on how physical systems were able to survive in extremely unstable situations, and his work was a breakthrough from Newton's scientific laws and the assumption of reversibility, which consider that past, present and the future is assumed to have the same role (Prigogine 1996:110). The time perspective is also called the arrow of time and when this is associated with irreversible processes, we find the most complex structures according to Prigogine:

“Once we have an arrow of time, we understand immediately the two main characteristics of nature: its unity and its diversity: its unity, because the arrow of time is common to all parts of the universe; your future is my future: a future of the star is the future of any other star: diversity, as in the room where I write, because there is air, a mixture of gases that more or less reach thermal equilibrium and is in a state of molecular disorder and there are the beautiful flowers arranged by my wife, which are objects far from equilibrium, highly organized thanks to temporal, irreversible, nonequilibrium processes. No formulation of the laws of nature that does not take into account this constructive role of time can ever be satisfactory...Once science encountered complex systems, it would have to modify its approach to time” (1996:56, 60).

Prigogine argues that chance (or probability) is not a convenient way of accepting the unknown and that the dichotomy between being and becoming is not two different things. The long-term future of a system is operating in a contradictory dynamics of stability and instability that are non-deterministic. Prigogine illustrates this by showing how both deterministic and probabilistic processes are exposed to non-linear relations, illustrated by the branches in the following two figures; left side ‘Pitchfork Bifurcation’ and in the right side ‘Successive Bifurcations with Increasing Distance from Equilibrium’:



**Figure 15: "Pitchfork bifurcation" and 'successive bifurcations with increasing distance from equilibrium'" (Prigogine 1996:69, 70)**

Even though there is knowledge about the initial conditions/values, there is, over time, a window of possibilities in relation to how the system develops. The choice between branches is by Prigogine called a bifurcation point, where the system is particularly vulnerable and is able to partly or totally change its structure, due to even a minor disturbance. Bifurcations are the manifestation of an



intrinsic differentiation between parts of the system and its environment (Prigogine 1996:69). Thus, according to Prigogine, bifurcation can be considered as a symmetry breaking solution and therefore “...the source of diversification and innovation” (1996:70). In this context, self-organisation is by Prigogine understood as a process that occurs spontaneously at given values of the control parameters. A bifurcation point offers multiple system solutions and the selection of any one will drive the system toward a particular trajectory as opposed to some other. A bifurcation is able to set up periodic and aperiodic oscillations, making the system switch from one state to another (King 2001:179). The exact same initial conditions can end up in significant different outcomes and, as Jantsch points to, dissolves dualism as a generator of dynamics: “*physical energy itself may be an agent in the service of evolution. It would then be superfluous to assume a dualism between physical and psychic organization – all organization in the universe would be physical and psychic at the same time*” (1975:337-38).

Prigogine’s claim involves a close connection between science and philosophy and the view on processes bears similarity to the work of Whitehead in terms of the actuality-potentiality relation (Hernes 2008). I.e. bifurcation points provide the opportunity of novelty through its actuality-potentiality dimension. For Prigogine, potentiality represents what is not accessible here and now, whereas actuality is what is apparent and open to assessment. This reveals the challenge of studying bifurcations (and therefore process of actuality-potentiality), where Prigogine denotes the constructivist role of science that when interfering in processes, we become co-producers of facts (Ibid). Prigogine, thus, has challenged the traditional ways of thinking about science in terms of the incorporation of time irreversible processes (actuality-potentiality) and the constructivist role in science, where knowledge about systems is created through a dialogue with nature; that is, a resilient relationship between the knower and the known (Prigogine 1996). Consequently, the ideal of an objective observer is severely challenged from those labelled the “hard” sciences (or natural sciences), which are considered to have the highest probability of creating ‘epistemic’ knowledge; i.e., knowledge that are universal, invariable and context-independent (Flyvbjerg 2001).

#### **4.2.2 From Chaos Theory to Biotic Processes**

Chaos Theory is an aggregation of results, achieved by mathematicians and physicist on non-linear conditions. The non-linear relation in the equations, produced by chaos theory, generates an unstable behaviour over time, which creates an explosive augmentation leading to disintegration of any given system. However, the explosion is not without boundaries (Stacey 2000). To find out what happens in this disintegration between stability and instability it is necessary to do a range of calculations and

from this, a pattern develops that is highly irregular but one that lies inside determined boundaries. Small changes in the environment can cause different directions of behaviour and to predict this, it is necessary to discover each single change with precision. Hence, where chaos, in a traditional sense, was thought to be an entropic infection that comes from something outside of a system as an external contingency and fluctuation, it was now a possibility with chaos theory to see that a system – e.g. a machine – could develop its own instabilities and chaos (Gleick 1987, King 2001). Importantly, chaos is lawless behaviour governed entirely by law; that is, stochastic behaviour occurs in a deterministic system (Stewart 1989:17).

Tsoukas & Hatch (2001) identify five properties from the researches who study what they label complex systems (synonymous with chaos theory in this context): (1) non-linearity; (2) fractal: irregular forms are scale dependent; (3): recursive symmetries between scale levels; (4) sensitive to initial conditions; and (5) replete with feedback loops. For example, property 4 originates from Lorenz (1953) who studied the weather system and illustrated in a simple computer program - by a coincidence – how extremely sensitive the weather system was to initial conditions and small perturbations. Therefore, it was not possible to predict the weather on a long term basis and on the short term, it was linked with considerable uncertainty. However, even though the weather system over a long period exhibited a highly unpredictable behaviour, there still was a qualitative pattern in the systems' behaviour. Property 2 originates from the works of Mandelbrot (1977) and the geometrical concept of 'Fractals' (generated by stationary stochastic processes) with the important notion of scale dependency. Measuring the coastline with a surveyor working with a set of dividers of one foot would produce a different measurement than would a surveyor measuring it by a calliper of one yard, because the latter skip over twists and turns that is not at least one yard. The length of this coast line is dependent on the ruler and its smaller scale measurement device (and a constructivist role in science). We do not know the length of e.g. a given coastline because it depends on the measuring device and thus the outcome can be very different. Hence, fractals illustrate the epistemological concern by its recognition that distance in nature is both relational and paradoxical. It can be infinitely long and simultaneously dependent on the length of the ruler (Smith 1990:415). From this also follows that there are no "right" size of a phenomenon and no size of same phenomena is typical (Bak 1996:21).

The logistics equation has been applied to explain the dynamics in chaos, whereas this equation already was in use in the work on systems dynamics (Stacey 2000). The logistics equation,  $A_{t+1} = A_t$

$*g*(1-A_t)$ , describes a non-linear relationship between growth and a negative feedback (e.g. environmental depletion) where change is a property of both (Sabelli 2005:81). Hence, the logistics equation describes a unipolar feed-back in a closed system, where the total energy is constant and conserved, generating periodic and chaotic patterns; the recursion is unipolar and models scarcity (Sabelli 2005). That feedback is unipolar does not denote that feedback is only negative, it can also be positive but it is either-/or and cannot be both. In this context, it is important to be explicit about what is understood by feed-back, as this is also one of the concepts that have gained different meanings in the development of systems approach. Sabelli argues that positive feedback either generates growth or decay because it is a reinforcing feedback. Negative feedback, on the other hand, is counteractive or corrective and maintains stability by generating a positive or a negative reaction as required (2005). Importantly, Sabelli claim that if only positive feedback processes were predominant, it would have no check to exponential growth such as plants become weeds, animals become pests, and beliefs become self-fulfilling prophecies. Equally, if negative feedback predominated, it would denote little change and no evolution and therefore *“The creation of organization requires a combination of positive and negative feedback.”* (2005:80).

Sabelli's (e.g. 2005) mainly focuses on bipolar feedback types; although both – unipolar and bipolar – occur in nature; the latter represent a different level of complexity and the equation is expressed by  $A_{t+1} = A_t + g_t^* \sin A_t$  which is referred to as the process equation model (Kaufmann & Sabelli 1998). The equation includes both positive and negative values and is a mathematical model for the philosophical notion of complementary opposites in terms of straddling values from one pole to its opposite. This dynamics is referred to as biotic processes (or bios) as a result of bipolar feedback; that is, 'bios' travels in feedback including both positive and negative directions at the same time, with the possibility of the process expanding its form. Bios is creative in contrast to chaotic attractors; for example *“Arm, leg, fin and wing all derive from the same origin, and have the same fundamental structure, modified to perform different functions.”* (Sabelli & Carlson-Sabelli 2006:334). Thus, another difference between bios and chaos is that biotic processes exhibit creativeness and is non-random: *“Chaos is a deterministic equivalent to random; bios is a deterministic equivalent to random walk. Unpredictability characterizes chaos; novelty characterizes bios”* (Sabelli 2005:75). A biotic recursion does not conserve energy and the total energy of an open system can vary according to opposites increasing and decreasing each other; the recursion equation models both abundance and scarcity. As we will see later, the latter notion is important, as resources must necessarily come before scarcity and as Sabelli notes *“Scarcity plays a role in biological growth which is limited by whatever*

*resource is in least supply, but abundance is just as important. Life exists because nature's supplies are abundant. Natural supplies obviously precede human production"* (2005:572). In other words, in order for something to shrink, it has to expand first.

Because chaos has a stochastic element, implying the notion of randomness, it has limited explanatory power and in the complexity science domain, there is a persistent discussion in terms of whether chaos can explain complexity. For example, Bak (1996) and Cilliers (1998) reject the possibility whereas King (2001) claims that the philosophical and methodological points of view are common for chaos and complexity. Dooley & Van de Ven (1999), on the other hand, point to four types of system states with chaos theory characteristics: white noise (many variables acting independently), pink noise (many variables acting interdependently), chaos (few variables acting independently), and periodic (few variables acting interdependently). According to Dooley & Van de Ven, each state can be identified in organisations; for example, do they argue that 'white noise' can be found in early stages of innovation, where different factors 'uncoupled' can influence the innovation search and have less path dependency (and less feedback mechanism), implying more exploration than exploitation. The question then becomes which validity claims such conversion of mathematical equations to organisational boundaries rest upon? Sabelli argues that unipolar feedback (e.g. chaos theory) can be identified in some parts of nature, but for example resembling patterns to how the heart functions, it is necessary to model the dynamics of opposite, which biotic processes do mathematically (2005).

Thus, with biotic dynamics and the work of Prigogine as introduced in previous section, we are approaching a process theory, which Sabelli & Carlson-Sabelli (1991) formulates by three elements: (1) oneness; everything is energy (ideas and matter are forms of energy) in terms of self-driven processes that interact with other processes. (2); Opposition; processes result from the interaction of opposites. Opposites are similar and inseparable such as conflict and harmony, abundance and scarcity. (3) Creative diversification (bifurcation): Processes diversify, creating novelty and complexity. In contrast to Sabelli, we need to add another component to this process formulation, in terms of the constructivist role to how processes unfold.

#### **4.2.3 Complex adaptive systems/ Agent-based Modelling / Neural Networks**

Dooley (2004) distinguishes between four categories to agent-based modelling (ABM): CAS, computational models, dynamical models, and self-organising models. These models have highly overlapping boundaries; however, there is one distinction that is important to stress. That is, CAS

emphasises teleological change, where individual agents improve its fitness level, whereas self-organising models emphasise dialectic change in terms of how agents produce change by interactions and connections. This could lead to an interpretation where CAS has agency, whereas this is not the case with self-organising models; such potential dichotomy should be dissolved by the end of this chapter. Moreover, in general, there seems to be two different streams of approaching complex system; connectionist and the rule-based (Cilliers 1998). The rule-based approach is by far the most dominant, and according to Holland (1995) it is the question of ‘coherence under change’ and that general principles rule the behaviour of the system, which is central to the common heading of CAS. In the following, three CAS approaches are presented which are based on Stacey’s (2007) interpretation, while the connectionist models are primarily based on Cilliers’ (1998) explanation.

#### **4.2.3.1 Complex Adaptive System Approaches**

An example of a rule-based approach is Reynolds’ (1987) simulation. Reynolds sets out to investigate how thousands of birds manage to fly in formation. Is it due to a predetermined plan or are they simply following a leader? Reynolds’ argument is that such flocking is an aggregate result of the actions of individual animals, each act solely on the basis of its own perception of the world. In other words: “...*a flock is simply the result of the interaction between the behaviours of individual birds*” (1987:25). To simulate such behaviour, Reynolds argues that one must begin with simulating the behaviour of an individual bird or at least the part of the bird’s behaviour that allows it to participate in a flock. Thus, Reynolds’ computer simulation illustrates how the agents called Boids develop a pattern according to three simple rules: (1) collision avoidance: avoid collisions with nearby flock mates; (2) velocity matching: attempt to match velocity; and (3) flock Centring: attempt to stay close to nearby flock mates (1987:28). The output of the simulation may be interpreted as three rules being enough to produce flock behaviour and through interaction with each other, the Boids produce a coherent pattern which is guiding the whole system of Boids. There are no overall blueprints for these Boids, no controlling centre; control is spread in the system. Since each Boid is specified to a set of rules on how it must interact with the other Boids, the interaction is self-organising because the Boids are not instructed by other agents, as they must follow their own instructions. This does not lead to anarchy as each agent cannot do what they want because they must follow the rules for interaction (Stacey 2000). Reynolds argues that the validity of the simulations is difficult to measure objectively; however, he also argues that by comparing behavioural aspects of those in the simulated flock with those from the natural flock, it is possible to improve and refine the simulation model. Thus, such approach is warranted from a traditional system approach where external control of a system as ideal.

Moreover, the flocking of birds is based on homogenous entities, not entities with variety; which Ray (1992) on the other hand, is an example of.

Ray's "Tierra-simulation" illustrates how organic life utilises energy to organise, which evolves to develop more and more diverse forms as organisms compete and co-operate with each other for light and food in geographic space. Ray uses an analogy of digital life in which central processing unit (CPU) time organises strings of digits (programs) in the space of computer memory. The question is whether digital life would evolve as bit strings and interact and compete for CPU time. The computer simulation model consists of a range of instructions for agents to copy, introducing a mechanism that generates variety which is made visible through a form of random bit flipping. A constraint is inserted in terms of limited resources, causing each agent to circulate in a queue, receiving segments of computer time for carrying out its replication tasks (Stacey 2007:201). Then memory space becomes occupied by agents until a given per cent, where a reaper intervenes and stops for the population to grow and this affects that newly arrived agents get fewer instructions in order to replicate. Thus, they borrow codes from other agents, which makes them replicate faster in terms of allocated computer time. This simulation goes on where parasites emerge, affecting the agents to create counter-strategies by rechecking position, causing parasites to suffer periodic catastrophes. However, this successful strategy made agents slower in replication (Stacey 2007:202) and the process continues:

"Over a series of runs the bit flipping and the interaction between the bit strings result in rearrangements on the bit strings themselves. In other words, new arrangements of bit strings appear, that is, new categories of replication instructions. At the same time older categories disappear because of the procedure of competitive removal of some of them. Once begun, this evolution continues even when the random bit flipping, that is, is turned off. Self-organisation is then the driving force of evolution" (Stacey 2007:202).

According to Stacey's (2007) interpretation, the emergent order of the simulation goes through the local interaction of diverse agents which is vital for the continuing evolution of the system and its ability to produce novelty. However, what form that order takes – that is, the population-wide pattern of behaviour, the system-wide strategies – cannot be predetermined from the rules of individual agent behaviour. The strategies are emergent unpredictably in co-evolutionary processes; the first strategy is diminutive, but then parasites change the rules of the game again and the best strategy becomes the development of local memory. Competition and conflict emerge and the evolution of the system is driven by agents trying to exploit each other, but the game can go on only if neither side succeeds completely (Stacey 2007:203).

Kaufmann's work (1993, 1995) represents one of the most popular CAS approaches. Kaufmann begins his models with a set of rules for interaction and demonstrates how this leads to emergence of complex novelty through connections. One of the concepts related to Kaufmann's work is the 'fitness landscape' which is based on the 'n-k model', describing evolutionary processes where the network of agents is "searching" for variations that are more "fit". The shape of the landscape, whether it is a few high peaks or many low peaks, determines how easy or difficult it is to find a fit state. The landscape is defined by two parameters: n, the number of elements in the system (dimensionality), and k, which is the interconnectedness of the system. When k is low, it has a smooth landscape (simple peak) and, conversely, when k is high, it has many peaks and a rugged landscape; i.e. the more the system is dependent on interaction rather than individual components (Dooley 2004). Both competitive selection and being co-operative are sources of order that can lead to self-organisation. The latter occurs through the 'edge of chaos' where there are enough agents that are richly enough connected imposing conflicting constraints on each other and where the system is capable of novelty (Stacey 2007):

"The fitness landscape is not a given space containing all possible evolutionary strategies for a system, which it searches for fit strategies in a manner driven by chance. Rather the fitness landscape is being constructed by the interaction between agents. The notion of the fitness landscape, its ruggedness, becomes a metaphor for the internal dynamic of a system, not an externally given terrain over which it travels in search of a fit position. These internal properties of the network are the connections between its entities and these connections create conflicting constraints. The internal dynamic is thus one of enabling cooperation and of conflicting constraints at the same time." (Stacey 2007:200)

Because the fitness landscape is not a fixed space but is shaped by connections and conflicting constraints, we cannot know which movements are the right ones. This is because of the co-evolutionary way the fitness landscape works; a paradoxical relation of cooperation and competition (Stacey 2007). According to Levinthal & Warglien (1999), the fitness can be represented by profit or a mix of variables related to an organisation's goals. Thus, the fitness landscape can be applied as a mapping of the actions of a set of individuals and their collective performance. In particular, a 'rugged' landscape with multiple peaks is a result of interdependence among a set of actors, who locally improve contribution to the collective fitness (Ibid). The fitness landscape touches upon the actuality-potentiality dimension where local peaks produce the emergence out of a vast number of possible emergent configurations (Levinthal & Warglien 1999, Kaufmann 1993).

#### **4.2.3.2 Self-organising Models – Neural Networks**

‘Neural networks’ is a modelling technique that is based on a method of information-processing which is inspired by how the brain is understood. ‘Neural networks’ is a distributed way of modelling and therefore, according to Cilliers (1998), it holds more promise than rule-based models, where the latter relies on a strong conjecture of formal representation. Shortly explained, the nervous system is solely consisting of neurons that are richly connected by means of synapses (i.e. connection between the end of one nerve cell and the next). The dynamics of the system is the stimulation that is generated in the synapses (i.e. interaction points) and when the stimulation reaches a certain threshold, the given neuron is triggered and a process happens where impulses are sent away from the nerve cell. The impulse then provides the input to a number of other neurons. Each input is, however, first multiplied with a certain value or ‘weight’. This weight determines the connection strength between two specific units, and models the characteristics of the synapses in the nervous system (Cilliers 1998:37). The physical structure and the transfer characteristics modify the synapses where a many-branched process arises from a neuron that receives impulses from other neurons; all neurons in the system have the possibility of connection. Each neuron is continuously calculating its output in parallel with all the others, and patterns of activity, determined by the values of the weights, flow through the network (Cilliers 1998:37). Complex behaviour emerges from the interaction between ranges of simple processors responding non-linearly to local information (Cilliers 1998:18).

Weights play a central role in the dynamics of the network because the distributed information is determined by the two layers of weights. The question hence is where the weights come from? The determination of the different values of weights is explained through the ‘Hebb Rule’, also referred to as the “use principle”, where networks develop an internal structure which is based on local information available at each neuron. In the use principle, the connection between two neurons should increase proportionally to how often it is used (Cilliers 1998). The principle can be illustrated by a network that has to switch on a lamp when it gets dark. The process starts with an untrained network, which means that it has random values and no capacity to perform the task. An external agent steps in and switch on the lamp when it is dark, in order to train the network. The process continues; it becomes light and the lamp is switched off and the network is forced to activity in associating the different output conditions with a given set of input values:

“If this cycle is repeated a number of times, the network will adjust its internal weights, without external intervention. Through the application of Hebb’s rule at each neuron, the input conditions representing darkness are associated with an active output, and vice versa for



conditions of light. After it has been trained, the network will be able to perform the required task by itself” (Cilliers 1998:18).

Thus, weights are only predetermined by an external designer when dealing with the simplest problems and networks; conversely, models with many problems carry enough examples to generate the weight of the values themselves (Cilliers 1998:38, 39). In these highly abstract models, some characteristics are repeated: processes of internal competition cause networks to self-organise its internal structure, and no abstract procedure is available to describe the process used by the network to solve the problem (Cilliers 1998:43). Neural networks conserve the complexity of the systems it model because it consists of complex structures itself; it encodes transformation about the environment in a distributed form, and it has the capacity to self-organise its internal structure (1998:25). The latter point covers a central notion of change in terms of self-organised criticality that is also referred to as autopoiesis (Bak 1996).

According to Cilliers, self-organisation is an emergent property of a system where individual components only operate on the basis of local information and general principles. A self-organising process is not guided or determined by specific goals, and it is often difficult to talk about the function of such a system. As soon as we introduce the notion of function, we run the risk either of anthropomorphising, or of introducing an external reason for the structure of the system. As with rules (elaborated later), the notion of function is intimately linked to descriptions of complex systems (Cilliers 1998). Macroscopic behaviour emerges from microscopic interactions that carry very scanty information content. Analysis at the microscopic level can explain the behaviour of each element in terms of a number of simple transformations. Simple, local interactions can result in complex behaviour when viewed macroscopically:

“...it is not possible to give crudely reductionist descriptions of self-organizing systems. Since microscopic units do not ‘know’ about large-scale effects, while at the same time these effects manifest themselves in collections that do not involve anything besides these microscopic units, the various ‘levels’ of the system cannot be given independent descriptions. The levels are in principle intertwined.” (Cilliers 1998:104)

Hence, in self-organising systems, there are not different levels of analysis. Rather, microscopic units, but not any single individual per se, are the energy that creates large-scale efforts in a distanced and distributed cause-effect relation. Self-organisation involves higher-order, nonlinear processes that cannot be modelled by sets of linear differential equations (Cilliers 1998). Therefore, self-organised criticality is the mechanism by which networks diversify their internal structure maximally. The more

diverse the structure, the richer is the information that can be stored and manipulated (ibid). Self-organised criticality evolves to the complex critical state without interference from any outside agent:

“The canonical example of SOC [self-organised criticality] is a pile of sand. A sandpile exhibits punctuated equilibrium behavior, where periods of stasis are interrupted by intermittent sand slides. The sand slides, or avalanches, are caused by a domino effect, in which a single grain of sand pushes one or more other grains and causes them to topple. In turn, those grains of sand may interact with other grains in a chain reaction. Large avalanches, not gradual change, make the link between quantitative and qualitative behavior, and form the basis for emergent phenomena” (Bak 1996:32).

According to Bak, acceptance of the example above makes instability and catastrophes inevitable in biology, history and economics. It is the same kind of dynamics that produce small ordinary events as well as large catastrophic events in line with Cilliers’ previous quotation and, as King points out, *“novelty is just as likely to be promulgated from what appear to rather obscure and unimportant corners of the universe as anywhere else. And of course, in a vital sense, innovation et cetera “come from nowhere” in particular; they are again emergent properties of the entire system”* (2001:244). The ‘critical point’ is where single events have the widest possible range of effects; i.e. the system tunes itself towards optimum sensitivity to “external” inputs (1996:108). Furthermore, two important elements characterise feedback of autopoietic systems: circular causation and self-reference (Sabelli 2005). Thus, in the systems approach, feedback is more complex than originally thought, as also identified in biotic processes. Moreover, where autopoietic systems have been connected to a ‘closure’ and therefore an identified boundary through the work of Varela and also Luhmann, this is not the case from a complexity science point of view. Rather, it can be argued that it is the opposite of closure in terms of continuous interaction and self-reference with its environment (Sabelli 2005); between agents (minds) and its environment including others agents (minds).

Understanding how the brain works has profoundly affected how we can understand dynamics of a system, in particular in relation to efficiency. For example, taking the relation between speed and efficiency, conventional thinking would see a direct positive relationship between increasing speed and achieving a higher degree of efficiency (e.g. identified in the ‘lean’ philosophy). However, Cilliers perform the claim that it is highly problematic to equalise speed with efficiency and refers to the “illusion of simultaneity, which denotes that to live quickly and efficiently in the present denotes coming closer to reality; rather, *“the faster the system becomes, the shallower its resources will be”* (2006:109). This claim stems primarily from how memory works as a process of selection, where states that are significant are repeated whereas less significant states will fade away (i.e. the use

principle). Importantly, memory is only possible if the system can forget and, therefore, certain slowness is necessary; memory is not an instant thing, it takes time to develop. Thus, what the claim highlights is the relation between anticipation and memory (and therefore past and the future), where anticipation is not an extrapolation of the present, but a complex non-linear process between experience and what it has to cope with in the present (p. 108). Thus, if the brain reacted instantly to every trend in its environment, it would not be able to discriminate between information and noise. On the other hand, if it reacted too slowly, it would only capture low-frequency information, which of course also has the potentiality of being just noise. Hence, according to Cilliers, the balance between stability and change is a contingent playing out in time with the requirement of a certain degree of slowness, or what we can also refer to as reflection.

Eventually, Cilliers claims that with connectionist models, a system can function without the basis of rules; however, certain systematic properties can be described by means of rules, if they prove to be useful. That is, those who look for structures and patterns do not need to start with a “hard” approach (e.g. fuzzy logic) that is made complex enough so softness emerge; merely, the analysis can start with a system that is soft at the bottom and complex enough that hardness sometimes appear at a higher level. In the following quote, Cilliers emphasises relationships:

“To think in terms of relationships, rather than in terms of deterministic rules, is not a novelty for science, but it has always been seen as part of qualitative descriptions and not as part of the quantitative descriptions and calculations deemed necessary ever since Kepler’s insistence that ‘to measure is to know’. Many phenomena, especially in the life-sciences, but also in physics and mathematics, simply cannot be understood properly in terms of deterministic, rule-based or statistical processes.” (Cilliers 1998:46)

By emphasising relationships, Cilliers touches upon a central element in the conventional thinking of agent-based-modelling and the value of rules. The conventional logic of rules implies a certain generality to the cases subsumed by the description incorporated in the rule. The specific case must have the same rule as the general case, and rules must also be linked in such a way that one rule can be used by a next rule as an input (i.e. possess the characteristic of an algorithm) (Cilliers 2000b):

“...a principle that applies locally between the components of a complex system...has no ideational content, it operates on contingent, low-level information, is not selective, and provides us with no general information about the system as a whole, or even parts of it. The same rule – perhaps it is better to start talking of something like a principle, rather than a rule – operates everywhere in the system...” (Cilliers 2000b:44)

Cilliers argues therefore that it is necessary to distinguish between different kinds of rules in terms of constitutive rules and regulative rules. Constitutive rules provide a framework within which one can understand a set of facts; for example rules in terms of a game. The game does not exist if the framework is not accepted. Regulative rules determine and constrain permissible moves within that framework and such rule only makes sense in the context generated by the set of constitutive rules *“to serve a double fault only makes sense when one is playing tennis”* (Cilliers 2000b:45). The question becomes where the constitutive rule comes from? Rules do not have a formal representation but a distributed one and this emphasise relationships. The discussion of relationships at the expense of rules is further elaborated in a later section concerned with the implications of ‘distributed representation’ and the distinction between complicated and complex.

#### **4.2.4 Discussion of Complexity Science Branches, Concepts, and Models**

The conventional agent-based-modelling approach begins with an external designer setting up a computer program by means of a set of operating rules and instructions for interaction, where control disperses into bounded frames that refer back to the set of rules. Reynolds’ bird-flocking simulation provided an example of such an approach that possesses certain characteristics for a dominant discourse of the application of insights from complexity science. Reynolds asks the question of how individual birds are actually able to flock (i.e. organise)? The answer is setting up rules that enable prediction of how local interaction creates an emergent pattern and, thus, the rules are a normative representation of the phenomena bird-flocking. Rules are external and they control the boundaries of the system. Another constraining element from Reynolds’ explanations is that the agents adhere homogenously to the same simple rules. Hence, it is a very attractive claim for management that identifying and formulating simple rules will create an adaptable organisation (cf. Stacey 2007). From this follows, adopting the CAS approach without further justification emphasises the ability to control a system by enabling it appropriate rules. Applying such a simulation to organisation can be categorised by Maguire et al’s framework the resemblance method, which is founded on a limited explanation power. In this regard, Burnes (2005) offers a critique of complexity science work that some authors, without further justification or even proper understanding, apply the normative guidance straight-forward, which in itself cannot be a valid claim.

A conventional CAS approach often maintains the assumption of cognitive psychology as part of a traditional systems approach where rules have a strong causality. Central to cognitivism is that the brain is assumed to act as a passive mirror of reality. Importantly, since all normal individuals have similar biologically determined brain structures and all brains are processing symbolic representations

of the same pre-given reality, there is no fundamental problem in sharing the same perceptions (Stacey 2007:61). Cognitivism, however, has difficulties explaining experience, as this cannot necessarily be verbalised, intellectualised, and made into rules. Experience (or learning) and intuition is often dismissed by cognitivists as guesswork, irrationality, or supernatural inspiration (Flyvbjerg 2001). That is, “‘cognitivist’ regards analytic problem solving as the only possibility, and excludes any other; i.e. intelligent behaviour is following sequential models of reasoning consisting of “elements-rules-goals-plans-decisions” (Flyvbjerg 2001:13-14). ‘Neural networks’ is a modelling technique on how the brain works and this contests the assumptions of this rule causality, where the “use” principle is moving us from regarding rules as controlling the system to regarding rules as merely functioning if they prove themselves endogenously. However, as Cilliers (2002) argues, although the connectionist model may be better at mapping complexity, it has, like any other modelling techniques, the disadvantage that is not possible to include all interaction in a system; therefore things are left out, which we do not know the effects of.

According to Stacey (2007), complexity models inform us that the evolution of life in the universe occurs not primarily through random mutations selected for survival by the forces of competition as in Darwinism, but rather through an ‘internal’, self-organising, co-operative process that presents orderly forms for selection by the forces of competition and cooperation. Selection is not made by freely operating competition that chooses amongst random little pieces, but by a competitive process constrained to choose between new forms emerging from a co-operative process: “*Life in the universe, and perhaps life in organizations, arises from dialectic between competition and co-operation, not from unconstrained competition*” (Stacey 2007:203). I.e. in systems terms autopoiesis with bipolar feedback. In this chapter, modelling of the heart (biotic processes) and the brain (neural network models) both exhibited the relation of opposites and as complexity science also informs, the brain and the heart is decisive in explaining human evolution (Gould 1996). Thus, contradictory properties are a central element of analysing complexity and where ‘normal science’ has thought of oppositions as ambiguous leading to scientific failure; the claim with complexity science is the opposite, which is articulated by Capra (1982):

The systems [holistic] view looks at the world in terms of relationships and integration..., integrated wholes [being] irreducible to parts...The activity of systems involves...transaction-the simultaneous and mutually interdependent interaction between multiple components... [in] process thinking...form becomes associated with process, interrelation with interaction and opposites are unified through oscillation....although there is competition, it usually takes place within a wider context of cooperation...The important aspect of the stratified order...is not the

transfer of control but rather the organization of complexity” (Capra 1982:266-267, 279, 282, in King 2001:262-263).

Opposites operating at the same time are a characteristic which, to a large extent, is identified in the complexity work reported in this chapter. Returning to the change motors of Van de Ven & Poole, the immediate interpretation would be the dialectic change motor, where a thesis and anti-thesis collide to create a synthesis that is a source for a new thesis and anti-thesis. However, this type of dialectics is not conciliating with the kind of dialectics that is produced in complexity science in the sense that contradictions are not part of a systematic improvement through syntheses (novel constructions) that are leading towards a telos. Rather, oppositions are intertwined in a complex relationship: there is not just conflict but also harmony in a bipolar feedback (Sabelli 2005) and as in the neural networks; it is not neurons in itself that are dynamic but rather the relationships between them (Cilliers 1998). As Sabelli points to:

“It is unwise to oppose the laws of nature because such resistance fosters the growth of the force it opposes. Excessive force in a particular direction tends to foster the growth of its opposite. An obvious and aggressive attempt to gain power and position can produce an opposite consequence...Real opposites are not polar extremes of a continuum. Opposites are complementary, and complementarities are opposite...Bifurcation and differentiation have objective and logical priority over creative interactions, dialectic synthesis, and system formation. The unity of opposite is primary, but evolution and progress consist in the diversification and separation of opposites. Diversification is the pattern of natural evolution” (Sabelli 1998:432, 433, 435)

Thus, where dialectics has, by Hegel and in the model from Van den Ven & Poole, been framed by conflicts as the central element of dynamics, it is not sufficient to comprehend the insights from complexity science as reported in this section (this part is elaborated in later section 4.4). The final part of this discussion compares approaches to complexity science in order to establish a contribution from the complexity science approach. The framing of complexity approaches follows Maguire et al’s (2006) ‘application’ level (see figure 1) of ‘models’, ‘metaphors’, and ‘meanings’. One critique to be mentioned here is that Maguire et al’s framing considers the clear distinction between subjectivist and objectivist work as being too simplified a dichotomy, for reasons already discussed in this chapter. The ‘models’ approach is in particular dominated by the work of the Santa Fe Institute and popularised through the approach of CAS/ABM. ‘Meanings’ represents the argumentation throughout this chapter. The final approach, ‘metaphors’ needs some elaboration. It is an approach particular developed by Tsoukas & Hatch (2001) which is labelled the ‘narrative approach’. The ‘narrative approach’ claims that we are not interested in complexity science because we regard

‘fractal’ as a real property of a complex system, but because it provides a vocabulary to understand social systems. Natural systems are viewed as distinct from social systems and the former is not applicable to the latter. Hence, complexity science introduces a vocabulary that enables us to reach an understanding of complexity from the subjectivity of the researcher.

In terms of the notion metaphors, a few comments should be added; in particular that meanings also apply metaphors; however its grounding is different. As Richardson (2008) claims, the problem is not with using metaphors per se. The concern is that metaphors are used irrespective of criticism, where metaphors are imported with very little attention towards the legitimacy of importation. Richardson & Lissack points to:

“...all descriptions must necessarily be metaphorical in nature. Even mathematical models are metaphors for reality, a metaphor simply being a partial description of one thing in terms of another. In the case of mathematics, the universe (one thing) is partially described in terms of selected mathematical constructs (i.e. other things). As all explanations must be by their very nature metaphorical, we must treat them as such rather than implicitly assuming that our explanations are homological with the object that they claim to describe” (Richardson & Lissack 2001:44).

Metaphors, as understood particular by Tsoukas & Hatch, indicate that complexity is a property of the eye of the beholder. That is, there are no connection between conceptual boundaries and natural boundaries, placing causality between the conceptual boundary and the ‘eye of the beholder’. This is a difference to a ‘meanings’ complexity science approach, which assumes quasi-boundaries between metaphors and the reality it relates to. Positioning the thesis’ approach into Jackson ‘system approaches framework, there are elements of emancipatory and post-modern categories with emphasis on contradictions. Here, it is important to elaborate on the meaning of conflict and contradiction. The thesis has not adopted the Hegelian view that conflicts, and only conflicts, are essential to explain progression or dynamics. Rather, contradictions are the source to discover the mechanisms of dynamics; abundance *and* scarcity, collaboration *and* competition. Also, bifurcation points and fitness landscapes can have an incorporated emancipatory element where human agency is incorporated as change element. The three approaches are outlined in following table where ‘meanings’, in the middle of the table, represent the approach that is advocated in this chapter:

	<b>Models</b>	<b>Meanings</b>	<b>Metaphors</b>
<b>Focus</b>	Prediction of agents' behaviour in a system	Relationships, Complex Thinking	Images to describe interpretations
<b>Epistemology</b>	Formal representation	Distributed representation	Emblematic representation
<b>Ontology</b>	Post positivistic, positivistic	Relational ontology	Symbolic discourse, subjectivist
<b>Level of analysis</b>	Rules	Contradictions, oppositions, connections, processes	Symbolic analysis
<b>Research Methodology</b>	Quantitative, Computational, Modelling	Qualitative/quantitative, Process of abstraction Narratives	Qualitative, metaphors, Narratives
<b>Boundaries</b>	Fixed	Quasi	Social constructed
<b>Implications for complexity</b>	Complexity is reduced	Complexity is absorbed	Complexity in the eye of the beholder
<b>Authors (e.g)</b>	Dooley, Van de Ven, Allen, Mckelvey	Prigogine, Cilliers, Richardson, King	Tsoukas & Hatch, Houchin & MacLean,
<b>Natural - vs. social science</b>	Natural science method superior. Draws from such as the CAS approach (e.g. Kaufmann, Holland, and Gell-mann)	No dichotomy. Reality is complex and non-linear. Draws from such as Prigogine and the ontological and epistemological consequences of complexity science	Social science is distinct from natural science. Draws from the insight from natural science but see no further concern justifying concepts adopted.
<b>System school</b>	Traditional (functionalistic) systems approach	Autopoietic systems approach (emancipatory, postmodern systems approach)	Soft systems approach

**Table 5: “Comparing complexity approaches in organization studies” (author)**

Most work on complexity which is incorporated into management and organisation studies has been non-empirical and, for example, the popular N-K model is rarely applied against real world data (Maguire et al 2006). An approach “in-between” is where secondary gathered data is applied to resemble the ideas from complexity science. Boisot & Child (1999) represent such an approach and provide an institutional claim that organisations are complex adaptive systems which are able to handle different forms of complexity contexts. Moreover, Thrane (2007) is an example of primary data gathering that is applying complexity science, in order to study an alliance network oscillating its behaviour between being at two ideal type states: an amorphous (equality and independence) and a hierarchical (negative energies and power) network type. Thrane claims that boundaries are porous and enacted, whereas these boundaries seem to find identification in the ideal types as ideas from which the system can switch between.

Houchin & MacLean (2005) represent a ‘metaphor’ approach in a longitudinal case study give the following comment on the use of complexity concepts; “*we encountered problems in defining and*



*trying to separate different key complexity-theory concepts. There was a degree of circularity as initial conditions, disequilibrium and feedback all appeared as facets of one dynamic.*"(p. 163). In the study, Houchin & Maclean found that the studied organisation was driven by anxiety rather than creativity at the boundary of the organisation. This makes them question whether organisations really are complex adaptive systems. As a result, they call for more application of sociological and psychological theories in order to strengthen complexity science. In a sense, Houchin & MacLean identify their own weaknesses as the metaphors are applied without much consideration of its importation. The institutional claim in comparison is built upon a stronger foundation. However, as advocated and elaborated later, a complex system does not equalise the boundaries of an organisation, and therefore, the institutional claim is also met with significant challenges of drawing boundaries. The rest of this chapter is going to advocate how a complexity science can inform analysis based on the approach 'meanings'.

### ***4.3 Relational Ontology and Distributed Representation***

From the 'meanings' complexity science approach, two central and highly related ontological and epistemological elements are distributed: representation and relational ontology. A central discussion in the complexity domain has been whether complexity is an ontological or epistemological phenomenon: is it a property of a system, its parts and their interactions; or is it a property of a given interpretation, representation, or simulation of a system (Maguire et al 2006:170). Consequently, ontological complexity concerns how complex things really are in themselves, whereas epistemological complexity concerns how complex our descriptions are (Cilliers 2002). There is a growing consensus emerging in the complexity domain that it is both an epistemological and an ontological issue (Maguire et al 2006) where Cilliers (2002) takes it further to claim that there is a complex dialectic relationship between the world and our descriptions.

Relational ontology rejects that it is possible to break the whole up into parts and then collect them again as in atomistic ontology. The latter is replaced with an ontological primacy of relationships. Categorical dichotomies are rejected between: the parts and the whole (individual and society); order and disorder; continuity and change; probability and determinism; simplicity and complexity; freedom and determinism; the observer and the observed; the abstract and the real; and so forth (King 2001:7). Perhaps the most critical dichotomy rejected is the discrete relation between structure and human agency, which is touching upon how to understand the notion of structure. Sewell (1992) argues that structure, although being a central concept in social science, is under-theorised and

elusive. It seems nearly impossible to define it adequately and it is difficult not to use the word structure in the definition itself. Sewell claim that the most elementary problem is that structural arguments tend to consist of a far too rigid causal determinism. That is, structure is reified as primary, hard and immutable, whereas the events or social processes are regarded as secondary, superficial and external. Therefore, structure tends to be impermeable to human agency “...to exist apart from, but nevertheless to determine the essential shape of, the strivings and motivated transactions that constitute the experienced surface of social life” (Sewell 1992:2). From this also follows that patterns are reproduced, even when actors, who are engaging in relations, are unaware of the patterns or do not desire their reproduction. A related problem here is that it is difficult to address change and structure at the same time; that is, the metaphor of structure implies stability. This denotes that change is often situated outside of structures – exogenous to the system in question (Sewell 1992:3). Changes are for example located in telos of history, in notions of breakdown and, thus, dealing with change tends to become associated with discomfited epistemological difficulties.

Complexity science regards structure as a central element of complex systems. Structure is the patterns of interaction in the system and underplays a distinction between the structure on the one hand, and activities on the other (2001:140). As a general expression: “...structure pertains to the internal mechanism developed by the system to receive, encode, transform, and store information on the one hand, and to react to such information by some form of output by the other” (Cilliers 1998:89). Structure, then, is not an *a priori* design. Rather, it emerges as an internal result of the interaction between system and environment and, thus, we are back in the ‘use principle’, where events that occur once, will fade away, whereas significant repetitive events will be reinforced in the pattern of activity and therefore its structure. As a consequence, individuals cannot be given independent descriptions; they can only be understood by their relation to the surrounding environment, and the assumption of the individual being theoretically coherent and empirically viable, is severely tested in terms of how memory works:

“Memory, like the rest of the mind, did not arise to provide us with an objective and comprehensive database composed of the contents of the world. Rather, our general concern is adapting our behaviour... Minds shifting produce inconsistent people in different situations, as the working mind “in place” executes its job as if it had always been there, then disappears, to be replaced with another “recruit”, one with different memories, priorities, and plans. And “we”, our conscious self, hardly ever notice what has occurred. We know what is on our mind - ...but we have no capacity to know what is in our mind – which mind “program” is acting for us at any given time. So our standards change without our awareness” (Ornstein 1991:190,210 in King 2001:201).

Methodological individualism loses its secure assumptions where individual behaviour can be discretely analysed and where particular behaviour can be ascribed individuals and aggregated to collective entities. Discrete individuality is an illusion; individuality is at its roots a cooperative undertaking (cf. Prigogine & Stengers 1984); and as Masters claim “*Homo sapiens has always been a social animal and accordingly it is always a population that is the basic unit of evolution, not individuals per se*”(in King 2001:117). Assumed individual behavioural capacities which are explaining the evolution of the system and that this in itself creates a competitive selection and a fit system is severely challenged by the complexity science (again because it dismisses the possibility that dynamics can take place at discrete levels of a system). These assumptions are replaced by an autopoietic paradox where:

...increased contact and interaction (feedback loops) by an individual with his environment leads not to an enhanced dependency alone, but to a matrix or web of interdependency which, in that context, actually increases individual autonomy and agency though it is important senses both determined and constrained” (2001:212)

From this claim follows a non-dualistic relationship between structure and human agency. To regard structures as having circular causality over human agency – or vice versa – is to amputate our understanding and as Sewell claims, it indicates a single direction of causality. There is no scientific claim that such causality exists (Flyvbjerg 2001). Rather, causality is relationally distributed and the possibility for human agency is subjected to degrees of freedom, as well as degrees of determinism, at the same time in an actuality-potentiality relation. For example, bifurcations present multiple solutions to system change; however, it is what we do as actors, individually as well as collective, that have a most significant impact on which course the system takes through bifurcation (King 2001:180). Thus Jantsch (1975) argues that complexity science is a stance against the dualistic principles that have been embedded in the Western thought, such as pleasure and pain as an either/or type; rather “*human life is not essentially concerned with seeking pleasure and shunning pain, but that it receives energy from both at the same time*” (Jantsch 1975:8). This relational dimension is further articulated in distributed representation that, as mentioned, is a central property in connectionist models and why rules and external programmers are unwarranted in complex systems as significant explanatory power of its dynamics. In connection with distributed representation, Cilliers (1998) argues that the characteristics of complex dynamic systems inform us that limits to knowledge is unavoidable and that knowledge will always be contextually and historically framed.

In regard to complexity and distributed representation, one way to address the issue of ontology and epistemology is to distinguish between ‘complicated’ and ‘complex’. A jumbo jet is complicated because it can be modelled accurately, assembled and described by rules (at least in principle). Complex things are different because they are constituted by relationships (Cilliers 2000b). That is, complicated things have a formal representation, while complex things have a relational/distributed representation. Complex systems have emergent properties, complicated systems do not; no one would fly in a jumbo jet with emergent properties (Ibid). Referring back to the earlier distinction between constitutive- and regulative rules, the constitutive framework may be appropriate in a complicated system, but not in a complex system. Complicatedness relates to a closed system, whereas complexity relates to an open system. This distinction between complicated and complex is perhaps too rigid. As Cilliers argues, it might be possible to accurately predict a complex system. However, this would require a model that can represent the meaning of the system, and since the nature of a complex system is the result of the relationships distributed all over the system, the model has to reflect all these relationships, with the environment, and each interaction in the history of the system (Cilliers 2000a). Therefore, although if we hypothetically invented such a model including all these interactions it would still be necessary to make an interpretation of the model to get knowledge out of it. This is also known as the phenomenon of ‘incompressibility’:

“We have seen that there is no accurate (or rather, perfect) representation of the system which is simpler than the system itself. In building representations of open systems, we are forced to leave things out, and since the effects of these omissions are non-linear, we cannot predict their magnitude” (Cilliers 2005:13 in Richardson 2008:16).

Thus, an important element of distributed representation is the limits of knowing, and because the system is open, we do not know the boundaries of it. According to Cilliers (2000a) descriptions of complex systems are always incomplete as no single description can capture all relevance or ignore contingency. Decisions of ethical and political implications are required as part, not extraneous, of the work of complex systems. In this context, Cilliers understands ethics as referring to the inevitability of choices that cannot be backed up objectively. Distributed representation, thus, touches upon how we can understand and use models. Osberg et al claim that models are a re-negotiation tool denoting that they are not pictures of reality or a direct reflection of ‘real’ representations. Models are pragmatic tools providing temporal understanding of knowledge that enables us to interact with the world in a cyclical re-negotiating process between theories and our positioning in the world (2008:221). The model is selected in terms of the aims of our description of the system, and the quality and usefulness of the model is primarily determined by this selection (Cilliers 2000b:46). In

order to generate general understanding, a model reduces complexity; however, good frameworks, although reducing complexity, also allow us to see things that were not apparent before. Thus, as Cilliers states “...our models can both conceal and reveal complexity” (2000b:46).

In other words, we deal with both natural and constructed boundaries, where the latter allows a generation of understanding of complexity. This understanding is not apart from the natural boundaries; that is, the materialist micro-interactions of the complex system. Thus, because it is not possible to understand and describe the millions of nonlinear interactions that happen in a system, we must try to describe it with an acknowledgement that it is imperfect. We need limits in order to say something (Cilliers 2002) and, therefore, we need to have boundaries. To draw boundaries is one part of why attention is now drawn to Ollman’s interpretation of Marx’s method. The other highly interrelated part is Ollman’s comprehension of opposition through contradictions.

#### ***4.4 Oppositions, Contradictions and Process of Abstraction***

In the previous sections, oppositions and contradictions have been highlighted as central element in complexity science and for understanding dynamics. In order to understand the density of contradiction, it is useful to take a short step back, as this will provide us with a more general scientific principle of dealing with oppositions. Thereafter, Ollman’s interpretation of Marx’s method is presented. The homology between the complexity sciences and Ollman’s interpretation of Marx’s method is awarded and first described by King (2001). Important for the incorporation of the approach here is the connection between drawing boundaries and the dynamics of contradiction, which supply a method for management to understand complexity without justifying it through non-linear mathematical equations. While neural networks examined how the brain worked as a system, process of abstraction takes it further in terms of how the brain as system draws boundaries in its environment. Thus, it is an approach for understanding the millions and millions of interactions that take place in a system.

##### **4.4.1 In General on Oppositions - Contradiction, Conflict, Tension, and Paradox**

The traditional system approaches treated oppositions and contradiction as unwarranted elements that should be resolved, ignored, or eliminated. However, there are many ways to deal with oppositions. For example, Seo et al.’s (2004) focus on how multiple tensions exist simultaneously to shape change. They introduce four different ways of managing dualities: (1) *selection*; dualities are acknowledged but placed in a ‘cold war’ relationship. For example, change can both be proactive and reactive, but instead of exploring the relationship between these tensions, they are treated as discrete and

threatening to each other. (2) *Separation*; poles are separated through levels of analysis or temporal processes and they ignore tension and its critical interdependence. For example, a particular change intervention might be described as operating one way at the individual level and an opposing way at an organisational level. (3) *Integration* can be dealt with in two ways; first neutralisation, which is similar to compromise and secondly, forced-merger that arranges contradictions in perplexing ways, for example when quantitative and qualitative research data is forced to fit in a triangulation. (4) *Transcendence* refers to a synthesis and it reframes a new perspective or a reformulated whole. Even though transcendence recognises and embodies both sides of the pole, it does so by working toward a synthesis (Seo et al 2004:77). Complexity science, as reported in this chapter, would discard all these four possibilities as conciliate with its view on oppositions although it might represent the conventional opportunities.

Stacey (2007) also recognises that there are different ways to encounter contradictions and, importantly, he argues that the way we understand contradictions says much about the way we understand dynamics. First, a contradiction can be thought of as an ‘either...or’ choice. For example, managers faced with a need to improve quality, and thereby increased cost, may at the same be faced with a need to cut cost. One way of approaching such choice is by dilemma; that is, an either/or choice between two equally unattractive alternatives - improving quality is unattractive because it increases cost and decreasing cost is unattractive because it destroys jobs. A contradiction may also be termed a dualism where a ‘both...and’ thinking is present. For example, managers may be faced with a need to customise their products to meet localised customer requirements, but on the other hand, they are also faced with the need to standardise their products in order to meet global competition. A way to deal with this contradiction in a dual term is to “think globally and act locally”. That is, instead of choosing between one and the other; one locates them in different spaces or times. Finally, Stacey (2007) argues that we can think of contradictions as paradoxes, consisting of conflicting processes and tension generating behaviour, which are linked to the dialectic logic of Hegel and the emphasis on conflicts.

Conflict also touches upon yet another viewpoint on opposition in terms of the more fundamental tension between conflict and consensus. Flyvbjerg (1998) distinguishes between the central ideas of Foucault, following the work of Nietzsche (power analytics and ethics), and Habermas, following the work of Kant (discourse ethics). Foucault’s work begins with a focus on the concrete struggle with a constitution in a specific society: how the constitution is interpreted, how it is practised in actual

institutions, and especially, how interpretations and practices may be changed (Flyvbjerg 1998:223). This contrasts Habermas’ strongly normative, consensual and procedural approach, which pays little attention to actual discourse and how communicative rationality becomes an important part of society (1998:218). Thus, Habermas is criticised by being an idealist (i.e. that there exist categories of ideas before experience) with more interest in universals, context-independence and control via constitution-writing and institutional development. We can translate this discussion into Burrell & Morgan (1979), who identified functional theories as static, concerned with explaining the status quo, generating rational explanations, and providing practical solutions to practical problems. It emphasises the importance of understanding order, equilibrium and stability in society and the way in which these can be maintained. From this follows that all functional theories recognise change and stability as an obvious empirical reality in everyday life and, consequently, lose their potential for explaining radical force and influence (Burrell & Morgan 1979). Thus, a conflict theory based on deep-seated structural conflict and concerned with radical transformations of society is not consistent with a functionalistic perspective (Burrell & Morgan 1979:16). The regulation-radical dimension is illustrated in following table:

The sociology of REGULATION	The sociology of RADICAL CHANGE
(a) The status quo	(a) Radical change
(b) Social order	(b) Structural conflict
(c) Consensus	(c) Modes of domination
(d) Social integration and cohesion	(d) Contradiction
(e) Solidarity	(e) Emancipation
(f) Need satisfaction	(f) Deprivation
(g) Actuality	(g) Potentiality

Table 6: “The regulation-radical change dimension” (Burrell & Morgan 1979:18)

Burrell & Morgan, who are advocates for functionalism, bring a sharp dichotomy into play between change as a natural phenomenon and then contradiction which is operating outside of stability, leading to a possible radical transformation. Thus, contradictions should be avoided in order to have stability. Actuality becomes distanced and separated from potentiality. In general, the systems approach regards contradictions and conflicts as a treat, which may be an explanation why the works of Habermas has gained much more influence in contemporary systems approaches than is the case with the approach such as Nietzsche (cf. Jackson 2000). Jackson further claims that many historical events have proven that conflicts can be a very dangerous source for change such as the world wars, which again places conflicts and contradiction as operating outside of stability. Such claim entails that we cannot achieve stability if contradictions occur.

Smith & Berg (1987) provide a theorisation on paradoxes which is applied to the concern of group dynamics and is an approach that has notable complementarities with a complexity science viewpoint. From their findings they argue that conflicts have a great influence on the group's performance and those conflicts often ends up in paralysing the group, rather than creating dynamics. The yearning to have conflicts "resolved" stems from an imperfect understanding of the meaning conflict has in the life of groups, i.e. paradoxes do not settle down, they are always at work (Smith & Berg 1987). From Hughes & Brecht (1975), they adopt a formal definition of a paradox as a statement or set of statements that are self-referential, contradictory and that trigger a vicious circle. An example of a paradox in this context is: "*all rules are meant to be broken, including this one*". If we examine the statement, what emerges is the establishment that rules and rule-breaking are inextricably linked. The idea of breaking a rule is grounded in the notion of the rule itself, and vice versa (1987:14).

Smith & Berg (1987) provide a range of examples of paradoxes in group work; one of them is the paradox of scarcity. A corporate project brought together a team of architects and a team of engineers. Before the project was initiated, headquarter allocated resources based on rough estimates that provided a basis upon which the two teams began their relationships (p. 184). The architects felt that they were given insufficient resources when compared with the magnitude of the engineering task being proposed. A process started, in which the engineers and architects negotiated how to re-allocate the resources, where both groups took the starting point that only as the other group took an action would it know what to do. That is, they were dependent on each other's guidance. Unable to find a solution, they asked the organisation for more money; however, this entity was in no better position to determine the matter. Therefore, the organisation decided to increase the budget with 10 per cent for each team. This decision did not solve anything, as the only way the group chose to frame its experience was in terms of the relationship with the other group. Therefore, the teams quickly ended up in asking the organisation for even more resources. In this case, we have a self-referential circularity where actions that might solve one problem, create another one. In principle, the two teams could go on forever if they maintained their independent structures, not realising that the groups had to work together.

Smith & Berg's articulation of self-reference is a central notion where systems create limitations for themselves that are difficult to get out of because of the circular nature of contradictions: "*The more*



*that members seek to pull the contradictions apart, to separate them so that they will not be experienced as contradictory, the more enmeshed they become in the self-referential binds of paradox. It is precisely because the contradictions are bound together that circularity exists”* (1987:14). Thus, from a psychological point of view, Smith & Berg’s approach deals with non-resolvable paradoxes, which involve self-reference, circular causation and contradiction. However, to some extent, Smith & Berg still treat oppositions as a one-directional phenomenon where contradiction, understood as conflicts, is the explanatory element. The focus is subsequently on Ollman’s (2003) interpretation that places a double-movement of contradictions as the central element of analysis.

#### **4.4.2 Ollman’s interpretation of Marx’s Method**

Ollman’s (1993, 2003) interpretation of Marx’s method has its point of departure in a type of dialectics, that are conciliate with the understanding of oppositions from complexity science as discussed in preceded sections. The approach has a relational ontology in the presence of the ‘philosophy of internal relations’. The epistemology is based on process of abstraction as a means to deal with the implications of distributed representation and incompressibility in terms of how to draw boundaries in a complex system. Finally, the approach considers from its epistemology contradictions as a dialectic relation and an important part of its theorisation. The “method” begins with the problem of basing our understanding on the immediate surroundings and focusing exclusively on appearances, which may lead to failed conclusions because reality is more than appearances (Ollman 2003). Marx’s abstractions are processes of systemic relations where the notion of “thing” (as something that has a history and external connections with other things) is replaced with the notion of “process” (which contains its history and possible futures) (Ollman 2003:68). As a consequence, it becomes a matter of where and how one draws boundaries and establishes abstracts through our five senses, which are assumed to exist as part of nature. However, the conceptual distinctions, that tell us where one thing ends and the next begins both in time and space, are social and mental constructs; boundaries are never given and, when established, never absolute (Ollman 2003). Hence, ‘process of abstraction’ is the epistemological consequence of complexity and a relational ontology.

‘The process of abstraction’ as the mental activity of establishing boundaries begins with the notion of the “real concrete” (the world as it presents itself to us) and proceeds through abstraction (the intellectual activity of breaking this whole into mental units) (Ollman 2003:60). For example, how we understand literature is dependent on the abstraction of it: how it determines what works and what

part of each work will be studied, with what methods, in relation to what other subjects, and in what order. Another example is listening to a concert: *"...we often concentrate on a single instrument or recurring theme and then redirect our attention elsewhere. Each time this occurs, the whole music alters, new patterns emerge, and each sound takes on different value. How we understand the music is largely determined by how we abstract it"* (Ollman 2003:61). Therefore, the drawing of boundaries is highly influential on the way we understand the phenomenon studied:

"We "see" only some of what lies in front of us, "hear" only part of the noises in our vicinity, "feel" only a small part of what our body is in contact with, et cetera, through the rest of our senses. In each case, a focus is established and a kind of boundary set within our perceptions distinguishing what is relevant from what is not. It should be clear that "what did you see?" (What caught your eye?) is a different question from "what did you actually see? (What came into your line of vision?). Likewise, in thinking about any subject, we focus on only some of its qualities and relations. Much that could be included – that may in fact be included in another person's view or thought and may on another occasion be included in our own – is left out. The mental activity involved in establishing boundaries, whether conscious or unconscious – though it is usually an amalgam of both is the process of abstraction" (Ollman 2003:60)

Portraying Marx's process of abstraction, as predominantly a rational and conscious process, does not exclude the enormous degree to which abstractions accurately reflect the real world; many qualities that could have been included are left out (Ollman 2003). Process of abstraction is not only a quality of the mind; it also refers to the particular organisation of elements that exist in the world, and the linkage between the specific and the general, between abstraction and concrete experience (co-constructed and co-evolutionary in complexity terms). This way of abstracting differs from the traditional systems approach where abstractions have been thought of as existing separate from concrete experience. An example refers back to Parsons, who relates function as a form of abstraction to the equilibrium of social systems where individuals were to adapt their behaviour to their roles in upholding a social system's norms. Also, Scott (1992) regards organisation theory to be defined as a level of abstraction that is adequately general to attend similarities in function and form across activity (Hernes 2008). However, following the logics of Whitehead, concrete experience can never be fully self-explanatory and needs abstraction to be meaningful (Ibid):

"The dimension of concrete experience versus abstraction captures a central activity of organization. The notion 'organization', along with numerous notions such as manager, role, and technology, is an abstraction used to talk about organization. Simultaneously, there is concrete experience, which is shaped by abstractions and it could be argued that interplay and dynamics between abstractions form the essence of process theorizing about organization" (Hernes 2008:57).

According to Ollman, one of the modes of abstracting is “level of generality” that deals with the limits set by qualities that are associated with its appearance and function and can be understood as the movement from the specific to the general and vice versa. The “levels” are illustrated in following figure:

<b>General</b>	
Level 7 -	A quality as material part of nature incl. weight, extension, movement.
Level 6 -	Generality of the animal world (i.e. life instincts, energies, life function).
Level 5 -	Qualities as part of the human condition.
Level 4 -	Qualities that address class society
Level 3 -	Qualities that make the individual a typical worker
Level 2 -	Qualities that make us speak of the individual by profession
Level 1 -	Qualities that is unique about a person/situation => name, address etc.
<b>Specific</b>	

**Figure 16: “Abstracting level of generality” (Adapted from Ollman 2003:91)**

The relation, thus, between freedom and determinism is dialectally expressed in level of generality because people make choices based on the nature of the overlapping context between the specific and the general; the unity and diversity as Prigogine would claim. The word “level” should not be taken literally in the sense that we can talk about different levels of analysis that can be separated. Levels are intertwined and refer to the same relation in a process of abstraction. Importantly for the concern here, and elaborated later, is that other maps of “level of generality” can be drawn for other kinds of problem (Ollman 2003:88). A related mode of abstracting is setting up “a vantage point” concerned with a place to view and piece together the other components in the relationship. That is, the same relation is being viewed from different sides, or the same process from different moments. Vantage point is closely related to what subsequently is referred to as the ‘perspectival element’ (Ollman 2003:100). Finally, “extension” is abstracting boundaries in time and space. Time in terms of limits set in the distinctive history and potential development of any part. Space in terms of the limits, set in mutual interaction, that occur at a given point in time. It is through extension that contradiction can be abstracted.

‘Contradiction’ is understood by Ollman as *“the incompatible development of different elements within the same relation, which is to say between elements that are also dependent on one another”*

(2003:17). The dynamics of contradictions are the movement of mutual support and mutual undermining, exercising a constant pressure (Ollman 2003:17, 84):

“In the contradiction between capital and labor, for example, capital being what it is, helps bring into existence labor of a very special kind, that is, alienated labor, which will best serve its needs as capital, while labor, as the production of goods intended for the market, helps fashion capital in a form that enables it to continue its exploitation of labor. However, capital and labor also possess qualities that exert pressure in the opposite direction. With its unquenchable thirst for surplus-value, capital would drive labor to exhaustion, while labor, with its inherent tendencies toward less working hours, in better conditions, et cetera, would render capital unprofitable.” (Ollman 2003:86)

This is the double movement of contradiction where the imminent unfolding, made from the elements of the contradiction, enables the possibility that the contradiction becomes bigger, sharper and more intense at the source of contradiction, constantly supporting and undermining the process. In the case of capital, it both produces pressure to increase surplus-value as well as it creates demand on workers, decreasing surplus-value. The process produces both negative and positive feedback at the same time; i.e. it has a bipolar feedback principle. Hence, capitalism’s problems are internal materialisations of how it works. The extraordinary success in increasing production stands in contradiction to the decreasing ability of the workers to consume these goods. For example, increases in productivity are often directly related to lower consumption capability, when production technology replaces jobs and when cheap labour displaces well paid consumers (King 2001). Given capitalists relations of distribution, workers can buy ever smaller portions of what they themselves produce, leading to periodic crisis of overproduction/under-consumption (Ollman 2003). Rest aside the ideological discussions here, the contradiction can extend into other processes of the system and, eventually, contradiction can lead to a parcel and temporary resolution or a permanent one (Ollman 2003:85). The latter involves that the contradiction undergoes qualitative change in both process and system, whereas a temporal resolution can be regarded more as a readjustment of the “old” contradiction; *“In the case of simple economic crises, where economic breakdown is followed sooner or later by a renewed burst of accumulation, the initial contradiction is expanded to include more things, a larger area of the globe, more people, a more highly developed technology. Essentially, the stakes have been raised for the next time around”* (Ollman 2003:86).

The view Ollman interprets from Marx has, as previously mentioned, some particular similarities with Sabelli’s (2005) biotic processes in terms of the bipolar feedback viewing on how supply and demand as opposites undermine and support the economic process at the same time. Sabelli (2005)

studies patterns in economic data and finds that demand and supply do not tend to neutralise each other in equilibrium. Rather, change is carried internally in the relation, not in something that occurs externally. Thus, in general, the problem with equilibrium theory is that it can only equilibrate if nothing else happens. However, in order to account for observation, the models require a constant introduction of disturbing “external shocks” that change prices. Sabelli argues that an offer first of all reduces demand by satisfying a demand, but it also produces something else that is not correlated with this satisfaction, as the offer also can reduce price, increase wants etc. in a constant bipolar movement:

“Offer decreases demand in the obvious way of satisfying it. But offer also increases demand by reducing price, by increasing wants, by creating needs for products that complement those we already get and/or are essential for economic competition, and in many other different ways. In the same manner, demand increases supply by offering a market and decreases supply by consuming it...demand creates supply and supply creates demand, and that their interaction generates bios, not equilibrium...In an exchange, supply and demand complement each other exactly, so each decreases the other simultaneously and to the same extent in the short run. In the long run, supply and demand can increase each other. Supply reduces demand insofar as it creates new possibilities, needs and wants...” (Sabelli 2005:573, 575, 576, 578)

It is important to notice how demand and supply are both identical and different in this economic process. The dialectic contradiction – made visible by supply and demand – mutually supports and undermines the same process in a conciliate manner, as with abstracting extension of contradiction by Ollman. Moreover, as Sabelli demonstrates, the market of oil has conventionally been explained by “central limit theorem”, where the oil production will eventually peak in order for it to continually decrease afterwards. However, through studying data of oil production, this pattern also resemble a biotic pattern where supply, demand and price form circularity rather than equilibrium “*Unavoidably, the country and the world will run out of oil, a prediction made for the USA in 1919, and more recently triggered by the “energy crisis” of 1973, followed shortly by the “oil glut” of 1986. Actually, the production of oil over the years follows an irregular curve that appears either biotic or stochastic. Though fears of oil depletion are unjustified, they moved the British to invade the Middle East in 1914*” (Sabelli 2005:571). In that way, the equilibrium model neglects opposites in particular in regard to abundance as the necessary complement to scarcity. Resources precede scarcity where the latter can present inefficient use of resources. The abundance-scarcity opposition, then, also becomes an expression of the degrees of freedom and degrees of determinism, that operate at the same time, when agency make use of resources, and how decisions are not extraneous to how complex systems work, including political decisions.

From this view on contradiction, we cannot understand for example “booming” economy as a temporary deviation from market equilibrium as caused by “external” factors (e.g. politically motivated interference by the state, natural disasters, wars, human irrationality). Rather, they are regarded as outcomes of the internal contradiction itself. Referring to Cilliers’ point that when we are faced with unexpected occurrences, especially when they have catastrophic results, we tend to ascribe their cause to a rare combination of unlikely circumstances. For example, when we have to explain the crash of the stock-market, or a sudden outbreak of political violence, we try to find a number of factors that combine in order to cause it; often with the hope of showing that the chances of the same combination of factors occurring again are slim. This kind of analysis is typical when the aim is to try to explain the behaviour of large complex system by extrapolating a complex system’s behaviour (Cilliers 1998:96).

Ollman includes three connected dialectic relations besides contradictions in his analysis: identity/difference, interpenetration of opposites, and quantity/quality relationship’ which are all relations that have been highlighted in the complexity sciences previously discussed in this chapter. ‘Identity/difference’ is a categorisation that normal science regards as either being the same or different; however, identity and different coexist (Ollman 2003:77). For example, although there are obvious differences between profit, rent, and interest they share identity as forms of surplus value (Ollman 2003:15). In relation to this, ‘interpenetration of opposites’, also referred to as the ‘perspectival element’, designates that conditioning factors apply to both objects and the persons perceiving them (Ollman 2003):

“...it is only because a machine is owned by capitalists that it is used to exploit workers. In the hands of a consumer or a self-employed operator, that is, conditioned by another set of factors, operating under different imperatives, it would not function in this way. As regards the latter, when a capitalist looks at a machine, he sees a commodity he has bought on the market, perhaps even the price he has paid for it, and something that is going to make him a profit. When people conditioned as workers, however, look at the same machine, they only see an instrument that will determine their movements in the production process” (Ollman 2003:16).

In complexity terms this would denote a distributional representation of function and form. Also as identified in biotic processes, although form basically can have the same structure (e.g. arm, leg, fin, and wing), it modifies to perform different functions; function and form are never finalised but remain forever complex. Finally, the ‘quantity/quality relationship’ articulates the kind of change addressed in complexity science in terms of bifurcation points. According to Ollman, a

quantity/quality relationship change consists of a relation between two temporally differential moments of before and after, encompassing both build-up and build-down and what this leads to (2003:17). Initially, movement within any processes takes the form of quantitative change where aspects of processes increase or decrease in size or number. Due to time, a qualitative transformation takes place, indicated by a change in its appearance and/or function; it has become something else, while in terms of its main constituting relationships, remaining essentially the same (Ibid). Again, we have resemblance with the insights from complexity science; for example with self-organised criticality and the pile of sand; it is grains (quantitatively) that make avalanches possible (qualitatively) through time.

The final point about contradiction and process of abstraction is 'the philosophy of internal relations', which is the assumption and principle that legitimates the process of abstraction. This philosophy rejects the idea that all events are entirely loose, separate and discrete (Ollman 2003). Instead, events are connected to complex webs of interaction, all relationships having a history, continual co-evolution in the system, and the whole being present through internal relations in its parts. This, however, leaves us with the question whether "external" generated dynamics are possible in a complex system?:

"Ultimately we do not know the limits of the universe, we cannot describe its shape or demarcate its boundaries. As such, we are always dealing with "internal" relations...and when we invoke the "exogenous" we do so only temporarily...always remaining cognisant of the fact that...eventual collapse of the exogenous into a higher-order holism (endogeny). We may also, in like manner, provisionally differentiate between the endogenous and exogenous when holistic-relational systems display periods of relative stasis in the breathing spaces sometimes afforded by non-linear dynamics in their early stages of development when they are structural distant from the edge of chaos or self-organized criticality.." (King 2001:181-182).

Hence, the boundaries of exogenous processes may be more identifiable in their preliminary introduction in a complex system. However, a complexity science perspective has clear primacy of endogenous processes over exogenous ones. Also, as Richardson & Lissack (2001) state, the only absolute ontological boundaries in a complex system are those that define the basic constituents and their interrelationships; i.e. the universe is the one and only well-defined system. From this follows that all other boundaries are emergent and temporary; that is, if we accept the results from complexity science (p. 42). Furthermore, if hard enduring boundaries do not exist in nature and everything is connected to everything else, then the concept of boundary becomes problematic (Richardson et al 2001): *"Boundaries are often drawn where we want them, and this may not be the best job at hand."*

*At a fundamental level, boundaries are inferred in order to allow us to begin to make sense of our surroundings” (Richardson et al 2001:8)*

With the philosophy of internal relations the challenge becomes where to start and where to end in linking individual quality and the whole. This is referred to as the problem of individuation (Ollman 2003); i.e. the process of giving individuality to someone or something. In order to provide a possible answer to this, Ollman borrows from Dietzgen’s work, which stresses the balance between the reality of the world and the conceptual activity of human thought, responsible for how we grasp that world: *“The theoretical problem of individuation is successfully resolved by people in their daily practice. The fact that they do not see what they are doing as individuating parts from an interconnected whole is, of course, another question...it is the abstracting activity of people that gives the world the particular “things” that these same people see in it. Even mind, we learn, results from abstracting certain common qualities out of real experiences of thinking...”* (Ollman 2003:46). Thus, the primacy and reliance of validity is based on process of abstraction. Placing the process of abstraction into the actual-potential relation, which is a central element in complexity science, appearances are the actual, which can be observed directly. Potentiality, then, is achieved through the process of abstraction where potentiality holds a number of factors derived from appearances (Ollman 2003:123). Thus, the process of abstraction contains, as mentioned, degrees of determinism and degrees of freedom for any individual’s emancipatory project:

“...if man is the subject, the way to reconcile himself with the world, now understood as his object (actual or potential), is actively to change it. Change becomes a matter of man transforming its existence. From being a passive observer of development, as in Hegel, the individual has become the actor whose daily life brings it about” (Ollman 2003:43).

This is the articulation of the before mentioned autopoietic paradox where individuals transform and are transformed through interaction with their environment. Furthermore, referring back to the discussion of complexity science models, the assumptions of the external programmer and designated rules are not present in Ollman’s interpretation of Marx’s method. Although both the latter and complexity science regard boundaries as constructed, it is important to signify that this is not the same as saying that boundaries do not exist. They do exist both in the mind and in the real world. Comparing Ollman’s interpretation of Marx’s method with complexity science has demonstrated a hallmark of the systems approach and the cross-disciplinary nature, providing a frame of reference for applying a ‘meanings’ approach to a complexity science analysis.



#### ***4.5 A Complexity Science Approach to Inform Analysis***

This chapter has focused upon the kind of knowledge that it is possible to achieve from complexity science. Contradictions and relationships are a necessary enriching part of the structure of complex systems while abstraction is an appropriate approach to understand complexity. Cilliers (2000a) claim that complexity science it is not a grand new theory that will solve outstanding problems of science and philosophy; rather it allows us to understand and grasp the structure of complex systems. This chapter have provided consideration for such an argument and supported that view. The challenge now becomes how to mobilise the insights of complexity science into a frame of reference for applying a complexity science approach.

Chapter 3 discussed two infinitely different process perspectives distinguishing between exogenous and endogenous qualities. The apparent claim was that exogenous and endogenous processes must be incompatible as the two processes had very different explanatory values. On the other hand the claim was that the two process types had attractive qualities for enhancing the understanding of the dynamics of procurement management and that complexity science could inform about the relation endogenous and exogenous processes. First of all, we may identify exogenous processes as closed systems, which indicate that they are complicated and therefore not complex. Complicated signifies that the object can be broken down and built up again by rules and specifications. From this follows that something ‘external’ (a designer or programmer) decides the constitutive rules of the framework in order to control and conserve energy, resources, contingencies etc. Importantly, as the rules for an exogenous process are based on a closed system, the designer is required to maintain these boundaries. However, because of complexity of endogenous processes, it is not possible to per se have such processes designed and performing according to intentions in an open system. Change is not separating two or more differentiated states of an object as a thing.

The claim thus develops into that models cannot have a formal representation of procurement management. Rather, the effort is directed towards what happens with our exogenous models (management technologies) when they face the challenge of endogenous processes. That is, processes constituted by relationships and therefore are complex. If we take the example with the jumbo jet again, it is made up of specifications and rules that can be composed and decomposed. When a jumbo jet has passed its test of complicatedness it should be ready to fly. The focus then is how the jumbo jet is travelling through an endogenous process in airports, the weather system, and all other related entities. Endogenous processes do not have confined boundaries; feedback is bipolar and is subjected

to complex properties and the dynamics of contradiction (as double movement). However, just because boundaries are constructed do not mean that they do not exist. Measuring and upholding boundaries of exogenous processes in an endogenous complex system would require an excessive amount of resources on short and long-term. Moreover, calculations in a complex system cannot be precise. It is only precise if we have decided the boundaries of it and how to measure this. Hence, this stability would require that the process stays exogenous. Thus precision is a construction and therefore such measurement renders the possibility to blame someone or something; measurement is relational and fractal. Hence, we need to understand the contradiction in endogenous processes in order to understand the use of exogenous processes and management technologies as they travel in complexity.

Thus, the dynamics of procurement management understood by complexity science emerges as the result of processes in a complex system and interaction between individual and environment. To understand the emergence of structure in a complex system is through the “internal” contradiction in the whole web of relationships and the activity of micro-level agents, which do not have access to global patterns. As a consequence, local conditions and principles become important; in particular the amount of resources available in the system. That is, a complex system has at the same time abundant and scarce resources and from this follow that boundaries, constraints and possibilities are pre-conditions for structure. This introduces competition *and* cooperation as driving forces of the system where no single entity can enable sustainable structures by itself. Systems are co-evolutionary.

In this context, outside of the procurement domain literature, game theory has been employed as a framework for exploring co-evolution of competition and collaboration (Sabelli 2005) and has been articulated as co-opetition (Brandenburger & Nalebuff 1996). This could apparently resemble the insight from complexity science; however this is not the case. Game theory maintains the assumption of the individualist as a rational economic man where the biggest gain is if he cooperates. The typical example is ‘prisoners dilemma’ where two suspects to a crime is interrogated in separate rooms and different scenarios to confess is outplayed. Eventually, the highest gain is if both remain silent; in particular because how do we know that police is going to keep their promise? (Sabelli 2005:522). Game theory is based on a closed system that conserves its energy, is time indifferent, validates its prediction through methodological individualism, and which plays by constitutive rules. The co-evolution of competition and collaboration is about the legislative rules; i.e. what happens in the game after the rules has been determined. The question then arises who have made the constitutive

rules? Again we run into infinite regress. The competition-collaboration opposition is not a matter of two parties independently, by their economic rationale, decides that they gain more value by collaborating than if they competed. In complexity terms competition and collaboration is bipolar, a contradiction that at the same time undermine and support each other. I.e. there is no clear trade-off between competition and collaboration as they are intertwined so a decision to choose between them is also a temporary boundary. We can then expect that to choose one pole effects the other pole striking forceful back.

In chapter two five oppositions of procurement management was identified: integration-disintegration, cost-value, centralisation-decentralisation, strategic-operational and reactive-proactive. These were all related in the dynamics of procurement management. The procurement domain literature regarded it as vital to separate the oppositions in order to ensure effectiveness. For example, one of the boundaries from the procurement domain literature was to separate strategic and operational activities, which was followed by a claim that supplier relation should be based on integration or disintegration. Thus, oppositions are distanced in time and space. The five relations of oppositions identified in the procurement domain literature can be enfolded into how the oppositions are viewed from complexity science. This inevitably informs that the maturity model path towards a high sophistication level cannot be a positive cycle eliminating dilemmas and separating oppositions. Effectiveness (doing things right), in other words does not live in harmony with efficiency (carrying means out with minimum resources). Rather, effectiveness and efficiency relates and is intertwined in harmony and conflict, in a bipolar feedback of resources being abundant and scarce at the same time.

The dynamics of a complex endogenous process are bifurcations<sup>3</sup>, oscillation<sup>4</sup> of oppositions and the double movement of contradictions. A complex process has bipolar feedback and that is autopoietic

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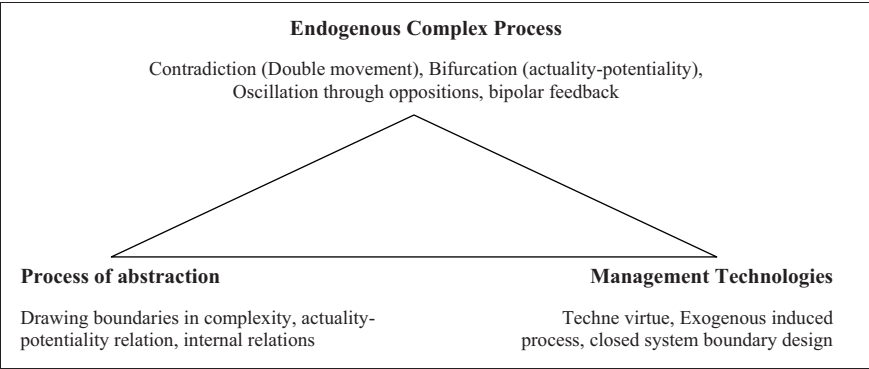
<sup>3</sup> Bifurcation is defined as “the point at which the division into two forks takes place” (Oxford English Dictionary). Bifurcation in this complexity analysis is used to signify that creativity and differentiation are taking place in the process; that is, “*oppositions generate differentiation...The creative process is a cascade of bifurcations into opposites*” (Sabelli 2005:105). This understanding in relating bifurcation and oppositions is adapted from Sabelli’s work on biotic processes (e.g. 2005), also referring to the process equation as earlier introduced in this chapter.

<sup>4</sup> Oscillation is defined as “To alternate *between* two states, opinions, principles, purposes, etc.; to vary or fluctuate alternately *between* two limits” (Oxford English Dictionary). ‘Oscillation’ in this complexity analysis is closely connected with the double-movement of contradictions (Ollman 1993, 2003) and bipolar feedback (Sabelli 2005) denoting that oscillations is the dynamics between oppositions that exist in a constant tension so it never is situated in one part of the opposition but in constant movement *between*. In contrast, oscillation is by Van de Ven & Poole defined as “to oscillate in a periodic sequence between opposites” (1995:535); i.e. periodic sequences being time-space where the system has chosen (as minimum temporarily) one of the oppositions. Van de Ven & Poole’s definition can moreover be analysed according to how they comprehend feedback, which they understand as unipolar (cf. Van de Ven & Poole 1995; 535-536) being either positive *or* negative.

(i.e. self-organising). For example, supply and demand increase and decrease each other in bipolar feedback, as a dialectic contradiction mutually supporting and undermining process. To understand the dynamics of procurement management is then to understand bifurcation processes oscillation of oppositions, and contradictions as an actuality-potentiality relation. To absorb this complexity by a relational ontology, process of abstraction offer itself as a possibility to absorb complexity as a complementary method to the mathematical heritage from the “hard” sciences of explaining complexity with an analytic mathematical model starting point. Also as Cilliers claimed, we do not need to start with the hard rules. Rather, the analysis should begin with the soft and let principles emerge, if they prove useful. An endogenous complex process and contradiction are closely related in this analysis, where contradiction and oppositions are the dynamics of the process. It is in this context that complexity concepts are used, which as mentioned refers to bifurcations (actuality-potentiality relation), self-organised criticality (autopoietic, no external observer control), and fitness landscapes (when management technologies competes and collaborates at the same time). These concepts all articulate how oppositions relate and therefore they work as concepts enabled by the process of abstraction. Following the ‘meanings’ approach the application of complexity concepts is to abstract boundaries of processes.

The framing of a complexity science analysis requires a further re-orientation of process of abstraction. In previous section, it was addressed how process of extension was used to analyse the dynamics (double-movement) of contradiction. For this complexity analysis then, bifurcation, self-organised criticality, and fitness landscapes are added to process of extension. The vantage point, the place from which to view the elements of any particular process must come from the thesis’ research framing. That is, the decisive vantage point is procurement management as a perspectival element. Concerning level of generality and the overlapping context concerns level 2, 3, and 4 in figure 16. Level 2 is referred to as the qualities that make up an individual procurement professional. Level 3 refers to what make the procurement professional a “typical worker” in organising in relation to other entities such as internal customers and suppliers. Level 4 can be abstracted as trade relations and demand-supply relations (and in a wider perspective consumption-production relation) focusing on qualities that people, their activities and products have in common. It should be stressed again that the levels are not literally separate levels of analysis but part of the same relation of process of abstraction. Furthermore, the three forms of abstraction - extension, level of generality, and vantage point - is made together and three aspects of same assessment (Ollman 2003:101). As a result of this

chapter’s arguments a triad of complexity is now introduced constituting a frame of reference that encapsulates a complexity science analysis to understand the dynamics of procurement management:



**Figure 17: “A triad of complexity for the dynamics of procurement management” (Author)**

Finally, in chapter 3 different approaches to change and innovation was outlined. One approach emphasised individual characteristics that often provided under-socialised explanations highlighting a leader or entrepreneur as driver. Another approach was a structural explanation that often provided over-socialised explanations where a culture is strong enough to overrule differences by individuals. It is the contemplation that complexity science, as advocated in this chapter, has provided a perspective that avoids these, accessible but reductionist, approaches to understand the dynamics of procurement management. Next chapter address the methodological considerations in carrying out figure 17 in the empirical enquiry.

## 5 Methodology & Methods for Data Collection

The purpose of this chapter is to further operationalize a complexity science approach in terms of the methodological guidance per se and the identification of methods that are appropriate to conduct the concrete empirical analysis with. In the complexity science domain, the discussion about methods and methodologies is rather fragmented and it will probably continue to be so because of the major strand of agent-based modelling as the favoured approach and the opposite opportunity of narrative constructivist (i.e. models vs. metaphors). Qualitative case-studies of procurement entities have been selected as primary means of organising the empirical inquiry. As demonstrated in chapter 2, the procurement management domain literature does not widely appreciate the qualities of qualitative case-studies and, therefore, the case-study form can provide different explanations than those previously derived in the domain literature. For example, Ellram et al (2002) call for more case-study research in order to study the complex interaction in procurement. The chapter is structured in three sections: first, the methodological discussion from complexity science is elaborated; second, the case study as inquiry form is addressed, and finally, the methods applied to collect the data are presented.

### 5.1 Methodological Guidelines Outlined From Complexity Science

According to Maguire et al (2006), there is a general dominance of non-empirical studies in the complexity domain. This is, for example identified in the popular application of Kaufmann's work, where only a few scholars have corroborated fitness landscapes model findings against real world data. Maguire et al suggest combining modelling techniques with narrative description; for example, that agent-based modelling would bring experimental corroboration and elaboration to findings based on narrative studies. Qualitative researchers should also design studies to enlighten or challenge model-centred findings. Furthermore, according to such authors as King and Cilliers, there is a close connection in complexity science between theory as 'the know why' and methodology as 'the know-how of know why'. Methodology is furthermore closely ingrained in the epistemology and as King argues, complexity science "*in general replace scientific prediction with tentative and uncertain "probabilistic scenarios," a menu of possible systems outcomes (a methodological-epistemological pluralism) rather than a one-dimensional, reductionist solution which denies the essential uncertainty and contingency which emanate from all the non-linear dynamics of the world of complexity as we know it*" (King 2001:157). A pluralistic approach to the data approach is warranted; however, pluralism does not refer to the possibility of randomly picking and choosing between methods and methodologies, although there are no an absolute 'a priori' given method:

...we may have to acknowledge that the kinds of narrative description and analysis in ethnographic research is not necessarily a poor methodological cousin to quantitative research methods...simulation-based modelling and qualitative (topographical) probing are the most effective means to “test” and comprehend complex systems. Yet, such probing is tentative in its conclusions, for it can never effectively model a complex system in its entirety due to methodological need for structural “incompressibility” and the ultimately overwhelming problematic of precision measurement...(King 2001:137, 147).

What is dismissed, however, is the reliance on methodological individualism, which is severely challenged primarily because it bases its validated grounding on personal unity and stability. If there is no pre-programmed blueprint of a person’s mind, then, for example, an interview cannot be a pre-programmed effort to reveal the “real” world view of the interviewed. Methodological individualism, however, is not replaced with another comfortable methodological outline. The starting point of complexity science is marked by such notions as non-linearity and emergent properties, thus, the methodological assumptions must rely on a more dis-comfortable grounding. Therefore, because of the many non-linear interactions and emergent properties, we omit something that we do not know the effect of. Hence, an important consequence from this thesis’ complexity science approach is that understanding of things becomes dependent on how the phenomenon is abstracted.

The focus of a complexity approach in this thesis is a focus on relations as process, the dynamics of oppositions, the boundaries of our models (management technologies) through the process of abstraction. The data collection of the case-studies consists of interviews, observation, and documents as a resource to explore relations. The different data, thus, is not applied to uncover a non-negotiable reality, enabling an aggregated stability of theory-building, but to re-negotiate and investigate relations to absorb complexity and its effects.

## ***5.2 Case study as Empirical Inquiry Form***

Understanding complex issues requires in-depth case study research (Flyvbjerg 2006). Social science in general have traditionally regarded case-studies as a less sophisticated scientific method than those of quantitative studies (Ibid) and this is also the case with complexity science and procurement research domain. The statement that quantitative studies if favoured over qualitative case-studies, however, do not denote that case-studies are not as scientific as other empirical inquiries; merely that it is not accepted as such. Hence, Flyvbjerg claims that case-studies benefit from in-depth knowledge, whereas large sample research benefit from its breadth. Thus, case-studies are suitable to falsify hypotheses but also to identify what Popper has called “black swans”. Overall, it is argued that case-studies fit the approach of complexity science with its emphasis on context-dependency, anti-

predictive theorising and ability to study relations. However, working with case study as inquiry form must necessarily begin with the acknowledgement that the word ‘case’ is a very loosely approached study form. That is, at its most general level, although a case may be regarded as a qualitative study or even equated to it, virtually every social scientific study is a case-study or can be conceived as one (Ragin 1992).

### 5.2.1 Type of “Case”

Since a “case” can encompass many things, it becomes necessary to specify what kind of case we are talking about. In the following, several frameworks are addressed in order to assist these selections. Stake (1995) distinguishes between three different forms of case-studies; (1) *Intrinsic case study* – we are interested in a case, not because we learn about other cases by studying it or about some general problem, but because we need to learn about that particular case. In other words, the case is interesting in itself. (2) *Instrumental case study* – by selecting one case, we aim to learn about other cases; this means that the researcher must refer to criteria, i.e. tasks chosen because they are important in themselves. In other words, issues are dominant; it begins with issues and ends in issues. (3) *Collective case study* – here we choose several cases in order to learn about other cases. Each case is instrumental and important in order to learn about the effects of X and there is an important coordination between the individual studies (1995:3). Stake’s typology enables a distinction between whether we are interested in something concerning a particular case, or in issues which the cases can reveal something about. The cases presented in this thesis, are all instrumental case studies, where criteria are important to study procurement organising and how procurement practices develop and emerge. There is an important coordination between the cases, as they all refer back to the research question and how complexity science informs analysis; and, to some extent, they therefore hold a collective form. However, although the cases are independent of each other in terms of having their own “story”, a certain level of discussion and comparison can take place across cases.

A framework by Ragin (1992) addresses the relation between specificity and generality, empirical units and theoretical constructs. In the following figure it is illustrated how it is possible to link different approaches to a case:



Understanding of cases	Case conceptions	
	Specific	General
As empirical units	1. Cases are found	2. Cases are objects
As theoretical constructs	3. Cases are made	4. Cases are conventions

Figure 18: “Conceptual map for answers to “what is a case?” (Ragin 1992:9)

Each cell has its own implications; however, a case study can be positioned in several cells. For example, Ragin points to the possibility for a researcher to use conventional units, accepting them as valid (cell 2) and trying to generate new theoretical categories (cell 3) (1992:11). In order to characterise the possible case-studies performed here, we start with cell 2, where cases are empirically real and bounded. As a result we do not have any necessitate verifying a complex system’s existence. We can thus claim that a complexity science approach regards cases in a dialectic relation between cell 2 and cell 3; a process of abstraction as operating in the mind and at the same time in the world. That is, cases as empirically real, but because we cannot compress the case and its dynamics in its totality, we need to construct boundaries in the case, i.e. cell 3. A combination between cell 2 and 3 is a dialectic engagement in a real world case and the choices and abstractions of boundaries during the process. The latter refers to an initiation of a constructivist process where themes, people, and areas are selected.

Vaughan (1992) is an example of an author who advocates for cell 2 and sees a diversity of empirical units – e.g. an organisation – for studying specific processes in vastly different types of settings. Vaughan argues that the theorising on actors and structures remains deviated and that explanations are given at either level, and never in the critical links between them. Consequently, the often dichotomised and fragmented relation between the micro-level and macro-level is, only a challenge in terms of data availability. Vaughan maintains a clear distinction between the macro and the micro level of analysis that is not possible to maintain from a complexity science perspective because the levels are intertwined. It is in particular here that process of abstraction has its strength because we can distinguish between the different qualities of the different levels that are brought to focus. That is, when we are addressing qualities about a profession, the level of organising or the supply-demand relation, we touch upon different levels of generalities and through bifurcation points address the relation between actuality and potentiality.

### 5.2.2 What Can We Say From Doing Case-Research and How Can We Say It?

Becker (1992) addresses how we are able to extract findings from case-studies as well as what knowledge we can draw from a case (the level of generalisation) and how to arrange it (p. 205). Becker (1992) distinguishes between four different types of cases in terms of what they allow us to conclude: causes, conjunctures, stories, and imagery. “Causes” approach the problem by saying that something causes something else; billiard ball A hits billiard ball B, billiard B moves and did A’s hit cause it to move (Becker 1992:205). Cause is co-variation, if the dependent variable A changes in some regular way when the measure of the independent variables changes and cause has been demonstrated. “Conjunctures” recognise that causal variables are not really independent; rather, it says that causes are effective when they operate in concert. Variable  $X_1$  has an effect, but only if variables  $X_2$  and  $X_3$  and  $X_4$  are also present, if the latter are absent, so is the effect of  $X_1$ . “Stories”, a process or narratives analysis, has a story to tell by explaining something that comes about through a series of steps. The analysis is devoted to how the result has come about. Hence, instead of measuring association between independent and dependent variables, the focus is why something inevitably got to be the way it is. Finally we have “imagery”, which is based on a construction of the different pieces of information, which we have about a case. On the basis of the data we have collected, we try to construct an attractive complete story of the phenomenon (Becker 1992:211). As Becker says:

“What do we think we are looking at? What is its character? Most importantly, given what we think it is, is the way we study it and report our findings congruent with that character...the basic operation in studying society is the phenomenon and refinement of an image of the thing we are studying. We learn a little something (maybe a lot, who knows?) about something we are interested in...Developing imagery is a process in which we try to understand what we want to understand better. We do not search for causes so much as look for stories that explain what it is and how it got that way...” (Becker 1992:210-215).

Becker argues that narrative analysis produces something which causal analysts are suspicious of, as they are of the opinion that any probabilistic causal analysis that produced a perfect correlation would be dismissed as necessarily containing sizeable errors; that is, narrative analysts expect imperfect correlations. On the other hand, narrative analysts are not happy unless they have a completely deterministic result, and every negative case becomes an opportunity to refine the result. From this follows that part of the process of constructing a narrative is a continuous redefinition of what the theory is explaining (Becker 1992). From the complexity science and the presentation of non-linearity, distributed representation, relational ontology etc. it should be no surprise that ‘imaginary’ cases, as Becker introduces, is the approach advocated here. This discussion does not imply that we cannot apply a narrative (or process) study; however, it is un-warranted to portray “stories” as formal

representation and end up in the dichotomy and unhelpful discussion between the causal and the narrative analysts; i.e. a distinction between either absolute or incomplete correlations. The data material is, as Hernes (2008) argues, not independent on the gathering of data. Also, it is problematic to tell stories by a problem. That is, as Stake (1995) points to, much of our gathering of data from other people will take form of stories, and much of what we can convey to a given audience will preserve that form:

“The elements of a story are these: it becomes apparent that characters in a certain setting have a problem. Initial efforts to solve the problem fail and the problem takes a turn for the worse. Then by extraordinary and climatic effort, the problem is resolved... Cases are generally not known by their problems. They have an existence that includes problems and problem solving, but the essence of the usual case is not its problem. The researcher takes a close look at the problems, sometimes called issues, because issues are good windows for examining the conditions, the complexity, and the coping behaviour of the case...There seldom is a climax to report.”(Stake 1995:127)

Case study reporting is not simply storytelling, although this aspect can be part of a case-study in terms of what Stake calls vignettes; that is, by the use of small stories that illustrate aspects of the case: *“vignettes are often tinged and unrepresentative, logically troublesome”* (Stake 1995:130). To replace storytelling, Stake draws attention to another categorisation; a) a chronological or biographical development of the case; b) a researcher’s view of coming to know the case; c) individual descriptions of several major components of the case (Stake 1995). Stake suggests contemplating certain alternatives, whereas the process of abstraction here first of all relates to ‘a researcher’s view of coming to know the ‘case’, although the other approaches can be identified (elaborated when presenting the specific cases). From all of this follows that although a case can be narrated as a story, it is not merely story-telling, not formal representation, it is rather primarily a result (i.e. reporting) of the process of coming to know the case by studying relations.

### **5.2.3 Selection of Cases**

Flyvbjerg (2001) overall distinguishes between two selection types: random selection and information oriented selection. The purpose of the random type is primarily to avoid systematic biases in the sample as well as achieving a higher probability that the sample is representative and generalised. An information-oriented sample, on the other hand, is primarily based on expectations about its information content. There are four types of samples: extreme/deviant cases, maximum variation cases, critical cases, and paradigmatic cases. These types may evolve through the study, for example, what first may appear as a deviant case, may end up as a paradigmatic case etc. The selections in this thesis are based on an information-oriented selection, where cases are selected by maximum

variation. That is, the aim is to obtain information about the various circumstances for case process and outcome (Flyvbjerg 2001:79). The selection of a maximum variation case selection as a starting point is conducted to enlighten the research question from various conditions, affecting that a discussion is based on similarities and differences at the same time. Generalising, in the sense that the cases can be directly compared, is not pursued and neither warranted from this thesis outline of a complexity science approach. In the systems approach, cases are partly unique (Arbnor & Bjerke 1997); one vantage point in a system cannot represent other vantage points in the system. All information-oriented cases are subject to change and when we engage and learn from the cases, studying different procurement contexts and settings, it can enrich the understanding of the dynamics of procurement management. The variation in this thesis is constructed by size, ownership/industry, and whether it is a private or public organisation:

	<b>Large</b>	<b>Small-medium sized</b>
<b>Public</b>	Case III	
<b>Private</b>	Case II	Case I

**Table 7: “Cases selection by variance” (Author)**

Case I was selected because it represented an innovation project between five companies, universities, and municipal consultancy. Innoair participated in the innovation project with the ambition to support supply chain activities, including new product development and with the focus of a particular dominating supply chain. Procurement management in this case developed a supplier management model and the relations in this supply chain demonstrate how it travelled in an endogenous process. Case II was enrolled because the procurement organisation had invested significantly in developing procurement practices in recent years. The group has invested in off shoring of procurement activities, procurement competence development, e-enabled procurement, and in general worked with professionalising an approach to run sourcing processes for its internal customers. As the company is a large conglomerate cooperation, it was also an interesting case from an organising perspective, and combined with the high ambition of renewing its procurement practices, it was a suitable case as inquiry to the thesis research question. Case III was selected because it was possible to follow the process of the procurement’s group developing of a strategy, which made them more supply chain oriented, including going from reactive to proactive, from clerical and administrative to address strategic issues. The strategy concerns three focus areas; capacity building, sourcing process of vehicles, and sustainable procurement.

### 5.3 Methods of Inquiry

The methods of inquiry are primarily done through three methods; interviewing, observation, and reading material such as business plans, presentations etc. Because of agreements with the companies not to reveal “sensitive” data, certain concepts have been rephrased in parts of the cases; however, it has been a continuous effort not to let it impact the meanings of the case. Furthermore, as many interviews as possible were recorded and saved digitally, in order to get viable data as well as having access to the interviews when needed. Many of the interviews have been transcribed. This has been followed by a coding process of identifying and extracting passages when the selected oppositions are articulated. Hence, coding has operated here as a pragmatic tool. In the following table, an overview of the data collection is provided:

	Case I	Case II	Case III
Pre-meetings	0	4	1
Interviews	8	13	9
Observation	Evaluation meetings (participant observation)	Workshops and office visits (observer as participant)	Evaluation meetings (participant observation)
Access to documents	Business plans, presentations, Supply Chain Operation Reference (SCOR) analysis	Business plans, presentations,	Business plans, presentations,
Second Sources	News- and magazine paper search	News- and magazine paper search	News- and magazine paper search, EBSCO, CBS library

**Table 8: “Overview of data collection” (Author)**

The data collection in Case I was gathered through a year, where six interviews were conducted at the company with representatives from the purchasing-, product development-, quality-, and logistics departments. Two interviews were conducted at a supplier, one with the key account manager at Innoair and one with the head of product development. Finally, two evaluation meetings at Innoair took place during the project period, as part of the innovation consortia project. As there have been many participants involved in this project, the case reporting is not a “confessional” researcher approach, as in the other two cases, but more a chronological development of the case and description of chosen bifurcations points. The data collection in Case II is achieved through interviews and observation during a period of one and a half year. Most of the interviews have been audio-recorded; however, in some cases it was not possible to do so, due to different circumstances. Observations took place in training workshop events, each lasting app. 10 days at two different locations; one in Asia and one in Europe. Also, there have been observations at the procurement organisation’s office at several periods of time. These observations are characterised as ‘participant as observer’ (see explanation in subsequent section) allowing observations of relations from different parts of the

organisation of GlobalFirm with either a procurement professionals or 'part-time buyers'. In terms of interviews, it was possible to audio-record some of the presentations given at the workshops, where certain passages have been transcribed. Interviews were conducted with people responsible for the investments as well as with employees of their category management group, which was to adopt and apply the investments. The data collection gathered in Case III was conducted during approximately ten months and the data has primarily been conducted through interviews with management, responsible for developing the supply chain strategy at given intervals throughout this process, as well as through interviews with members working with the contemporary operations in the procurement organisation. A secondary data material was conducted at the CBS library and EBSCO in terms of research to inform a particular subject in the supply chain strategy (elaborated in the case in chapter 8).

### **5.3.1 Interviews & Observations**

Derived from the methodological implications, the interviews carried out have not sought to search for real inner meanings or objective interpretations. Rather, the interviews have involved active participation with emphasis on the dialogue and dynamic questioning, searching for the contradictions of social reality. Hence, the interview production is inspired by Kreiner & Mouritsen's (2005) guide for 'analytical interview' which means that the classical role of interviewing is radically changing towards being a collaborative effort. It still means that there is an interview guide and, therefore, themes and objectives are the point of departure for the interviews; but the actual value lies in the dynamic questioning that takes place during the interview (Ibid). Kreiner & Mouritsen argue that it is the dynamic questioning that motivates the interviewee to engage fully in the interview. Consequently, both the interviewee and the interviewer has contributed to the knowledge creation; a so-called dynamic learning process. Thus, the truth is constituted by dialogue, that is, valid knowledge claims emerge as interpretations, and action possibilities are discussed and negotiated among the members (Kvale & Brinkmann 2008:247).

The preparations for the interviews in this thesis have been considerable when using the "the analytical interview" method, because it requires advanced knowledge about the topic of the interview, while still maintaining that it is the interviewed who is the expert of the field concerned. Thus, part of the preparation of an interview is not only making an interview guide but also studying back-ground research for the context of the interview. Although an analytic interviewing process is flexible, it does not replace the need for a consistent approach in terms of structuring the interview process by transcription, reporting, and analysing. Moreover, the analytical interview requires

considerable theoretical insight and the interview begins with the premise “*that both researcher and respondent are knowledgeable about the situation they are discussing*” (Kreiner & Mouritsen 2005:174). From this follows that ‘analytical interviewing’ is an ambition as well as a strategy for interviewing. Therefore, the analytical interviewing technique has evolved throughout the study process as the theoretical insights have become more robust and the empirical settings more well-known. As such, where the analytical interviewing has had reduced conditions, the interviews can be regarded from an explorative open-ended interview-guide perspective. Finally, we may say about validity and reliability that the analytical interview is more vulnerable to the risks of nonparticipation and incapability than to the risks of poor validity and reliability (p. 161). That is:

“Validity and reliability are at risk, whoever is manipulating each other...The methodological costs of involving an interviewer and interviewee in the knowledge production are not of type related to validity and reliability. They are opportunity costs – the knowledge domain that was not mobilized; the line of thought not pursued; the connections discovered only in retrospect; the ideas discarded too quickly; and the failure to recognize the implications of phenomena” (Kreiner & Mouritsen 2005:160-161)”

Hence, it is only if we are concerned with validity where the interview guide is a tool to portray the studied phenomena by a formal and “correct” representation, where the researcher’s role is not disturb the message about reality from emerging (Kreiner & Mouritsen 2005). Such understanding of validity is not possible from a complexity science perspective because of its rejection of methodological individualism.

Observation can assume various forms, depending on whether the researcher takes a participatory or an observing role. First of all, the face-to-face interviews can all be regarded as direct observation, whereas the readings of texts such as business plans etc. take the form of indirect observation (Arbnor & Bjerke 1997). The interviews in this study have ranged between 45 to 200 minutes. The interviews were, to some extent, semi-structured in the condition that a range of pre-selected themes, in the form of an interview guide, were to be investigated during the interviews. Furthermore, it is possible to position observation types, other than interviewing and reading; as Gold (1958) would call “participant – as – observer”. The field is informed and aware of the observer and the observer has to keep a distance and retaining “the stranger” form in order to avoid “going native” to the field of study (Gold 1958:220-221). In thesis, observations have enabled data collection about the studied phenomena in a broad context. Moreover, observations have been important in order to give information about relations. From the participant observation, a log-book was applied that included notes from observations, small talk, and own thoughts and reflections. Generally, the observations

were also able to corroborate interviews, which is congruent with the systems approach where validity is pursued by studying the system from many angles (Arbnor & Bjerke 1997). The approach “participant – as – observer” was primarily a method in case II in terms of workshops and office visits. In case I and III there were also participation in evaluation/discussion meetings, which have the more direct interaction referred to as observing by participation.

### **5.3.2 Structuring the Empirical Inquiry**

The construction of the cases have been done with point of departure in the initial framing of procurement organising and how new procurement practices emerge and develop. The case construction emphasises the change process of the procurement organisation; i.e. the relationships between procurement professionals, internal/external customers and suppliers. Overall, this is structured by the two themes of how procurement is organised and how procurement practices are developed through management technologies (and exogenous processes). Therefore, the starting point for the interviews has been to enhance knowledge about procurement organising and how new procurement practices are developed. Specific interview guides were structured around the two sub-research questions and the five relations of opposition from the procurement domain literature: disintegration – integration, cost – value, operational – strategic, decentralisation – centralisation, and reactive – proactive. In terms of narrating the cases, this will be carried out by the related oppositions identified in the procurement domain literature, keeping in mind that they are part of the complexity oppositions.

An important part of the cases is to apply the framing of a complexity science approach as outlined in chapter 4 and analyse these oppositions in the cases, as complex contradictions and bipolar feedback; that is, when oppositions oscillates in the process. Each case has an introduction, where a framing of themes is provided including how the case presents itself by appearances, whereas the case is a process of abstraction, understanding the complexity of the case and the dynamics of procurement management. Following the systems approach, cases are performed as descriptive studies (Arbnor & Bjerke 1997) constructing and abstracting relations. The chapters involving case studies are structured by first presenting a case context (i.e. is about management technologies/exogenous processes, the procurement organisation relation to the company etc.). Afterwards, the change process of the case is analysed in terms of the relations put to focus conditioned by the ‘imaginary’ case style and case vignettes. The analysis is guided by the insights from complexity science that has an endogenous process perspective. After the cases have been presented, investigated and analysed, discussion and implications of the findings take place.



## 6 Case I: INNOAIR – The Complexity of Supply Relationship

This case is based on a part of an innovation consortia project, which was constituted by a network of five companies, a consultancy agency and several universities/business schools. The main idea of the project was to integrate and synergise the relation between activity-based-costing, supply-chain-operation-reference (SCOR) model and relationship management and to yield a competitive advantage to the companies participating in their supply network. The focus of this case is a supply relationship and how procurement unfolds in this relation between Innoair (pseudonym) and the relation to one of its suppliers Exceltrix (pseudonym). The context of the case is, in particular, that Innoair some years ago was upgraded in a large customer's supplier base representing a significant challenge for Innoair and Exceltrix. The case is illustrated by its initial appearance in the following figure:

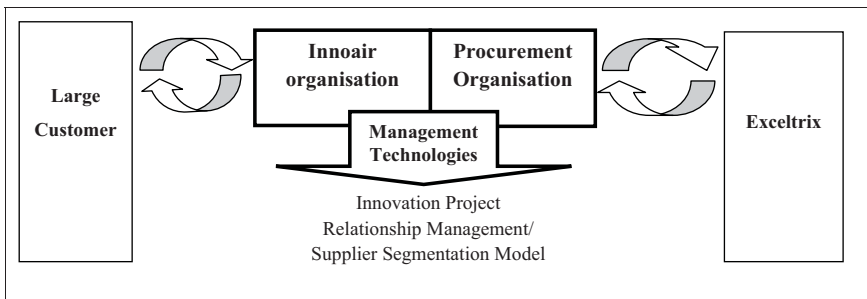


Figure 19: “Case constructs - Case I” (Author)

The case is organised first by presenting the case context in terms of the supply chain in focus, the innovation project, and how procurement is organised. This is followed by the change process in the supply relationship between Innoair and Exceltrix demonstrating bifurcation points and oscillating dynamics through the oppositions of integration and disintegration. Afterwards the concern is follows how procurement management in Innoair is entangled in the supply relationship with Exceltrix. The case ends with a discussion and implications.

### 6.1 Case Context – The Supply Chain, the Innovation Project, and Procurement Organising

Innoair is a medium-sized company and one of the world-leaders in a niche segment that develops and produces components and electronics to different industries. The focus of this case is a supply

chain that has dominated the company's growth for several years. Thus the projected boundary of the case is a large customer and an important supplier Exceltrix; the latter is majority-owned by the same holding company as Innoair. Innoair had undergone many changes in terms of how it was organised in the last decade due to a substantial growth in the company's turnover that has many-doubled. The projected "supply chain" operated in a highly dynamic industry, the market was volatile, the product time-to-market sensitive, and delayed deliveries were critical to the company's profit. The introduction of new products and components had moreover an exceedingly high rate in the industries Innoair operated in.

Innoair's participation in the innovation project aimed to support what it termed supply chain activities, which included activities as new product development (NPD) tasks in association with external subcontractors and vendor managed inventory. Innoair had no identified process-technological competitive advantage, why the use of subcontractors was necessary and it was this management competence that Innoair was trying to enhance in the innovation project. Innoair strived to have a coordination role in their supply chains that at the same time denoted an attempt not to have supplier that also possessed a coordinator role. Furthermore, the particular focus here on the relationship with Exceltrix became a central focus during the innovation project as the relation suffered from poor performance, which was especially visible in operational and commercial concerns. The specific ambition from top management was that the two companies Innoair and Exceltrix participation in the project was that both companies should experience a decrease in total-cost and a reduction in time-to-market. In addition, it was the objective that the methods developed in the project had a global perspective in terms of application as well as it was expected that significant performance improvements could be achieved for both companies.

Taken as a whole, there were a number of sister companies amalgamated in the Holding organisation where both Innoair and Exceltrix were represented. The Holding organisation had no management support functions; however, there was a mandate for each of the companies to be represented in a work group in search for synergies between these affiliated companies. Procurement management were equally represented from Innoair and Exceltrix in this group coordinating efforts. The categories in focus so far in this search for synergy in indirect spending were leasing of cars, travelling, and office supply. The ambition was to establish centralised procurement agreements across the holding owned companies. In Innoair, moreover, there were a board of directors with head of the company; the finance director and the production director and then a management group consisting of various

entities in Innoair represent by the sales, business development, NPD management, supply chain management (here it was the head of procurement that was represented), the production management, and quality management.

In terms of the procurement group in Innoair the procurement manager of Innoair had a coordinating role in manufacturing sites in Innoair located in several European countries, US and China. Innoair procurement organisation's focused primarily on supporting production activities in direct categories at production sites. Also, the procurement organisation reported to the head of production in the company. Indirect spend was more intermittently a work task and procurement primarily here reacted as support in the contract phase; which was bought and controlled by different "part-time" buyers in the company. This prioritisation on direct spend was based on the estimation that the production related spend facilitated the highest economic impact. At each of the production sites there was also a procurement employee responsible for a smaller spend. Furthermore, there was a sourcing office in China with two people referring to the procurement manager. The China office has primarily had the task to benchmark and do market research in terms of incorporating Chinese components directly into the design phase of NPD.

Hence, the procurement organisation was engaged in many types of activities, which is difficult to explain by a design of either being decentralised, centralised, or hybrid. That is, it becomes difficult to discern what is decentralising and centralising activities, operating at the holding level and at the company level, as well as under production, in direct and indirect categories etc. From the holding company procurement was decentralised; divisions were buying on their own behalf. From the vantage point of Innoair's procurement organisation there are many different principles carrying out buying activities. For example, in indirect spending the procurement organisation was almost, as mentioned, not involved and thus would be characterised as decentralised. However, at the same time there were coordination efforts initiated on indirect spending between the holding companies. From the initial relations of procurement the attention is now on the complexity of the supply relationship between Innoair and Exceltrix abstracting generality primarily between level three and four. That is, the supply-demand, (and the production-consumption) relation and the organising relation, and their overlapping contexts.

## ***6.2 The Change Process of Innoair and Exceltrix***

In the relationship between Innoair and Exceltrix there are some initial conditions that are important to address in order to understand the change process. Exceltrix was founded in 1983 as a part owned

company of Innoair and a close relationship between activities. In the beginning, Exceltrix could be regarded as more or less as Innoair's internal electronics department but since the ownership design has changed considerably. Furthermore, Exceltrix was as a company involving production- and NPD activities; however, Exceltrix was mainly built upon the competences in NPD. As a result, Exceltrix had less focus on improving production and efficiency competences. Innoair, on the other hand, was dependent on Exceltrix's production as well as the NPD activities, as they were obligated to buy both the production and the development supplies. Finally, Exceltrix as supplier were critical to Innoair's products, especially in the projected supply chain in focus and participates early in Innoair's NPD processes and when the product is sent to production. An overview of the identified bifurcation process of Innoair and Exceltrix is now re-fabricated in a period of nine years from 1998 to 2007 where the innovation project ended.

The first of the bifurcation process identified was in 1998, where a Holding company was founded in order to divide Innoair by two business areas. A related consequence was that Exceltrix and Innoair became self-governing companies and equal partners in the new ownership structure. Thus, a customer-supplier relationship was initiated although they still were bound together by ownership and a guiding principle that the two companies had to work together. Exceltrix kept the intellectual property rights (IPR) of the items supplied to Innoair, so although Innoair accounted for 90-95% of Exceltrix's turnover there was mutual dependency. However, as the case is going to show the dependence was particularly visible in the commercial performance. Although the guiding principle was that the two companies should work together and operate as a competitive buyer-supplier relationship, the decision influenced an oscillating behaviour between integration and disintegration. Integration is understood as becoming closer and more cooperative, more association and combining effort etc. To disintegrate, on the other hand, designate more remoteness and disconnection, separating effort etc.

As Exceltrix became an external partner, Innoair's procurement organisation now gained the responsibility to handle some of the external day-to-day coordination at the operational level. The procurement department at Innoair, among other things, began to question the prices from Exceltrix and made an internal inquiry whether they could make a benchmark and find alternative prices. However it turned out that this could not realised because of the IPR situation, the ownership structure, and the close relations between top management in the two companies. The condition with the IPR belonging to Exceltrix was not necessarily giving much attention at the time. Exceltrix was

more or less regarded as Innoair's own electronic department and the considerations were not based on separate companies. Initially the procurement manager in Innoair abstracts about the relation to Exceltrix:

*"I was hired in 1997 to update our procurement department from an extended disposal function to be a more professional department also...when I first bumped into Exceltrix I was told not to worry about them because that was organised. But it became something to relate to because it is considerable money we spend. It is not the biggest supplier but it has always been a top three...my task has pretty much been to get the lowest prices as possible...I had a feeling that the price level wasn't right [with Exceltrix] and whether I also could get it documented that it was not right...we could not even get what the prices were...that was just about impossible...There I am the type that keeps on going until I have reached the goal...we don't talk five minutes here we talk years...the prices have been untouchable..."* (Interview with procurement manager)

So, although the procurement organisation in Innoair has pursued more competitive prices and other concerns such as higher delivery security, this has not been achieved. The degrees of freedom of procurement management in Innoair had been constrained by the political abstractions of top-management in both companies. At Exceltrix, a key account manager was later hired in order to handle the commercial relationship with Innoair but he also had to follow his company's policy:

*"...it was [my superior] who paid my salary and I had to listen to him also. So some of the direction, which had been before my employment, I had to continue and this was not something that was particular conducive to radical alter the relation into a real customer-supplier relation. And this has been my struggle, which I have had many internal and external row for...but this is probably a salesman's burden..."* (Interview with key account manager – Exceltrix)

Accordingly, even if the key account manager could see that a more coordinated and collaborative working principles may have been more beneficial, the buyer-supplier relationship was managed under the premise that Innoair was obligated to purchase Exceltrix's manufactured goods. Furthermore, IPR rights and the ownership situation meant that Exceltrix had less incentive to allocate resources in the production part and primarily focused its attention towards NPD tasks. Also, the procurement manager at Innoair described the relationship with Exceltrix as adversarial, despite the many connections across the companies and belonging to the same holding company.

A particular part of the bifurcation took place in 2003, which first of all signified a closer integration of the projected supply chain and the entities constituting it. Innoair were upgraded in a large customer's segmentation model moving from a second-tier supplier status to a first-tier supplier. In particular, integrated cooperation in NPD projects with customers as well as continuous cost-

reduction targets became central of this upgrading. However, also with suppliers more interdependence was created. The contract was accomplished by Innoair's top management and sales department and in the contract considerable yearly cost reductions were agreed for Innoair to comply in return of a higher contract 'spend'. There was no participation in the agreement from the procurement organisation in Innoair although it became highly affected by the decision and the conditions and consequences that followed from it. This part of the bifurcation process with the customer agreement played a central role in the further oscillation of oppositions between integration and disintegration in the supply relationship with Exceltrix.

The upgrade first of all made the procurement organisation a coordinator of some of the large customer's chosen suppliers. Meanwhile, yearly price reductions and delivery security and accuracy were accentuated. The agreement required new competences at the procurement organisation in Innoair and a supply chain management organisation was developed based upon the procurement- and the logistics department indicating more coordination between the supply- and demand side. The agreement became a challenge in the relation with Exceltrix because the demand for efficiency and effectiveness changed. While there was agreed in the contract between the large customer and Innoair a 15-30% yearly price reduction, there was only agreed a 5% cost reductions between Innoair and Exceltrix. The agreement included both development and production cost.

Another part of the bifurcation process took place in 2004, which increased the oscillating behaviour of the relationship between the opposition of integration and disintegration. Exceltrix merged with another company and although it did not change the ownership situation between Innoair and Exceltrix significantly, Innoair went from being almost their only customer to purchasing around 40-45% of Exceltrix's turnover. Because of the change in ownership Exceltrix now had several customers and Innoair competed with other customers being a priority in Exceltrix. The relationship changed significantly, and Exceltrix became more and more unstable in important issues such as delivery precision and quality during the implementation of the merger. Innoair had difficulties understanding Exceltrix's prioritisation and planning. Exceltrix became overall more unable to handle Innoair as customer:

*"They have acted as being an inferior supplier in almost everything they have delivered, not just the project part, everything has been done at the boundary and typically past it in the last half year...our demand has increased a little but [Exceltrix's] capacity has definitely not improved, on the contrary, also followed by their merger where there obviously have been some start-up troubles"* (Interview with testing/product project manager)

Internally there were many challenges for Exceltrix in getting the two companies to work together with the same priorities. This again influenced the relation between Exceltrix and Innoair where the latter was affected at many places in the organisation; in particular it was visible in commercial and operational concerns. However, the relation between NPD related concerns and operational and commercial concerns did not have a clear boundary. For example when it came to flexibility of testing new products before it could be sent to production:

*“These development projects are difficult for Exceltrix to plan and incorporate. They do not have the same experience as they have on established product production...As soon it is a development project, then they have to find extra people, test it manually and so forth. They have the components misplaced and have just the same type of testing problems as everybody else when it comes to a new product”* (Interview with testing/product project manager)

Managing the boundary between the completion of NPD projects and then the coordination to setup the production was the major issue from Exceltrix’s perspective:

*“We have felt that there was a problem when things should go from development to production. There have been too many thing falling in-between chairs and as a result when we made these prototypes and they were approved both by Innoair and the end-customer and they pushed the button and now would like to have 500 items. Then it has taking too long time for us to react and deliver these things”* (Interview with NPD manager in Exceltrix)

At the time before and after the merger a restructuring of the organisational interface between Exceltrix and Innoair emerged that at the same time became an effort to solve the problematic boundary between NPD projects and production. The company Exceltrix merged with had an organisational structure that divided production and development into two organisations and this was adopted in the merged company. This meant that there now were to be two different agreements; one covering production cost and one covering development cost in contrast to previous arrangement where there was one price containing all activities. The restructuring had consequences for the relationship between the research and development departments of the two companies. Exceltrix Development now negotiated directly with the research and development department in Innoair. Instead of paying a yearly amount, they now paid per hour they used Exceltrix Development’s competences in return for Innoair now owning themselves the IPR rights. The arrangement also made it possible for Innoair to switch supplier for new products, which was an opportunity that was realised by a new selected supplier that had based its NPD activities in Denmark whereas production was established in China:

*"With a new supplier we needed to define everything in detail. Exceltrix on the development front has several development-engineers, which makes it easier for them to approach and manage it. They can take an existing product, and modify it. Exceltrix is also better to handle NPD tasks whereas the new supplier we are too dependent on one man we have experienced. We provided the supplier with three projects in one case and this was not possible for him to handle"* (Interview with testing/product project manager)

However, along with incorporation of a new supplier also the relationship in NPD projects changed significantly where the payment that Innoair were paying Exceltrix were at the same cost-price as with buying an "external service". The price was several times higher than the "internal" budgeting price than if Innoair themselves were performing the activity. A new procedure was established that required the participants of the NPD projects in Innoair to complete a specification of the service they required from Exceltrix:

*"We specify what we need and then Exceltrix make a confirmation of the assignment to us, which we have to read and approve with signature and the assignment is in process...there we have had some disturbing situations about the time used and so forth. When to pay and how much to pay and a lot of back and forth discussion between us and their development people? What can you say? None of us have decided that it should be this way"* (Interview with sales/product project manager)

As a consequence of the new NPD arrangement, the contact between the two development departments was now less frequent and more formal. At the same time, the experiences with the new supplier also required more effort in specification, not just about the specific service but also routines and mutual knowledge established were to be established from the beginning with the new supplier. The latest condition of the bifurcation meant that Innoair had to be much more detailed in every aspect with particular new partners but as followed also in the changed situation with Exceltrix. The collaboration throughout the years had been close between the two companies' development departments. This part of the bifurcation process increased the disintegrative behaviour of the relationship. However, although Innoair had significant challenges incorporating other partners this did not designate an ambition returning to the previous condition between Innoair and Exceltrix. In the NPD relations a more professional relation was warranted from Innoair:

*I do not entirely agree with what has been decided overall...I think the leash has been to long [to Exceltrix]...it would be better if we decided that although it is a company in our "family" it has to run exactly the way it is with other customer-supplier relationships we have..."* (Interview with sales/product project manager)

From one viewpoint of the supply relationship, it had disintegrated by choosing another supplier. Innoair paid a consultant fee that was approximately the same as with "external" consultancy



services. At the same Exceltrix developed relationships with new customers (and supply chains) that were competitors to Innoair. From another viewpoint the relation was still integrated. Innoair had many assignments in hold at Exceltrix, which was already pressured by the orders previously received from Innoair. Also, the production of existing product lines continued denoting a close dependency between the two companies.

At the commercial and operational level a consequence of dividing the contract was that the procurement department at Innoair now had to negotiate a yearly trade agreement on general conditions with Exceltrix Production. The role of the procurement department thus changed officially from an operating day-to-day task to also include a more direct responsibility for the commercial relationship; i.e. a trade agreement on what to buy, the costs, and general conditions with Exceltrix Production. The challenge for procurement in Innoair was now to be a more important entity in the commercial relation. The commercial aspect has previously been handled by top management while the day to day disposal activities concerning material-flow were carried out between procurement and logistics in Innoair and production in Exceltrix. The commercial arrangement opened the possibility to do something about the discrepancy between the cost-savings agreed from the sales side of Innoair with the large customer and what was agreed on the supply side with Exceltrix. In contrast, the key account manager from Exceltrix states about the competitive relation after the merger

*“Innoair stands for 40-45 % of our turnover I would assume. So we are there we would like to be around this structure. There is in every other sentence we hear from Innoair... the word benchmark. That we need to accept to be benchmarked. And this is OK, if we cannot accept to be benchmarked then we are not competitive...we can say to Innoair, try and listen 60 % of our turnover goes to other customers than you, so do not think we are not competitive. We have customers like...and they know what these things cost, so of course we are competitive...they [Innoair] forget to benchmark when we come and ask to get additional cost covered...that is not possible...How do you think it would have been with another supplier?”*  
(Interview with Key account manager – Exceltrix)

The merger affected the relationship between Innoair and Exceltrix in several ways. The operational and commercial challenges were circumstanced by daily activity and Innoair's profit was dependent on that it was possible to comply with especially this large customer's orders. This compliance could only be achieved proficiently by Exceltrix's facilitation. The merger, in a bipolar feedback, decreased Innoair's negotiation possibilities because Exceltrix achieved new customers. At the same time the negotiation strength was improved by the organising of separate NPD and commercial agreements. The bifurcation process around the merger and the separation of production and development produced a double movement of dependency. Innoair became less dependent on Exceltrix because of

the change in IPR circumstances. At the same time more dependency and need for coordination was created because the merger denoted a highly unstable performance from Exceltrix.

During 2006 the results of the supply relationship analysis carried out in the innovation project began to show, which exhibited in particular the challenges around the operational performance. The SCOR analysis revealed that Exceltrix had many operational difficulties which caused Innoair to experience long response time on inquiries and missing information when Exceltrix could not comply with requirements. On the other hand, the analysis demonstrated that Exceltrix were affected by an inferior internal coordination in Innoair and many orders were characterised as urgent. Exceltrix had a delivery reliability of 34% against the expected 67%. Over half of the orders Innoair placed did not live up to the agreed conditions. Instances were also identified where Exceltrix had a delivery time of 15 working days while there was still a minimum of 500 items in stock at Exceltrix. The qualitative oriented part of the analysis illustrated that there were many different attitudes and experiences in the different departments in Innoair and that each department had their own problems with Exceltrix. The logistics department pointed out a lack of deliveries and reliability while the procurement department complained about uncompetitive prices. The R&D department pointed out errors in the products, and in the quality department there was a special “guarantee agreement”, which meant that Exceltrix had a 2% error margin before Innoair could object – a very high rate in this industry. On the other hand, Exceltrix found that Innoair did not act with one voice and sent out different and mixed signals; thus there was no overall prioritising of the problems at hand. In addition to this, Exceltrix pointed out that every department at Innoair thought that their problem was the most important one. Exceltrix thus identified a principal need for Innoair to prioritise and define their issues.

Importantly, the lack of internal alignment in Innoair made it difficult for Exceltrix to react to Innoair’s requests. Innoair used considerable time waiting for Exceltrix to reply on request or did not reply at all. Furthermore, agreements made by top management between the two companies were not further communicated to the procurement and logistics department in Innoair. The cost of coordination was also visible in the fact that many orders from Innoair were characterised by no prioritisation and often characterised by “urgency”. Communication was often done by mail to document sequences of events. The analysis also showed that managing this supply-demand relation required flexibility verifying Exceltrix’s argument that placing the production in China to lower the cost could not be a solution:

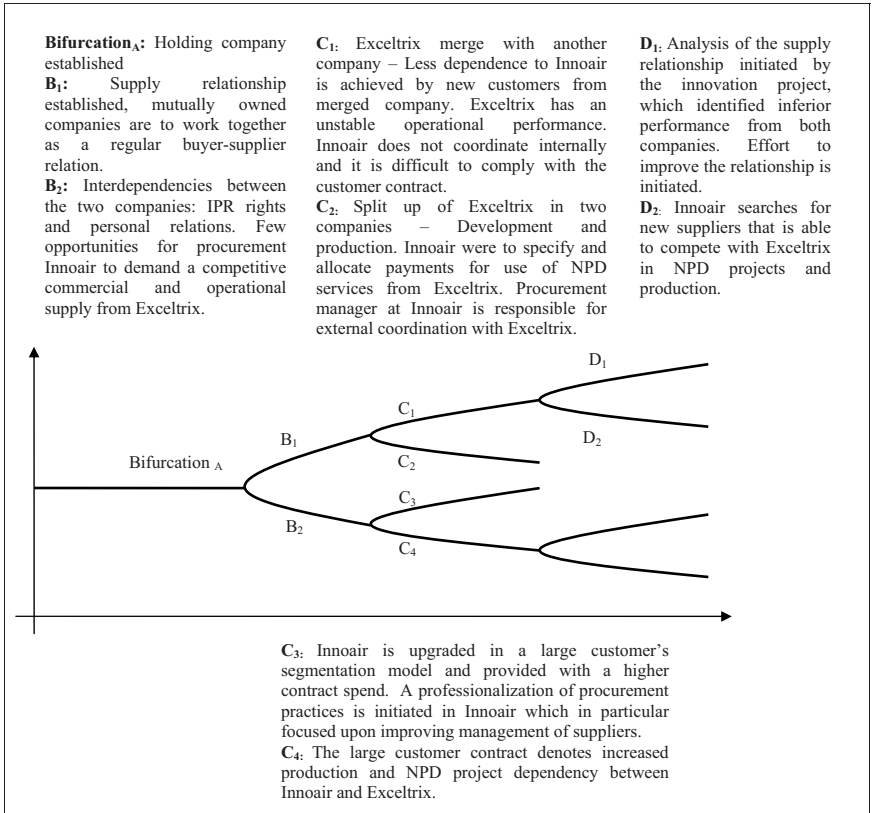
*"These forecasts Innoair show up with they go (up and down). The one week, they needed 1000 a week and then we do everything we possibly can to do the job and buy things from our suppliers and then they suddenly then do not need it anyway. Then they come two days after and then they needed it anyway...There needs to be flexibility in this production because when we have these customers [Innoair's large customer contract] that require one thing this day and another thing tomorrow; that is, where it goes up and down, then it is no good if you produce it in China. That will not work"* (Interview with NPD manager Exceltrix)

At the same time there were promises of continuous cost-reductions to be complied in the large customer contract. This cost versus flexibility is an expression of the contradiction between efficiency and effectiveness, where Innoair is constantly pressured on its coordinator role to reduce cost and comply with the customer contract. At the same time Innoair is also required to manage increasing cost by delivery flexibility; again in order to comply with the same customer contract.

Nevertheless, the innovation project ended up in an effort to improve the relationship. The primary focus became the cost of coordination. Hence, at a evaluation meeting at Innoair the short-term prioritisation was decided to be that the unit price was competitive. On a longer term it was decided that Exceltrix was to be measured on several cost parameters; delivery ability, i.e. delivery security, time, and flexibility, quality security on products (in general total cost). At a later evaluation meeting at Exceltrix the prioritisation was to make Innoair understand that they were no longer the only customer, increased credibility and communication around forecast, and an improved information flow. Overall, Exceltrix requested that Innoair became better at coordinating and prioritising internally. The gap-analysis that was generated was difficult for both companies to relate to. Nevertheless, the outcome of the analysis was more coordination; for example, arrangement of weekly meetings in order to achieve more effective day-to-day coordination and an open discussion of expectations. A follow-up meeting were arranged in relation to the innovation project, where the procurement organisation in Innoair presented a new supplier segmentation model as one of the outcomes of the innovation project. At same meeting the relationship with Exceltrix was touched upon as well, and improvements were not achieved yet concerning the operational and commercial challenges.

Overall, the first part of the bifurcation process identified where the holding company was established and the two companies were to operate as independent companies, were followed by a cascade of

time-irreversible bifurcations as the dynamics of the supply relationship. The bifurcation process of Innoair and Exceltrix is illustrated in the following figure<sup>5</sup>:



**Figure 20: "Overview of the bifurcation process of the relationship between Innoair and Exceltrix" (Author and adaptation from Prigogine 1996:69-70)**

The dynamics of the bifurcation points of this supply relationship between Innoair and Exceltrix is the opposition of integration and disintegration working as a contradiction mutually undermining and supporting each other. That is, a constant bipolar feedback where integration and disintegration at the

<sup>5</sup> The vertical axis of the graph is the variables of the system and the horizontal axis is a parameter that can bring about bifurcations.

same time puts pressure on the process; for example, identified in the changes in ownership, the changes in organising principles, and the upgrade in the customer's segmentation model. The case display that from the exact same condition we can have totally different outcomes and that we do not know before experience what leads to integration and what leads to disintegration. That is, this supply relationship has had well-founded circumstances to succeed according to the IMP school (see chap 2) and the supply chain management concept (see chap 1). For example, personal relations between the companies at many levels in the company, early supplier involvement in NPD projects, top management support, and mutual ownership. In this change process there are no correlations between top management deciding to work together and the behaviour agents exhibited. For example, the guiding principle that the two companies should work together produced multiple effects for the supply relationship. In fact one can argue that the more top management inserted guiding principles in certain directions it met the power of its opposite. For example, when top management dismissed that prices could not be re-negotiated, the system did not go to rest; rather, more impetus from procurement management was a counter strategy bringing more competition into the relationship.

The relationship between Innoair and Exceltrix with procurement as vantage point is now further investigated abstracting level of generality including the qualities of individuals' profession.

### ***6.3 The Supply Relationship from a Procurement Vantage Point***

The procurement strategy was articulated in the supply chain management organisation setup that was developed in the bifurcation process where Innoair was upgraded in the large customer's supplier segmentation system. Central concepts of the strategy were based on benchmarking (in particular visible in the China effort/investments), knowledge sharing, total cost, global sourcing, and differentiated resource-allocation to suppliers (a supplier management model). The ambition and what was promised to top management in Innoair, was achieving considerable (total) cost-reductions, improving delivery-ability towards customers, and improvement of the inventory turnover. In order to achieve these goals there was a budget of 4-5 people working as category buyers and carrying out operating agreements. The disposal part was handled by logistics and was the closest internal customer for the agreements made by procurement. As launching of new products was frequent in the industry and a dominant issue for Innoair as such, it was also a part of procurement's ambition to be more involved in these projects. A project buyer at that time was hired to work across the logistics and procurement as well as to be more involved in cross-functional projects, in particular production and NPD. However, the procurement manager stated about priorities that procurement tasks are

organised by commodity groups and being responsible for the respective suppliers is the key responsibility. The role as project buyer was an extra-added activity to this category responsibility. In the following quotation the procurement manager address the boundary between operational and project oriented activities:

*"...we need to be in both boxes as employees [operational and projects]... off course we have to do our operational tasks, which also has a considerable economic impact, but we also have to think in wholes...we need to be a desired colleague, competent and innovative, we have to be in momentum all the time... we also need to make our own demands...allowed to have our own demands and be heard in the projects...In terms of what we expect of them what is really important is that they involve us in the integrated development projects..."* (Interview with procurement manager)

As interpreted from the quotation the procurement manager did not lack ambition on behalf of its own procurement organisation. From the quotation that the procurement organisation did not play an important role in the NPD projects. The procurement organisation was managed by a budget and it had to choose and being chosen in relation to activities being involved with. In order for the procurement organisation to be engaged in NPD projects it was highly dependent on information from elsewhere in the organisation. However, the role of the procurement organisation the NPD project was not merely a role to comply with other entities and their demands:

*"We are not technical responsible. That I have not written anywhere, so this we are not. Therefore we have an expectation that they assign a person that is technical responsible for the given commodity group, that means, if we have something called [component X], then they must have one responsible for [component X] that manage all what there is about design. Our role then is to be a support if they have questions. And off course we have to agree on to select the preferred suppliers we have chosen and exist in our system. That we take responsibility to reuse components and preferable not expand our supplier portfolio, because that cost money...that there is understanding that we focus on the commercial aspects otherwise we would be nothing but a pain..."* (Interview with procurement manager)

Thus, the possible role of the procurement organisation in the NPD projects would include not increasing the supplier portfolio (i.e. select preferred suppliers) and reusing components as much as possible. These activities would influence a positive impact on commercial performance measures. The possible participation of procurement then is an expanded view on cost reduction and being proactive on behalf of operational and commercial concerns of a NPD project.

On the one hand this procurement organisation was embedded with the tension of being proactive and reactive and that the budget of running the procurement organisation was about prioritisation of limited resources. Procurement was a bottle-neck that was constrained in terms of resources to

participate in the NPD projects whereas it was a problem that they became involved very late when other entities had been playing out their strategies:

*"...we have calculated how many resources we think we can use compared to how many designers there are. We know we are the bottleneck in many cases right now, for better and worse...procurement has as a task to do active procurement marketing and forecast research from technology, components, and suppliers, and that fills a lot in our minds. And this purchasing marketing is also a mean to get a saying in our own organisation...And then we want to establish a supplier committee because as things have been, there has been anarchy in many things. We have not resources to participate everywhere then they [the project team] find a bunch of suppliers and when we finally enter the field then we have to spend 80% of our effort cleaning up after others. So, there need to a settled attitude about this...now we write on paper in our category strategies" (Interview with procurement manager)*

Hence, what the quotation also informs is that in order to be more involved in Innoair it has to spent resources on convincing the internal customers about the value of procurement as well as it has to spent resources on supplier market intelligence. At the same time the procurement organisation needs to spend more resources when entering late in the NPD process, it also has to spent more resources in being involved earlier in development process. Therefore, the procurement organisation runs into an encounter where it eventually would have to increase the cost of running the procurement organisation in order to push its competences (actual and potential) out in the organisation if the category strategies should be complied. The reactive-proactive relation becomes a dynamic creating tension where striving for more involvement in activities with higher technical and commercial activities was an impetus that made the procurement organisation to pursue more professionalism. This because professionalism of procurement practices is expected to be a positive cause to more involvement (effect). However, from the change process of the supply relationship this can work both ways where the effort of professionalism and bringing competitiveness into the relationship was meet with rejection from top management.

Before the innovation project was initiated, procurement at Innoair had adopted a conventional four category segmentation (Kraljic's) model of suppliers where a supplier evaluation was built into it. The model was one of the effects of the bifurcation process where Innoair was segmented in their customer's supplier model, which required new competences from procurement management in Innoair. The developed competences centred on the increasing coordination with suppliers; including suppliers that were selected by the customers. The segmentation dimension was based on the risk of cost and delivery. Exceltrix was categorised as a strategic supplier and had always been regarded as a top-three supplier in terms of the overall 'spend'. However, in terms of Innoair's business, following

the logic of the Kraljic's model, it was primarily the development activities that were considered strategic although that, as mentioned, the boundary between production and development does not carry a clear cause-effect relation:

*"The cooperation with Exceltrix is closer than with other suppliers for two reasons. They are closer to us and then it is easier, i.e. the position is important and we have a good dialogue with them. But it is also a considerably more advanced product compared to other suppliers and is central in our products and also where other of our components is designed from"* (Interview with testing/product project manager)

Regarding the production part there were several possibilities open, in principle, to choose from with a considerable spend. Thus it can be argued that it was a leverage category and this categorisation is attractive for procurement management because it enables good conditions for negotiating contracts and deliver cost-savings. However, as identified in the changes process this leverage position could not be taken out its context, interdependencies, and history. It is constrained and enabled by the overlapping context between the supply-demand relation and the relations of organising. A snapshot of the segmentation model as a management technology before the relationship management project was initiated and the model that was developed in the innovation project are presented in the following figure:



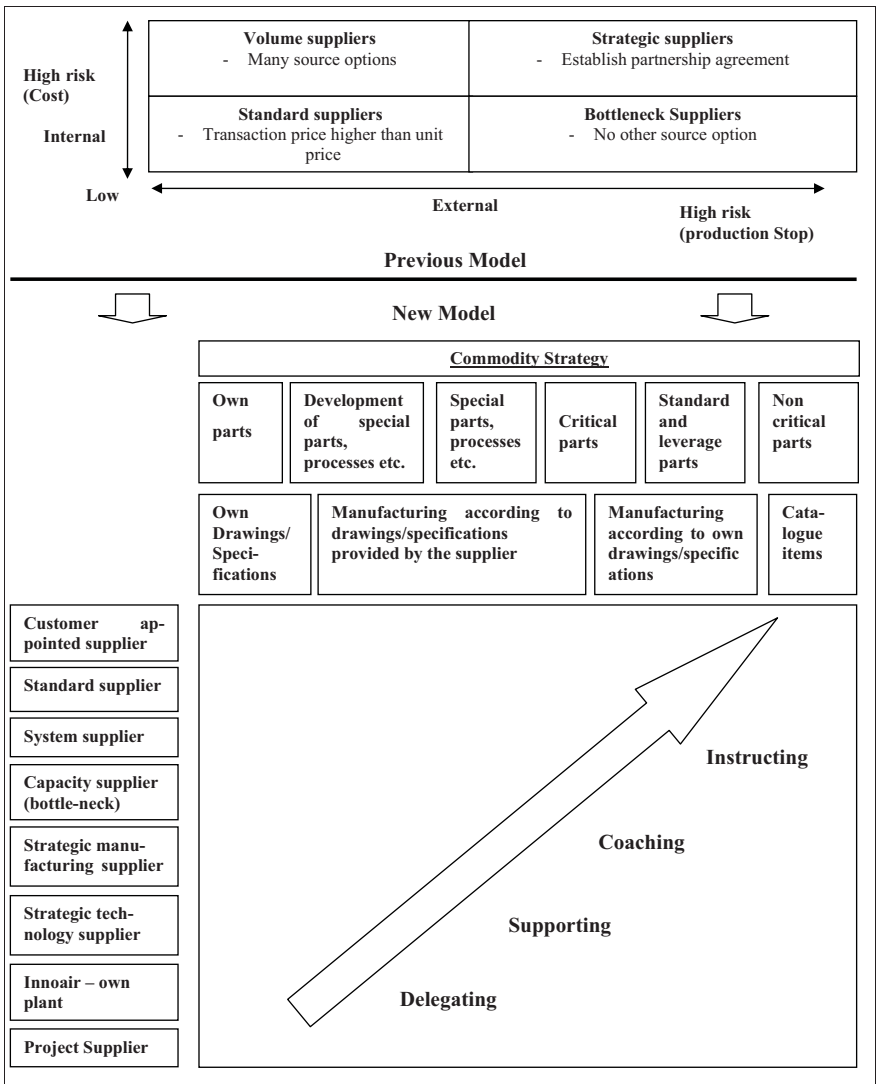


Figure 21: “Snapshot of Innoair procurement organisation’s past and present segmentation model”

The effort with the new supplier management model was expressed by procurement management to make it a more dynamic model, increasing the probability that both suppliers and goods were

managed, so important parameters belonging to each category were taken into consideration. The example of Exceltrix showed the distributional representation of such segmentation model and organisational obstacles for the procurement department in professionalising and fulfilling the goals of the strategy. Furthermore, the former supplier management model as a management technology was travelling through space in an endogenous process. Accordingly the procurement organisation was connected to a range of drawbacks. As a consequence a new model was developed with more features, more evaluation and so forth. Furthermore, it can be stated that the procurement organisation had formulated models, policies, and strategies to guide procurement management in Innoair. However, the previous change process between Innoair and Exceltrix demonstrated the model and the procurement strategies were challenged by the complexity of relationships and access to resources. The latter was determined by the amount of resources provided in the budget determined by higher up in the hierarchy of the company and articulates the abundance-scarcity opposition, where resources precede budgets. That is, the budget is an effect of political decisions.

From the bifurcation point where Exceltrix merged with another company, procurement management became a coordinator of the commercial condition with Exceltrix. This coordination indicated a responsibility of negotiating a frame-agreement with the production division of Exceltrix involving commercial considerations; for example, price, delivery conditions, and how to buy. However, there was no entity in Innoair responsible for internal coordination and the supply chain analysis displayed that the internal coordination in Innoair was affecting the performance of the chain. In the following table are statements presented from other entities concerning the relation to procurement management in Innoair:

Entity	Procurement and its connections to other Entities	Comment
<b>Sales/ product project manager</b>	<i>...there should be more internal coordination [in Innoair]. At least at times when things go wrong [in relation to Exceltrix]. We have our procurement that handles the contact externally; however [procurement] have no internal coordination role at all. Then we have our logistics director but our logistics director is very logistics oriented and not development oriented....many times I have said, OK, if I have the time I order my [components]myself four weeks ahead so I am sure that I have them when I need them. But, when there is going to be prioritised and prioritised then these components is postponed every time and I do not get these components in time anyway...if we cannot figure out the internal priority of our suppliers how are we to expect our suppliers is going to? And if our suppliers are not up running full speed and can deliver everything, then it is impossible for them to prioritise...in principle then, everything is important?...Our appearance outwardly is not perfect at all, I don't think Exceltrix see us as a particular professional customer...</i>	There is an internal coordination problem in Innoair; however it is difficult for the manager to identify a solution. Procurement, however, does not seem to be part of the solution
<b>Quality manager</b>	<i>One of our major problems with Exceltrix is the warranty agreement [2% error margin]...we lose money on that expense...it is something our procurement department is measuring on...our problem is that we do not get to the bottom of the problems because it becomes an automatic routine that this is the way we deal with errors...[How would you rate Exceltrix as a supplier?] That would not be fair for me to answer. The information to be evidence for that rating is in the procurement department...I think they [Exceltrix] are as good as we make them. I.e. they cannot be better than what we demand from them...</i>	There is a special agreement around quality with Exceltrix that is not properly managed and procurement is the present contact
<b>Testing/ product project Manager</b>	<i>...I think the general attitude [from Innoair] is...that the biggest problem is delivery on time. We all are affected by this...the production is affected by it...Exceltrix is supplier of components to almost all our products...</i>	Operational concerns affect many entities
<b>Logistics (disposal)</b>	<i>[Who are responsible from Innoair towards Exceltrix?] That must be procurement, it is their responsibility...they have made the frame agreement...</i>	Procurement in Innoair held responsible despite its lack of internal coordination

<b>Key Account Manager – Exceltrix</b>	<i>"We have of course been protected by the IPR decision. When the [procurement manager] has been looking at our [product] and would like to negotiate some prices and other terms, then she knew that it was only here [Exceltrix] that this was possible. Of course she tried anyway, as one has to as procurement manager, to get best the possible prices, delivery terms etc... and this she works with until our superior says to their [Innoair's] superior that this stops now "let them be" [i.e. Exceltrix]. This has really been bothering her and this I can easily understand..."</i>	Procurement is constrained in negotiating conditions despite being held part responsible for complying customer agreement
<b>NPD Manager – Exceltrix</b>	<i>"They [Innoair] have been trying other possibilities, in particular recently. What the reason is for this I do not know. Perhaps it is because those managing the production and logistics set-up [i.e. the supply chain management organisation] have said "now, we want to try something else". But they are, from my understanding of it, not the easiest people to cope with"</i>	The separation of production and development creates distance in the supply relation-ship. Procurement is indirectly held responsible

**Table 9: "Other entities' relation to procurement in the context of the supply relationship"**

The quotations in the above table from other entities in the relation between Innoair and Exceltrix demonstrate the difficult challenge it was for procurement management in Innoair handling the frame agreement and coordinate the commercial terms with Exceltrix. The challenge is further underscored by the resources and authority provided as previous described. One of the project managers in Innoair acknowledged that there was an internal coordination problem; however, it was not followed up by any hope that procurement should be given more authority in the internal coordination even though that procurement was handling the external conditions. It was also identified that if procurement were to be involved it would involve re-using components, not expanding the supplier portfolio. Therefore eventually constraining agency and degrees of freedom for NPD project management. However, this separation between internal coordination in Innoair and procurement management being responsible for the commercial matter with Exceltrix did not isolate the strategic and operational concerns (as assumed by the maturity model logic). Rather, the pressure concerning internal coordination became more intense. Specifically, NPD projects were also affected by the relationship performance between Innoair and Exceltrix and the operational difficulties presents itself as one of the causes. As a project manager in Innoair points to:

*"I can easily understand that there are people [in Innoair] that go "crazy" when their product is blocked. When a product like [X] which is our extreme high runner is blocked, then there are*

*some giant economic consequences versus if my little development project... has to be postponed 14 days”* (Interview with testing/product project manager)

Thus the case discloses the oscillation of oppositions, (the bipolar feedback) in terms of the operational-strategic and cost-value relation (framed by from the maturity model logic). At appearance the operational and commercial difficulties are separated from the top management relation and NPD projects. The developing projects had performed better than the operational performance through the change process of the two companies, among other things concluded in the innovation project. Also, in the slipstream of the bifurcation point where Exceltrix merged with another company the commercial concern and the development projects were separated and to be managed separately. However, as this case has described this isolation has caused oscillation between operational and strategic concern rather than closure.

The operational and commercial challenges demarcated the relation by delivery difficulties and prices not being competitive and thus not effective compliance to customer contract. Oppositions oscillate by bipolar feedback in complementing each other by increasing and decreasing each other simultaneously. For example, following the previous quotations from the project manager, the performance of the operational level between the two companies and coordination internal in Innoair, made it necessary to prioritise and this impeded NPD processes, which also was part of complying with the demands of the large customer. In this context focus on cost efficiency and price was connected to reduce cost, whereas business development in terms of developing new products and manage customers was to increase value. At extended level of abstraction cost and value also becomes identical expressions. The ability to get a higher turn-over from the customer (value/profit) is only realised if procurement is able to meet cost reduction requirements. That is, reducing cost and increasing value is at one point different but due to process of extension we can see that they interpenetrate; that the dynamics of procurement is ingrained in an oscillation between cost (in terms of reducing the cost base) and value (in terms of securing contract compliance and higher turnover). I.e. it is not an either/or situation. The dynamics is illustrated in following figure:

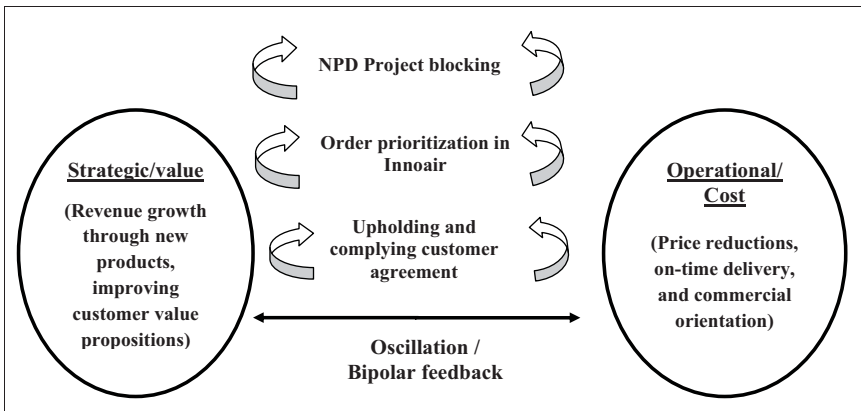


Figure 22: “Oscillating dynamics between operational and strategic oppositions – Case I” (Author)

The supply-demand relation and Innoair’s organising thus placed considerable constraint to the possibility of agency for procurement management. However, this did not denote that procurement became a passive entity reacting to others demands. A cause to action by the procurement manager, as demonstrated in several parts of the bifurcation process is the significant discrepancy between the yearly cost-reductions it had promised to comply and the cost-reductions that could and were agreed with Exceltrix as well as some of the special arrangements, for example the quality agreement. Although procurement was not involved in agreeing the conditions of the customer agreement it was of the bifurcation that both enabled procurement management more significance as an entity upholding the contract. The customer agreement involved, at the same time, several degrees of determinism in the overlapping contexts between the organising relation in Innoair and towards Exceltrix as well the overall relation in production meeting consumption.

As the bifurcation process between Innoair and Exceltrix informed there were activities signifying disintegration within an integrative supply relationship evolving around dependency in production and development. In the supply relationship there were efforts towards a more regular customer-supplier relation. For example, as reported in the change process section, the NPD project participants from Innoair were to specify and pay for R&D services instead of just demanding the services when it was required. The supply relationships oscillation between integration and disintegration also meant that procurement management were constrained and enabled. One of the claims that have been put forward in the procurement domain literature in terms of the IMP school (see chap. 2) is that over

time companies develop relations that make them trust each other and they exploit each other's complementarities. That is, companies understand each other and share knowledge and eventually the relationship rules out the market. Hence, is this claim the solution for procurement management in Innoair? And what is actually a good relationship with a supplier and which activities support it? The intention that the relation should operate as a regular customer-supplier relationship was with the ambition that both companies became more competitive and therefore performing better serves as one offer to what a good relationship with a supplier is. For the disposal responsible (i.e. operational part of procurement activities) the condition of the relation was in particular dependent on the demand-supply relation:

*"There was a period around a year where the market situation was stable and where things went OK [with Exceltrix] ...it actually goes so well that [the Exceltrix contact] starts sending "un-serious" mail...and there I lose some respect. We need to be professional towards each other. We have a business connection, that's it....in the moment as soon as we ramped up again...the first my superior tells me is whether I have checked that Exceltrix are ready to follow the demand...I use a lot of time checking up on them...my conversations with them are however very concise...with other suppliers it is different. For example with one who was on vacation in France last week. But I REALLY needed to get in contact with him and at the same time we has a conversation about wine yards...it is important that we have a good relation and willing to do things for each other..."* (Interview with the responsible of disposal)

The quotation reveals the simultaneous overlapping contexts between the here and now as it present itself, the quality that makes us speak about the individual by profession in terms of ensuring that orders are complied, by the qualities that make the disposal responsible an employee in the relation of organising, and finally the qualities that address demand and supply. That is, the disposal responsible both possess a degree of freedom as well as a degree of determinism for performing the job and one of the degrees of freedom is trying to avoid unwarranted personal relations while at the same time being dependent that the relation to Exceltrix are performing so it is possible to comply the customer's contracts. Also the procurement manager states about personal relations and professional relations:

*"...this has been my biggest problem I have no interest at all to become personal with anyone I cooperate with...I do not think they [Exceltrix] has anything against me personally but they really do have a problem with the function I am caretaker of...then it becomes personified..."* (Interview with procurement manager)

Thus, when the interviewed in Innoair abstracted and compared the Innoair-Exceltrix relation with other customer-supplier relations, which has a different context and history the comparison becomes futile. Because of history, the connections between agents, and the distributed representation of

function and form of the supply relationship denotes that there was no possibility of a “regular” customer-supplier relationship. Also a project manager states that good relationships with suppliers are often them with less coordination:

*“... [Supplier x] is a really good supplier and them we almost have no communication with. We send a purchase order; get it confirmed and we know we can trust it. We even get an extra confirmation when the goods are sent. They are good at reporting back, it is a good relationship, real professional”* (Interview with testing/project product manager)

Therefore, we do not know a priori which activities that support relationships such as the number of interactions and the distance/closeness within relations. Overall in terms of Innoair and its relations to Exceltrix, professional relations are warranted creating competition within a collaborative arrangement and this involve distance and closeness at the same time. In the absence of a blue-print, an external observer, multiple solutions were offered in the bifurcation process for the agents to follow outperforming the guiding principle that the two companies should work together. For example, the procurement manager states:

*“...It should be obvious that there are different interests and stakeholders...really it is just about to make an agreement that satisfies what our internal stakeholders believe is the requirements, and which of course corresponds to the market condition...the problem is that we are not allowed to have an opinion about how the market looks like. Every time I came with something like in China there are 30% price reductions then I get the question how do I know that, you are not a buyer of that [component]?I have heard that from my channels [a network group]... I was actually asked to consider whether it was really that good idea that I was part of that [network group]...”* (Interview with procurement manager)

Thus, the case articulates from a procurement management vantage point the bipolar feedback, the double movement contradiction of integration and disintegration both from a level of generality of the individual, the organising relationships, and the demand supply relation. Although there are managerial choices to disintegrate and, these are temporary boundaries in endogenous processes. Intensified competition in the marketplace and internal reorganisation are nodes of the oscillation of the relation between integration and disintegration as articulated in the change process. That is, the demands from the large customer affected that the Innoair and Exceltrix relation became more integrated and dependent in production for meeting consumption. At the same time Innoair installed more and more disintegration with Exceltrix in order to cope with the contract to the large customer. The oscillating dynamics of the integration-disintegration opposition from a vantage point of procurement management is illustrated in following figure:



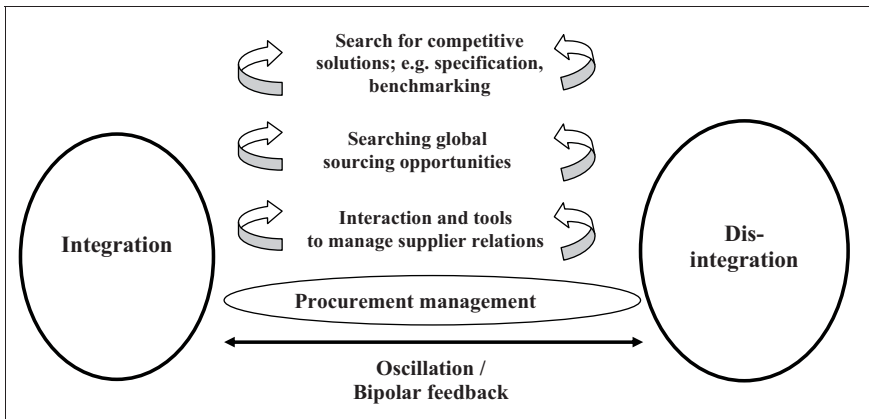


Figure 23: The oscillation of integration and disintegration for procurement management – Case I” (Author)

A claim in this case, thus, has been made towards the union of integration and disintegration where competition and collaboration act as simultaneous forces both constraining and enabling procurement management. Innoair’s procurement organisation made an effort to improve their supplier model when they experienced that the previous model did not worked well enough in terms of how it was intended. Thus, procurement management worked on a new and better model that provided more features, more considerations, and more evaluation. That is, they made the model (i.e. management technology) more complicated and from a complexity science perspective this is not in itself a way to deal with the complexity of relationships. However, the model may due to the rules inscribed enable a more sophisticated way to deal with suppliers; however, the value of the supplier management model is not independent of the increased cost of performing the model. Thus, also procurement management is part of a bipolar feedback between abundance and scarcity where the resources spent is awarded developing a supplier management model against all the other possible windows of opportunities offered in the bifurcation process. Furthermore, new ways of practising procurement from this case – e.g. a new way to manage supplier or coordinate between departments – in itself requires practices that allow procurement to increase its professionalism (i.e. to leverage buy-in for the model).

We overall have a time-space where agents compete and collaborate for resources and progression. Boundaries are not between buyer-supplier, not between supply chains, but between agent and environment (and therefore other agents). Consequently, for example anticipating that an internal

owned supplier is easier to manage than a supplier in the market is profoundly contested from this case.

6.4 Case I – Discussion and Implications

This case was about the complexity of relationships of many entities in a system from a vantage point of procurement management. The case has paid attention to a projected “supply chain” with the participation of two sister companies Innoair and Exceltrix, where the interaction has framed the development of the relation. Emergent and unexpected circumstances changed the character of the supply relationship where the case demonstrated what the implications can be when endogenous processes influence exogenous models, intentions, and product innovation. Moreover, the case has demonstrated what can happen when there are no blueprints, no overall guidance, no rules inscribed strong enough to govern the system and where agents have searched for the best fitness in the condition of no access to overall pattern/information. That is, what that happens when a system is autopoietic in a constant bipolar feedback of oscillating oppositions. This interaction is illustrated in following figure:

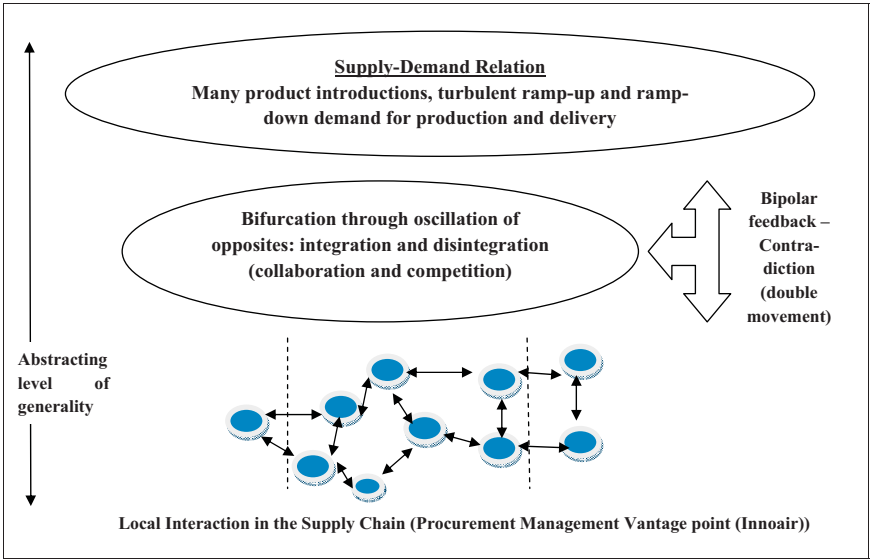


Figure 24: “Local interaction and the supply-demand relation – Case I” (Author)

An important element in a complexity science is the co-evolutionary dynamics between local interaction and emergent patterns. This case showed how the emergence of supply-demand qualities constraints and enables local interaction and how local interaction constrain and enable the supply-demand relation. The large customer concerted the supply-demand dynamics relation more than Innoair and Exceltrix in the sense that the instalments, in particular the yearly cost-reductions, situated pressure on the projected supply chain. As a consequence of supply-demand dynamics and organising of the supply relationship, procurement management were enabled to negotiate commercial agreements with Exceltrix; however, constrained in terms of not having internal coordination. This did not influence that the procurement manager became a passive actor. At given part of the bifurcation process there has been an effort to change the conditions of the supply relationship.

The dominant explanation from the procurement domain literature in this case would point to that procurement management must move higher up the sophistication ladder in order to improve performance. However, this case demonstrated that operational and strategic activities characterised by the maturity model logic was not two different and isolated levels of sophistication for procurement; rather, the fitness was a constant oscillation as one process. From the outset of abundance-scarcity opposition the temporal dilemmas become whether procurement should invest its resources in supplier market intelligence, strive for more participation in NPD processes. However, the bifurcation point after the upgrade in the customer's supplier base and the merger of Exceltrix with another company demanded more and more internal coordination in Innoair. If this coordination role was to take place there was no indication from the analysis that it would involve less focus on cost, commercial and operational orientation. We thereby touch upon the dual role of procurement professionals participating in NPD proposed by Schiele (2010). Also, although there are a possible claim that procurement could take part in the internal coordination in Innoair, the case also shows that we can expect counter-strategies from other entities. What leads to more competition or collaboration is not possible to categorise before experience. The maturity model logic is challenged because it is based on an ending where other entities (top management, other functions, and suppliers) ultimately accept and see a great benefit of procurement having a strategic resource-demanding role. Yet again, we do not know what the strategic importance implies 'a priori' and with which strength the counterstrategies possess. What we have is a system where agents compete and collaborate for resources and progression and it is the same impetus that produces breakthroughs and breakdowns.

The case challenges the traditional systems approach viewpoint where a dualistic perspective is taken; humans are seen as both being part of the system and as an objective designer of the system. One designer of the relation was the owners and top management as inscribing “rules” that it must be an effective buyer-supplier relationship by working together. This normative inscription produced unintended consequences where the case demonstrates that all entities had their own principles in terms of how the relation should be derived from their own local information. The claim was established with complexity science that rules could only work as description of a system’s behaviour not as the strict rule mechanism for how the system works. This also denotes that politics cannot be exogenous to a complex system; it is part of the pattern of interaction where boundaries are persistently negotiated including the management technologies travelling through space in an endogenous process. The supply relationship was constrained by endogenous contradictions of oscillating nodes between integration and disintegration. The case illustrates how integration and disintegration, and therefore also competition and cooperation, interpenetrate each other. Competition at process of extension is necessary for cooperation to function. Exceltrix was not particular focused on becoming more efficient in its production. However, despite of this lack of focus it became necessary to do many things where impetus was directed towards more efficient production or at least make it perceive as such. Thus, as the contradiction unfolded it undermined and supported procurement’s emancipatory project at the same time.

To sum up, we have a case that demonstrated the non-dual relation between integration and disintegration. This is contrary to the procurement domain literature which sees integration, or disintegration, as both the mean and the end. In this case, the dynamics of procurement management is not so much about a chase for integration as it is an enduring effort to secure competitiveness in interdependent supply-demand relations and this involve a dialectic contradiction between integration and disintegration. We may end the case with Capra’s words (from chap. 4):

“...form becomes associated with process, interrelation with interaction, and opposites are unified through oscillation....although there is competition, it usually takes place within a wider context of cooperation...the important of stratified order...is not the transfer of control but rather the organization of complexity” (Capra 1982 in King 2001:262-263).

## 7 Case II: Procurement Dynamics in GlobalFirm

This case is about a procurement organisation (GFPG) in the company GlobalFirm (pseudonym); a large global conglomerate group. GFPG has made comprehensive investments in developing its competences, tools and technology application, with the ambition of becoming a procurement competence centre in GlobalFirm. Being part of a large conglomerate organisation, the point of departure for this case is how we can understand procurement organising in relation to GFPG, as a central office, and how it has invested to develop its procurement activities in terms of off shoring of procurement activities, procurement competence building, and e-enabled procurement. The starting point for the case is illustrated in the following figure:

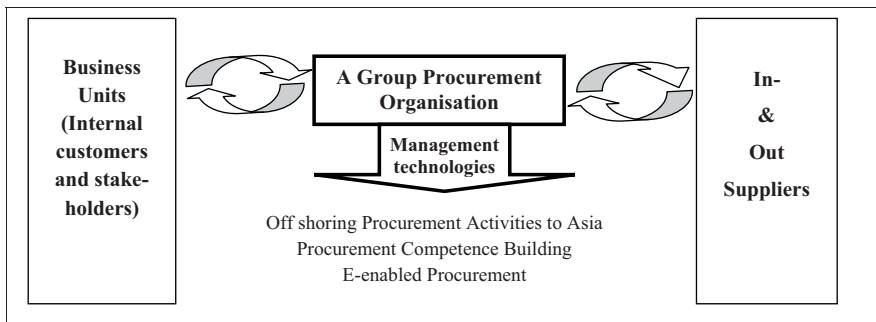


Figure 25: “Case constructs - Case II” (Author)

This case discloses the dynamics of GFPG as a federal relation with business units oscillating between local-led and center-led authority. The procurement investments as management technologies can all be regarded as process innovation of a sourcing process model. Since the establishment of the procurement organisation, this model has been a reference point for developing procurement professionalism. The case demonstrates that these management technologies, when travelling in an endogenous process, exhibited a double moving contradiction between cost and value and, thus, in a broader context between efficiency and effectiveness. The complexity of relations for the procurement organisation in this case study was considerably measured by the number of entities interacting. This aspect emphasises the role of the process of abstraction from the researcher’s vantage point for comprehending the relations. The case is marked by a supply-demand breakdown of the financial turmoil in the fall 2008, and all the sections are more or less situated around this bifurcation. The case begins with a case context which introduces the procurement organisation and the subjects concerned. Afterwards, the change process of GFPG is described, as it changed from

being a project organisation to becoming organised around internal customers. This change process disclosed an oscillation of local-led and center-led authority. Subsequently, a section focuses upon the specific period around the supply-demand breakdown that provided possibilities for the GFPG to change its form and function. Finally, and in relation to the other two sections, the management technologies' off-shoring procurement activities, procurement competence building, and E-enabled procurement are described and analysed; how they travel in an endogenous complex process before and after the supply-demand breakdown. The case ends with an identification of case implications and a discussion of case findings.

### ***7.1 Case Context: Procurement Organising and Procurement Investments***

GlobalFirm is a large global conglomerate company, which has several and quite different business units. Shortly described, in terms of being a conglomerate organisation, there are many linkages internally in GFPG, between business units (internal customers) as well as with suppliers. Robinson et al's model portrays how GFPG was organised by a sourcing process model which was divided in new task (strategic sourcing), modified re-buy (category management) and routine buy (operational procurement). From another part of the literature, Kraljic's model and the following logic of organising, was apparently followed as there was a strategic part that was not burdened with operational day-to-day routines. These activities were carried out at business units as well as in a separated routine procurement department inside GFPG. GlobalFirm is a globally operating company, which also reflected GFPG's geographical organising. Headquarters is located in Europe, while it has expanded its geographical scope by setting up international procurement offices around the world. For example, a procurement office opened in China. At that time, approximately one-fifth of GlobalFirm's total purchasing volume was sourced in China. The opening of the office was done in order to enhance low-cost-country sourcing, to open up for new sources of supply to the company's many worldwide operations, and to get close to the supply market. A similar and yet quite different procurement office was established in Asia, with the purpose of carrying out off shore routine procurement activities and serving internal customers in business units. Being a conglomerate company had some consequences for GFPG, in terms of extraordinary many different types of sourcing projects and purchase situations, as well internal customers who were often composed of different entities, situated in different parts of the world.

Before GlobalFirm started their 'strategic' sourcing projects, the only activity that was placed outside of business units was the procurement department, which had routine procurement responsibilities.

From a central office perspective, the sourcing projects were involved in making agreements across business units from a mandate provided. However, they did not buy anything themselves and the divisions bought on their own behalf. Although this may be regarded as a ‘decentralised’ design according to Cousins et al (2008), it also reflects the federal (local-led) way of organising as introduced by Rosemeijer & Wynstra (2005). Over time, this relation developed into a federal design (Cousins et al 2008) where a mandate is given to GFPG, providing a service based on established principles. In terms of professional procurement competences involved in purchases, GlobalFirm was also highly decentralised. Many “part-time” buyers were carrying out buying activities without any involvement of professional procurement competences.

The sourcing work process model guided sourcing projects and consisted of a range of steps, determining internal and external conditions. The process model included a variety of tools; for example, supplier workshops, idea generation, supplier market analysis and total cost of ownership calculation. Overall, the sourcing process model counted around 50 activities. Having a ‘reference point’ and a ‘standard’ for approaching a sourcing project can be regarded as a sign of professionalism of procurement (see chap. 2). As claimed later, the sourcing process model was the central management technology, which could explain how GFPG developed its organisation, and the activities in the sourcing process model became a vantage point for the investments in off shoring of procurement activities, procurement competence development, and e-enabling procurement. At the time where the case inquiry began, the business model in GFPG had, in terms of investments, primarily targeted off shoring of procurement activities and procurement competence development; the latter both internally in GFPG and company-wide. The case inquiry began not long before the supply-demand breakdown. Before this bifurcation, GFPG had an ambition of providing business units with high standard procurement processes and resource use in order to support their strategic and financial objectives. GFPG wanted to be a centre of competence, setting corporate procurement standards and directions and capturing group synergies; furthermore, it wanted to leverage low cost opportunities and develop global procurement capabilities. In other words, GFPG business model strived to have functional leadership of procurement in the company. When the study ended, GFPG claimed that it had a ‘center-led’ procurement structure; i.e. a hybrid design where strategic procurement activities were conducted from the central office and where operational activities were carried out decentralised (cf. Monczka et al 2006). However, as the case demonstrates, there are a number of different ways to draw boundaries around procurement organising.

## **7.2 The Change Process of Being Organised by Projects to Internal Customers**

Around the millennium, GlobalFirm announced that procurement was going to be a future investment area. In reference to a central office, procurement had, up to then, primarily been serving internal customer, characterised by routine procurement activities. The initiative started with a pilot project, which aimed to coordinate purchases across the different business units of GlobalFirm. Important keywords were inter-group coordination and applying technology. The pilot project was a significant success and the effort resulted in an integration of the existing purchasing department and, hereafter, the newly established strategic sourcing project team. The project manager for the pilot project had a well-respected name in the company and was announced as CPO; however, this person had no previous career in procurement. In the following years, a consultancy company assisted in the project an in building up the procurement organisation with training programmes and incorporating the sourcing work process model to carry out pre-contract work. IT and transportation were some of the first contracts that were in focus, which secured that GFPG was gaining momentum in GlobalFirm. GFPG was supported by and referred directly to top management during its nascent years; later, it came to refer to a business unit executive. Furthermore, where GFPG developed to be primarily concerned with the pre-contract work of sourcing projects to search for group synergies through the sourcing process model, it also maintained a role for business units, conducting routine procurement tasks. However, in terms of organising the roles were separated.

One sourcing manager labelled the sourcing projects “the cavalry” of the procurement organisation and the central element of GFPG, demonstrating its significance in the company. The activities around the sourcing process model were concerned with project oriented pre-contract activities; the implementation of the contract. The day-to-day work was designed in a way that gave the internal customer the post-contract responsibility. Furthermore, not only were the sourcing projects mandated by business units, the decision concerned with the outcome of a sourcing project was also in control of internal customers. GFPG established different scenarios which the internal customer could choose between:

*“It has been through our development that the ownership always has been at the business unit. We have never had the mandate to drive something, to decide something. We have always had to demonstrate our value and to some extent we have also been satisfied with this. To have a mandate does not necessarily designate that everything goes smooth and whether we were at all capable to have such mandate”* (Interview with sourcing manager)



The success of a sourcing project was primarily measured upon the ability to generate a cost saving the business unit and GFPG had to agree on the actual cost-saving. In order for GFPG to provide credibility, regarding its cost-savings, it had a structured reporting process to estimate savings, organised with internal customers to validate the calculation. GFPG also had a finance unit which operated independently of the sourcing projects, in order to ensure credibility about the reporting. Together with the given business unit, the finance unit completed a sign-off before and after the sourcing project. Hence, generating savings was then an achievement that was needed in agreement and consensus with business units, keeping in mind that the captured savings were based on pre-contract work (we here have to distinguish between expected savings (as a project sign-off) and realised savings). GFPG was as a procurement organisation measured upon the cost-savings generated against how much it cost to run the procurement organisation. To achieve a successful sourcing project, business units and GFPG were highly dependent on each other to yield the savings potential in both the pre-contract and post-contract phases. It was in the latter that the realised savings primarily could be effectuated. From a GFPG vantage point, pre-contract activities, as a project, were regarded as the significant value-creation, whereas the post-contract and day-to-day activities were separated in time-space and were in control of the business units. Furthermore, in regards to defining the roles of the business units and GFPG, a particular concern was in the technical and commercial relation; as a sourcing manager expresses:

*“I don’t think we will label ourselves as merely commercial because we try in procurement to get the whole way around. Some of the things we look at is for example to optimise processes...can we exchange something without downgrading quality. Could we have a better productivity and thereby create value because that is something engineers appreciate. So it is not just about downgrading, cutting cost, but we try to look at what we also call total value of ownership, and what we get out of it if we optimise it. It takes time to convince engineers that this is actually what we do...we need to get insight from their side so that we can build these scenarios because most of the commercial scenarios we can guide, not independently, but at least guide them... we also need to know what impact it has on sale, and whether we will lose customers because of this initiative, so that has to be part of the evaluation as well, whether there is business loss or opportunities”* (Interview with sourcing manager)

The claim from the sourcing manager is that although procurement was progressing around commercial concerns, it was not a means in itself. Procurement had to expand the scope, because a means to achieving a commercial outcome was connected to technical and customer issues. Furthermore, sourcing projects were, as mentioned, characterised by ‘new task’ and the main focus in the early development of GFPG. However, from this vantage point, new task was not necessarily new to the company but new to the application of professionalised procurement competences. When

GFPG entered a project, it searched for locating synergies and stepped into routines and processes currently working in the company as well as with relations to suppliers. Leveraging internal customer buy-in was the foremost challenge with reference to the scenario building, the degree of involvement, and the consensus around the amount of cost-saving. In particular, concerning technically oriented projects:

*"We experience a lot of what you can call push-back. Some of it is justifiable, some of it unjustifiable and a part of it understandable...There was a business unit where we were the first that came in and made something and they always have said that "it might be that you [GFPG] have succeeded with others but we are different, more technical and you do not have insight into our [business]" ... we are not the experts in the different businesses. It is also important that we get challenged and we challenge them but in the specific examples where there are many engineers... it is a problem that they challenge us because as they often will do is to say "this we cannot use" ...Then there comes a technical explanation, which we have no chance to counteract. There they can stop the project" (Interview with sourcing manager)*

GFPG had tried to hire engineers in order to support sourcing teams in the pre-contract situations. However, it had been a challenge to convince the right experts to take a procurement job and, in particular, to find engineers that could combine technical and commercial interests. Moreover, it was expressed by a sourcing manager that the idea of hiring their own experts was not necessarily a sustainable path to increase success of running sourcing projects in relation of the oscillating of authority between GFPG and business units:

*"We also need commercial minds because, really, there is no way to match them [the business unit] and their experts and this is also the way it should be. We should not match them in this way, what we often do is that we make all the scenarios and then it is up to a given business unit, to a certain extent, to decide. However, they have to be responsible for what we have showed them...if they don't accept then, fine, you have to be aware that this is the documented scenarios where we can get here, and "this we won't", then have to answer all the way to the top that this is the decision" (Interview with sourcing manager)*

In this stakeholder buy-in process, the exogenous process of the sourcing process model is entangled into an endogenous process and the oscillation of authority between local-led (the autonomy of business unit decision-making) and center-led (GFPG and the commercial responsible of a professionalised procurement approach). The sourcing process model was the reference point for the participants of sourcing teams from GFPG as a standardised approach for conducting a sourcing project. However, the aim was to search out the possible synergies that could be identified internally in the company and by the supplier market. This denoted that in order to achieve internal customer buy-in, GFPG seized some of the emergent opportunities that arose in terms of searching for these synergies. For example, a business unit had a problem with a long-termed contract where it was

difficult to discern the price regulation mechanism. Faced with a signal of a large price increase from the supplier, the business unit took the initiative to approach GFPG:

*“They reach out to us and asked if there is something we can do about it. It is typical this with that they do not want us in for a long period, and here is a completely hopeless situation. I actually do not think they expected that we could do something about it, but I think they thought in the situation that no harm could be done. It was an enormous challenge that we accepted the initiative and we were to be a larger team and in difference to other projects where we define scope, etc...we came up with a very different approach to the contract without being affected by the legal aspects of the contract where we switched something, and not just negotiated the price. That we actually said what can we do for the supplier and can they help us in any way, and can they help us in a GlobalFirm perspective. It changed a lot, besides we had [a considerable] saving on the project, it changed the attitude from this business unit and now there were a demand for us”* (Interview with sourcing manager)

The project was carried out by a variety of pre-studies in terms of searching for market conditions, spend-analysis, and information about the specific supplier, where they afterwards convinced the internal customer to initiate work streams. It became one of those projects highlighted as a significant GFPG success and a considerable cost-saving was agreed with the business unit; all of this was carried out without ever actually being formally being on the project. Although the sourcing process model was not as such followed it characterised the pre-contract value GFPG strived for. Because the sourcing teams started projects in new settings with different internal customers and suppliers the sourcing process model in the initial phases of GFPG’s development was necessarily a creative trial-error process, although being a standardised sourcing project model.

GFPG was, in the context of a federal design, provided with the incentive to create competition within cooperative arrangements, in order to achieve cost-savings. In this pre-contract work an effective sourcing project introduced competition while existing supplier relations were not a concern per se from this vantage point. For example, in a sourcing project where the challenge was to convince the supplier that he was not the only supplier option:

*“...either we can negotiate to demise here or we can have the ambition to convince the supplier that he is not a monopolist, that we actually have alternatives. They made a communication plan and sent it out to the whole team so they could see who, even when they called [the business unit executive]...it was a communication practice to how it was possible to create competition in this market and convince this supplier that he is not a monopolist anymore. Either he has to act as he was in a market with competition or else we end this by switching him. And again, because of transaction cost, switching cost and all that, we do not just want to switch him out, that easy it is of course not”.* (Interview with sourcing manager)

The effort for the procurement professionals were from a competence level of generality to manage and convince internal customers through demonstrating cost-savings in overlapping context with the supply-demand relation. In particular, since GFPG did not have the final decision of the project. As mentioned, in this process competition is introduced in collaborative arrangements:

*“Idea-generation and workshops are something we have much focus on in the sourcing part... most of the good ideas comes from where we have interacted with suppliers. There is a great deal of change management in this, especially with current suppliers actually. Where they say “yeah yeah now you say we should come with the good ideas but in reality it is in order to get lower prices”. But those ideas we exchange with current supplier, but in particular those ideas coming from new suppliers, we share openly with everybody, to give equal opportunities to come in and optimize their offer.”* (Interview with sourcing manager)

At the expense of a mandate to decide the whole sourcing process, GFPG needed to convince first of all the internal customers about the value of procurement but also suppliers, which were not used to be confronted with a commercial orientation from the company. This position were at the same time positive and negative (bipolar) feedback, in the sense that the impetus of the sourcing project could be shattered if business units did not accept a scenario. On the other hand, it was the same impetus that enabled the procurement organisation actively to identify and pursue synergies in the supply market and business units, in order to convince internal customers. This is for example described in the following “win-win situation” within a competitive interaction concerning a project on a print and brochure category. Synergies were primarily investigated by economics of scale and thinking differently about the work process:

*“We had a brochure on 18 pages however if we went in and said that then we will make the brochure on 16 pages then there is no waste and you get the par for the half...it's a win-win because we got the paper for half-price and the supplier we don't twist his arms and he saves time because the job became easier to handle...The print part and distribution part there we got half of the savings from that project on optimizing together with the supplier. Previously when the pressman delivered the good he came with a packing case and we put it in a corner where we had someone to put the brochures in envelopes and labelling...now when the pressman is done he takes over to his packing system pack it in plastic wrap and placing an address...finally we send it out with another kind of mail and then we saved [70 per cent] on that cost also”* (Interview with sourcing manager)

The examples mentioned illustrate the character of sourcing projects as a new task where synergy and a cost-saving is identified and reported, leaving the implementation to the business units and then begin a new sourcing project in a new setting. To uphold the significance of GFPG as central office, new synergies were to be identified that could yield new cost-saving effects. These examples of sourcing projects also share the commonality that a value was gained by analysing synergies in the

supply market as well as between business units. Hence, the work practices of GFPG were initially based on interacting in new settings rather than continuous effort with same categories, stakeholders, and supplier markets.

However, the more projects that were carried out the more entangled GFPG became in an endogenous process. It is in this process GFPG developed a category management section with several indirect and direct categories that can be examined in terms of strengthen the relationship with internal customers and continuing the work after the “first” pre-contract sourcing project. The different category teams did not start up at once but often in continuation with the completion of a sourcing project. The category management activities and the organizing can be characterised as ‘modified re-buy’ to manage the continual basis surveying of a given category’s supplier market, servicing internal customers, and analysing how capital is spent in the given categories. That is, category management was the continuous effort identifying synergies:

*“Where it gets really difficult with our stakeholders [in business unit]) is when we have to consolidate spend and volumes, then there are so many different individual stakeholders we have to agree with. These stakeholders are positioned in different parts of the world and also culturally do things differently”* (Interview with category manager)

Category management, however, also revealed yet another approach to organise around the sourcing process model, increasing the ‘federal’ way of organising and oscillation between center-led and local-led authority. Therefore, one perspective to view category management was to regard it as an investment, a management technology, in making the sourcing process model (pre-contract work) more effective from a CFPG vantage point and connote its significance to the company:

*“...if you take this [sourcing process model] then it is tied up against that you have to go out and make a buy in about six months and that you go through [the model] from start to an end. We are placed in these categories and then we know our suppliers, we have the spend; we have that on files, which are continually being updated. We have an intelligence log, so the first three-four steps we have actually covered, which is something our category is doing all the time. Roughly speaking we can step directly into the buying process. There is of course also where we follow material cost and that is really about being proactive in a given negotiation. In this way you can say that many of the things we do on a daily basis that is included in the first 3-4 steps of this model... that way the model becomes used more to make us stay top on things...”* (Interview with category manager)

The sourcing process model is used identically to sourcing projects. The model is used to open a market when sourcing. However, the model also adapts a new function where it becomes an embedded device to capture knowledge in the supply market and the internal conditions in terms of

specification knowledge etc. Moreover, although category management teams were established with a supply-side (supplier market) and demand-side (internal customers in business units), they were in particular organised around a set of internal customers:

*“...we come with our input to what we think is the correct and what we do with our internal stakeholders is to make a governance chart, how we handle things, and who do what. In that way we at least give some empowerment to those we think should have it. Even though there might be people positioned in three sections discussing things it is in the end probably a manager that decides whether we turn left or right, or straight ahead. This is the idea with the governance chart so everybody agrees...it is a composed document that everybody signs and it is actually the same with our savings reporting where the idea is that our business unit sign-off, so they agree on how we do things and not are to argue about that afterwards”* (Interview with category manager)

The governance chart exemplifies how the category management teams were constrained and enabled in the relationships with internal customers. This is a difference from the earlier described signature of sourcing projects that were conducted in new settings in the early stages with less autopoietic feedback and exogenous calculated boundaries. One category serves as an example to demonstrate this complexity of relationships when procurement management is organised around internal customers. This category management team had primarily one business unit as internal customer divided in two departments in different parts of Europe; a technical responsible department and then the headquarters of the business unit. This category moreover had an internally owned supplier and the supply market was characterised by being an oligopoly-like market with four or five suppliers. Finally, GFPG's department in China was also connected, which was closer to the supply market than the category management team in Europe. Thus, the category management team was conditioned in a web of relations in terms of organising procurement activities. Managing and being managed in this category was carried out by competition and collaboration feeding off each other. For example, it was difficult for the business unit to establish a competitive relation and searching other suppliers because of the relation to the internal supplier. The category management team enabled this opportunity:

*“Here we are more independent and are outside of these discussions; at least, the suppliers are happy with that”* (Interview with category manager)

That is, this category team's responsibility was foremost to create competition to the internal supplier but also to enable relations with other suppliers in the market. This category management team was therefore also able to collect and use information to create competition in spaces of relationships of politics and integration:

*“Of course we also have to pressure the price as much as possible...the big discussion is that our business units want to handle the internal supplier as ‘any other supplier’. For that reason there is some info in the internal supplier they can give us because we have so close contact to our business unit.”* (Interview with category manager)

In general for the category management teams, they interacted with the aim to enhance professional relations between entities. For example were there clear policies for the categories not to receive gifts from suppliers and other types of personal relation building activities. In addition, procurement management in the categories in this case touches upon how we are to think of boundaries between internal and external. For example, when ‘travel’ was implemented as a centralised category, it leveraged a position where the power of decentralisation was visible through the endless number of efforts of maverick buying from internal customers as well as suppliers who were not chosen as the selected partner in charge. Hence, the category team became a part of the “front-office” supporting the supplier at the same time as it was a back-office in GlobalFirm.

Also in the sourcing project organizing, GFPG was modifying its form where it had worked on defining roles and responsibilities between business units and GFPG. This ended up in sourcing teams being responsible for a stable client base in the respective business unit. A manager in GFPG had a counterpart in the business unit organisation and the two entities were then to work together with a joint responsibility of running sourcing projects and procurement activities in the respective business unit. The manager was installed with a set of performance measures being responsible for projects, training, resources etc. Although this setup of a specific internal customer responsibility had emerged during the last couple of years it was now formalised that it should be done this way. Thus, it was not only the category management section that was to be organised around internal customers, also the sourcing project teams were now organised more or a less with a defined boundary to business units in terms of roles and responsibilities.

Another node in the change process of GFPG was distribution of procurement competences to business unit so they could buy professionally themselves. This ambition of decentralising competences became a significant element in the notion of being a competence centre. The activities were primarily based on GFPG’s procurement competences, which as mentioned were based around pre-contract work. A sourcing manager says about distributing competences:

*“...it was the title on our business plan. I am not sure but I think it was three years ago. So it was there we first ourselves began to have the mind-set about reaching as far out as possible. It is there where we say, we can do a lot ourselves or we can make others do a lot as we have*

*done and then support them in doing things right. That was where it started for us...it was not there four years ago when I started. There it was more like can we do a sourcing project, what are the results and can we do more sourcing projects. Who can we do it for?...Our five-year plan is exactly that we move more towards being a 'centre of excellence' and there we enable the group [GlobalFirm] to do it themselves and to share practices all the way round."* (Interview with sourcing manager)

This ambition was in many ways a different strategy than carrying out sourcing projects on a mandate from business units. In the latter situation, there was a clear work process and reward system, whereas distribution of competences initiated a new discussion to how GFPG should be measured as a procurement group. For example, GFPG was marked by a high turnover of employees in its nascent years where after working a period in GFPG, became employed in other parts of GlobalFirm providing a platform of relations to GFPG. From the perspective of distribution of competences it was a positive element because it increased the overall procurement professionalism. It can also be argued that it increases the probability of more internal customer buy-in. At the same time it was a challenge in terms of how measurement of GFPG was effectuated. That is, the measurement was based upon the savings it was able to provide divided with the cost of running the procurement organisation. GFPG's effectiveness, thus, was measured primarily by the indicator of being able to generate savings of more than its cost as an entity. In the context of how GFPG has developed as a procurement organisation, one manager says about the performance measurement:

*"We try to make them as hard as possible [performance measures] but clearly there has been a re-thinking on how we measure what we do? Previously, we have said that what we make internally [in GFPG] we can measure and report as savings. However, what if we initiate something and it is the business unit that carry out the activity, perhaps with some consultancy help from us, how can we be measured? Or what if we have our online tools and [internal customers] are using it? Here, we are still dealing with how much we averse the expression "savings" because there is so much else we do that has GlobalFirm value. Year after year we experience that when our CEO and CFO [chief financial officer] looks after the results, they look at the numbers. In the end this is what is looked upon"* (Interview with sourcing manager)

Following how GFPG was measured, an apparent incentive for GFPG was of course to agree with the business units about the expected cost-savings, so GFPG could denote its significance. The more cost-saving provided the more could GFPG increase the cost base of running the procurement organisation according to the incentive. Although the cost-saving calculation denoted the measurement of GFPG it was not a means in itself; it required to develop procurement management technologies (as elaborated later). The new task represented by the sourcing projects was a service supplying a cost-saving to fulfil demand. Supply and demand increases each other in bipolar feedback. The more sourcing projects demanded the more GFPG developed and grew in order to



supply demand. Being measured by how much cost-saving it could achieve required that more and more synergies were identified at the same time as already identified synergies were realised. GFPG became more and more an endogenous part of the company and the boundaries of the exogenous model became difficult to uphold. This is the expression of the exogenous installed processes travelling in an endogenous process towards self-organised criticality in an endogenous complex process. The “use-principle” influenced how GFPG unfolded and how it is used in connection to internal customers. GFPG entangled a federal structure oscillating its behaviour between local-led (the autonomy of business unit decision-making) and center-led (GFPG being the competence centre of a professional procurement approach). This oscillation is further demonstrated in the following table:

Oscillating center-led and local-led authority	Comment
<i>“...when we make a saving on behalf of our business unit then we have to make sure that we one way or the other get an accept from their side that what we have done is correct because the first thing people ask about in terms of GFPG is what value do you create for us as company, or business unit, or group section...when we have bought this good then it is a forward projection of 15 years and there we make an assumed saving but as long the business unit agree with the principles to how we have calculated this and they sign-off, then they at least agree with us that it is a correct approach we have done...” (Interview with category manager)</i>	In order to get a sign-off to contracts and convince sceptical business unit GFPG create value it was important to agree on the coordination principles with the business unit
<i>“The “worst” is if we get a really high saving on a project. Then you can ask question about the spend, i.e. whether the budget are too high and you [i.e. the internal customer] have been poor in analysing the budget. The next question is whether they have been inferior negotiators or that the market really has had that much influence...in some places you can get 25 % savings other places 15 %, even though it is the same we actually source, or we negotiate. Then you can ask a question was it the local market compared to another local market, or is it because they do not know the process well enough. There we can come with a recommendation, but there you really have to be careful because then you start pointing fingers and that should not be used; it is a political organisation” (Interview with sourcing manager)</i>	To discuss the amount of saving from a project is a political abstraction, where GFPG are careful about expressing the value it has delivered because it create defensive mechanisms and resistance from internal customer

<p><i>"Of course would we prefer a mandate but that does not indicate that we are not doing it in collaboration with the local. It is not us alone that have the decision; it is always a mutual decision...there are never problems in the small projects, on the large projects there can be because there politics come in. On the small projects it is typical that we have achieved a new price and it is the best, then we take it. On the bigger projects, there you can have some saying; "but he is too small, so him we do not want to trade with after all", and there we go in and say "this we will not accept so this goes up in the system". We have sent information out to customers and suppliers saying it is only top five that can be awarded these services and then it is no good that you take three or four out because you have a better relationship with number eight, ten, and twelve." (Interview with sourcing manager)</i></p>	<p>Interaction with business units; agreeing on a cost-saving calculation and discussing which suppliers to choose. For CPFG personal relations were unwarranted whereas business units had preferences.</p>
<p><i>"It is about to belong to the past that they can just say no, there is a focus on to do things the right way. There will be challenges, this there are everywhere. There are some suppliers, you just have a closer relation to than other; there will be some [suppliers] people would be sad to lose. This does not change that we still have to go in and challenge them... perhaps it is a matter of argumentation. They [stakeholders] kind of need to justify why we should not do it like this" (Interview with sourcing manager)</i></p>	<p>In the slipstream of the supply-demand breakdown the claim for the "good argument" should decide authority</p>
<p><i>"We try to look at what our internal customers' core competences are. Some of what we buy is not their core competences, so could it be different taking it away from our internal customers and then let the suppliers doing it instead" (Interview with category manager)</i></p>	<p>Increase external spend so the category could increase its spend area</p>
<p><i>"...it is a big machinery [this business unit], which cannot change in one day or two. Sometimes it may be the small battles that needs to be taken to change some things continually because there are so many people involved and if we have to make specification changes on [this item] because we think it is right, then there are so many calculations that have to be certain when we go to market it is perhaps a [considerable dollar amount] we make during a year. Our business unit is conservative in the sense that things needs to be worked and calculated thoroughly before changes are made" (Interview with category manager)</i></p>	<p>Thorough calculations, such as total-cost-of-ownership, were a prerequisite to change: commercial calculations installed to increase authority</p>

**Table 10: "Oscillation between center-led and local-led authority – Case II"**

The oscillation of center-led and local-led authority affects continuously the development of increasing and decreasing coordination lines between GFPG and the business units. The following figure illustrates the dynamics of activities as captured in this section between local-led and center-led authority:

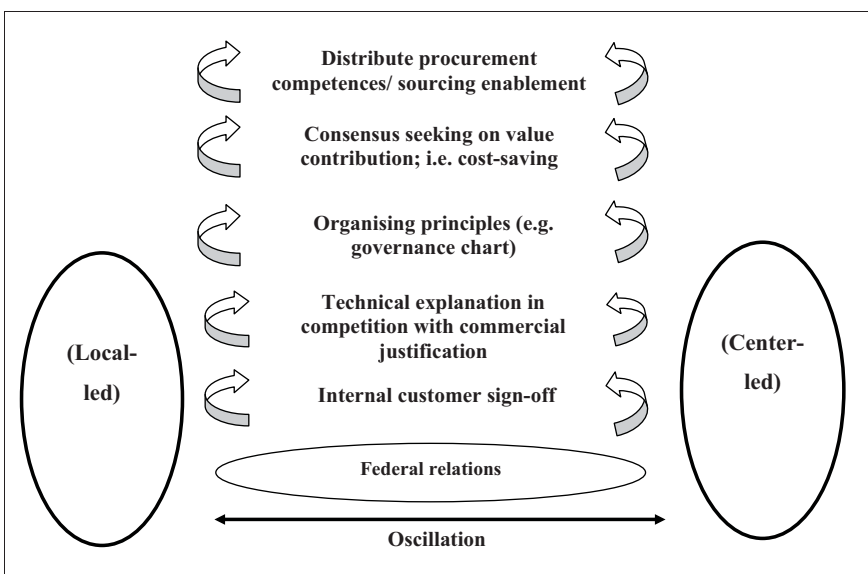


Figure 26: “Oscillation between local-led and center-led authority – Case II” (Author)

Procurement organising is dependent on the vantage point from where we abstract. Importantly, different vantage points create different contradictions and effects. For GFPG the primary contradiction is cost-saving and cost-consumption. That is, a contradictory relation between effectiveness (doing things right and demonstrating value) and efficiency (the amount of resources spent on achieving effectiveness). GFPG is an overhead cost and an indirect cost of the company, whenever it consumes resources it has to justify them. The way GFPG was measured explicates this in terms of how much cost-savings it generated against how much it cost as a procurement organisation. Thus, the development towards being a competence centre carrying more cost were connected to the challenge of measuring effects of being a competence centre. Although GFPG was measured on a cost-saving calculation, it carried out many activities that did not directly referred to being measured on a quantifiable cost-saving. The case so far challenges the notion “what you measure, is what you get” (e.g. Butler 1995) in the sense you also get a procurement group that wanted to challenge the status quo of what that measurement denoted. The activities covered an ambition of being a competence centre and having a center-led procurement organisation required more overhead cost, which by the existing measurement only could be justified by GFPG increasing the amount cost savings achieved. This tension is central when investments in procurement

management technologies is addressed and what happens in the conditions of organising of a federal relation in an endogenous process.

### ***7.3 The Supply-Demand Breakdown – Bifurcation and Oscillation of Opposites***

This section enfolds the organising between GFPG and business units into the bifurcation points of the financial turmoil in the fall 2008 (also referred to as the supply-demand breakdown). First of all, the question is how we can understand this supply-demand breakdown from a complexity science perspective. The supply-demand breakdown is not created by an external shock but is an “internal” manifestation of how supply and demand relates, and in a broader notion how the production and consumption produce dynamics. We can here refer to the theory of self-organised criticality, also sometimes labelled catastrophe theory, where small and large changes come from the same microscopic entities but no individual microscopic entity per se. The supply-demand breakdown is then a critical point where the structure diversifies maximally in continuous interaction and self-reference without no external observer to guide direction. The change is caused by a double-moving contradiction where supply and demand has continually undermined and supported the process. That is, goods and services are being more and more expensive supporting a demand for those supplying demand and decreasing demand by the inability that more and more entities can afford the goods and services. That is, the double movement of contradiction and the bipolar feedback of an autopoietic dynamics regarding the supply-side and demand-side of a company.

Up to the point of the turbulence surrounded by the outbreak of the supply-demand breakdown, GFPG had experienced a change process, where the procurement organisation had become bigger and bigger, more and more involved in business units and spend categories. GFPG had also expanded its geographical scope and applied more and more management technologies to demonstrate procurement professionalism. The supply-demand breakdown as a bifurcation point was a symmetry breaking process where GFPG diversified producing breakdowns in terms of an unsure position in the company and breakthroughs through the increased cost awareness that were emerging in the company.

After the supply-demand breakdown the process was first of all demarcated by a decision from top management in the company. The decision concerned the role of entities that were not part of the business units profit centre activities, in order to reorganise and rationalise the company. The context of this decision, however, was not only the supply-demand breakdown as there also was a direction in the company from top management that it should have a more holding-like form. That is, a form

where each business unit governs its own business domain. As such the decision could have led in many directions including to close down GFPG as procurement organisation or may even also have upgraded it. However, the decision was that GFPG was to become a service organisation. This outcome changed the conditions for GFPG and assisting business unit on their request. Thus, the challenge as a competence centre was apparently met with difficult conditions. The pressure was on central offices and procurement in particular because the strength of GFPG was its search for synergies between business units. The decision of being a service had some consequences for the way sourcing projects was carried out on the short term. Rather than running a project with the authority to suggest scenarios, GFPG became more an 'instant service' assisting internal customers in business units. For example, GFPG assisted in a project with a business unit that suffered significantly by the new market conditions identifying savings in many small 'spend' categories.

After the bifurcation of the supply-demand breakdown several inventive nodes took place. A dismissal round was taking place in GlobalFirm and GFPG. However, measured in per cent it was quite low for GFPG compared to other group management functions. Some of GFPG's international procurement offices also experienced a temporary decrease in the number of employees. It was also decided that GFPG's office were to be re-located due to space management consideration as the rent was considered too high. A profit-centre business unit moved into GFPG's office instead. Another initiative that was taking place in some of the categories was re-negotiation of contracts that adjusted the prices to the new market conditions. The same categories, however, already a few months after completing the re-negotiation of contracts, were asked to survey the market conditions of the possibility of the market prices increasing again. These re-negotiations of contracts also were an inventive node that bifurcated the off shoring of procurement activities centre (elaborated later). The changes could also be captured in the business model of GFPG. Although being a competence centre and capturing GlobalFirm synergies still was highlighted, the notion of functional leadership and driving procurement standards was made silent at the expense of more particular competences. These competences focused more explicitly on improving the value equation of GFPG and the ability to demonstrate cost savings against the cost of running the organisation.

An important node was top management in a reaction to the supply-demand breakdown decided to introduce a significant cost-reduction program to be completed within a year. This produced a successive bifurcation providing new possibilities, in particular as one of the top managers in GFPG became a coordinator of the cost-saving program. Moreover, GFPG moved towards self-organised

criticality in a further intensification in the oscillation between local-led and center-led authority after the supply-demand breakdown. For example, one of the activities that had belonged to being a central office was making centralised company-wide contracts on selected items and afterwards assess and survey that the contracts were complied with. However, this activity was abandoned and the entity in GFPG responsible for compliance of contracts was closed down. At the same time the market conditions and the internal re-organisation in GlobalFirm also made it more difficult to ensure compliance:

*"One would presume it would be easier for us in these times, because it is not only that there are someone saying that you are to use these agreements but also that you have to reduce cost; you get fewer people and fewer resources to move around with. In a certain desperate situation or in a desperate market it is easier to promote procurement ideas because they are more willing to do something else than they used to do. They come out of the comfort zone...It is clear we look from a group-perspective which is part of our job. On the other hand, what is also part of the re-organising of our company is that each individual unit must be a cost centre in terms of that there should not be any one else "carrying" others and then it is no good if you are part of this group agreement, if it is more expensive for you." (Interview with sourcing manager)*

The increased cost awareness in GlobalFirm produced multiple directions for GFPG where successive bifurcations followed each other. The supply-demand breakdown and the decision to empower the business units changed the form of GFPG in terms of that group contracts had been one of the first activities that enabled GFPG its significance. Although these group-wide procurement agreements were a result of thorough analysis where many professional procurement considerations have been taken. For example, total cost of ownership analysis in terms of quality, product-life-cycle, and service. The frame-agreements were pressured by short-term perspectives on individual budgets. Moreover, the value of group-wide agreements is dependent on economies of scale; i.e. that many agents are using them. However, the contracts were pressured by agents having access to local information (budgets) at the expense of long-distance information; if everybody would use the contracts it would benefit the cost base of the company as a whole:

*"...it is also more difficult because there will always be something. If you are placed in China and we say it is [producer x] we are buying at and there down the corner are a [producer y] factory, which out of the backdoor sells to spot prices, then it is really difficult to counter argue, also in times where you need to save money" (Interview with sourcing manager).*

At the same time, business units were authorised with more autonomy of their own business. However, GFPG was also authorized with more authority because of the pressure of providing cost-saving to budgets within a year. In that context, the management technologies that were connected to the sourcing process model enabled opportunities as there emanated more attention towards the

process tools connected to the sourcing process model, in particular the e-auction part and off shoring of procurement activities. Due to the changes in the supply-demand relation (elaborated in next section), opportunities aroused in supply markets to reduce cost in contracts:

*“...we been in a market, and this we have been for many years although it now starts to turn because of the crisis, but it has been a suppliers’ market on many areas that are important for us, strategic categories...”* (Interview with sourcing manager)

Again, the bifurcation of the supply-demand breakdown offered both opportunities of breakdowns and breakthroughs, especially in terms of those management technologies that could demonstrate cost-saving potential on a short term basis. Thus, the decision about GFPG that it should be a service entity was only a node in multiple bifurcations in the context of the oscillation between center-led and local-led authority. In this process, GFPG continued to develop competences through their investments in specialised procurement competences (i.e. off shoring of procurement and e-enabled procurement), which were particular relevant for delivering these cost-savings. In particular, the participation in the large scale cost-saving program, which had top management priority and attention was an opportunity to apply e-auctions, the newly opened off shoring of procurement activities centre, and category management in renegotiating contracts were mobilized as enforced management technologies. Although these investments may be regarded as a service to the business units, it was strategic competences for GFPG (the perspectival element). Hence, the breakdown in the supply-demand relation had provided more pressure to the business units and new arguments to achieve a higher buy-in in terms of professionalising procurement in GlobalFirm. Hence, it opened a window of opportunities to improve how GFPG was measured in terms of how much cost-saving generated and how much it cost to run the organisation.

A significant spend area in terms of travel was centralised and to be maintained by GFPG. A procurement council was established in GlobalFirm and in many of the business units, individual procurement organisations were established as well as a CPO was hired. The CPO of GFPG became the coordinator. The procurement council underscored the federal relation of procurement organising in GlobalFirm and the oscillation of center-led and local-led authority. However, the procurement council also became a space for GFPG to distribute its competences and setting procurement standards, although it was a council based on mutual participation procurement top management throughout GlobalFirm. One of the primary activities in the beginning of this council was to develop and agree upon a standard set of important procurement performance measures that were to be guiding principles for procurement professionals in the company as a whole.

From the procurement domain literature we may articulate that GFPG has started as what Cousins et al (2006) would call a ‘celebrity’ procurers with an undeveloped skill base (however supported by a consultancy company) but a high top management support. From this position it has developed a professionalism of procurement including specialised procurement competences. Instead of the gradual development of procurement and the status it perceives in the procurement domain literature, we can from the lenses of a complexity science expect bifurcation points that render unpredictable ways of change. The bifurcation process from the outset of the supply-demand breakdown can be illustrated in the following figure<sup>6</sup>:

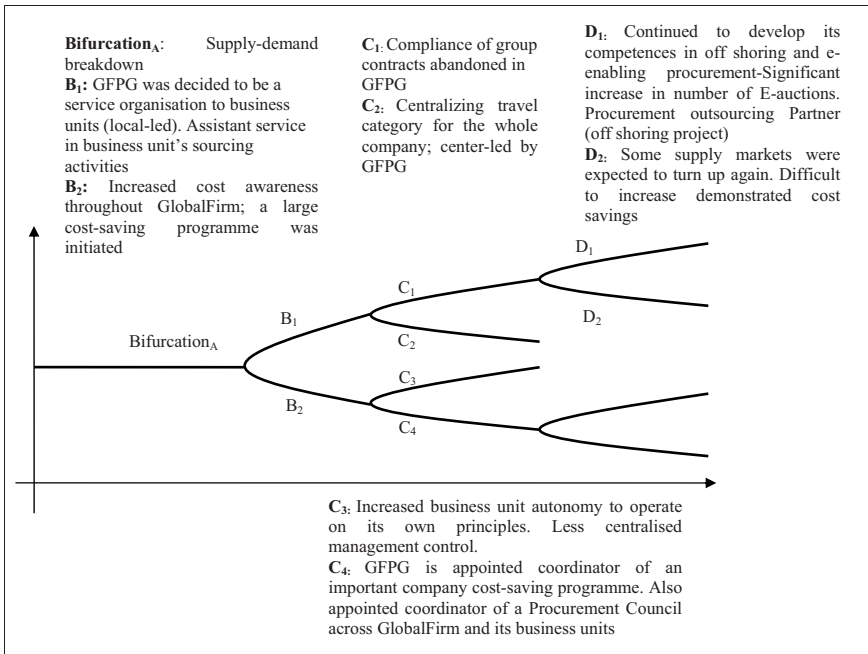


Figure 27: "The bifurcation process of GFPG from a supply-demand breakdown bifurcation" (Author and adaptation from Prigogine 1996:69-70)

<sup>6</sup> As in figure 20 in Case I, the vertical axis of the graph is the variables of the system and the horizontal axis is a parameter that can bring about bifurcations.



The dynamics of this endogenous process is the oscillation between local-led and center-led authority which provided opportunities for individuals engaging in bifurcations. Hence, the above figure illustrates points of nodes of the inventive possibilities a process display as well as the degrees of freedom and determinism of interconnecting elements and processes for procurement management. Process being history and possible futures, the decision of GFPG's role in the company is only a node that is non-linear with the system's behaviour up to that point where an autopoietic (self-organising) feedback creates counter-strategies. The system is only able to maintain its identity by constant renewing itself and agents accommodating themselves to new behaviour by feed-back loops (i.e. the autopoietic feedback structure). The dynamics of this procurement management is its "internal" contradictions of the endogenous net of totality of relationships. Not from any external caused variables and events. Hence, the change after the supply-demand breakdown is a process without interference from any outside agent where the network diversifies by its internal dynamics. In the absence of an external reference point, the dynamics arose from different agents to progress in the system where a cascade of bifurcations offered the opportunity of GFPG to experience breakthroughs and breakdowns. What first appeared as breakdown through the decision of downgrading GFPG was through the dynamics of autopoietic feedback and counter strategies after the supply-demand breakdown, a bifurcation creating the opposite effect. GFPG eventually grew bigger in geographical scope and in terms of its connections to the business units. For example, in GFPG's role developing the procurement council. In the next section it is elaborated how the specific management technologies; e-enabling procurement, procurement competence building, and off shoring procurement were travelling in an endogenous process before and after the supply-demand breakdown.

#### ***7.4 Procurement Management Technologies: Travelling in an Endogenous Process***

The investments in e-enabling procurement, off shoring procurement and procurement competence building were all related to the exogenous sourcing process model by a proposition to make the purpose of the model more efficient and effective. First are the three management technologies separately in focus in terms of their planned intentions and the bifurcation process after the supply-demand breakdown. This was followed by an analysis of the three management technologies in the fitness landscape. As it is going to be demonstrated, these management technologies were all entangled in the oscillation between center-led and local-led authority and when they were travelling in an endogenous process they exhibited a double moving contradiction between efficiency (cost, resources spent) and effectiveness (value, doing the right things).

#### 7.4.1 E-enabled Procurement

E-enabled procurement centred primarily on e-enabling the sourcing process model and establishes a procurement knowledge platform in order to professionalise procurement for procurement professionals and non-procurement people that did procurement. E-enabling the sourcing process model was a broad encompassment of the activities in pre-contract work. The related tool and activity of e-auction (e-auction optimises the negotiation process, where instead of the buyer negotiates with suppliers individually, the suppliers are in principle negotiating with each other instead) became an important possibility for GFPG to increase its significance in the bifurcation of the supply-demand breakdown as previously described. One of the major benefits of e-enabling GFPG's sourcing process model was that it allowed addressing and inviting many more suppliers into the buying process than could be achieved manually. That is, it intended to make the request-for-information, request-for-proposal, and request-for-quotation more efficient as well as there is a built-in causality that the more suppliers included the better price in the end. The sourcing manager of the e-enabling technologies said about the overall ambition:

*"The way we use the tools today is kind of what you can label opportunistic. There sits somebody somewhere [in GlobalFirm] that has heard about this and would like to try it. However, at the same time there are by the hundreds who have not heard about it and which by the way has a quite solid resistance towards changes, and would like to continue what they are doing on their own way. We have made a strategy for the roll-out of this tool...at the end of the year has a company standard that if you do it, then you do it like this"* (Interview with sourcing manager)

E-enabled procurement necessitated standardisation but also required a need for coping with variability. The benefit was that everybody would have a standard way of doing the work process at a category level. If the standardisation did not fit the user, or the user did not accept the way of doing it "standardised", it should be known why. Thus the effectiveness of this e-enabling process was that users were willing to share their knowledge and experiences. From these conditions followed two things. The standardisation process was done at category level and the e-enablement of the sourcing process was closely related to the development of virtual networks and establishment of communities of practices. Furthermore, from this standardisation process it also followed that the e-enablement team needed to "sell" the technology:

*"...there is much sale in this. We were running a range of projects which have provided us with good results. There is nothing like concrete examples to convince our colleagues....For example, this specific auction [initially starting with 1200 suppliers where 315 fulfilled*

*requirements] we ended up with the same supplier as previous, the price is just 13.8 per cent lower” (Interview with sourcing manager)*

The primary buy-in arguments were, besides the assumption that the more suppliers there are in the tender, the more attractive is the result, to convince about a claim that it will become easier and save up time, when the process has been installed. So, it brings competition into the sourcing process from the outline of the process model as well as it saves times. Therefore the tool in principle holds a promise of both efficiency and effectiveness with no apparent trade-offs between the two. Moreover, although the e-enablement of the sourcing project, in particular in the context of the e-auction tool, facilitated competition among suppliers, it did not necessarily indicate that actual disintegration took place in a buyer-supplier relationship as exemplified in above quotation. Another element of the e-enabled procurement was contract management that was the most distributed and applied tool. It was also the e-enabled procurement tool with the longest history introduced by GFPG. This tool moreover had a close connection to work routines of many part-time buyers and procurement professionals. Therefore the “sale” argumentation was pronounced as more approachable than the other parts of the e-enablement opportunities. For example a category manager expresses:

*“...where we have a considerable interest in this [e-enabling procurement] is the contract management tool. This is also a demand from our business unit that they want to see the contracts and what we buy, so they have access to it...it is also in our interest, we get so many requests on mail if we do not use it” (Interview with category manager)*

The contract management exhibited a decentralised solution but also a visibility that provided GFPG availability of information. For example, potential synergies could be identified such as if GlobalFirm had many contracts with the same supplier. The arguments of applying e-enabled procurement in terms of the promises of efficiency and effectiveness are thus attractive; however, in terms of its actual use it was more difficult. Although e-auction had been applied in sourcing projects there were still many places where it was not distributed or visible. For example, category management teams exemplified use of the technology specifically in terms of e-enabling the buying process and the application of the e-auction tool. It also illustrate why the standardisation tool was difficult to distribute:

E-sourcing far from equilibrium	Comment
<p><i>"...the contact person at the suppliers has ten production sites in China, each having different price-structures...The supplier cannot handle and get an overview on how to put data from 8-9 different factories and press enter. This is clearly a limitation for us, other things we can use e-sourcing for is RFI [request-for-information] and RFQ [request-for-quotation] because this we already do. We can say we do not use the system as it was intended, but as how we see fit?"</i> (Interview with category manager)</p>	<p>Increases the need for coordination in the supply relationships. Has negotiated its own boundaries to make e-enabling procurement fit the category's operations.</p>
<p><i>"...it is something GFPG has an interest in that we get this e-sourcing in as much as possible. It is not like our business unit are pressuring us to use e-sourcing tools, rather it is that we are pressuring them...however, there is also interest from a stakeholder in a business unit that we get in because one of the persons down there has previously been working in procurement..."</i> (Interview with category manager)</p>	<p>Difficult to convince internal customers although a former GFPG employee worked as enabler</p>
<p><i>"... it is a matter of priority...there are some things that need to be incorporated and to be sure 100% that it works. There you can say it is only a problem first time it has to be done and there will also be some training of the suppliers. We will not go out and pressure our suppliers and push this through before we have had a conversation with them about it..."</i> (Interview with category manager)</p>	<p>The resources required are extensive the first time; however, the impact is also most significant the first time</p>
<p><i>"Every time you have a clear specified product and a clear specified forecast, and you have control of your internal customers, then e-sourcing is an obvious tool to use. Where e-sourcing is less obvious is where the forecast is not particular well defined, you know that you do not have control of your internal customers and that they can object and say that this they are not going to accept, then it is no good to run an e-auction. There has to be pretty clear lines of responsibility and preferably select the supplier with the lowest offers...It is not particularly often that we have a mandate although I think we now will be able to have it more often. Typically we do not have a mandate... earlier we either had to take a chance or drop it and say then we cannot source for you because we do not have a mandate "</i> (Interview with category manager)</p>	<p>The e-sourcing tool could be applied in this category; however, because of product specification and in particular because the category did not have the authority of buying process the tool was not implemented</p>

**Table 11: "E-enabled procurement in use"**

The categories negotiated the boundaries of the e-enabling procurement management technology in an oscillation of variability and standardisation. In some cases the standardisation was too powerful, especially in cases that required authority of the procurement decision. Thus the condition of integrating e-enablement in the sourcing process model is conditioned by the federal design principle and the competition in the supply market. The e-enabled procurement investment becomes part of the oscillation between center-led and local-led authority. The quotations from the categories therefore

also highlight the importance of relationships as means to getting buy-in and stakeholder awareness as well with the constraints of suppliers. In terms of the buy-in for the use in category management it is a double buy-in process where both category management and the internal customer have to be convinced.

Importantly, from a complexity science perspective, e-enabling procurement and the use of e-auction, is not a technology that promises efficiency and effectiveness without contradiction. The effect of running an e-auction, the highest cost-saving effect was achieved when running it the first time on a commodity. It became more difficult over time to produce the same effect:

*"It might be that you get high savings the first year, but less savings next year, and even less next year again and also there comes a time where the market goes up and it is not possible to make a saving...In terms of savings, you will get less savings the more you run it [e-auctions]..."* (Interview with sourcing manager)

In a GFPG context e-auctions provide a high impact in terms of demonstrating the effectiveness of GFPG (i.e. how much it provide it demonstrate cost-savings against the cost of running the organisation). Effectiveness (or value through a cost-saving) thus decreases over time unless more and more categories and spend-coverage are involved in order to demonstrate the effectiveness of GFPG from a cost-saving perspective which was the value it was measured upon. However, at the same time, the e-enabling team had to use more resources in order to demonstrate the same value and therefore increasing the cost of running the procurement organisation. An answer to this was to build a knowledge platform in order to increase the spend that has to be covered by e-enabled procurement and enable coordination in a decentralised environment. However this proved to be an immensely difficult task to do establish from a centralised position:

*"I do not experience that people are eager to share feedback...we are working on changing this, for example you can observe at the Internet that there people, in their private sphere, are willing to discuss for dear life. These conduct would we like to have transferred to the professional engagement as well"* (Interview with sourcing manager)

This underscores the oscillation of opposites through variability and standardisation where GFPG on the one hand had to command that users should use it in a certain way at the same time as it should fit the boundaries of the decentralized entity. Hence, this again underscores the oscillation of local-led and center-led authority where the process does not go to rest; rather, the boundaries are constantly negotiated. In that regard, the supply-demand breakdown as bifurcation point increased the possibility

of expanding the use of e-enabled procurement. In particular, the running of e-auctions which were materialized in categories that traditionally had been difficult to reach:

*“...If you had asked me a half year ago if it was possible to run e-auctions on something as railway transport, then I would have said that it is not possible and I am supposed to be the primary ambassador of whole this area [e-enabling procurement]. So there is clearly a pressure from the business that they will do whatever it takes to improve their own processes and to find new savings so they can make more money. It is here we step much more in character as a service organisation and not as a procurement organisation that has the responsibility for the company's purchases but that we services all units from a group perspective, that we are available with processes and tools, also when they themselves go out and source”* (Interview with sourcing manager).

The e-auction possibility gained momentum in GlobalFirm after the supply-demand breakdown and was highlighted in the CPO's scorecard as something to gain more focus in order to increase the 'spend' that GFPG was to be involved with. This management technology then increased its fitness temporarily due to the increased cost-awareness in GlobalFirm and also was included in the off shoring of procurement activities.

#### **7.4.2 Procurement Competence Building**

In 2008 it was decided to establish a team that should be responsible for driving procurement competence building. It was a central element in the objective of realising procurement functional leadership in GlobalFirm. The activities centred primarily on general procurement training for relevant GlobalFirm participants (e.g. part-time buyers), specific training for procurement professionals, and then an ambitious talent program for future procurement leaders and specialists in GlobalFirm. In line with developing a centre of procurement competence, specific long-term perspectives were also to develop procurement competency maps, a procurement leadership program, set standard for procurement job requirements in GlobalFirm, and ensuring a process for attracting procurement talents. At the start-up of the procurement competence building team the job and ambition was primarily to secure a procurement leadership pipeline, raise procurement competencies throughout the company, and develop procurement skills to enhance a professional approach to sourcing enablement:

*“...what we focus on is to distribute the process through what we call sourcing enablement, how we enable the competences at our procurement people and our non-procurement people that do procurement”* (Interview with sourcing manager)

Thus the role was similar to e-enabling procurement management technology in terms of the role of distributing procurement out in the company from a centralised position. GFPG already has

established a training module where employees in the company could get training to perform the sourcing process model. When establishing the team for procurement competence, the identified short-term challenges was to work on such as how to measure value of training, establishing a talent program, project and category specific training, procurement competence mapping, and sourcing process development. In terms of the latter, although the model was a central building block at the development of GFPG, there was no directly responsible for developing it. As mentioned in the change process, distribution of procurement competences became a central part of GFPG's business model and aspiration and this team was designated to have an important role in this ambition throughout GlobalFirm including the development of a procurement community of practice. Hence, the competence building was provided with an important mandate for the future development of GFPG as a central element in reaching its long-term plan at that time. To add, the primary competence of GFPG through its history has been the sourcing process (i.e. pre-contract work) and this was the only training element that was carried out by GFPG themselves.

The talent program became the central concern in this case as it was the only investment that unfolded during the investigation. The target group for participating in the talent program was besides working in GlobalFirm that they should have either an academic background or considerable experience with strategic procurement and having an ambition and potential to a career path in procurement. The talent program consisted originally of the modules; 1) procurement strategy; 2) procurement economics and systems; 3) building the procurement professional (professional skills); 4) global sourcing; 5) supplier relationship management. The talent program was built up with half of the participants from GFPG and the other half from business units. The cost of running the talent program was financed by the position the participant came from and thus the program was supported by both business units and GFPG in terms of the cost.

The first module had been taking place just before the bifurcation of the supply-demand breakdown, so the investment was already in motion and several of the modules were planned in advance. In between module one and two of the program, however, the bifurcation of the supply-demand breakdown provided challenges for the competency building team. At the present time it was announced by the company that a thorough assessment had to be made in order to reduce the cost-pool of the company and training was exposed as a means:

*“Things have been in upheaval since I have taken over this responsibility and we definitely need to do things different than we have done in the last many years. Be that as it may, there is*

*now a clear focus on reducing training expenses in the company...to get as much liquidity and aim to have cost as low as possible. It does not necessarily indicate that the long-term prospects for training is taken away but...we have to re-evaluate our efforts, which at first indicate that all training is postponed unless it is business critical...For my part, it influences that some of the things that were put on hold until we were able to handle them, is put on hold a little longer or may even be out of the picture. Other things are continuing as it is now. I do not know much more than that right now and it can change quickly along the way...from day to day”* (Interview with sourcing manager)

As might be expected from how GFPG was measured as an entity, it was the competence building investment that was among the objects giving the critical look. However, at the same time the decision about GFPG status was evaluated, which as mentioned signalled that ‘functional leadership’ activities were no longer prioritised. The challenge became particularly to demonstrate the value of competence building; i.e. how to make it measurable in terms of its effects on quantifiable cost reductions. That is, the activities had to be recognised as business critical:

*“You can discuss what that is business critical but that is up for those that are responsible to decide that...I would argue that if a business unit is challenged upon that it has to cut its cost, then I would say that sourcing and procurement is business critical. You need to have the competences; to actually do what is necessary to be done”* (Interview with sourcing manager)

In this way, the procurement competence team were entangled into a cost-saving – cost-consumption opposition where the value was measured by a cost-saving while at the same consume cost in order to provide that value. The primary focus for the procurement competence building team was to demonstrate the value of the talent program, which as mentioned already had been invested in and was in-process. However, there were no immediate cost-saving potential connected to this investment. Hence, the original plan of the talent program setup was challenged:

*“It is a huge investment, and I think it comes back ten-folded but this is difficult to prove in these times. What of course is my challenge is that if we close this down, then it will be remembered as the program that started and closed down. So we will drive the first round of the talent program to an end. We had originally planned to start the second round in this year so that several programs were running at the same time, but I really do not think that we will get the money. I do not think there are enough business units that can justify it...”* (Interview with sourcing manager)

The manager of the program were to spend considerable effort to demonstrate this value and although the arguments that executives were convinced of its relevance, it was not enough because of the ambition to save cost within the budget year it was on the boundary to be changed (i.e. the investment was on the edge of chaos). One of the value elements for GFPG internally was the relationship building with business units:



*“At first module there was a lot of time spent on talking about what it actually was we [GFPG] can bring. There was actually much scepticism, so all these change management aspects, without at all being instructed to it, most of them from [GFPG] had to go in and say that this was not correct and we sit here and do this and so on and this will help you in this way. So from this position they came from and exerted this effect, which was really positive for us [GFPG] of course as well”* (Interview with sourcing manager)

For GFPG this investment was an opportunity to “sell” its services by improving the perception of them. Accordingly, the talent programme became a part of the buy-in strategy for internal customers. Another viewpoint of the programme was that it had replaced another program, which had been conducted internal in GFPG. That is, without participation of business units. This former program had provided a platform for ideas (in business case report) that later had been implemented in GFPG. Therefore, the talent programme was at the same time a space for developing new ideas and contributing to the process innovation of the sourcing process model and activities around it. So, for GFPG the program was a central management technology in its own competence-building in order to increase its significance and ability to search for synergies within the business units and the supplier market. As also described in the change process of GFPG, the movement from being organised by projects to be organized around internal customers, required that GFPG became more and more capable of identifying synergies.

The second module of the talent programme was to take place close to the newly established off-shore service centre. This again provided an opportunity for GFPG to create a buy-in for its services (this is elaborated in sec. 7.4.3 – Off shoring Procurement Activities). Moreover, the second module took place at a time after the supply-demand breakdown where many business units were strained in terms of the rapidness of how market demand was decreasing, pressuring many of the participants of the programme in their daily job. Many of the training sessions were about how procurement practices could deliver value in the organisation such as ideas from the supply chain management concept and how to manage outsourcing. However, it was difficult to take the sessions out of the daily context. For example, it was difficult to talk about total cost of ownership as a valuable procurement tool because most of the participants were pressured to deliver cost-savings currently within the budget year; not a focus on a life-cycle perspective of cost over ten years.

The third module took place the fall 2009 and what was decided to the final module of the first talent programme, instead of the five modules which originally was planned. In contrast to second module, the third module came about in a phase of relative stasis without bifurcation producing large-scale

change. Furthermore, due to cost pressure in the company and that the talent program had been reduced considerably, it was expected that GFPG forwardly should not be responsible of developing procurement competences in that way. However, after the third and last module, top management in GFPG, decided to continue the procurement program although the form changed from how the first talent programme was planned and implemented. The ratings and evaluation of the last module were significant improved from the previous rounds. The module had increased internal customer satisfaction and therefore the probability of increasing buy-in within the company.

The talent program should end up in business case report where each report was carried out by two people. Many of groups were a mix between a procurement professional from GFPG and then a participant from a business unit. One example of a business case report concerned to set up a supplier relationship management program in a business unit regarding an important sourcing category. The sourcing category was capital intensive and the supply-demand relation had imbalanced drastically at the outbreak of the financial turmoil. Tools were such as supplier segmentation, supplier market analysis, and supplier assessment to identify improvement areas in the relations. The key-issue was to create a dialogue with suppliers. This business case was also planned to be implemented and it was expected from the business unit that it would provide a significant outcome. The business case report had used the demand-supply breakdown to approach the uncertainty by bringing more interaction with suppliers on how to increase performance.

The claim, however, is not whether this business report was a success in implementation. Rather, it was a report carried out with the competences from GFPG and the business unit. The benefits would be reported in the bottom-line of the business unit, whereas for GFPG it would merely count as relationship-building with a business unit. In terms of measurement and reporting, it proved that the talent program could benefit the company. However, the business case report exhibited the difficulties for GFPG, as well as the procurement competence building investment, demonstrating its value as a competence centre and in general to demonstrate and measure its impact. In other words, the value was difficult to report as a saving and the programme also functioned as part of the buy-in process with internal customers, which was difficult to quantify as well. At the same time as GFPG showed an advanced competence to identify synergies, it also signified that the value was more difficult to abstract. Other examples from the reports were proposals such as developing a balanced scorecard to, among other things, guide the development of GFPG, a financing optimising tool in regards to contract, an approach to guide low-cost sourcing, and an approach to optimise the

specification process to avoid under and over specification. There were also a range of approaches to move around in Kraljic's model in order to consolidate supplier base. Top management in GFPG estimated from the suggestions that the financing tool was most likely to be prioritised and implemented. Although top management in GFPG in general expressed openness to new suggestions improving performance that went beyond merely taking advantage of the supply-demand breakdown.

The procurement competence building investment did not work out as intended from the agenda that this entity within GFPG was to be responsible in developing the central office as a centre of competence. Bifurcations points from the outset supply-demand breakdown offered breakdowns and new opportunities. Therefore, this talent programme as well as the procurement competence building team in general was entangled into the oscillation between center-led and local-led procurement authority. For example, an oscillation was the talent programme and how it moved between being terminated and continued, eventually it was decided that it should continue in a modified form.

#### **7.4.3 Off shoring Procurement Activities**

In the beginning of 2009 GFPG launched the off shoring service centre in Asia, which were to perform procurement activities for internal users in GFPG and later develop into an outsourcing partner of procurement activities to business units in GlobalFirm. GFPG's ambition was to continue what was characterised as a success with off shoring procurement routine procurement tasks and now launch off shoring of procurement activities concerned with the pre-contract work represented in the sourcing process model. The off shoring of procurement activities project concerned essentially the transfer of knowledge from high-cost country to low-cost country of pre-contract activities; however, with emphasis on the strategy that GFPG were to have direct control of the involved activities. The off shoring of procurement activities could be characterised as a new venue and approach to organising procurement where the basic sourcing process model stays the same.

Extensive preparation for more than a year was carried out in order to initiate this off shoring project. The effort was directed towards anticipating challenges with for example financial analysis of the project. The impact was expected to cover a couple of per cent of additional spend in GlobalFirm. The ambition was also to reduce time in sourcing projects, while specialising in parts of the sourcing process model. There were no immediate ambitions to reduce staff in headquarter of GFPG in relation to the opening of the off shore centre. Rather, time that was released should be rewarded improving the sourcing pipeline and gain more impact and spend coverage in GlobalFirm. The released time that procurement professionals were intended to encompass was therefore expected to

be directed towards focus on such as supplier- and internal customer management and preparation for negotiation. The off shoring project was so far implemented in a process where first a mapping of task that was suitable for off shoring took place. This mapping included for example spend data collection/mapping, supply market mapping/supplier mapping, data mining/data crunching, compliance check, market analysis/country reports, and power point presentations. One of the activities was also to support specific parts of the e-enabling procurement activities and in particular in e-auctions. Hence, the scope of activities was in GFPG both servicing the sourcing project teams and the category management teams through the reference of the sourcing process model. Then followed an evaluation of the potential of the service and although the scope of activities initially were connected to a relative low complexity, easy to describe, and required low interactivity with the user, it was still characterised as part of GFPG's knowledge capital.

The aim with the off shoring centre was also to provide an improvement for GFPG in how it was measured as a group (i.e. how much cost-saving it demonstrated against the cost of running the organisation). The off shoring centre was to start in the short-term offering its services inside GFPG to procurement professionals. Later, as mentioned, the service was to be launched as an opportunity to the whole company and GFPG developing into an outsourcing partner. Based on the initial feedback from potential users in GFPG, it was expected that many assignments were to be received from the beginning, which also eventually was realised. Furthermore, GFPG had been able to hire employees to the service centre educated with a commercial and engineering degree that also have had a career within procurement. Employees that GFPG had experienced difficulties to hire in developed countries, where the experience was that there was a bottleneck of procurement professionals with potential and experience. As such the off shoring project was an inventive node in the oscillation between center-led and local-led authority.

After a couple of months since the opening of the off shore centre, a combination of the escalation of the bifurcation points conditioned in the supply-demand breakdown and the overlapping context with the activities which had been carried out so far, demonstrated a peak of fitness (and momentum) for the off shore centre. A learning curve was established in order to deliver procurement services:

*"We can do standardisation and we can do it effectively, and we can also do it as a centre of competence. We add the quality that we do many things many times, make quantity, and make supplier profiles. I think [this employee] has made more supplier profiles than anyone else sourcing manager in the entire GFPG has done and this also affects that he know where to find things. He has already some downloaded reports, found by a coincidence or sent from one of*

*the stakeholders and by which he can draw from in case of questions.”* (Interview with sourcing manager)

From this quotation follows that it was through standardising the services that the off shore centre could promote its value. This was also articulated in the off shore centre’s value-proposition stated by the sourcing manager responsible for the initial implementation. Furthermore, because users of the services had to specify what and how they wanted the service, it could create awareness about what was important for the users themselves; what they could improve and what could be off shored. The services should be characterised by specialised, but standardised, procurement competences to support and improve the work in the sourcing process model:

*“...from being five generalists to do everything, then there are now perhaps two generalists that does something during the sourcing projects, which is going to be better at other things, and then there are some specialists who do the rest and feed into them. This affects that the quality from both places improves” ...”* (Interview with sourcing manager)

As indicated by the manager here, the primary competence of the service centre was that it could make other entities work more efficient and effective, which at the same time was to make the off shore centre more efficient and effective. Eventually this would promise a better performance in the way GFPG was measured in terms of the cost of running the procurement organisation. Consequently, as previously described, there was a promise from the off shoring centre that it could deliver both effectiveness and efficiency to the sourcing process model, in terms of doing things right and doing it with minimum resources. In this context, the project manager had from the beginning stated that the aim was to do value-added activities in work processes. This was in opposition to be a garbage can for clerical tasks, “nice-to-have” assignments, and support urgent matters. The project manager says about the first months of experiences:

*“It should not be such that we make ten slides, where you normally would make five. It has to be that we make five slides and then people do something different that create more value. It works well and to a high extent it is really about that you align expectations with the people engaged, challenge them, and “do you really need this?” You can say the couple of times where the situation had occurred, it has been clear-cut cases...we had an example with a request of twenty-eight supplier profiles, where we said that it would take up to a month to do this and whether we could do it in a different way; if we do top eight then it covers ninety-two per cent of the total spend and then perhaps we can limit it to that...even though that also could be a great deal of money after all...”* (Interview with sourcing manager)

After a few months in action, the off shore centre had expanded the scope of its activities and, among other things, it had been decided that it should be part of GFPG’s role in centralising travelling in GlobalFirm as well more increase the focus on using e-enabled technologies; in particular e-auctions.

In terms of the latter, it was a move from merely a support of e-enabling procurement to actually run projects themselves. About this progress:

*"After two weeks we already thought about what to do next. Because I could see that people were starting to get bored and we could do everything that was prepared so we started to analyse what we then could do."* (Interview with sourcing manager)

Hence, contrary to the expected, the off shore centre had already started to be involved in projects with business units. Although it according to the plan, first was to be the focus later on, after it had been applied thoroughly internally in GFPG. Thus the off shore centre changed moved from being a support unit to be provided a possible mandate to run activities and projects on their own. The activity of running e-auctions was a particular opportunity because it already had hired employees with competences in that area. A part of the buy-in process was the promise of cost-savings and using minimum resources that were a leading agenda of the company in the bifurcation process after the supply-demand breakdown:

*"We convince them by every time they put a dollar in, they will get hundred back...but I clearly expect that they [internal customer] are sceptical; definitely not the response "this sounds like a great idea". It may sound a bit implausible but people are not that much for throwing themselves into new undertakings, so we will have to prove ourselves all the way."* (Interview sourcing manager)

As part of the rather fast development of the off shore centre, another possibility was provided for the project manager. The participants of the talent program were to visit the off shore centre for a day in connection to the second module of this program, which had contained workshops about off shoring and outsourcing. So this was a possibility for the off shore centre for both "selling" the services internal in GFPG and to business units in GlobalFirm. About this process:

*"...our primary stakeholder has been [GFPG headquarter] and they are convinced...Next step is external stakeholders, and procurement outsourcing by the way. [The talent program] plays an important role in this connection. It was an opportunity that emerged as they were going out here. It was a possibility that aroused when it became known that they were planning to be here. If you had asked me if whether I [three months earlier] would think it was a good idea to use the [talent program workshop] to develop a strategy to how we can off shore procurement from other business units, then I would probably have said that it was a bright idea and very nice and theoretical; however, something we would not be able to do two months into the project."* (Interview with sourcing manager)

Thus, a bifurcation point with a window of opportunities were offered to change the configuration of the off shore centre changing from a support service to gain more impact and project ownership in GFPG and GlobalFirm. The possibility of using the talent programme as means to buy-in were seized

and the opportunity was attractive as there were middle-managers from business units, which could act as ambassadors for the off shore services. First of all, the participants of the ‘talent program’ got presentations from different people working at the off shore centre; including the project manager himself. They were introduced to the different services that could be delivered and presented to the employees that had been hired. A central part of this “strategy” was to divide the ‘talent program’ participants in teams each with a representative from a respective business unit. From this presentation the participating managers were to discuss in groups which assignments they thought from their daily job could fit into the off shore centre. Different possibilities from the groups arrived; a selection is presented in the following table:

<b>Project team 1</b>	Activities: Contract management, order handling, supplier database updates. In terms of categories it was suggested to start with order handling and execution Value proposition: centralisation and standardisation to increase efficiency and release resources to procurement and business development. Not cost cutting in terms of the number of execution but reducing the expenditure of carrying out activity. Next step could be supplier market analysis and getting access to engineer knowledge.
<b>Project team 2</b>	Activities: off shoring of procurement analysis in small and medium spend categories, e.g. office supply. Value proposition: expected to add significant impact to the bottom-line of the business unit; reduce negotiation administration by request-for-quotation and e-auction.
<b>Project team 3</b>	Activities: Identifies many operational level oriented activities such as manual quotations, daily invoice handling, material request, update internal part numbers (suitable for the GFPG’s other off shoring centre).Value proposition: free up time for the technical department and the procurement department that are doing this as well as many work processes already are outsourced to outside consultancies. Free resources to do more procurement related stuff.
<b>Project team 4</b>	Activities: market analysis, supplier analysis, total cost of ownership analysis of equipment, potential request-for-quotation of categories. Value proposition: this business unit had no committed procurement staff but was on some services served by the routine task part of GFPG. Support in professionalising the procurement process.

**Table 12: “Suggestions for off shoring by project teams”**

The suggestions illustrate that off shoring in general were well received in a time where cost-savings were on the agenda. Also, the activities that could be off shored to release full time employee resources for other things to do. However, there were also activities such as from project team 3, where the off shored activities were characterised as routine based procurement and thus not within in the boundaries of this off shore centre. In other words, because the activities were of the day-to-day post-contract activities it was out of scope for the off shore centre. Moreover, in some cases off

shoring was also seen from “adaptors” as a way to get rid of assignments that were not value-adding to their own processes, which is both a constraint and possibility dependent on the circumstance:

*“I can easily understand them and I believe definitely that it is a target for off shoring; however then it is for our other off shoring office. They handles these task with expediting things effectively, it is not something that we can add that much value to. Besides is our average cost about [one-third more] than our other off-shoring office so it would also be more expensive. Even though it as a whole is not that much money, then it is still something to consider and if they can make it [one-third] cheaper it makes more sense to put it there, where they work with things different than we do””* (Interview with sourcing manager)

As was the circumstance with e-enabling procurement there also was a double buy-in process in the off-shoring project, as a minimum, operating in a complex web of leveraging buy-in. That is, for the off shore centre to be an outsourcing partner it had in many cases to achieve acceptance from several stakeholders in a given business unit. It was not enough merely to convince the procurement people in the business unit, also the next level in terms of their internal customers were to be convinced. Therefore project team 1 and 2 in previous table were more attractive in terms of implementing the suggestion. This was explained by that the activities resembled some of jobs they already had been carried out as well as there were personal relations to support internal customer buy-in:

*“These personal relations are not to be sneezed at. That is why we just have to make sure that the first projects that we do is going to be successful and there we cannot help to be a bit selective.”* (Interview with sourcing manager)

Hence, personal relations were warranted in regard to achieve buy-in with internal customers whereas it with suppliers was unwarranted for the sourcing project part of GFPG. The selectiveness about choosing projects to target for the service centre to become an outsourcing partner was to start with those projects that had the highest probability of yielding a positive return for the internal customer; i.e. the highest possibility of compliant a positive synergy effect. However, this was not the case with the first project, which was an opportunity with some risk built into it and part of the bifurcation process that could offer a breakthrough or a breakdown for the off shore project:

*“One way to do it is to get some good categories to start with, so we build something credible up before we spread ourselves too much. In the first project [with stakeholders outside GFPG] there are risks, because we are choosing some projects we are not sure what the potentials are...the way I want to do it, if I have the opportunity’, is to go about it very low-key. Let us start somewhere, if we now move further with a small head-count of [xx] dollar, despite times of crisis it could very well be an opportunity”* (Interview sourcing manager)

The internal customer buy-in argumentation, outside of GFPG, was to reduce overhead cost by the service centre’s specialisation and low-cost setup. However as mentioned earlier, the first phase of



the off shoring centre focus were the services it could provide users in CPFG's procurement organisation. That is, how it could improve the cost of running the organisation against the value it could provide, releasing full time employee's resources to do more value added things and thus improve the work of the sourcing process model. The following table points to comments by different category management teams and their view on organising activities in relation to the off-shore project:

Off shoring in use by category management	Comment
<i>"What we right now primarily use them for is supplier profiles regarding prevalent information about the suppliers we have, but also go in and investigates quarter, half-year, and yearly accounts and follow the economic development in these corporations and then make an financial analysis..for us it is relevant this market intelligence, especially in these times of crisis that has been in the last half year and follow the economic development because it has great influence on how the market will be for us."</i>	Has increased cost in terms of this category has taken the opportunity to have done something of value in the slipstream of the supply-demand breakdown bifurcation.
<i>"... if we believe the quality is good enough of their work we have no problem in handing over market analysis to them but if it is not good enough then we maintain it here... it does not matter if we save a headcount in this office on these analyses if they [the off-shore centre] make the wrong analysis that make a purchase a million dollar more expensive. In this way it becomes kind of cost-benefit analysis..."</i>	The off shoring activities within the central part of category management were first of all a cost-benefit analysis. It was also a matter of where to increase and decrease number of employees
<i>"...perhaps it is not necessary that we have five departments here sitting and doing many of the same things and perhaps use different sources to find it. Because it can be as you said earlier that if we look at this commodity price it can differ in China, US, and Europe, then it is course relevant to know where to purchase it..."</i>	Off shoring offered to organise around competences, here commodity analysis, instead of being organised primarily around internal customers
<i>"...we have never done 200 agreements before on such short time; the world is not what it was a year ago. Because we have not done it ourselves before does not mean that we should not do [off shore] it in this situation. It is not that they [the off shore centre] did activities that were extra work. The work that they do has to be documented that it is worth the effort. In this case it is a matter of that we out of these 200 agreements only have 2 that have caused a price increase so no matter whether we perform well or worse we get something out of negotiating an agreement. We cannot perform outstanding and that is why the off shore centre might as well collect some of these information that gives extra negotiation power when we are placed with suppliers" (Interview with category manager)</i>	Justifying the use of the off shore centre and that it did not carry activities out that were extra activities. In this example, the off shore centre enabled that this category team could do more

<p><i>"We have a large category called spare parts in general and it is dominated by a bunch of more or less monopolistic suppliers. In purchase of equipment where you need spare parts and you typically only have the same source and many of the suppliers are really small. So what we use the off shore centre for is a lot of pre-analysis of that category when go out to source. We do not have knowledge of this already so it can be used as a piece of paper that tells us the necessary when we negotiate with a supplier"</i> (Interview with category manager)</p>	<p>Another example of the off shore centre enabled GFPG to do more. Here by providing information to negotiate small spend categories. The off shore centre again enabled the category to do more things</p>
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**Table 13: "Off shoring in use by category management"**

In several cases, the off shoring centre did not as such directly release full time employee resources. However, it enabled that the categories could do more in terms of re-negotiating contracts. The off shore centre became the preparation of negotiating contracts, so categories then used more time on actual negotiations. In this context, some of the category management teams were at the same time as the off shore centre opened in a re-negotiation phase with its suppliers, in order for the contracts to reflect the new market conditions. Therefore, the off shore centre enabled that the category management teams could do more and more in order to achieve and demonstrate cost-savings. Furthermore, the off shore centre also provided risk analysis to the categories, which could be significant to impact the business. However, at the same time such value could not be reported in the way GFPG was measured currently. Therefore, in abstraction, it also provided an increase in the cost of running the procurement organisation as well as it increased the effectiveness of doing things right; although it could not be reported as such as a value.

The above table also demonstrates how the boundaries of a management technology are constantly re-negotiated due to the different agents' involved using local information. Overall gathering the different perspectives the different use of the off shoring centre meant different things for different entities. For executives within GFPG it was a device to ensure a positive measurement of its procurement organisation as well as getting more 'buy-in' company-wide. For the sourcing manager responsible for the off shoring project implementation it was a device ensuring that value-added activities were conducted. This to avoid that the service merely became an overhead cost and at the same time ensuring internal customer satisfaction and spend coverage. For a project team at the workshop, it was an opportunity to run e-auctions and do market analysis with a low overhead cost. For another team the opportunity identified was to carry out order handling activities and in such case the off shoring centre develops into an outsourcing partner. For some category teams it enabled that they could engage in more contract negotiations enabling cost-savings and improves how GFPG was

measured. Finally, for different category management teams it also opened for opportunities to avoid sub-optimisation between the different category management teams although this was a potentiality not ready for assessment. The off shoring project when this study ended became a central element in the business model as an outsourcing partner to internal customers in GlobalFirm. Among other things, a service offering with a value contribution of an attractive overhead cost but also many other possibilities due to distributed representation and different vantage points of its use. The off shoring project is now discussed in relation to the other management technologies in focus and how it competed and collaborated in space of the fitness landscape.

#### **7.4.4 Management Technologies in GFPG as a Contradiction between Cost and Value**

Each of the three management technologies previous analysed all supported one way or the other pre-contract work of procurement activities. The off shoring centre and e-enabling procurement had a promise of more value in terms of doing things the right way, and cost efficiency in terms of carrying out activities with minimum resources. Procurement competence building was a central element for GFPG being a competence centre and to signify its value in other terms than what a cost-saving calculation could afford. This was at the same time contested in the analysis of the management technologies. The more value provided, the higher was the cost in terms of resources. The more it wanted to do things right, the higher were the stakes in the entering of the contradiction between effectiveness (doing things right) and efficiency (the use of minimum resources of being effective). We may abstract the supply-demand breakdown in highlighting the contradiction of effectiveness and efficiency for GFPG in order to experience a temporary solution when it was downgraded. However, at the same time the contradiction experienced a qualitative change in the sense that it modified its form and thus the contradiction undertook a temporary resolution in order for the initial contradiction to include more things. For example, the number of e-auctions increased to achieve cost-savings in a market that was in a downturn was a seized opportunity to measure the performance of GFPG. However, what about e-auctions' contribution when the market goes up again?

The management technologies were all planned before the supply-demand breakdown to increase the significance of GFPG whereas they were all affected by this bifurcation and changed function and form changed accordingly. Understanding the procurement management technologies through the fitness landscape concept is connected to the dynamics of the network by various connected agents where competitive selection and cooperative interaction are sources of order. The network of agents

is searching for variations that are more fit but no agents in the fitness landscape are ‘in control’ and develop according to competitive-cooperative constraints. The fitness of the management technologies is a construction of the relative fitness between different entities. The peaks and valleys in the landscape represent the highest and lowest fitness accordingly. As each entity only knows and acts by its local environment, success depends on the “most fitted” strategy that is relative in terms of other entities’ strategies. For example, before the supply-demand breakdown the procurement competence building can be claimed to have a high fitness peak where it developed an expensive and ambitious talent program for employees seeking a procurement career in the company. The mapping of the management technologies in the fitness landscape is illustrated in the following figure at one moment in time and space when the study was carried out in the bifurcation after the supply-demand breakdown:

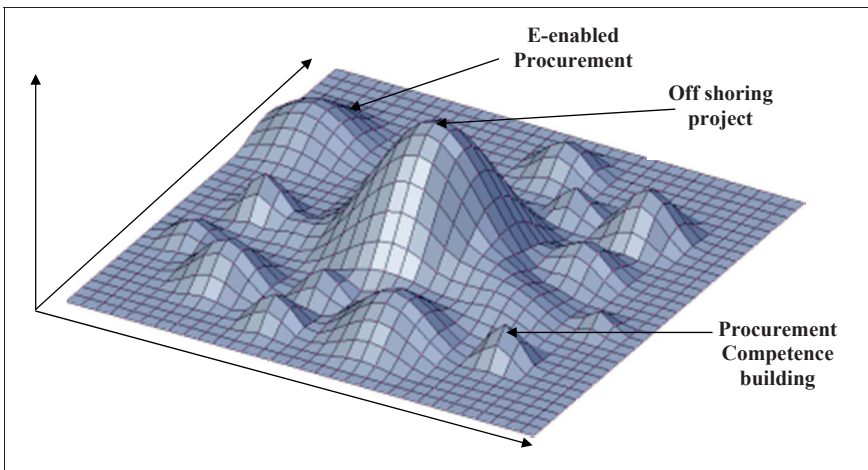


Figure 28: “A rugged fitness landscape adapted to management technologies” (Author based on <http://cairnarvon.rotahall.org>)

The off shoring project represented a strategy that reached a high level of fitness in the business model where procurement outsourcing became a central part of the strategy for GFPG. The off shore project at that time had a high peak (i.e. fitness) whereas one of the lower peaks, at that particular time in the fitness landscape model, was the procurement competence building that in prior versions of GFPG’s business model had been a dominant element. However, as demonstrated in this section the management technology was significantly pressured in order to survive as an investment. As

mentioned in chapter 4 by Levinthal & Warglien, the peaks in a rugged fitness landscape can represent profit or a mix of variables related to an organisation's goals. In the above figure the management technologies have been mapped by the attention and priority from top management within GFPG, top management in GlobalFirm, and how GFPG are being measured as group in order to increase its significance in procurement activities in GlobalFirm. The multiple peaks of the rugged landscape are a result of the interdependences between agents that locally improve fitness. For example, the off shoring project's success was not a direct cause-effect of the supply-demand breakdown bifurcation. Rather it was planned in a time when the company performed exceedingly well in terms of its overall bottom-line and did not have a particular cost focus. Thus the management technology had been prepared for a long time and when it was to launch it did so in the bifurcation process from of the supply-demand breakdown opening possibilities for agents to improve fitness locally:

*"The organisation has been asked to save an [enormous amount of money], so there is a pressure up from [top management in the company]...suddenly the demand will come naturally. I do not think [this business unit] would for nine months have been in particular cost-saving mode....there starts to be a focus on saving money and there are some of their investments that touches upon the boundary of being profitable"* (Interview with sourcing manager)

The off-shoring project was able to deliver, in particular, lower overhead cost to managers' budget as well as to assist category managers to re-negotiate contracts by market analysis. This condition enhanced the fitness peak of the off shore centre in the system and improved how GFPG was measured as a procurement organisation. In relation to this, also e-enabled procurement through e-auctions increased is fitness, in particular due to the e-auction tool that provided a means to lower the contracts that had been carried out during 'suppliers market' times. It was also adopted in the off shoring project to deliver cost-savings on the short term.

However, the procurement investments as management technologies/exogenous processes are also situated in time-space with temporary boundaries, the fitness is temporary and subjected to the distributional representation of function and form (the perspectival element). For example, the investment in the talent programme was from GFPG's perspective an investment that increased the ability to achieve cost-saving in the long run. It had a role as marketing of professional procurement competences to internal customers. In this context, the participants from the business units were internal customers in a similar way as if it were an internal customer of a category spend. At the same time, the talent programme was also a cost of running the procurement organisation and for the

business unit's budget it was an overhead cost. Thus the same object functions differently dependent on who is activating the object it and meant something different from different viewpoints. However, because the talent programme not just was an overhead cost but also a value-device for the buy-in process helps explain why it survived as a management technology and why it eventually turned out to again became a significant part of GFPG's activities.

Another example is the off shore activities. It was expected that the off shoring activities would improve the measurement of GFPG in terms of increasing cost-savings and decrease the cost of running the cost of running the procurement organisation. Thus it had carried two propositions; more effectiveness in terms of doing things right and increasing the value it brought to the company and the procurement organisation. It also promised efficiency in terms of carrying out pre-contract work with minimum resources. From the use of off shoring by category management teams it was identified that it both increased and decreased the cost of running the procurement organisation. The off shore centre delivered value in regard to financial analysis in a period where many suppliers were in vulnerable situation. Thus in this case it becomes a risk management device; however, the value is not directly related to how GFPG was measured and therefore it increased the cost of running the procurement organisation. The off shoring activities also became an important entity in activities re-negotiating contracts through its competences in supplier profile analysis; also here improving the measurement of GFPG. The management technology was entangled in the contradiction of efficiency and effectiveness by efficient use of resources and more and more value contribution to internal customers.

The case therefore probe that the more mature GFPG became the more it had to use resources to provide cost-savings because the more it had to cover in terms of spend and invest in management technologies. For example, category management, off-shoring, and e-enablement procurement, consumed resources in order to demonstrate value and synergy effects. The investment in category management could be regarded as investments in order to identify synergies by consolidating spend between various internal customers. This required an extensive effort both in leverage buy-in and manage the variability of stakeholders involved. The contradiction displays management to lower the cost of running the organisation but at the same time increasing resources to demonstrate value to its internal customers constraining and enabling agency for procurement management. For instance, the off shoring of procurement activities was one way to redefine the value of GFPG's offerings in terms of procurement outsourcing and thereby becoming a service to the whole company. However, internal

in GFPG the off shoring of procurement activities also aimed to lower the cost of running the procurement organisation and providing more resources to manage suppliers and internal customers. In terms of its use as internal device and releasing full-time employees it was more difficult to capture the effects in cost-saving calculation. GFPG were pressured to expand the scope of the performance metrics it was measured by, which took place in the procurement council.

The procurement management technologies demonstrate how they are in a process of a continuously process of actuality and potentiality with its overlapping contexts between procurement competences, the oscillation of organising between center-led and local-led authority as well the dynamics of the supply-demand relation. This oscillation of opposites helps understanding why new procurement practices developed in the case in order to maximise value providing cost-savings and to reduce the over-head cost of running the procurement organisation. That is, to reduce the consumption of cost which e-enabling procurement and off shoring of procurement activities were examples of. However, the more it wanted to be effective, the more it was pressured on its efficiency. Management technologies lose its explanatory force as things (and as an object) in themselves and therefore we do not know the effects they produce a priori. Because of the dialectic relation between function and form, a procurement investment as a management technology can offer many types of possibilities and thus subjected to its own web of unintended consequences.

### ***7.5 Case II – Discussion and Implications***

GFPG was the biggest procurement group studied and also the case that have had the highest level of opportunity to invest in developing activities of its procurement competences. It is probably also the procurement organisation that has had the highest probability of succeeding according to the maturity model rationale. That is, this case was about a procurement organization that had done many of the things that the procurement literature would appreciate in claiming belonging to a high sophistication level archetype in terms of investing in competences and its strategy, policies and processes. The use of the sourcing process model (i.e. pre-contract work, which was highlighted in the procurement domain literature as the important phase, e.g. Keogh 1993) and being measured by the cost-savings it was able to generate against how much it cost as a procurement organisation unfolded effects on how GFPG was organised and how it developed new practices. That is, it developed its competences and professionalism despite and because being measured on a calculated cost saving. The measurement was for GFPG an outcome and the value indicator for running the procurement organisation but not a means in itself. Therefore, in order for GFPG to achieve cost-savings it had to do many other things

and invest in procurement management technologies and competent procurement professionals. It also needed to do marketing of these competences and investments in the company, in order to achieve internal customer buy-in.

The process innovation (i.e. an exogenous process) of the sourcing process model was conditioned by how it was measured as well as placing primary emphasis on the pre-contract work rather than the continuing implementation of contracts (post-contract work and the entanglement of a complex system). However, in a separated part of the procurement organisation it also worked with investments and competences in operational routine procurement activities. The establishment of category management made the first steps of the sourcing model more effective as there were people dealing with the same internal customers and supplier market. Likewise, the e-enabled procurement promised more effectiveness in terms of the negotiation process but also make the sourcing process faster and therefore more efficient. Finally, a part of the off shoring of project was also specialising in different parts of the sourcing process model, so it was able to do things more effective and efficient than if it was a sourcing team doing every steps of the model.

The cost-saving calculation was the constitutive rule that GFPG was built upon. Therefore the development with key responsibility for internal customers and category management, were among other things, a part of dealing with buy-in to internal customers. This in order to increase the spend coverage handled by GFPG and provide a change in the constitutive rules where the legislative rules also needed to change. That is, the oscillation of local-led and center-led authority where GFPG changed from being organised by projects to being organised around internal customers entailed more participation in endogenous complexity. However, the sourcing projects were exogenous designed, in the sense that confined boundaries were put up to decide whether the project was a successful project or not. E-enabled procurement, off shoring, and category management were at extended abstraction management of the contradiction as an effort to more efficient use of overhead cost and increase effectiveness by demonstrating value to the organisation. Thus, the more mature, the more difficult and more resources it required for procurement management to achieve significance and identify synergies.

From a complexity framing point of view the change process of GFPG involves the exogenous sourcing process model and the connected value device of a cost-saving calculation that operates as management technologies with confined boundaries. That is, the management technologies are from the outset more complicated than complex. However, over time as the procurement organisation



became part of an endogenous complex system, the exogenous qualities of the model become less visible at the expense of endogenous complexity. I.e. the savings calculation was based on confined boundaries whereas the new procurement activities involved complex properties where different entities negotiated the boundaries of the investments unfolding. Furthermore, the change process involved new activities to characterise a progress; however, due to contradictions the change has a morphostasis element, where the “new” activities cope with the “same” contradiction. This is an articulation of quantity-quality change relationships, where the activities decreases or increases in size or number but where a qualitative transformation takes place. GFPG has become something else (off shoring activities, organised by internal customers); however, in terms of its constituting relationships remaining essentially the same.

This case thus displays the tension between increasing cost and reducing cost working as the dynamics of the system by a contradiction of effectiveness (doing the right things) and efficiency (the use of minimum resources to be effective). Overhead cost becomes the contradiction mechanism because these on the one hand allow GFPG to develop competences and make investments in order to create more value. The latter was primarily a calculation of how much cost-savings produced against how much it cost of running the procurement organisation; i.e. overhead costs were to be justified. As GFPG's objective was to be a centre of competence and labelled itself a center-led procurement organisation, the cost of running the procurement organisation would also increase as center-led activities was denoted with a boundary that did not include operating units. Initially, the value-device was primarily built upon that cost-savings was achieved through the search of synergies in company-wide contracts and enabling technology that could provide cost-savings across categories and business units. GFPG commenced sourcing projects that had a high probability of yielding the highest synergy effects to provide a high value in terms of what GFPG was measured upon. This approach was also recognised in the later investments, for instance the off shoring project, where the process of gaining internal buy-in was achieved through selecting categories with the smallest possible risk and a “safe” cost-saving impact. In search for more sourcing synergies; more spend visibility and consolidation, user compliance, and market analysis was warranted leading to a high cost-saving calculation at the same time as the cost of running the organisation increased as synergies required more effort to be identified. Hence, this dynamics is an articulation of the double-movement of contradiction and bipolar feedback.

## 8 Case III: Global Capacity Provider – a Procurement Organisation Developing a Supply Chain Strategy

This case is about a procurement organisation (GCPPO) in the company Global Capacity Provider (pseudonym); which is an entity of a global aid development organisation. The case follows the process of its procurement organisation developing a strategy which should enable them to be more supply chain oriented. That is, a planned process going from reactive and administrative practices to proactive and address strategic supply chain and procurement issues. The strategy concerned three focus areas; supply chain capacity building, sourcing projects of items that are common for every capacity project, and sustainable procurement. However, the latter was not materialised sufficiently during the study period to be part of the case. Being part of a large global aid organisation, the point of departure for the case is how we can understand the dynamics of strategizing in terms of procurement organising and the development of new practices oscillating between center-led and local-led authority and in a contradiction between variability and standardisation. Moreover, in this case, we are dealing with public procurement practices, which put more emphasis on rules and regulations. The starting point for the case is illustrated in the following figure:

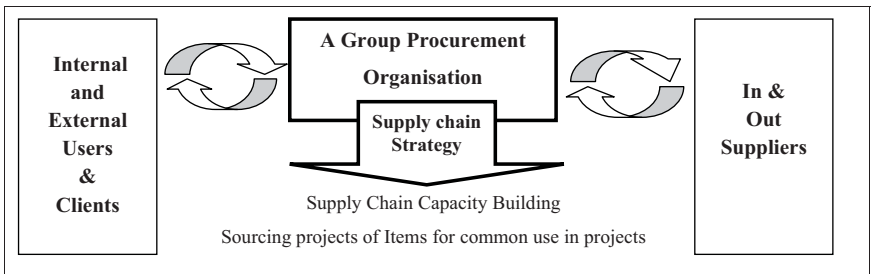


Figure 29: “Case constructs - Case III” (author)

In terms of the specific strategy formulation, the primary focus from GCPPO was the capacity building and sourcing projects, which was the concern of this case along with how the strategy was accompanied by developing towards becoming a center-led procurement organisation. The context of the case offers a general introduction to GCPPO and the supply chain strategy. Next is the change process of GCPPO addressed from how it has functioned as a support function to the possibilities from which the supply chain strategy is based upon. Afterwards follows a section concerning procurement organising and how the strategy is changing the way of organising. Then the central development activity, supply chain capacity building, is addressed in depth. This pillar did not

mobilise as an actual implementation during this case study investigation, so an important element in this part (and analysis) is the challenges for GCPPO in formulating the strategy in the context of conditions that other research study on the topic has experienced. Subsequently, in order to capture the former sections, it is demonstrated how the supply chain strategy entangles a contradiction between being variability and standardisation. The case ends with a discussion and implications of the case findings.

### ***8.1 Case Context – GCPPO and the Supply Chain Strategy***

Global Capacity Provider was established as an independent entity in 1995, from a larger entity in a global aid development organisation. Global Capacity Provider's primary activities concerned project management in terms of technical assistance, monitoring, and evaluation in peace building, humanitarian and development environments. It had headquarters in Europe and five region offices around the world. Its clients were a diverse group of different institutions, governments, international financial institutions, and non-governmental organisations. Global Capacity Provider's approach to project management was based on local skills (personnel, partners, expertise, training & institution building) and then contributing to cost effectiveness and sustainability. In terms of running the organisation, Global Capacity Provider was faced with the following conditions: it had no core funding, no confined market, and as a consequence, it was in constant competition for business.

Procurement activities were carried out in several ways in the organisation. Firstly, procurement was done on behalf of Global Capacity Provider's own needs such as running project related items and establishing frame-agreements for local requirements of the organisation. Secondly, there was project procurement where the organisation was asked to provide selected services for other entities and thirdly, Global Capacity Provider also managed entire projects, where procurement was present in one component. Thus, GCPPO supported project management but also offered procurement services directly. Across these different conducts, procurement was involved in 80 % of Global Capacity Provider deliveries. Therefore, the procurement organisation had and would have a significant impact throughout the organisation. Objectives of the strategy were such as to ensure efficiency and cost control, establishing a centre of competence through the means of professional standards from a 'procurement institute', and providing the service at 'least cost' locations through the means of technology. The new strategy entailed an innovation proposition for GCPPO, exploring new business niches that first of all concerned developing management advisory services in alignment with the

Global Capacity Provider business strategy. This strategy, in general terms, concerned fulfilling a high quality standard in project management services reflecting speed and cost effectiveness.

Overall, four components were decided to enable the strategy: information technology, policies and standards, training employees' skills, and arranging the relationship between headquarter and the regions. One of the first objectives to be achieved in the strategy was to get a professional procurement qualification, through certification programmes, in order to promote its own image. A method to access leakages in funding was also to be identified, including developing an approach to performance measure the impact of the intervention, and developing a supply chain management competence platform. In addition, it was important that the supply chain strategy increased the procurement organisation's credibility in becoming a recognised partner in Global Capacity Provider's projects, rather than an administrative function whose role was to satisfy audit controls. That is, an important part for GCPPO was that the supply chain strategy was aligned with the corporate strategy and, thus, indirectly had followed the rationale formulated by Cousins (2002, 2005).

## **8.2 The Change Process of GCPPO Procurement**

When Global Capacity Provider was established as an independent entity, the business model was adopted from the larger organisation, which it had been a part of. Thus, Global Capacity Provider started as a shadow-like entity to the larger organisation that, today, instead has become Global Capacity Provider's largest client, responsible for around 50 % of the income. One of the conditions for Global Capacity Provider, and thereby GCPPO, was a fragile business model in terms of its projects: it reacted when other entities demanded their services, which provided them little flexibility in order to plan its resources. As a consequence, there were few competences before a project started; for example a relative small number of fixed staff was an indicator of this aspect. The challenge was extended with the fact that Global Capacity Provider had to generate income in order to justify its existence, and although being a public entity, it was conditioned by private market circumstances. Thus, the conditions for GCPPO were that Global Capacity Provider was offered the most unattractive jobs. If it was an attractive assignment, the other aid entities wanted to do it themselves. In that way, Global Capacity Provider became a type of subcontractor, designed into other entities offerings:

*"...when will some organizations, looking at the broader picture, use [Global Capacity Provider] as contributor is when they are not capable of doing it themselves? So what you have is high risk projects that nobody else wants to touch because if it is easy money then everybody*

*wants to do it, tight deadlines and very weak specifications and requirements expressed. So the risks you have in these projects is also extremely high and the income very low. So what happens very often is that the organization have, from my own perspective, essentially been dollar driven...then we will deliver the project and suddenly you put your nose into some projects that are not necessarily well-defined but there are cash behind it...the risk has not been discovered behind this project administration, then the risk can be financial, it can also be political...”* (Interview with procurement manager)

As a consequence of this role, profit margins were narrow and conducting business was associated with excessive risk when engaging in projects. Global Capacity Provider was pressured by the diminutive time for managing a project. Hence, the planning of resources was an immense and difficult task. Furthermore, in terms of the reactive role:

*“...when you define a project document you will see very often that procurement is not consulted. So you have a project that is actually defined with budget lines for acquisitions...but the solutions have not been defined with procurement at all. It is just defined by the project manager how to do it...and two weeks before the purchase they come to procurement, here are the requirements. It is a very reactive function that we have. Very often you will see that the requirements are invalid defined and we cannot do the job, deadlines will not be kept...so from day one you have cost overrun”* (Interview with procurement manager)

From this quotation follows that planning was attractive as it would denote a more efficient use of resources. Because, not only were the projects conducted by a reactive role, the degrees of freedom in the projects had also significantly been decreased when received by GCPPO. Although being a public entity, it was conditioned by a competitive environment, and in order for Global Capacity Provider to deliver sustainable services, it was pressured on its own sustainability with a vulnerable capital platform. In this context, the supply chain strategy was accompanied by a necessity of significant investments to upgrade the procurement organisation. Another issue for GCPPO and the supply chain strategy was the role of the procurement manual process; both in terms of Global Capacity Provider's own projects, but also with other clients. For GCPPO, specifically as a public procurement organisation, the challenge for the procurement organisation was that it traditionally had a connotation to being an administrative function, whose role was merely to satisfy the audit process:

*“Procurement is essentially seen when we discuss project as a function, a burden. That it is a necessary process to cover in terms of audit. This is it, if you do procurement right; it is actually that you have got a satisfactory audit. It means you got your books, followed the rules and legislations, and passed the audit. This is essentially what it is, we are audit driven. You comply with the audit, you comply with the book...they [the project managers] don't see procurement as a value-added service”* (Interview with procurement manager)

The procurement manual is a systematic process, checking up that procedures have been followed; for example, whether the tender had been published, whether technical specifications were defined, whether the cheapest supplier was appointed etc. When the supplier has been chosen, there is a background checking on the supplier and whether it complies with legal standards, and also a financial checking. GCPPO is rewarded a fee when the procurement manual is completed. Thus, the procurement manual process is an example where GCPPO plays a reactive role in terms of its conduct, although having a role to play in the design of the procurement manual process, setting threshold, tender format, training users etc. The conduct of the procurement manual was a lengthily process, and with the combination that GCPPO primarily reacted, provided a difficult quandary:

*"...this is public procurement. They always come too late. In the end of the year they always come because they have a budget "oh, we have so much money left" and if they don't spend it this year they will lose it. So they come with their request and of course there is no time, every single year. They should be better because they do it again and again. Our own colleagues do it too. Now I am busy with buying computers and furniture because they have to spend their budget. So it is never quick enough. It is a lengthy process but it has to be done because we have public money." (Interview with procurement manual procurer)*

In terms of Global Capacity Provider's overall business of project management, GCPPO had, as mentioned, struggled to get a significant role. However, there have been bifurcations in the system that has opened up possibilities for professionalising procurement practices. Together with other entities, Global Capacity Provider consolidated certain business functions to strengthen procurement in the system and now hosted a procurement web technology in terms of a portal providing clients access to online procurement catalogues. GCPPO and clients became less dependent on the lengthy procurement manual process in this matter, as the tender process is already in place. In principle, the platform provides suppliers' with one entry point into the system and more transparency when suppliers publish frame-agreements. This opportunity opened for the possibility of GCPPO to attract more responsibility and, as elaborated later, a technology that could enhance the position of the procurement organisation within Global Capacity Provider and with external clients. In 2009, another bifurcation aroused, providing a possibility, where Global Capacity Provider was handed the mandate and opportunity to approach governments and create their own business. Hence, the organisation was given the opportunity to move up in the value chain, in relation to managing projects, and provided opportunities for GCPPO in developing its procurement practices.

It is from these latter opportunities that the new supply chain strategy was abstracted and moreover they caused GCPPO to align with Global Capacity Provider's company strategy. In the beginning, the

purpose of the exercise and the ambition of the GCPPO strategy formulation were to look not at what they had been doing, or did at the moment, but rather what it could be, and find areas in which to invest; thus, an expressed ambition of transformation (an emancipatory project in its supply chain relationships) in relation to Global Capacity Provider's overall strategy for change. To illustrate the difficulties, one of the first thing that was put an effort into, was to perform a re-branding exercise in order to change the perception of its image; however, this exercise also showed that, internally, it was difficult for its own staff to articulate the vision and ambition for Global Capacity Provider.

### ***8.3 Procurement Organising in GCPPO in the Context of the New Supply Chain Strategy – A Center-led Procurement Organisation is initiated***

The headquarters of the procurement organisation could be divided into two divisions. One division had a large-scale coverage in terms of being a procurement support unit in charge of the policies of the organisation, developing templates and the procurement manuals. They also dealt with long-term agreements and procurement activities that had a global perspective; for example, global travel arrangements and workforce insurance. This division was based on a stable set of employees, allocated from the budget, who should benefit the whole organisation. The other unit was a transactional based procurement unit, which provided procurement services on behalf of internal and external clients and users. Thus, the latter had an income generating role, whereas the former functioned as a cost centre. Within the regions and throughout the organisation there were approximately 30 procurement advisers related to procurement. However, some of the regions had complete deficiencies in terms of procurement competences and some advisors were not necessarily procurement specialist, but as a minimum they had the characteristic of having a procurement background. Thus, from headquarters point of view, the level of procurement competences distributed throughout the regions was not in high estimation, as well as the practices were limited in terms of the overall 'spend'. The primary role of the procurement representatives in the regions was based on operational procurement, supporting the projects carried out by the regions, as every project could not afford a person only dealing with procurement; i.e. it can be characterised as part-time buying.

The emergent pattern of activities in the relation between headquarters, in terms of the income generating part, and regional offices influenced that both places have had access to perform the same business delivering procurement services to clients. Hence, there were no boundaries or coordinating efforts and, to some extent, regions and headquarter were competing against each other on the same market with the same clients:

*“At headquarters my group is an income generator. Who do we serve? All kinds of customers across the borders...we basically hunt on the same territories, same customers as our regional offices. I serve the same customers...a client that wants to buy equipment can go through our local office if it exist in the country or the regional office, or they can come to headquarters.”*  
(Interview with procurement manager)

Furthermore, the condition for doing business with customers from the headquarters was not the same as from the regions' position; for example the pricing method was different and only headquarters had access to use the procurement web technology, as introduced in the change process. A central issue in the new strategy, however, was that headquarters and regions should not compete for the same business:

*“Regions do not outsource to me [transactional unit in headquarters]. If they do so I charge them a service-fee to do the job; however they prefer to run the risk doing the procurement by themselves in order not to share the income”* (Interview with procurement manager)

The objective was to have an aligned procurement organisation design such as having one pricing mechanism for the organisation and avoid internal strife over 'revenue'. The intended organising, accompanying the supply chain strategy, was that headquarter should be financed by regions, which were then the primary entity to generate income. The headquarters role, then, was to make sure that this income would continue to increase by being a competence centre and the initiator of new business lines, carried out by an ambition of being cost efficient and effective. The intended procurement organisation design refers to what the procurement domain literature label a center-led procurement organisation. The roles of regions and headquarters in GCPPO can also be described through the cost/value equation (see chap. 2) aiming to have regions justifying the cost of running the organisation, including investments through revenue generation. This was demonstrated in the two central pillars of the strategy; sourcing projects and the supply chain capacity building project.

The sourcing project activities were specifically in line with the center-led procurement organisation design, where headquarters was to operate as a competence centre with the responsibility of pre-contracting activities and the strategic part of the supplier management process. The commercial relationships were to be handled by the decentralised regions. The process of the vehicle project was to gain buying power, redefine relationships with suppliers, optimise buying power, and reach a realisation of the process in the market place. An important part of the gaining of buying power was for regions (and external clients) to use the established contract, and the primary means was the procurement web technology, where the mandate and access to use the technology was not distributed out in the organisation:



*"We have [our web tool], which is a kind of vendor system way to sell vehicles only at the disposal of headquarters; no other divisions can have access to that, only as a customer, not as a procurement officer."* (Interview with procurement manager)

This access, being restricted to headquarters, was one element in a not aligned way of organising work between headquarters and regions. Headquarters offered a lower-priced service to the clients than the regions did, and the margin was twice as high at the regions. As the regions did not hold the same level of professional procurement competences, the sourcing projects of items for common use in projects was an attractive space for utilising center-led procurement claims at the same time, as the change would designate headquarters being more and more a cost centre.

In terms of the supply chain capacity building, the procurement organisation was in several dilemmas. First of all, the dilemma concerned where to locate the competences that were to be hired in order to deliver advisory management services to regions and external clients. Hiring one expert in headquarters would be significantly more expensive than hiring an expert in one of the regions, although cheaper than hiring an expert in each region, increasing the overall number of experts in GCPPO. Moreover, if the decision was that one expert was to be hired in one of the regions, how did the competences travel, so the knowledge was shared with other regions? :

*"...The communication between the regions, the sharing of information, the business intelligence is non-existing. Now, the dilemma for us is to say; "do we want to maintain the techno structure that we have here", the thinking brain of the organisation and only make sure regions are operational and generating income or do we want to outsource the brain power that we have [in headquarters] in the regions as well. The cost is also lower but how do we ensure that if we outsource some of the brain power that this information will be disseminated everywhere in the organisation."* (Interview with procurement manager)

This dilemma displays the contradiction between efficiency and effectiveness in the context of a center-led procurement organisation. That is, in order for GCPPO to become cost-effective as a central office, it would have to rely on dotted lines of communication between regions and between headquarters and regions. One of the activities that were launched in the initial part of working with the supply chain strategy was a monthly newsletter where employees from the organisation could contribute with their experiences. This was accompanied by an intranet site, where employees could share knowledge and best practices. The application of knowledge sharing was one of the center-led procurement policies that had to be upheld by the regions for the supply chain strategy to succeed. In the proposed design of the center-led procurement organisation, the success of the cost/value equation and thereby the role of headquarters was how much value it could provide to regions in terms of

developing practices, increasing the revenue and keeping the cost of investments and running the headquarters at a minimum. This change denoted a significant change because of the before mentioned internal competition between regions and headquarters and also the accompanied allocation of revenues:

*“...The cost is fairly high for the organisation, for every dollar they [the regions] generate they have to pay two-third back...the regions cry that all the income that they are making is placed in headquarters, and there is very little left to innovate in new business lines, new staff, or whatever they want to grow their business with”* (Interview with procurement manager)

Regions were forced to allocate revenue to headquarters in order to realise policies, sourcing projects, and eventually the supply chain strategy. However, regions wanted to develop their own activities and maintain their revenue, whereas headquarters needed to increase strategic activities in order to justify their proposed role. Thus, not only did headquarters and regions compete on the same clients, they also competed on the roles they should have in the organisation. Headquarters emphasised that their role as a cost centre was to be achieved as efficiently as possible and it was expected that personnel were de-localised to the regions, in order to minimise cost of running the headquarters. In other words, the consideration necessarily was to split up of the headquarters geographically and increasing the need for coordination. Because headquarters were going to become mainly a cost centre in terms of the supply chain capacity project, it needed to justify that position at the same time as it required a cost increase in terms of the investments connected to the strategy. Headquarters, as a center-led procurement organisation, exist in a contradiction between efficiency and effectiveness. At the same time that people are hired (effectiveness, do more of the right things) the cost of effectiveness should also be minimised (efficiency, using minimum resources). In that context, when addressing the measurement of the organisation and how procurement performance currently was measured, a procurement manager states:

*“This is the administrative cost I have, then, how much do I need to make to be able to cover these costs...when I define my cost it is you got 12 people that cost this, then you need to make so much money to cover these costs. If you do not make it you are slashed in terms of the team...My main target within the organisation is the financial target, the quality is measured through the balanced scorecard but let us be honest, in this organisation the balanced scorecard it is only the financial perspective that you look upon. The other components of the scorecard exist to be nice on the wall but not used for effectively managing the organisation.”* (Interview with procurement manager)

The center-led procurement organisation could not realise the strategy if it was measured by the financial targets only, because it became highly dependent on regions engaging in coordination and

sharing experiences and center-led developed competences could be distributed to the regions. Headquarters, then, is not merely the innovator of developing business; it has also become the compliance controller to, for example, the policy of knowledge sharing. These center-led competences – that must be analysed according to the condition of the limited resources and meeting financial targets – were based on centralisation and standardisation. Here the certification partner had a significant role to perform as a central investment in terms of developing the headquarters' competences. The certification program was a standardisation device, and a sign of a professional approach to procurement and supply chain services. It also contained competences that could be distributed out in the regions, delivering advisory services in the supply chain capacity building projects (elaborated later). The question, then, is whether this standardisation and centralisation was the right strategy in regard to the creation of innovation in a supply chain strategy that at the same time had incorporated many decentralised elements, carried out by the regions:

*“The problem is that you have an organisation like this, which is a kind of mechanistic organisation. You develop standard procedures; you have strategy at headquarters, and then the operations centres. I do not know if this is good for innovation, because one of the key-factors we want to develop is to “innovate”. When you standardise all your procedures, then there is a kind of movement against innovation because you have picked a model-system automatically. The challenge is to say how we can develop innovation within the organisation, in this standardisation phase we are in”* (Interview with procurement manager)

Again, we see how the center-led procurement organisation separates operational and strategic issues, where the latter was to be carried out at headquarters, which was responsible for being the innovator. The regions and clients, being the adopters; at the same time regions wanted to innovate themselves as having the originator role. Thus, the innovation part of GCPPO's supply chain strategy was not only the actual offerings, but also that the innovative solutions contained the actual organizing of carrying out sourcing projects and providing supply chain and procurement management services. What has been described, so far, in the relation between headquarters and regions is what the complexity science refers to as an oscillation of opposites in an endogenous process. Thus, the supply chain strategy, in this framing, is a bifurcation point that stimulated change in an endogenous process in the relationship between headquarters and the regions. That is, an oscillation between center-led and local-led authority:

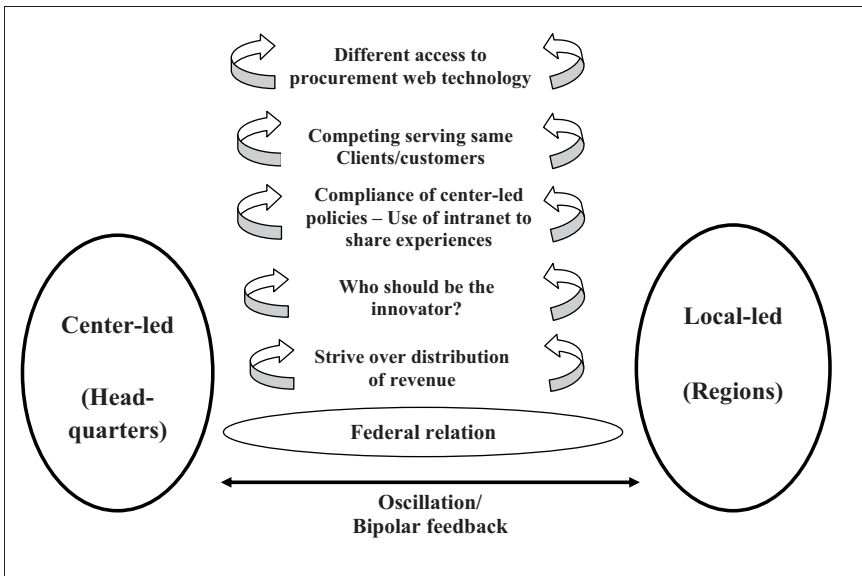


Figure 30: The oscillation of center-led and local-led authority – Case III” (Author)

The boundaries between the center-led procurement organisation and the regions are not fixed; they are abstracted. Through the analysis of the supply chain strategy’s effect on the procurement organisation, we can see how the oscillations between local-led and center-led interpenetrate each other, so a managed boundary between the headquarters and region will be difficult to uphold. In particular because the headquarters wanted to carry out its activities with minimum cost:

*“...we will need to look at the number of headcounts in the overall organisation. If the outcome is that we need to recruit more, then the equation will be; what is the income that you generate, what is the additional cost that you will have. Then the equation is to say where you are best positioned [and] what is the role of the central procurement office?”* (Interview with procurement manager)

Both in terms of hiring competences in advisory services as well as the sourcing projects and what comes after, a key decision involves geographical location of allocating resources. First of all, headquarters can decide to send employees to regions in order to take an income generating role. Second of all, headquarters can also send employees to the regions, maintaining that they are carrying out headquarters activities as defined by the center-led procurement organisation, but to a lower cost. Hence, the effort, in the supply chain strategy, to dissolve the oscillation of authority between

headquarters and regions, determining a boundary of what is the responsibility of regions and what is the responsibility of headquarters, becomes another inventive node in the oscillation of authority. One more inventive node, following from the strategy, is the reliance of dotted coordination lines between regions and headquarters where we can probe how center-led management and policies are difficult to maintain in decentralised environments, where access to local information, and not long-distance global information, is the imperative.

### **8.3.1 Realising a Center-led Procurement Organisation – Increase the Number of Clients and Enhance Value from the Supply Base**

The supply chain strategy did not only touch upon the relationship between headquarters and regions but also other clients and the approach to managing suppliers. A part of becoming a center-led procurement organisation was to develop competences of what was regarded as strategic procurement activities. The strategy in terms of the sourcing projects for GCPPO followed the rationale that it was in the buy-in process with clients and in the pre-contract work with suppliers that the effort was to be directed. Supplier management concerned how to leverage value from the supply base as well as to increase the internal and external client base in order to manage demand, instead of being driven by others. The example of the sourcing project of vehicles serves as an example to how GCCPO could develop procurement competences as a center-led procurement organisation, and the vehicle project was to be followed by other categories that were common use in projects, such as information technology (IT) and communication equipment.

In terms of supplier relations, headquarters was to become the main entry point for suppliers and, therefore, it was required that it developed the capability of managing suppliers. Supplier relationship management was introduced many years ago; however, there seemed to be no actual practices supporting the rhetoric:

*“We try to move from the adversarial relationships with suppliers to a more cooperative way of operating but it is very much in the words. In reality it does not happen very much, supplier management has been a concept in [our system] since, I have been here for 15 years, I have heard about it since day one. I have never seen, effectively, a supplier being managed properly. What it is for us in the [system] is to put the suppliers in the rosters of suppliers, and whenever you have a tender you select a few from the rosters, evaluate, and award the contract, monitor the deliveries, and then I would say the vendor performance management, you talk about but you do not do it” (Interview with procurement manager)*

Suppliers were approached through, for example, seminars and face-to-face meetings; however, this only included suppliers that had a contract. To enable cooperative efforts with suppliers was not only

a policy and competence issue for GCPPO, the interaction with suppliers was restricted by the rules and legislations that were connected to being a public procurement organisation:

*“...the borderline between cooperation and friendship with the supplier is sometimes very narrow and because we are a public organisation, we need to be very careful about the relationship that we have with the suppliers...For example when you buy IT equipment for certain projects then we do it normally by best value for money, and what that is, is the cheapest price....then one of the suppliers come and say this is what you want to procure but I can give you something that is much better, sometimes at a lower cost but the problem is that there need to be a comparison basis”* (Interview with procurement manager)

Thus, a condition that impedes the ambition of being “innovative” through supplier management is that there is a difficult adoption process of buying new solutions at the supply market, as there has to be several suppliers in the bidding of a given ‘tender’. Competition was a prerequisite for procurement management, not merely an effect of its work. However, these rules and legislations especially concerned the pre-contract work. The procurement web technology platform provided frame agreements that already had been through the tender process, opening other opportunities in the day-to-day coordination between clients and suppliers outside the boundaries of such rules and legislations. A procurer dealing with the day-to-day relationships with suppliers expressed:

*“I have an especially good relationship with [x supplier] for instance; he knows he can count on me. When I ask him to reserve me motorcycles for certain period of time then it is because it is serious. I will always if I have commitment from a client, then I would always try to help them by negotiating with the supplier...We do not talk about personal things but the better relationship we have with suppliers the better agreements you can get and the better service you get...whatever number of motorcycles I ask him to reserve, he has always reserved them for me without any financial commitments...”* (Interview with service procurer)

Thus, at the operational day-to-day post-contract activities, the interaction with suppliers denoted a different framing of how to get value from the suppliers although it may not have been a practice that was estimated as part of the supplier relationship management rhetoric. Moreover, a general issue of the setup of sourcing projects of items in common use in projects was that headquarters, when making the contracts with the suppliers, had to ensure that there was only one entry-point for the supplier into the organisation. This had, so far, been a challenge in the vehicles category, where no planning internally was combined with the supplier taking advantage of this situation:

*“We have one supplier, and the biggest supplier...is playing that game. Their interest is to split the market as much as they want to be able to control every segment. They are not interested to have the entire buy through one procurement deal...”* (Interview with procurement manager)

That the supplier was able to develop many entry-points into the organisation was understood by GCPPO to be an effect of the lack of planning from the organisation and clients towards the supplier market. Hence, the first business case was, first of all, concerned with optimising a purchase condition that had a demarcated and fragmented demand-side and a supply-side with a supplier dominated market, where the relationship with one specific supplier was significant. However, it was through the demand-side that GCPPO planned to transform its position in order to achieve more buying power at the supply-side. The buy-in process was to be an activity for the ‘center-led’ procurement organization, positioning itself in the ‘development community’:

*“My problem is to say; how can I transform my shop on basically being a vehicle dealer to a value-added function within [our system] and the wider range of the developing community with value-added services.”* (Interview with procurement manager)

In that context, GCPPO is developing into what the procurement domain literature would label a ‘Supply Management Outsourcing Partner’ (e.g. Monczka et al 2010), where an organisation allows a third-party to manage parts of the ‘spend’. The main elements of the buy-in process were that it could provide clients with competences that they often lacked, such as technical expertise and the procurement web-technology. In addition, one of the reasons for incorporating the certification programme as management technology was to demonstrate credibility and professionalism in the buy-in process, in order to convince clients to apply the procurement services. An example of the challenging buy-in process was when the largest client, a couple of years ago, decided that it would outsource the procurement activities which were not considered as essential for its inventions. Thus, what was a leverage item for the stakeholder was a critical item for the GCPPO procurement organisation. However, the challenge for GCPPO exactly seemed to be that the vehicle category was a leverage item for the largest client. Therefore, it was an attractive item for budget-holders in the other entities and it became difficult to convince the clients that they should outsource the category as a procurement service:

*“They have to pay a fee but it is also a loss of business for them [is this because the fee they pay reduces the budget and the number of employees they can occupy?]....this is the typical answer, yes. The problem is that they [the large client] do not see that these employees that spend time on buying vehicles could refocus on the main mission of their own organisation...”* (Interview with procurement manager)

Although Global Capacity Provider was given the mandate as the procurement outsourcing partner from the largest client, maverick buying of this mandate was more the tenet than the exception. Therefore, the buy-in approach also needed to be pervasive in order to secure compliance, despite the

policy from the client organisation to outsource the activities. In the latter case, the budget holders were not only convinced by the prices being attractive, although it seemed to be the prerequisite:

*“Very often this organisation is actually taken as a one-stop shop for the vehicle procurement....customers remain faithful to me insofar I can offer them competitive prices. This is the only thing that counts. If I am not giving them competitive prices, they shop somewhere else, they go to [supplier x], they go to [supplier y] directly they do not come to me...Right now everything in my business is essentially based on my negotiation skills; negotiating good prices with the dealers I am in business. If I actually have bad prices I am out of business and how do I get good prices, this is through the procurement volume that I am capable of giving to the suppliers.”* (Interview with procurement manager)

Getting buy-in for procurement services was through leveraging prices and this had incorporated the cause-and-effect that in order for the sourcing projects to be justified - as a center-led procurement organisation operating primarily as a cost centre - it required that more and more items and more and more clients were using the procurement web technology. That is, to uphold a high compliance ratio from existing clients, as well as to attract new ones to put into the calculation. As one of the procurer with the day-to-day interaction with clients articulates:

*It is very important that people out there know about [our web-tool], it is not everybody who knows about it. So we need to get more items in there, first of all, and we need to get to spread the word. Get more items, find out from present clients and previous clients, are there other items that you need, that we are not able to provide immediately now, that we have to go on ad hoc business about and go out bidding for...clients they save money and time by going through us and getting items because the vehicles, motorcycles, and trucks have been through the bidding process already and we have negotiated favourable prices, so in that way we need to get the word out to clients, to new clients”* (Interview with service procurer)

Accordingly, the ‘buy-in’ activities were already established in the daily work and the procurement web technology should be attractive to the regions and external clients because they could skip the lengthy process of the procurement manual. Furthermore, one of the solutions in a demand-oriented strategy was marketing of the procurement services. As the service procurer also state about procurement web technology and the need for a marketing department within the procurement organisation:

*“We need be proactive and reach out to the clients. I am not doing it all the time because I don’t find enough time to do it, sadly enough...I need to be better at contacting clients on a regular basis instead of just once or twice a year. But it is just a matter of finding the time because there are so many assignments that we do on a daily basis...we need] a marketing department to take contact and market [our web-tool] which is a key thing in this organisation in my opinion because “we are the breadwinner””* (Interview with service procurer)



Moreover, the claim for a need of a marketing department articulates the dynamics of the bipolar feedback between supply and demand. Supply reduces demand immediately because it has satisfied a demand. Supply and demand, however, also complement each other over time; the ambition of increasing the client base requires procurement to insert more and more impetus for supplying demand. Demand and supply increases each other so the stakes becomes higher causing a need for more marketing and more items to be updated. The role of the headquarters (i.e. the cost centre) is to uphold compliance of the contracts, avoid maverick buying as well as to secure that more and more clients apply the contracts. Also, after new sourcing projects are established and become modified-rebuy, GCPPO will need to invest in continuously surveying the supply market and capture changes in clients' need. Therefore, the center-led procurement organisation as a form requires to continually increasing its effort and resources while at the same time being marked as a cost centre that need to reduce cost. This change in organizing also captures the requirement of GCPPO to be measured differently than previously, because a procurement organisation needed to do more and anticipate future requirements. A procurement manager says about the possibilities of measuring performance:

*"...how much do I channel through the agreements in place compared to the overall spend of the organisation, or how many purchase orders can I put through an agreement compared to the number of purchase orders that are placed within this commodity group. So in the end my objective can be to say that eighty per cent of the procurement needs to be channelled through here, then you got the qualitative indicators, which is not a subjective one and which is not the monetary one either..."* (Interview with procurement manager)

The strict financial measures could not explain the effectiveness of GCPPO as a center-led procurement organisation and it would have to develop metrics that went beyond how much cost-saving provided against the budget of running the team. As demonstrated in the quotation above, this would necessarily involve the non-financial elements of their balanced scorecard. Overall, although GCPPO had an advance in this pillar of the strategy with its access to technology and a competence base, it was a considerable challenge to sustain center-led boundaries in an endogenous complex system, in order to change its role within the company and the wider international development field. This challenge was also present in the supply chain capacity building project as addressed; however, here the existing competences were much less visible in the procurement organisation.

#### **8.4 The Supply Chain Capacity Building Project**

The pillar of the supply chain strategy that represented the biggest challenge for the procurement organisation was the supply chain capacity building project, concerned with delivering procurement and supply chain management (advisory) services to internal and external clients. As mentioned in

the change process, when involved in projects, GCPPO was primarily a service unit through the procurement manual process and entering very late in clients' projects. In terms of the latter, this usually indicated that the handed assignment was connected to a high risk and therefore handed over to GCPPO because it was unattractive. The procurement organisation had an administrative and reactive occupation and GCPPO wanted to break out of this framing. Also, new declarations for the development community, emphasising that capacity should be developed directly within the countries contrary to do an assignment and then leave again, caused that the previous models of operating in international development would lose its authority. Hence, there were several challenges for GCPPO in order to install the supply chain capacity building project. It had to gain competences in supply chain service offerings, develop supply chain thinking as a management technology into the organisation, and identify tools to support the analysis of countries' supply chain. Finally, as touched upon in preceded section, it had to enable management competences that could be distributed throughout the procurement organisation.

In alignment with the overall Global Capacity Provider's business strategy, GCPPO's objective was to move up in the value chain for project management services, again stressing the cost-awareness of the approach. First of all, the connotation of procurement was too limited for GCPPO because it was regarded in the system as primarily a procedure and a process that were a "necessary overhead cost" for the clients. Procurement, therefore, was one aspect of supply chain management, where the latter is concerned with "end to end processes" of all goods, services and information flows from "suppliers' supplier" to "customers' customer". Supply chain is driven by strategy, customer, and market demand (GCPPO's Procurement Manual). The supply chain capacity building project was based on a model where the policies and procedures were accompanied by a range of supply chain service offerings such as forecast and plan, procure, produce and develop, which were all to be captured by supply chain performance. In particular in the beginning of the supply chain strategy formulation, the supply chain model was connected to "best practices"; i.e. that the supply chain management concept could deliver a set of ideas that could be applied across interventions.

One of the first elements of the supply chain capacity building project was to identify an assessment tool, serving as foundation for GCPPO to further develop the tool in the context of analysis within a supply chain management framing. That is, a management technology to detect corruption and analyse spending, and identify where the money is distributed in the system, in order ensure more effective consumption of funding:

*“Studies demonstrate in Uganda...that only seven per cent of the funding arrived from the ministry of finance to the end-users. So there are 93% of the funds that actually disappear. Corruption go on at all levels, sticking money in their pockets, and so what we try to do with these governments... let's try to find out where these 93% of the money disappear to through the supply chain, where is your money disappearing before it reaches the end-users? What do you do with that money? This is following the money principle...”* (Interview with procurement manager)

Thus, the aim was to identify leakages in funding that were identified in the supply chain of the respective countries by means of an assessment device. Market reports and case studies had informed GCPPO that when travelling from overall government level to ministry-, regional- and local level, a large part of the funding did not reach the end-user, which the funding was intended to help. End-users could be hospitals, schools and so forth. The buy-in process for the service offering was based on the development of this management technology and the argumentation was going to be that whenever governments lent money or received funding, GCPPO would act as a service provider to ensure that the money was spent correctly. Thus, the flow of the money from the government level to ministries, regional, local level and finally to the end-user was to be analyzed, which required a systematic step-by-step approach model that was to be identified. The criteria for the assessment tool were its ability to analyse the funding process within a country and its ability to measure the impact of the intervention.

Initially, a survey tracking tool was identified from one of the largest players in the capacity building community as appropriate to be refined for a supply chain context. The first step was to apply this tool to the identification of money leakages, whereas the next step was an intervention. This intervention took place where the certification partner was to enter and develop training programs and certification programs at national level, at regional level, and local level, certify processes, redefine the procurement policies, which all should be according to best practices. The analysis should also be public known and attracting attention from various other stakeholders in the country, such as consumer associations, non-government-organisations, and so forth. Thus, according to this rationale, the more visibility and transparency about corruption taking place, the higher is the probability that corruption decreases. The third step was to re-check that progression was achieved in the system and that CCPPO and the certification partner were capable of decreasing the leaks and close the gap; this called for building indicators and scorecards to measure its intervention so the project could also become sustainable for GCPPO. However, in order to obtain validity of the data, GCPPO had to

follow the process of the funding, and this comprehensive analysis was necessary in order to analyse the inconsistencies:

*The bet is basically to find out where the money is disappearing. [Using the assessment tool] you do not look at the books because the book-keeping is very poor in these countries but it is basically to raise more or less the same questions to every level of the model to say "okay, you said you had been giving so much" and then going down the line and finding out effectively through reconciliation of data, where do you actually find that the money is leaking... So you need to look at all the levels"* (Interview with procurement manager)

This analysis was to be seen in close connection with the incorporation of the training and certification partner, on order to realise the supply chain capacity building project. The incorporation of the certification partner touched upon several dimensions in the supply chain strategy. The employees of the headquarters were to be certified, whereas the certification partner was also given a direct role in the supply chain capacity building project. One of the intentions with the certification program was to create credibility when approaching governments approached. Hence, the strategy had a demand-side objective. About the initial thoughts of the certification program:

*"we gain fast branding...we can certify our management processes, pretty much like ISO9001....the thing is that ISO9001 is a very small part of procurement and looks at the entire organisation... what we want to do is to say with the certification is that we want to have best practices in processes...this certification is more demanding....much more thorough benchmarking...we also use the certification to go out into the market"* (Interview with procurement manager)

In terms of the supply chain capacity building project, one element of the certification partner was its responsibility to intervene when the assessment tool had done the first work. The certification partner should step in, supplying training and certification to the various levels when the leakages in funding were identified, and develop a sustainable system. Hence, the cooperation with the certification partner was built on an idea of complementarities. It would not be possible for GCPPO to carry out the amount of training and certification effort, which the certification partner could handle. In turn, the certification partner would get access to a large market prepared by GCPPO. However, in relation to the branding aspect, a procurement manager comments on the first "cases" approached and in the complementarities with the certification partner (CP):

*"[CP] suffers from the [national specific] branding. [CP] is known I would say in the English world...nobody has heard about [CP] if you go to Senegal...The two we are working on now Peru and Maldives have no clue about [CP]...and to get all the materials into the right language, certification in the right language...we need to bring [CP] to a certain level that enables them to deliver what we want them to deliver."* (Interview with procurement manager)

The complementary process was also going in the opposite direction in terms of GCPPO employees being certified. That is, in order to benefit from complementarities, there was to be a certain degree of integration between the two partners to a certain extent. This training process demonstrates the difficulties which arise when a management technology based on standardisation travels in an endogenous process of variability by procurement professionals working to being awarded the certificate. For one employee, who had many years of experiences with public procurement tenders, it became a diffuse learning process because the certification partner used different terms for the same activities as carried out by GCPPO. For another employee, it was the opposite as it did not provide resemblance to the daily tasks and thus were an opportunity not ready for assessment. Yet another employee who developed policies from headquarters had already been certified many years ago and used the standards it provided actively to improve GCPPO's operations through policies. The certification, thus, touches upon the cost-value equation and eventually abundance and scarcity. That is, the resources spent on certifying employees have bipolar feedback where resources come before scarcity; the policy of using resources on certification was a management (agency) decision.

The supply chain strategy was primarily directed towards becoming more knowledgeable in managing demand. Nevertheless, certification of procurement professionals and applying a supply chain assessment survey tool were based on standardising a contribution in terms of being a competence base in the organisation that could be pushed out to potential clients. In terms of supply chain capacity building, then, the initial formulation work was based primarily on a supply strategy, pushing services out in the market to create a demand. In contrast to the sourcing projects that were identified as primarily a demand-strategy, the supply chain capacity building project was primarily identified as a supply-strategy. GCPPO had taken the approach of starting with looking at the funding and how it was channelled through the system to the users, who were intended to benefit from it. The problem with funding effectiveness was validated in many studies and, although the capacity building and other concepts had put focus on the problems developing sustainable capacities, the assessment tools and management technologies were vague and too narrow in order to be effective, from a GCPPO vantage point. It was in the distribution of funding that the supply chain model was going to prove its significance and, according to the rationale, the intervention to be carried out needed to encompass the whole funding channel process in order to have the intended effect. The challenge of managing and building capacity is, thus, two-fold in terms of how the funding is funnelled through the system and how the actual funding is spent effectively at the end-user level. However, the end-

user only saw the outcome of what was left, when funding had travelled through the funding process, and this money was not necessarily spent effectively either:

*“...the figures that I have read have roughly a three dollar budget and a dollar spent effectively. The impact is to instead of maximising the dollar received, find the two dollars that you don't have and then the final impact will be huge....The dilemma for me is in the sense of timing whether I should concentrate on bridging the financial gaps making sure that the money arrives and once I have achieved that in the country start looking at the supply chain rather than say let me go to the supply chain model before I have tackled the other one, because my impact in the countries is much lower”* (Interview with procurement manager)

Importantly, this ‘dilemma’ of where to start was accompanied by the intervention in the country being demarcated by the notion of building sustainable capacities. Therefore, the concern is a long-term perspective to the intervention that goes beyond the point in time when the training and certifications effort is completed. In this context, the process of the supply chain capacity building project required measuring the long-term effect of the training and certification, at the same time as it required that a set of indicators or performance measures could ensure that the activity was going to be sustainable for GCPPO. A procurement manager expressed the concern that the long-term intervention perspective touched upon social processes of the country. For example, when hiring people in the country to assist a project team, during the intervention:

*“...I need to give them a decent salary, then it becomes a social issue and budgeting issue...So I can give them the best training, I can do fantastic gaps analysis of a supply chain but if the supply chain is not supported by social processes, the review of the salary baseline of the country, I am going to fail because the guys will behave while I am in the country and I tell them to do the good things. Then I say okay, I pull out...we are now talking sustainable development meaning something that when you leave, it has an impact not just when I am here....It touches more than procurement because suddenly I am involved in social aspects of salary and everything.”* (Interview with procurement manager)

The challenge becomes where to draw the boundary around the effort and how to make that boundary an innovative solution in an oscillation of opposites between variability and standardisation and, in a broader context, effectiveness and efficiency. Furthermore, during the process of configuring the strategy, it was difficult for GCPPO to know when it had an innovative solution. Developing an assessment tool was expected to be the foundation, with some adjustment and adaptation made by GCPPO, in terms of procurement and supply chain assessment. During the process of working out the strategy concerned with capacity building, GCPPO found out that they were not the only ones working with a supply chain analysis, assessing capacity issues:

*“I thought the supply chain approach to capacity building was the unique product until I find that document [an assessment tool to evaluate a public procurement system] that tells me the supply chain approach to capacity building already is on paper. Now I need to go down one step, which is if the approach to capacity building through supply chain has already been sought and already applied, why are we still talking about capacity development issues and why is capacities development on the agenda. If things were working everybody would know it, you would have the solutions. But we don't have it so that means the system is no good”*  
(Interview with procurement manager)

So, the search for GCPPO becomes a justification process to find a business niche that could label the procurement organisation innovative within the capacity building agenda; however, it was difficult to draw a boundary around the innovative solution due to emergent properties. Also, during the process, the models that were identified were, as mentioned, not estimated to be strong enough, because the intervention from the model was too narrow for the purpose set out by GCPPO.

The actual concretisation of the supply chain capacity building did not mobilise into an actual effort by GCPPO of implementing the solution during the case study period. First of all, because it was a new service offering that the procurement organisation was trying to develop, where apparently few competences existed already. Also, the project was a significant investment in terms of the way Global Capacity Provider was organised and the vulnerable business model they were conditioned by, but at the same time it also enabled an impetus to change the situation. Therefore, secondary sources are included in order to inform about the demand and supply of building capacities, discussing it with the progression of the supply chain strategy in regard to the capacity project as a management technology. Hence, a scanning of the literature concerning capacity building/development in a supply and demand context provided four studies as examples, to illustrate the challenges for procurement management to enable the supply chain capacity building project. The criteria for the selected work, outlined here, was that it provided insight into the complex relationship of supply and demand (production and consumption) from the vantage point of a capacity building/ advisory services abstraction. The studies illustrate the temporary dilemmas of enabling the supply chain strategy, in particular concerning the oscillation between variability and standardization; again in a broader context, the contradiction between efficiency and effectiveness.

The first study reported is a study from Parkinson (2009) who is concerned with agricultural advisory services in third-world countries called ‘demand-driven extension’ that depend on an actual or simulated market where farmers buy advisory and support services to assist their farming. Thus, a similar type of service as intended by GCPPO; Parkinson identifies:

“the challenges anticipated in implementing these systems are often characterised as ‘supply side’ – the availability and quality of private service providers – and ‘demand side’ – the ability of farmers to identify their advisory needs, seek services and pay for them....there are a number of reasons why services did not appear as responsive to farmer needs as anticipated....the capacity was usually limited to addressing general issues...that farmers did not always prioritise services was because they were not able to put the advisory training into practice without other forms of support“...capacity-building was a victim of the very problem it was required to address. Namely the lack of farmer commitment to [the capacity building project] as a demand-driven system was reflected in a lack of political commitment to the programme in the absence of concrete evidence of success. Because capacity-building was a long-term endeavour, there was not much tangible benefit to show for efforts over the short-term...For many small-scale farmers, the perceived risk and effort of investing in demand-driven extension is often too high to be worth the uncertain returns it affords...for many Ugandan farmers a demand-driven extension system did not appear to be the best for them. Farmers in places which were more commercially oriented already, or which were better placed to take advantage of markets, due to better road linkages, for example, seemed more prime to benefit from [management services]...” (Parkinson 2009:422, 423, 425, 427)

This study pointed to a mismatch in the supply-demand relation in terms of opening the question of whether there was an actual demand for the management services, and in which form. Many conditions influence the success of advisory services and it cannot by itself replace technology, better infra-structure, and access to markets. Parkinson’s work on advisory services can be described as being in an oscillation of opposites between variability and standardization. Furthermore, also in this context, the challenge is about making an impact on the long-term, while effort is demanded to be carried out on a short-term by a confined project implementation. Consequently, Parkinson also challenges the advisory services from GCPPO because of the eventual gap between delivering the services in standardised packages, and those who receive the training, and what they need in order to develop their capacities (variability). Although Parkinson’s claim is persuasive, in the sense that we should cope with variability by analysing demand, she does not address how this can relate to what can be supplied. That is, Parkinson advocate for effectiveness in doing things right and paying attention to managing demand variability. The other pole, in terms of the cost of being effective, is made silent.

The second study referred to is a study from Riordan (2007), who argue that much work in the developing of capacity is – although entities use the notion demand-driven – driven by what he labels a ‘supply-push strategy’:

“The typical market study collects detailed information on supply – for example, the kinds of farming there, and how much can be harvested. It also provides statistical information on demand from international agricultural sources, pointing out, for example that “demand for



pineapples has been increasing 3 per cent per year in Brazil.” What the typical market study doesn’t include is concrete demand – which companies actually buy and in what quantities...Our organisation had recently opened an office in La Merced and was canvassing the city for business prospects when we met Teresa Romero. Romero was a small-scale entrepreneur who owned several trucks. She brought pineapples from growers in the jungle area of eastern Peru, trucked westward over the Andes, and resold them – at rock-bottom prices – in the wholesale market of Lima. Meanwhile back at our office in Lima a PRA [Poverty Reduction and Alleviation] staffer knew the president of Nutreina, a large pineapple canning company based in the coastal city of Pisco, south of Lima. Nutreina imported pineapples from Ecuador, hundreds of expensive miles to the north...PRA introduced Nutreina to Romero, and they formed a beneficial business partnership” (Riordan 2007:53)

From this claim, a ‘demand’ needs to be concrete and particular. According to Riordan, being demand-driven includes thinking that leads organisations to produce what they can sell, in contrast to selling what they can produce. The problem is a misconception of what demand denotes and, consequently, Riordan claims that companies and agencies should base their operations on a “real” demand-driven strategy:

“The demand-driven process I am describing here may seem too small and piecemeal to achieve the grand goal that most development organizations seek. Connecting Teresa Romero with a pineapple canning company, for example, seems to fall far short of transforming entire communities and regions...international development organizations often create top-down master strategies that can be encompassing that practitioners have little idea where to start. It’s a relatively straightforward task to create a laundry list of all the problems that face a given marketplace, and only slightly harder to create an elaborate taxonomy to classify those problems. But it’s impossible to try to solve all of a client’s sector’s problems at once.” (Riordan 2007:53)

Although the problems have been identified, Riordan criticises capacity building programs for wanting to do too many things at the same time and argues that it is not possible to have solutions which can be pre-determined and settled before experience. Consequently, Riordan’s claim is indirectly a critique of the initial strategy of GCPPO, for wanting to do too much in one intervention. The claim denotes that when offering management services, in a supply chain perspective, there should also be a sustainable demand, and a customer who is willing and able to pay for the good/service. From this argument follows that for a management service to be an effective contribution, it must have a specific demand. However, Riordan’s point does not deal with the challenge of funding, which is less visible at the level of concrete and particular demand; again with the dilemma of where to start the intervention. Thus, Riordan fails to recognize the supply-side and, therefore, reduces complexity to a decision of the particular demand (which is attractive) and the supply-driven (which is unattractive). In same trajectory as Parkinson (2009), Riordan focuses on the

particular in order to meet demand variability, separating effectiveness and efficiency; the latter in terms of addressing a sustainable supply-side.

Nevertheless, Riordan's claims suggest that the supply chain can only be sustainable if there is a real demand. Arguably from the next study there is more intricacy to having a sustainable supply chain. Daviron & Ponte (2005) investigated what they call a paradox: producers of coffee have never received as low a price as they have done in the last decade (price often below cost of production), but, in the same period of time, there has been a coffee boom in consuming industries (The Latte Revolution). Daviron & Ponte address this "paradox", and where the profitability has gone, by analysing the coffee supply chain. This shows that profit margins in particular has ended at the 'roasters' level, which is often out of the scope of the developing countries, that are producing the coffee beans. However, the activities carried out at the roaster level were still characterized as low-tech operations (Daviron & Ponte 2005). In the same manner as identifying corruption, because it hampers the effectiveness and the sustainability of supply chains, one might regard the distribution of profit in the coffee supply chain as "unfair" and "unsustainable". Indeed, along with the coffee boom of consuming coffee countries, there have been interventions in creating a sustainable coffee production. Daviron & Ponte points to:

"...sustainability certification is a costly and sometimes lengthy exercise. It requires setting rules and monitoring compliance. In the right circumstances and with the right dynamics, this can create a virtuous circle of empowerment and organizational strengthening. At the same time, farmer organization may find it difficult to wade through rough times if the expected benefits do not materialize in the short term. The hidden costs of coordination (time spent in meetings, transport), uncertainty, and the limitations of collective action may dramatically decrease the overall net benefits of certification efforts...Obviously, increasing the market of fair trade coffee in general would have a positive impact on producers...To the extent that these initiatives [sustainability certification] enable the channelling of value-add to the producer (of any size), they still operate in a redistributive manner (between consuming and producing countries) and thus can play a role in correcting the trend towards increased transfer of wealth downstream in supply chain...But even these initiatives do not address the power relations among actors in the coffee value chain, since they are often built upon them...The global value chain for coffee used to be regulated by domestic governments in producing countries and international commodity agreements at the level of international trade. It is not less regulated today, just regulated differently. Certifications such as organics and fair trade started this process in niche markets...ignoring the role of power in determining the functioning of value chains. Prices at different nodes of a value chain are not exclusively determined by the volumes of demand and supply. They are also determined by oligopolistic behaviour, the ownership of stocks, and the actions of investment funds in futures markets." (Daviron & Ponte 2005:187, 192, 198, 256)

A sustainable supply chain is a complex phenomenon. As in the case with the coffee supply chain, there are many entities participating in the relation production, meeting consumption. It is not enough that a country produces a lot of coffee, if the rest of the supply-demand relation is organized in a way that makes the country poorer by producing more coffee. Specifically, the complexity of a supply-demand relation cannot be reduced to the existence of a customer, in the end, who is willing and able to pay for the product.

Initially, GCPPO was faced with problems of integrating the supply chain concept into the organization. Supply chain thinking touched both upon how the competences inside the organization were able to meet the challenges, as well as how the service offerings were going to be delivered to the market. Discussing Riordan's (2007) claims with a procurement manager, which was one of the responsible developing the supply chain capacity building project in GCPPO, provoked new thoughts on how to organize the service offering. This resulted in two main approaches to choose between:

*"I have two hats. The one is the consultant; I am going to give you a new system, then monitor how things work for two years, three years and I am out of the country. Done! I call it capacity building; I help you understand it but you don't want it. Then there is the other one, which is to say; 'yes you want a procurement system but what do you want to achieve with it'...change my hat from consultant to say that I come from a development organization to look at your procurement system and might have to revisit your entire process but 'I like to know how you want to develop your country?' More money from the World Bank; not exactly...because you are going to [waste it] up next time again...attract donors a few times...and after that you will see that things don't work and do not promote the development" (Interview with procurement manager)*

The strategy that was outlined in the quotation above took its point of departure in both supply and demand. Specifically, there needed to be indicators that could render GCPPO to be sustainable and to take a fee for its services; however, the model needed to be flexible in order to could cope with different demand situations (variability). This was the key challenge; to ensure the survival of the organization by promoting an intervention that could earn an income on the short-term, while, at the same time, avoid losing focus on the impact in a long-term perspective. However, in order to achieve the latter it was, as mentioned, necessary to be involved in social processes and long-term sustainability although such proposition was not in the initial formulation of the intervention model. The difference between the approaches in particular lies in the mind-set of how to develop capacities in the country and decide which intervention could improve countries' supply chains:

*"...suddenly the focus on the supply chain becomes an analysis of needs. What do you want to do if I built you a road? Maybe I first want to facilitate exchange with the neighbouring*

*country, which I cannot reach right now because there is only one road and fifty per cent of the time the road is flooded... If you built a road made of red clay and it starts raining in Congo, six months of the year, you cannot drive. Even the large trucks cannot get out of the hole. You spent another two months of the year fixing the road because you cannot use it. That's what I mean about capacity building project to build roads in the country through the supply chain model..."* (Interview with procurement manager)

From a supply chain management perspective, the contribution (and therefore the income) necessarily had to be linked to the success rate of linking consumption to the income in order to be sustainable. This, of course, would be a considerable change in the approach initially developed and the role of the certification partner. The change is connected to at least two temporary dilemmas in a contradiction between efficiency (use of resources) and effectiveness (doing things right). First of all GCPPO was to decide where begin its intervention in a complex system, as not everything could be done in one single intervention. Secondly, to carry out these capacity projects by offering a service required a specific and sustainable demand to supply. Overall, from this trajectory, the supply chain model was to become a method for analysing the context, and not a pre-determined model that was to be implemented in the country, fitting the reality to a pre-determined model. Thus, it is the difference between pushing a model, based on fixed indicators, as the traditional assessment tools identified; or, alternatively adapting a model and define the indicators in the specific context. For example:

*"I worked in a Congo election project and how to bring a system to register voters in the most foreign part of the country. The challenges were; how do you reach the population and then tackle that the population don't even know they are Congolese..."* (Interview with procurement manager)

Supply and demand is so profoundly interpenetrated and oscillating opposites that GCPPO required a strategy that took both supply and demand into account. The problem with the election in Congo demonstrates the point concerning the initial development of the supply chain capacity building project; that is, we are in advance with our models and try to force the reality into the model, not the other way around. This notion is touched upon by Kühl (2009), who indicated that the conceptual renewal within the development agenda by increased efficiency; rather, was it an attempt to achieve legitimacy in their environment by adopting the newest fashion. Kühl identifies in relation to capacity development, an off-spring of capacity building, that this was a call from the two largest players in the development agenda for developing countries to take their destiny in their own hands with the help of Capacity Development programmes:

"What is interesting, however, is that the concept for strengthening endogenous forces almost inevitably leads to a 'self-help paradox' in interventions. The concept of Capacity Development

is basically a call upon governments to be independent and self-sufficient. This is a paradoxical demand – obeying a call for self-sufficiency and independence is hardly an indication of genuine self-sufficiency and independence. On the other hand, resisting such a demand – persisting in a state of dependency, in defiance of a call of independence – would also be a contradiction, as resistance would be a form of independence or an act of self-sufficiency. The paradox lies in the contradiction between what the communication demands and the fact that it demands it. Every communication consists of a ‘report aspect’ and a ‘command aspect’. On the hand it communicates a subject (report), and on the other hand it transmits the expectation that this will be accepted as correct and appropriate (command). The ‘report aspect’ and the ‘command aspect’ cannot be isolated from each other and cannot even be analytically differentiated” [drawn from Luhmann] (Kühl 2009:569)

From a complexity science perspective this contradiction is not unexpected; it is the dynamics of the intervention by exogenous management technologies in endogenous complex systems. The intervention of an exogenous process is measured by a calculated boundary around a cost/value equation and therefore promises about effectiveness and efficiency. Inevitably, capacity building in any form is an exhaustive long-during task, carrying all the characteristics of an endogenous complex system. The characteristics being measurement imprecision, tendency to decentralize and that all agents have access to local information, in contrast to long-distance global information. The success of intervention – training, certification, etc. - is conditioned by these characteristics. Although there might be quick-wins and synergies, the procurement management challenge of compliance and contradiction of efficiency and effectiveness is visible and present as the dynamics of managing a supply chain capacity building project.

In order for GCPPO to develop its services, it initially planned standardized offerings to the market, in order to have a cost-efficient approach to the cost of running the organization. This produced the dilemmas of where to start the intervention as well how the standardized offerings would match the particular and concrete demand in the given country. Furthermore, the account from Riordan that capacity building was viewed as a global blue-print, curing the system at several levels at one time, resembles the complexity science claim that the boundaries of such blue-print are not viable to uphold, due to the strong decentralized impetus of complex systems, where agent have access to local information. Funding in general is a challenging endeavour in this demand-driven thinking, as funding is profoundly introduced as a supply-side element. Thus, the boundary which is set around the supply chain intervention needs to be maintained and this will demand a far more enduring effort than the effort of formulating the supply chain capacity project.

### ***8.5 The Supply Chain Strategy as Oscillation of Opposites***

Procurement management in GCPPO hoped that developing competences within demand management and in general supply chain management could enable a shift from being reactive to proactive, as well as a shift from being driven by establishing its own demands, in opposition to being driven by the demands of others. The latter was connected to a highly risky business model, where Global Capacity Provider and GCPPO carried out assignments that others did not want to do themselves. However, in order to drive its own demand, GCPPO also had to take risks in terms of investing in areas that could yield a sustainable business model. That is, in order to create a demand for its services, GCPPO planned to push service offerings to the market based on complementarities with certification partner, investments in information technology, and an advisory/management competence platform offering supply chain services.

Thus, GCPPO entered a relation of opposites; on the one hand, it wanted to become market driven in terms of pulling a demand that had variability. That is, doing the right things and complying demand effectively. On the other hand, GCPPO also entered a standardisation offering in terms of being supply driven focusing on which competences it could provide to the market and thus a matter of the use of resources (efficiency). Thus, the relation between effectiveness and efficiency was not solved with the new supply chain strategy, merely re-arranged. The activities that followed by the supply chain strategy all carried a contradiction of efficiency and effectiveness as mutually supporting and undermining the strategy of transforming the procurement organisation. That is, the activities connected to the supply chain strategy, as analysed in this case, carry a left side (variability) and a right side (standardisation) relating in an oscillation of opposites, as illustrated in following figure:

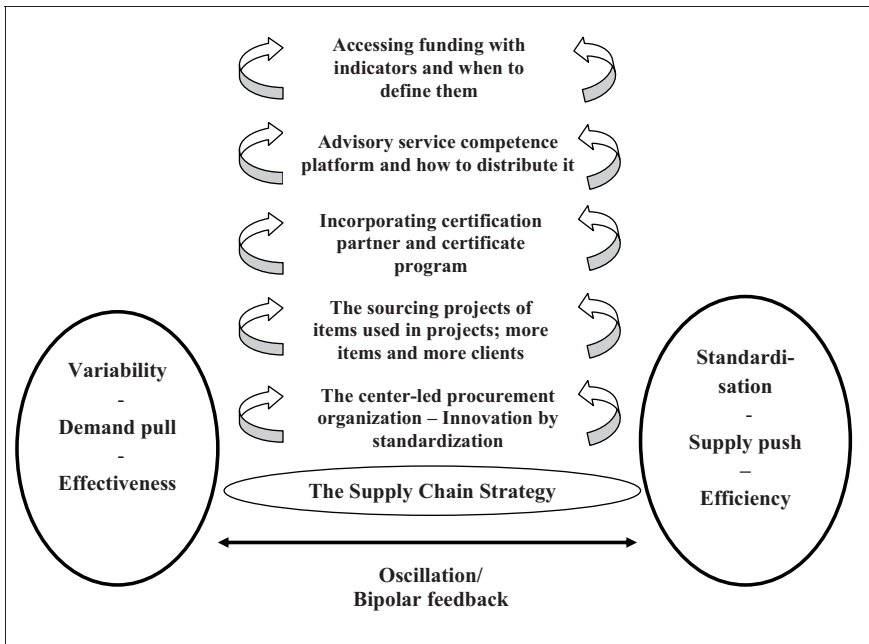


Figure 31: The oscillation of variability and standardisation in the supply chain strategy – Case III” (Author)

This case study was not longitudinal enough to capture the further process of bifurcation, oscillation and contradictions, enfolded in the supply chain strategy. Thus, it would be speculation to come with a prediction of how the activities further unfolded. However, a theorisation of complexity science from this thesis’ perspective probes that the oscillation of opposites do not go to rest and an effort trying to choose one of the pole will be met with a strong force from its opposition. That is, if GCPPO merely tried to cope with any type of variability in demand, it would not be able to develop a competence base to react on demand. Variability and standardisation feed off each other in a significant relationship. GCPPO required a strategy encompassing both supply and demand because they are so heavily intertwined in an oscillating of opposites, interpenetrating each other.

### 8.6 Case III – Discussion and Implications

GCPPO was in a transition phase where the procurement organisation had to redefine its role in the company as well with external clients and suppliers. Furthermore, the aim was to establish a relationship with a certification partner. In regards to both capacity building and sourcing projects, it

was a challenge for GCPPO that procurement was understood as a “burden”, a necessary step to pass. Consequently, it also decided to develop practices around the supply chain management concept. This constituted that GCPPO were now engaged in two concepts or ideas about management: ‘capacity building’ and supply chain management’; and both were exogenous management technologies that were to be applied in the context, to uphold endogenous processes of transforming the procurement organisation and its significance. In contrast to the former case-studies and their change process, this case was therefore more a story about the contradictions and conditions under which the new strategy of procurement organisation was formulated and initially unfolded. In realising the supply chain strategy GCPPO, implicitly, tried to realise the procurement maturity model logic in terms of organising for a center-led procurement design, demand management, value chain integration and so forth. The case, thus, illustrated the contradictions and conditions that such an objective imposed.

GCPPO was organised in a way where both the central office and the regions were offering the same procurement services; however, with a different setup and access to technology. In other aspects, the central office carried out activities that were more clear-cut divided, where the regions were income-generators and the central office were responsible for making policy and procedures. GCPPO’s aspiration was that the central office was to be primarily a cost-centre, where the regions were to have the commercial relationship with suppliers. The boundaries of operating were then to be determined by the headquarters that worked towards becoming a center-led procurement organisation. However, through analysing how the regions and headquarters operated, it was identified that an oscillation of opposites existed between local-led (regions) and center-led (headquarters). In that way, the supply chain strategy was a bifurcation point, created by the dynamics of opposites where headquarters aimed at being an innovator, introducing new business lines and handling strategic activities with clients and suppliers, whereas regions should be income generator and managing operational activities. Through the analysis, it was identified how GCPPO was entangled in complex relationships, where counter strategies would arise. For example, it was difficult to convince the clients in their largest stakeholder that GCPPO was to be an outsourcing partner of ‘leverage’ procurement services. Although it had officially been given a mandate to handle the services, it was an attractive category for the budget-holders, in order to control its resources.

For GCPPO the strategy also became a matter of controlling demand, which required an extensive marketing effort, in order to get rid of being framed into others demands. For example, one of the first exercises for Global Capacity Provider was to re-brand its web of clients and users. Furthermore, the



aim was to use professional certification and establish a relation with the certification partner, and achieve buy-in with internal customers to sourcing projects. There are good reasons for why GCPPO has adapted this strategy of creating a demand. That is, to know ‘real’ demand and identify customers able and willing to pay for the services would be a costly situation and it would require approaching one concrete customer at a time with a particular demand. The push for standardisation, and the accompanied efficiency, was vital in order to ensure strategy implementation; however, at the same time, there was uncertainty of whether the solution was an innovation in the system. What the case probed was that innovation was expensive to carry out because it would require less standardisation and more particularisation. All the activities in the strategy were conditions from a contradiction of variability and standardisation; a dynamics of oscillating opposites between the need for standardisation and at the same time coping with demand variability.

The organisation was challenged by a change in the way funding was awarded, denoting that existing models of operating eventually would be out-dated. In order to become more market-driven and better at planning its own resources, the supply chain strategy installed standardisation; therefore, GCPPO became supply-driven, in expanded form, at the same time as it wanted to be demand-driven. The capacity building agenda in the developing community did not present itself as something external, standing in relation for GCPPO; it relates itself actively through action, trying to redefine its role in an emancipatory project. However, the deliberation of driving its own demand did not follow a trajectory to re-define practices, which were characterised by market driven practices. Rather, it was supply-driven practices that had expanded their form, whereas the contradiction between efficiency and effectiveness had remained essentially the same. It was required for GCPPO to control its overhead cost, due to a difficult current business model, and it also needed to invest in competences to increase its influence (and thereby increase overhead cost), while at the same time being designed as a cost-centre. The contradiction of effectiveness and efficiency denoted a constrained ability to plan what it supplies; not the other way around. Thus, the case of how the supply chain strategy and the efforts of controlling and aggregating demand in order to plan will not lead to a reduction of complexity and uncertainty, but merely a rearrangement of it. What GCPPO needed was to make a supply chain strategy that included both variability and standardisation.

The case has demonstrated the difficulties of re-defining a role in a complex system. Perhaps not surprisingly, from a complexity science perspective, as the history informs us about what we have the potential to become in the future; bifurcation points do not emerge as something “external” to the

system; rather, change and innovation must be understood by their holistic “internal” relationships. The case, thus, demonstrated that planning will not lead to reduction of complexity and uncertainty. Rather, the procurement organisation’s ambition to plan required them to do more and more and engage in a constant tension between center-led and local-led authority. Another implication of this case is a discussion of a distinction in the procurement domain, where one part focuses on public procurement, while the majority focus on the private market. This case demonstrates that although public and private procurement issues are different, especially in terms of rules and legislation, they are exposed to the same kind of management issues. For example, it can be claimed that the procurement organisation in Case III in developing the supply chain strategy and a center-led procurement organisation engages in federal relations, as in Case II, with regions and supply chain relationships.

## **9 Conclusion: The Dynamics of Procurement Management**

The purpose of this chapter is to conclude the study by combining the conceptual, theoretical and empirical insights, the thesis has provided, in a discussion of their contributions and implications for research, which will lead to guidance for praxis. The emphasis is on the oscillation of opposites, the dynamics of contradictions, and how procurement management technologies travel in the relation between exogenous and endogenous processes. Hence, the following is the thesis' conclusion of understanding the dynamics of procurement management. As a start, we can benefit from repeating the thesis' research question:

### **How can we understand the dynamics of procurement management?**

- 1. How can we understand change of procurement organising?**
- 2. How and why do new practices of managing procurement emerge?**

As mentioned in chapter four, when we want to understand dynamics, we need to deal with complexity. Doing this is a matter of acknowledging that there are boundaries to our knowledge because of distributed representation and incompressibility of the many millions of endless non-linear interactions in a complex system. In turn, we construct boundaries that are primarily achieved through the process of abstraction, double-moving contradictions, oscillation of oppositions, and bifurcation points. The chapter starts with identifying findings across the presented cases. This is followed by a general discussion of procurement as complex versus the procurement domain literature; both sections are designed by a theoretical generalisation (Becker 1992, Flyvbjerg 2006) (see also chap. 5). Hereafter, implications for the research within procurement and supply chain management are discussed, and finally the conclusion will provide the guidance of a consequential praxis.

### ***9.1 Findings and Discussion of Cases***

Overall, the three cases have each contested the causality of the procurement domain literature and the maturity models in particular. That is, the maturity model of procurement management that has been heralded, among other things, as distinguishing between good and bad practices. From this follows that more centralisation (or center-led management), more integration, and more strategizing accompanied by policies, procedures, and work processes are the ideal to reach in order to have a

well performing procurement organisation. In different settings we have seen that such logic is fragile and pressured by the contradictory dynamics of complex systems and the oscillation of oppositions.

Case I demonstrated the dynamics through the oscillation of oppositions between integration–disintegration and the dynamics of competition in a collaborative arrangement. Integration and disintegration is an opposition consisting of two different logics. Integration follows the logic that by becoming closer and more cooperative, we associate more, we combine effort etc. To disintegrate, on the other hand, designate more remoteness and disconnection, separating effort etc. Case I, then, illustrated interdependencies of a network of production meeting consumption and how the opposition between integration and disintegration was the dynamics of the endogenous process. Because of interdependencies, competition at process of extension was necessary for cooperation to operate, and for Innoair to comply with customer agreement. Integration in terms of new product development and ownership were conditions demarcated by the history of the supply relationship. Several bifurcations points produced symmetry, breaking the opportunities for the relationship between Innoair and Exceltrix to experience breakthroughs and breakdowns. Procurement management had a role in this competitive relation by introducing management technologies such as benchmarking and searching (globally) other supply alternatives. This dynamics can be regarded as the force of decentralisation, at the lack of global information and blue-print, in a complex system negotiating and challenging installed practices, such as ownership, and the guiding principle from top management that the two entities were obligated to work together. The supply-demand relation enabled the double-movement of contradiction that made integration and disintegration oscillate in a continuous dynamic pattern.

Case II concerned a procurement organisation, which carried out procurement activities from a central office, with special attention towards pre-contract sourcing work. Case II exhibited an oscillation between local-led and center-led authority of procurement activities between business units and GFPG as a central office. However, in this oscillation of oppositions, in particular the bifurcation process of the supply-demand breakdown of the financial turmoil opened a window of opportunities, which offered possibilities, increasing and decreasing the role of GFPG. The decision to downgrade the status of the procurement organisation produced unintended consequences but eventually increased its fitness significantly. Case II invested in procurement management technologies that existed in a complex relation, exhibiting a contradiction between reducing and increasing cost. These were made visible through cost-saving, as the value identification and cost

consumption in terms of the work that was carried out, were an indirect cost of the company. The value which GFPG was measured upon was cost savings, which were captured against the cost of running the organisation. Thus, more captured cost savings by sourcing work and less cost in running the organisation indicated more value. However, in order to demonstrate to internal customers that GFPG was credible and competent, it had to invest in building competences and invest in technology; thereby increase the cost of running the organisation. On the other hand, it was more and more cost-consuming to find cost-saving synergies. The case, therefore, exhibited a contradictory relation between effectiveness and efficiency. The continual work with ensuring buy-in from internal customers was connected to becoming more and more organised around internal customers, as well as to spending time and resources on complying demands. Thus, the more mature the procurement organisation became, the more effort was to be done in order to realise value in terms of cost-savings.

Case III concerned a central procurement organisation and its investments in procurement management technologies, in order to realise a new supply chain strategy. The objective of this supply chain strategy was to enable the procurement organization to become a more strategic and proactive; focusing on planning rather than be characterized as a reactive administrative operating organisation. The strategy had primarily two focus areas: sourcing projects of items used in company projects and a supply chain capacity building project that was based on delivering management services to developing countries. Case III illustrated how this strategy was connected to an oscillation of opposition between variability and standardisation and that the activities carried out to realise the strategy were entangled in this oscillation; and, in an extended abstraction, a contradiction between effectiveness (doing things right) and efficiency (minimum use of resources being effective.) Also, in terms of organising the supply chain strategy, a center-led procurement organisation was initiated that exhibited an oscillation between center-led (headquarters and professionalised procurement activities) and local-led (regions, “part-time buyers”) authority of procurement activities. The strategy was to identify the strategic activities that should be conducted center-led, and the operative activities that should be carried out in regions. The analysis, however, showed that this boundary drawing would not be realised without counterstrategies from the regions. Moreover, the buy-in strategy to get more external clients was not only a convincing argument for an effective procurement service, but also a struggle between agents to control budgets.

In chapter 6, 7, and 8 each case had its own story to tell. When the attempt is directed towards a discussion between cases, the representation may appear as each case being a stable homogenous

entity, whereas there is heterogeneous variance between the cases. Nevertheless, the cases are discussed in relation to each other. In the following table, the cases are summarised by their main subjects:

	<b>CASE I</b>	<b>CASE II</b>	<b>CASE III</b>
<b>Company Outline</b>	Small-medium sized private company, part of larger holding company	Large conglomerate company with diverse business unit	Development aid entity operating within a larger development agency community
<b>Vantage point</b>	Procurement organisation as part of production	Central office as group organisation supporting business units	Central office as group organisation servicing the company's regions and external clients
<b>Perspectival element</b>	Supply chain relationship	Procurement investments	Developing a supply chain strategy
<b>Management Technologies</b>	Supplier management model, supply-chain-operations-reference model, benchmarking supplier market	Sourcing process model: E-enabled procurement, off-shoring procurement activities, competence building, category management	Supply chain strategy pillars: Procurement web technology, Procurement manual, Certification programme
<b>Oscillation of opposites / Contradiction</b>	<ul style="list-style-type: none"> <li>• Disintegration and Integration</li> <li>• Strategic and operational</li> <li>• Efficiency and effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Local-led and center-led authority</li> <li>• Cost and value</li> <li>• Efficiency and effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Variability and standardisation</li> <li>• Local-led and center-led authority</li> <li>• Efficiency and effectiveness</li> </ul>

**Table 14: “Comparing cases”**

The cases were selected by two criteria in terms of variance; size of company and whether it was a private or public company. Therefore, Case I and Case II are similar, as they both represent a private company, and different as case I represents a middle-sized company, while case II represents a large company. Case II and Case III share similarity in being procurement organisations in a large establishment, whereas they differ as one represents a public company, while the other represents a private company. From the vantage point of procurement management, size seems more important in identifying similarities than in the case of public versus private. In Case III, patterns were identified that were similar to what Case II had been through in terms of development of a federal relation,

where headquarters strategized for a center-led procurement organisation. All three cases used procurement management technologies in order to demonstrate to internal customers and top management that it should be regarded as significant (see table 14) and, therefore, an important element in the buy-in approach to internal customers. In all three cases, strategies – formal and informal – were identified in relation to achieving internal customer buy-in; however, perhaps because of the size of the organisations, Case II and Case III used a combination of management technologies and building relationships with internal customers. For example, employees who were transferred to other places in the company functioned as buy-in enablers. Case I was demarcated by its resources and was more an articulation of category strategies as potentiality not ready for assessment. Moreover, in terms of the buy-in context, Case II and Case III were entangled in federal relations with business units/regions. When the two procurement organisations in Case II Case III applied procurement management technologies in order to professionalise their practices, they primarily were organized around internal customers and in Case III also external clients, and the management technologies also became entangled into this federal relation.

In one way or another, all three cases were measured by the cost of running the procurement organisation; however, all three cases worked towards being measured differently. Case I was measured on its ability to achieve cost saving against a budget. Case II was measured by cost savings achieved against cost of running the procurement organisation, which also involved spend coverage. However, in line with being a competence centre, it also engaged in an emancipatory project of being measured by its ability to distribute competences out in the company, as well as total cost of ownership. Case III was measured upon revenue generation against cost of running organisation and the financial target in their balance scorecard. The new strategy entailed that it was to be measured on non-financial aspects as well. Moreover, Case I primarily focused on direct categories and referring to production. Case II and Case III both had a federal relation; Case II supplied a service from a mandate provided from the business units, Case III moved towards coordinated design, where headquarters were policy-maker and operating entities having commercial and income generating responsibility.

Case III aimed for the headquarters to be a cost-efficient cost-centre, and it was entangled in the same contradiction as Case II in terms of effectiveness and efficiency (cost and value), where development was in a constant bipolar feedback between increasing the amount of resources to gain more impact to the organisation and internal customers, while at the same time reducing cost to ensure efficient

use of resources. Moreover, when procurement management was professionalised in Case II, it was connected to a set of procedures that should be undertaken, before a buy was conducted. In the public procurement situation, a procurement process was installed to legitimise a buy. In Case II the aim was to create competition in order to optimise the sourcing process, in Case III competition was the prerequisite. Nonetheless, for both procurement organisations it required a considerable amount of resources in the pre-contract phase of buying an item. One of the most significant similarities was between Case II and Case III in terms of their center-led ambitions and their oscillation of authority with decentralised environments. A significant similarity was the contradiction between cost and value; that is, between doing things right and the amount of resources spent on carrying out the activity, as a federal relation oscillating between center-led and local-led authority.

Chapter 2 reviewed the procurement domain literature and identified five oppositions, which the literature regarded as either to be ignored, resolved or placed in a ‘cold war’ relationship. The framing of oppositions further enclosed how to approach the case studies. The following table shows the five oppositions operated in the three cases highlighting similarities and differences:

	CASE I	CASE II	CASE III
<b>Integration versus Disintegration</b>	Integration with customers and suppliers was necessary to uphold customer contract, at the same time was more disintegration necessary as integration were not profitable	More integration with internal customers as the procurement organisation grew. Sourcing projects were mainly carried out by people only concerned with pre-contract responsibilities and had no obligation to suppliers	Regions and headquarters worked mainly autonomous although a new strategy sought to provide clear responsibilities and eventually more coordination and dependency.
<b>Cost versus Value</b>	Budget controlled. Limited planned cost of running the procurement organisation was constraining scope of procurement involvement in company project activities	Value was cost-saving provided against cost of running the procurement organisation. New procurement investments were introduced promising more value, however at the same time increased pressure on resource use and more difficult to be effective	Budget controlled. Regions were to be revenue generators whereas headquarters was to be primarily cost centre. Pressure on regions to increase revenue and headquarters to decrease cost



<b>Operational versus Strategic</b>	Operational category work the central activity; project-buying an added activity.	Organised in separate parts of the procurement organisation. Pre-contract work the main priority, operational post-contract work at the responsibility of the business unit	Day-to-day work separated with project-buying in headquarters. Unclear work division between headquarters and regions
<b>Decentralisation versus centralisation</b>	Many procurement activities could not be categorized as either centralised or decentralised. The procurement organisation had no internal coordination role and thus operated by low authority of procurement activities	A federal design is dominant, where central office is given a mandate to provide a service. Oscillated between center-led (central office, professional procurement) and local-led authority (autonomy of business units, mostly part-time buyers)	In the change process towards a center-led design headquarters are policy-maker and operating entities having the commercial tasks. Oscillated between center-led (headquarters, professional procurement) and local-led authority (regions, part-time buyers)
<b>Reactive versus proactive</b>	Procurement had a reactive role in the participation of NPD projects. Proactive role announced in category strategies; however were constrained by its budget and its position in the company	Designed so that center-led procurement activities did not deal with day-to-day activities. However, because of integration with internal customers it reacted on behalf of a mandate given to them.	Reacted on behalf of clients, whereas the strategy was to be proactive; however, this created a need for standardisation and marketing, enabling a new form of being reactive

**Table 15: “Procurement oppositions across cases”**

Investments in procurement management, such as the supplier segmentation model in Case I, the sourcing process model in Case II and the supply chain strategy in Case III, over time is an engagement in an endogenous complex system. This engagement intensifies the cost/value contradiction – especially in the center-led procurement design - requiring more and more effort into demonstrating value but also increasing the cost of running the procurement organisation. Overall, thus, the procurement organisations and their use of management technologies can be illustrated in the following figure:

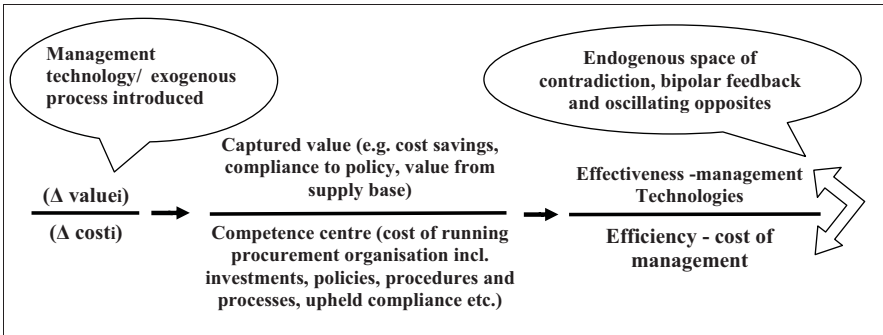


Figure 32: “Exogenous procurement investments travelling in endogenous complexity”

The conventional procurement management explanation informs us that new technology and new sophisticated concepts make work easier. However, from complexity science, this is a misconception, as the boundaries to maintain the exogenous instalments require extensive effort. Hence, complexity science argues that it would take an enormous amount of impetus to up-hold center-led boundaries because of the strong force of decentralisation and the many non-linear interactions of local entities. It was identified in the cases that boundaries of exogenous instalments were renegotiated by other agents connecting. Bounries were temporary and dependent on a various number of contingencies. Exogenous instalments of policies, procedures, and work processes, for example as present in the strategic supply wheel, have a contradictory relation between effectiveness and efficiency for a procurement organisation. As identified in Case III, developing a center-led procurement organisation was connected to extensive cost of developing policies, procedures, and work processes that required many decentralised regions to transfer their revenue, in order to make the resources available to develop professional procurement competences.

A dialectic double-moving contradiction supports and undermines each other in process and performs an important role in terms of how dynamics are understood in a complex system. Demand creates supply and supply creates demand. Instantly, a supply decreases demand by fulfilling it, but it also increases demand by creating wants and needs. Demand increases supply by offering a market and decreases supply by consuming it (see chap. 4). Supply and demand can increase each other over time. As we have seen in Case II, more and more demand of procurement services from business units created more and more supply of procurement competences such as introducing new management technologies and expanding the geographical scope. Hence, for the procurement organisation supplying internal customers, demand is also created demand within the procurement

organisation for supplying more services so it can grow bigger. This is a tension which creates dynamics because the stakes become higher, where the cost of supplying more procurement competences must be met by an increase in demand; at the same time demand is reduced by being fulfilled by supply.

As identified in all three cases although in different form, procurement was measured by the cost of running the procurement organisation versus how much cost-savings it could provide. Thus, the more it wanted to do the right things, the more it increased the cost of running the procurement organisation. Through the bifurcation of the supply-demand breakdown, the investments in e-enabling technologies and off shoring procurement got momentum for Case II; however, the cause of these investments was not the supply-demand breakdown. The investments were installed to supply a demand for procurement support and to make procurement (exogenous) processes more effective by reducing cost in contracts. Doing so demonstrated the value of investments made by GFPG as a competence centre, at the same time as it increased the cost of running the procurement organisation. That is, a contradictory relation between effectiveness and efficiency, between the cost of doing things right and the cost of running the procurement organisation with use of minimum resources in order to do things right. Hence, for procurement management to introduce management technologies, we may draw boundaries around its complicatedness and measure the implementation by selected boundaries. However, the more we expect the solution to envelop, the more are procurement professionals required to uphold compliance of its boundaries. The more developed a procurement organisation becomes, the more is it challenged. Impetus is needed to be installed in order to uphold boundaries, due to the dynamics of a complex system and its tendency to decentralise, as well as to the absence of long-distance information.

## ***9.2 Procurement Domain Literature and Complexity***

According to the procurement domain literature, procurement organisations started out by having a low priority in the company regarding resources. Also, the procurement entity in itself was a problem, because it did not see the possibilities that could be taken advantage of (e.g. Cousins & Spekman 2003). For example, Morris & Calantone's (1991) study pointed to that procurement generally was perceived as the least entrepreneurial part of the firm, and that this was also the perception from procurement itself. The procurement domain literature's answer to this challenge, in terms of particular the maturity models and the strategic procurement discourse, was an argument that a change process was required by a guided action, facilitated by procedures, policies and processes. In

this context, a rationale from the procurement domain literature was that it equated strategic with being important; leaving us with the implication that many procurement activities, carried out by procurement professionals, were not important, and that these professionals should attend other and more sophisticated activities. The procurement domain literature has implicitly adopted the change perspective from Van de Ven & Poole's framework, which is based on a single entity. The entity is implicitly defined as a collective entity of people dealing with procurement, under-stressing the relations to other entities, while emphasising the strategy facilitation itself and the organising around the maturity stage the procurement organisation is in. Dilemmas are solved at each stage, as source of dynamics for achieving a higher sophistication level. Also, it bases its model primarily on a morphogenetic change that alters the core of the procurement phenomenon. Furthermore, impetus is installed at a given time, and leaves when the mission is accomplished. Hence, the change process involves more integration, more center-led authority (and ability to plan), and in general more sophisticated tools and techniques. The end, or the outcome, is integrated relations with suppliers and the ability to be end-user demand-driven.

Another claim which is less biased towards the rationality of strategy is Strauss' (1962, 1966) study, which concludes that procurement's answer to a low organisational status is often an increased level of professionalism. The case observations in this thesis support Strauss' study. The dynamics of procurement management are connected to increasing the level of professionalism, as identified in the case companies, by management technologies in terms of strategies (and business models), e-enabling technologies, work models, competence development (e.g. employees with a high education level, professional certification), etc. Higher buy-in becomes important for procurement management because it allows more significance to the business of the company. At one level of abstraction, this buy-in is identical with a marketing effort that aims to attract more customers. Therefore, one characteristic of developing the procurement domain literature has been to adopt marketing literature and making it reverse. For example, segmentation models and concepts such as Supplier Relationship Management (i.e. replacing Customer Relationship Management) and Key Supplier Manager (i.e. replacing Key Account Manager). Making the marketing concept reverse draws a boundary between buyer and suppliers, and the relation between the "buyer" of internal customers and procurement professionals is a black box. It may, however, prove adequate to develop exogenous tools and concepts. This approach is highly contested by this study, as it reduces the intricacy to only dealing with suppliers and thereby ignores the complexity of relationships between procurement professionals and internal customers and their interdependencies. This denotes that the internal/external boundary is

a problematic one, as derived from the procurement domain literature, as well as that procurement is a reverse mirror of marketing from the customers' perspective when we are concerned with procurement activities as a process in the company.

The center-led procurement organisation, that is a dominant construction of the procurement organisation (Monczka et al 2006) where the objective is to reduce cost, increase control over spend, and increase the value attained from the supply base (Carter et al 2007), was also identified in Case II and Case III of this study. However, as Carter et al find in their study – a database of 260 companies using several methods – future strategies will move away from the center-led model. In particular in this context they point to:

“The greatest driver of centralization over the past decade has been the need to reduce the cost of purchased goods and services. These savings have been achieved by analyzing spend across business units and regions, agreeing to standard specifications for similar items, aggregating the demand of the standardized items across the organization and reducing the number of suppliers. This has allowed for a stronger negotiation position on price and other terms and conditions, resulting in a year-over-year cost savings. Presumably this has also allowed suppliers to reduce costs and prices through economies of scale. Once these savings have been achieved, the argument for centralization loses some steam. Admittedly, a return to decentralization might bring a return to different standards and specifications, but this is unlikely if it also brings a return to higher costs. Therefore business units will be unlikely to abandon common specifications and suppliers because they will not want to incur the resulting cost increases. Thus once the cost rewards of centralization have been achieved, the rationale for centralization may be less compelling.” (Carter et al 2007:92)

This point draws attention to the fitness landscape and the temporality of strategy claims, and the oscillation between local-led and center-led procurement authority. The strategy is temporal and dependent on an indefinite range of contingencies and, therefore, only experience and time will reveal whether a center-led organising is the right strategy, and whether it is possible to uphold its boundaries. Moreover, the center-led procurement organisations in this study gained their momentum by the ability to achieve centralised synergies; however, this was not the end of the process. What also followed were management technologies that supported being a competence centre responsible for strategies and innovating new practices. Complex processes are irreversible and the deeper the center-led procurement organisation enters a quest for searching synergies; it fulfil a demand but also creates a demand in terms of delivering cost-savings. On the other hand (in terms of the double-movement of contradiction, bipolar feedback) the same procurement organisation needs to spend more and more resources, invest in management technologies and provide a representation of its measurement. Also, Carter et al point to:

“Although many new and innovative metrics will be developed, representing the total value delivered by supply management will remain a challenge. For example, demonstrating to management that long-term relationships are really delivering value beyond – or on lieu of – cost savings will remain difficult. There will [be] no one metric or even a small set of metrics that demonstrates total value. Supply managers will continue to present the right combination of metrics and supporting discussion and to justify the resources devoted to supply management [procurement]...” (Carter et al 2007:98)

This finding evokes the inherent difficulties of an objective measure to value procurement. The finding also underscores the importance of understanding rather than measuring. Complexity science informs us that measurement is a relational phenomenon, fractal and distributional, represented in a co-construction between the market (supply-demand relation, production - consumption), the contradictions of organising and the competence of individuals. This is a stance against the possibility of one objective measurement of a procurement organisation. For example, in Case II a boundary was drawn around the pre-contract work in terms of a calculated and estimated cost-saving, but when it had to carry out activities outside of this boundary, it was difficult for them to demonstrate their value. This warrants an understanding of procurement management, rather than searching for an objective measurement of measuring procurement entities.

Carter et al regard the identified effects to the procurement organisation as causes to what they refer to as external forces and business strategies. However, from a complexity science perspective and from the findings of this study, the identified trajectories by Carter et al (2007) are all part of the same relation in the dynamics and complexity of procurement management. So, what Carter et al (2007) claim is that their findings reveal a trajectory for the future, a complexity science perspective argues that these points are part of the same dynamics as past, present and future as a process challenge for procurement management that oscillates oppositions. In the following table, some of the claims of distinction from a procurement complexity perspective versus a procurement domain literature perspective are outlined:

	<b>Maturity Models/Procurement domain Literature</b>	<b>Procurement in a Complexity Science Perspective</b>
<b>Oppositions</b>	Placed in a 'cold war' relationship. Either ignoring the one side or place the oppositions in different time and different spaces. Oppositions are primarily a managerial choice	Contradictions are the dynamics of a complex system. Contradiction works as part of endogenous processes that can be affected by bifurcation points.
<b>Boundary drawing</b>	Boundaries are fixed between what is important and not important. Management and control takes place at the boundaries in order to have control. Clear distinction between internal and external; often equal to companies' legal boundaries	Boundaries are effects of abstraction in the mind and in the 'real world'. Because of the endogenous quality of complex systems all phenomena are internal manifestations of a complex relation
<b>Management</b>	Management is a cause moving up and down the level of sophistication the procurement performance is conditioned by	Management is a cause and effect as an internal relation of a complex whole for example entangled in bifurcation points
<b>Cost of Managing</b>	The cost of management is not problematized. Management becomes implicitly cost free. Normative prescriptions are to be installed and when implemented are running smooth. The difficult part thus is implementation	Management is constrained and enabled by oscillation of opposites, in particular between effectiveness and efficiency. Systems have abundant and confined resources at the same time and from this follow that boundaries, degrees of freedom and determinism are pre-conditions for structure
<b>Processes</b>	Facilitate work in the organisation. Strong policies and procedures are necessary to have effective processes. An external observer is assumed to guide the system	Processes are irreversible and endogenous, which designate that processes are not governed by external observer. The latter is an illusion for this process perspective due to autopoietic and self-organising dynamics of complex systems
<b>Change</b>	Change is gradual and linear. Change tends to be morphostasis, where impetus is installed in moments of time in order for impetus to leave when the goal is reached. Change has a single entity level of analysis; often teleological	Change has many epistemological possibilities and dependent on multiple entities; dialectic and evolutionary. Change though agency is vital for systems progression but not any individuals per se.
<b>Management Technologies</b>	Is an object that is an objective in itself as function or rule that carries a direct cause and effect. Is connected to increasing the level of strategic status procurement has in the company	Is an object that is function and form distributional represented and conditioned by the situational context the object is abstracted from

**Table 16: "Procurement complexity versus procurement maturity models" (author)**

The table above encompasses many of the arguments that have been put forward in this thesis, in terms of understanding dynamics from a complexity science perspective versus a conventional procurement domain literature perspective. For example, the procurement domain literature would assume a straightforward causality between procurement management performing well and then successive change in the organisation. Dilemmas are solved at one level and this resolving works as a driver for moving to the next level, which is more sophisticated; this step provides new dilemmas to solve and progress and so the process continues. From a complexity perspective, dilemmas are temporal appearances of contradictions that do not settle or resolve, but are morphostasis in the sense that trying to dissolve the contradiction requires extensive efforts and the effects will disappear, as these efforts are not enduring to changes in a complex system.

At bifurcation points, the possibility of change has the highest probability, but again it does not denote that contradictions disappear or dissolve, although it can take a different shape. For example, in Case III a supply chain strategy was developed, trying to solve dilemmas about planning resources, where the change effort was met with new dilemmas; however, referring to same dynamics of contradiction of variability and standardisation. Also, in Case II the procurement organisation oscillated after a supply-demand breakdown between threats and opportunities; threats in terms of it being downgraded as a service group, opportunity because it made the whole company aware of the cost of running the business. Therefore, Freeman & Cavinato's argument, that it is important for procurement to be regarded as strategically important when a company is marked by a down-period, is profoundly contested. Because of the dynamics of contradictions, a supply-demand breakdown is not an external phenomenon but rather internal manifestations, where contradictions produce bifurcations that enable both breakdowns and breakthroughs.

From a complexity science perspective, procurement models, such as the Kraljic model, are not governed by an external observer and do not carry a compressible mirror of reality. Thus, from Case II, we have identified that for example a brochure and a print sourcing process is given extensive treatment, as well in Case III where sourcing of what is generally characterised by being leverage category becomes strategic for the procurement organisation, developing them into being a procurement outsourcing partner for clients. As such, the segmentation model becomes a space where the procurement professional, from its vantage point, re-negotiate the role he/she has in relations of organising. If procurement management only followed corporate strategy and the followed value proposition, many indirect categories would probably never gain resource-allocation; although it is a



significant part of the cost base as well as it can enable other employees' time to take effort in the company's value-proposition. This was for example identified in Case III in terms of the claim of becoming a procurement outsourcing partner for other companies. From this follows that procurement models should not be judged on how well they can represent what is going on in a system, as the models are exogenous and an extrapolation to the complexity of relationships it wants to represent. In a complexity science perspective, models will always be incomplete, no matter how much we extend the cognitive capacity. Therefore, we should not try to fit our models to the world, but rather make new realisations about the engagement; because of non-linearity, the exact same conditions can produce totally different outcomes.

### ***9.3 Implications for Procurement & Supply Chain Management Research***

The implications of this study for supply chain management research is first of all a claim that the dominant contemporary research on supply chains begins the analysis from an un-warranted vantage point with discrete levels of analysis, appearances and the external observer from a top-down position as the important features. For example, studies have been based on an isolated abstraction which is so general, that it is possible to attend similarities in function and form. Instead of starting with a "hard" approach, defining the supply chain boundary, the approach should start in softer way, exploring the "use-principle". From this follows an argument that we cannot understand the complexity of supply chain management, unless we devote attention to the contradictions of organising and the competences and objectives of professionals, who abstract from the specific to the general and vice versa. Therefore, supply-demand relation is severely limited when studying at this isolated level of analysis. This study of the supply-demand relation is often done at a dyadic level (Jespersen & Skjøtt-Larsen 2005), quite few exist at a supply chain level (Mills et al 2004), and another approach is from merely a focal company perspective (e.g. Lambert et al 2005).

The industrial marketing literature applied industrial buying models to legitimate an understanding of the supplier (i.e. the seller) to comprehend the buyer's procurement process. In a similar way, New (2004) has proposed that supply chain management can become a medium of power for large companies (the so-called focal companies) to exert control over its suppliers. New (2004) also argues that when systems theory is applied in supply chain management it is only concerned with causing a positive synergy, ignoring that the synergy could also be negative. Also, Mouritsen et al (2003) question the supply chain management conceptual framing as they argue that there can only be supply chain management when there is integration. It becomes very difficult to oppose integration because

the opposite is disintegration and, thereby, sub-optimisation. In other words, when the villain of disintegration occurs, the supply chain management concept, in principle, vanishes from the analysis.

Because of interdependencies in a complex system, integration and disintegration, as characteristics of describing the system, are not merely an effect of managerial decisions. The implication from the procurement domain literature viewpoint is that procurement professionals have to make a choice between pressuring their suppliers or being inviting and flexible. This study probes that such polarisation is not needed nor warranted; it also questions whether it is over time a managerial possibility at all. Therefore, we can also ask whether procurement activities have to be integrative in order to be successful and contribute to the ideas of supply chain management. From this study, the findings point to that the dynamics of procurement management are to disintegrate and bring competition into the supply demand relations; for example, in Case II, where several category management teams were installed to avoid personal relations, influencing the selection and conditions for suppliers. A supply-demand relation is not one thing and its constituent relations another; a supply chain carries its “internal” cause and effect and contradiction as a complex process. Whether integration is installed in system relations depends, among other things, on whether integration is an effect or a means. For highly dependent companies in a supply demand relation – as the one reported in Case I – integration was a necessity while a disintegration took place simultaneously.

The argumentation from this thesis is that the supply chain management domain is warranted to prevent the overly dominating way of looking at supply chains from top-down. Examples of this are statements such as supply chain management being a conceptual phenomenon, dealing with the boundaries of legal ownership, and that collaborative supply chains are competing against each other (e.g. Christopher 1998). Likewise, when Lambert et al (2005) presents the global-supply-chain-forum model as a way to approach supply chain management, the idea about management is that companies together are formulating how their strategic and operational processes can function together. That is, the important boundary is first between companies and when successfully implemented, the boundary circles around the supply chain members, where independent legal ownership concerns has vanished. The point is that a supply chain, as a discrete level of analysis, is unworkable because how is it possible to determine its boundaries? Importantly, from this vantage point, it becomes possible to abstract and analyse contradictions and paradoxes for management, and thereby, the dynamics of taking into consideration level 3, the contradictions of organising, and level 2, the procurement-,

logistics-, and operations professionals level. The complexity claim is illustrated in the following figure:

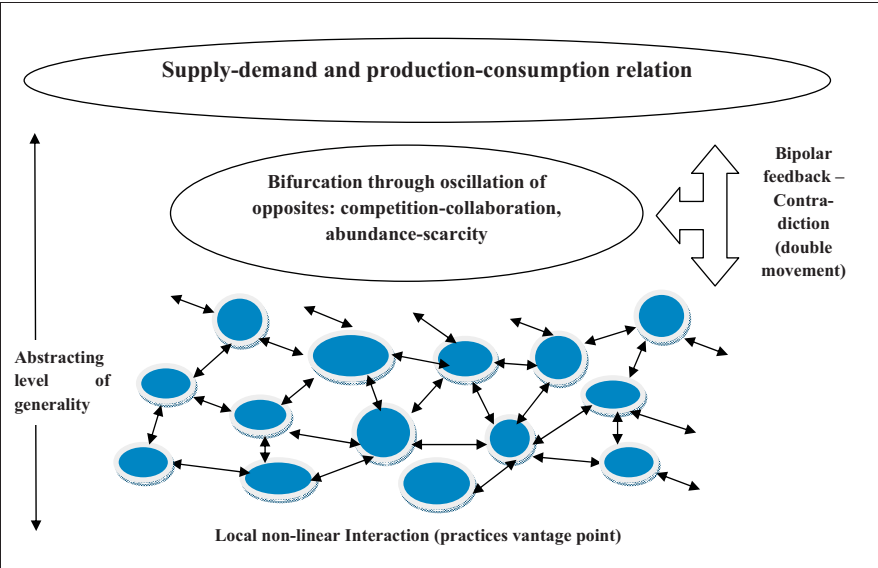


Figure 33: “The complexity of supply-demand relations”

One of the questions that arise is how to deal with legal boundaries. From the top-down perspective, concepts such as “supply chain management pipeline” (e.g. Bechtel & Jayaram 1997) or supply chain business processes (e.g. Lambert et al 2005) are stressed too little, in the sense that they do not take into account the complexity of different companies and how they organise. On the other hand, the procurement domain literature, when they for instance argue for the management of supplier relationships, the boundary is stressed too much in terms of the internal/external company boundary. For example, some of the category management teams in Case II had to move the boundary, so that they became the “front office” of the supplier towards internal customers. In such a process, competition and collaboration becomes impossible to separate in time and space, which points to Capra’s (1982) notion that although there is competition, it usually takes place in a wider context of cooperation and vice versa, as also in particular demonstrated in Case I.

Complexity science offers itself as an important perspective to address the complexity of supply

chains where two previous studies can be highlighted. Choi et al (2001) use complexity science to understand supply networks, addressing the amount of time, money and effort companies use on supply chain optimisation and the struggle realised in order to succeed in the dynamic and complex nature of supply networks. According to Choi et al, the consequential praxis and implication for managers, is to decide how much to control and how much to emerge. This questions part of the supply chain management literature's claim that the managerial task is to control its supply chain. However, management's ability to control is still a managerial choice in the perspective of Choi et al. Here, we may add that since we do not know which properties of a complex system that is important for the future trajectory, this ability is contested. Also, as both small and large properties can render the system in oscillation in totally different ways, control is not a property or mental model of human agency. However, this does not denote that agents should not engage in emancipatory projects; in fact we may claim that this is the main point, but that complex systems are cause and effected by many interwoven feedback loops, dependent on individuals but not any single individual per se.

Nilsson (2006) studies logistics practices and identifies how paradoxes in logistics management are entangled in complexity. First of all, logistics managers expressed a need to take a holistic view and at the same time being confronted with the sensitivity of details. Secondly, logistics managers expressed a need for simple frameworks and models to cope with a complex reality. Nilsson points to:

“While simplified models could be regarded as drivers for rationalizations and efficiency improvements, these cause paradoxical situations since not only is the increased perfection of logistics making processes more volatile and vulnerable, it might constrain further developments...while this volatility of logistics processes may speak for incremental improvements, the increasing market demands may request radical improvement efforts in order to gain competitive advantage. This creates interpretation consequences since they are facing what could be defined as an efficiency/effectiveness paradox, i.e. doing things right vs doing the right thing right.” (Nilsson 2006:50)

Thus, Nilsson suggests that logistics management is not about reaching ‘equilibrium’, and seeking quest towards a predetermined goal or an idea about going back to ordinary business. Rather, logistics is about management of paradoxes in transformative change processes with all its difficulties and implications. This vantage point from logistics processes stresses the complexity of the supply-demand relation and, again, that we should not start our analysis top-down, by addressing which kind of relation a company has to its suppliers – either competitive or collaborate. Rather, we should start our analysis with establishing conditions under which competition and collaboration operate. It is

important to stress that we are not addressing micro and macro, and structure and human agency in a duality; the micro and the macro is an “internal” relation encompassing history (i.e. the market is not an a-historical variable). As neither market nor local interactions are things in themselves, we can only understand dynamics by relations and, thereby, through our process of abstraction. Referring back to the exogenous and endogenous process perspectives, it is not the argumentation that we should replace exogenous with an endogenous process perspective. Rather, the point should be that we cannot build an understanding of procurement management by only looking at the normative guidance, derived from an exogenous process perspective. Therefore, this study should not be regarded as a discarding of the previous work achieved in procurement and supply chain management domains; merely, the point is to emphasise and claim that these domains are primarily one-sided and this is not sufficient in itself, if we want to understand and develop procurement and supply chain practices.

#### ***9.4 A Consequential Praxis for Procurement Management***

Systems approach research often ends up in guiding a consequential praxis. A quality to test a consequential praxis against a conventional understanding of a phenomenon is to examine the conventional management ideas with the anticipation to achieve new knowledge that facilitate that it could be otherwise. For example, Forrester and the work on system dynamics has influenced the way the supply chain management domain think of managing supply chains (i.e. production-consumption relations). This is also illustrated in the ‘beer-game’ and why an apparently rational decision to react on uncertainty (build up and keep extra stock to be sure that they could handle an increased demand) actually was the opposite of rationalising because of the dynamics of the system. Furthermore, this complex system is both self-referential and triggering a viscous circle due to the behaviour of each component of the system. Interpreted in this way the Forrester effect exhibits a tension between each manager optimising the system and how the system really works.

Another consequential praxis is the influence of Galbraith’s work on companies’ ability to plan in the context of the dynamics of production-consumption relations. Thus Galbraith (1978, in King 2001) argues for the praxis of control in order to avoid excessive cost:

“...for decision in the market place, the economic and political stakes in the overall production-consumption system are so high (and getting higher) that nothing really can be left to chance or the whims of serependitious market forces **if** something can done about them. Modern industrialism **requires** a controlled labor force and a controlled consumerism, as much as that is possible...as new products come on the market having had more time, money, and research

spent on them than ever before, the “costs” of production become extremely high and risky. Consequently, extensive control must be attempted to try to ensure that what is produced is consumed.” (Galbraith 1978, King 2001:52)

Examining the characteristics of companies in the supply chain management literature as constituting best practice, the tight control of the production-consumption is exactly what cases such as IKEA and ZARA exhibit. For example, Ferdows et al (2004) write about ZARA that the guiding principle of this company’s success is vertical integration *“To be successful, “you need to have five fingers touching the factory and five fingers touching the customer.” Translation: Control what happens to your product until the customer buys it”* (p. 106). Galbraith says:

“...measures to maintain a desired level of aggregate demand are part and parcel of industrial planning...The need to control consumer behaviour is a requirement of planning.” Without the regulation of aggregate demand “there would be unpredictable and almost certainly large fluctuations in demand and therewith in sales and production. Planning would be gravely impaired; capital and technology would have to be used much more cautiously and far less effectively than now”. Furthermore, this consumption control leads into a degree of thought and behavior control: Advertising and salesmanship -- the management of consumer demand -- are vital for planning” (Galbraith 1978:234,281 in King 2001:52)

The central notion is control of planning. Although Galbraith addresses control of consumer demand, the argument can be transferred to the relation between internal customers and procurement professionals. Provided a responsibility to supply a demand from internal customers procurement management becomes entangled into the planning principle. Therefore the claim implicitly guides a consequential praxis for procurement activities in terms of procurement management to have control and manage demand by planning and an extensive effort in marketing its services. The more procurement can plan, the more in control, and the better performance Galbraith would claim because excessive cost is avoided. This involves eliminating dysfunctions, supporting smooth development, and for management the overall-arching target of its practices becomes to reduce “external” uncertainty. The procurement models presented in chapter two fit such ambition; this work ignores the excessive cost of management and upholding control. These models take the position of an external observer from a fixed outside position looking at a closed system with fixed boundaries. The model may be complicated in terms of that there are many components put together, policies, procedures, and exogenous processes governing the subsystems and many other entities are determined to give choosy and knowledgeable input. If we can maintain and regulate procurement this way, then management is thought of as being associated with comfort, that is, we have achieved a stabile position that is associated with success. Moreover, it becomes possible to directly measure the

manager's influence. However, as soon as the external observer engages in the system that the model was meant to represent, the model becomes challenged.

The strategic discourse in the procurement domain literature has, at least, two important implications for managerial focus and thereby a consequential praxis. First of all it influences the resource-allocation of the procurement effort and whether to direct it at efforts to be involved in new product development and integrating suppliers. Secondly, as a consequence, the impression is giving to praxis that what procurement management already are doing is really not that important and should not be investigated and invested further in. The overall arching problem in the procurement domain literature is, hence, that it equals the term strategic with importance as well it polarises oppositions. As a consequence, a normative fence it built with a vague connection to praxis because it neglects the dynamics of very same. The challenge for procurement professionals in this regard work two ways. It can ignore this part of academia or it can actually take the rationale serious; the latter notion is more precarious than the former.

Complexity science informs us that if we want to install center-led authority, integration, or a given strategic direction it will require excessive impetus to develop and maintain the temporary boundaries. That is, to install an exogenous process that is based on closed system logic, management are to focus on maintaining the boundaries installed. These boundaries then are subjected to all the characteristics of an open system of distributional representation, emergent properties, non-linearity etc. Thus, management's role here becomes how to uphold and marketing these boundaries. Therefore, when introducing exogenous processes we have faced morphostasis change where changes are not particular enduring and will disappear unless the change effort is continually reproduced. The dynamics of the system of self-organisation and the autopoietic paradox continues to put pressure on boundary-instalments such as center-led authority and a strategic plan for collaborative efforts because agents only have access to local knowledge. There is no blueprint with fixed boundaries existing in a complex system.

The more we engage with our environment and this we do when we introduce exogenous processes and management technologies, the more dependent and constrained we become. On the other hand, it is the same relation that increases individual autonomy to draw new boundaries from the already established ones. In this way management technologies and exogenous processes are both enabled and constrained in a complex system. For example, if procurement management has a strategy and tools for being incorporated in NPD processes, research and development professionals may be aware

that that procurement management can improve the effectiveness of a NPD process. However, as we saw in case I, a given coordination of procurement would decrease the degree of freedom for the given research and development professional and counter strategies can be expected. This is also one of the reasons why it is difficult to appreciate a maturity model of procurement performance. Importantly, in many ways the more mature a procurement organisation becomes the more resources is spent identifying synergies, and the more it will need to search for innovative solutions to provide value in the contracts (see also the findings from Carter et al 2007). Hence, if we have center-led authority, integration and a demand-driven procurement organisation we have put of boundaries that will require extensive effort to uphold as cost of management.

It may seem as an arbitrary learning point claiming that our models are subjected to incompressibility and that our models are applied to re-negotiate our world. That is, at first glance it might appear to be a rather insignificant notion; however, the implications are not. It goes, almost without saying that this is not only an endless job to compress models to represent reality following the complexity science logic- It is also a task that takes focus away from procurement management and the possibilities it has for resource allocation; referring to the abundance-scarcity opposition. As illustrated in the cases considerable time is spent by fitting models to the reality they are operating in. For example, in Case III the supply chain strategy model was formulated by an exogenous design; however, when it was to be developed in the procurement organisation, the space of endogenous stepped in. For example, the notion of demand-driven was very well articulated in the models (i.e. by appearance), not by its praxis. That is, we spend a lot of time figuring out what kind of models that fits us, the level of complicatedness, and improving the model so it fits better with the "environment". In terms of a complexity science perspective we would expect no less than that agents are trying to maximise their "fitness"; however, the fitness is dependent on the dynamics of its "internal" contradictions in the total web of relationships.

The consequential praxis from this thesis is primarily concerned with opposites as co-existing, a dialectic contradiction, and a dynamic stability that has no equilibrium. Efforts directed towards separating oppositions and to choose a pole, the higher is the probability of the other pole strikes back. Importantly, from a complexity viewpoint, it is the co-existing of opposites that are the dynamics of the system. Strategies must be made so the procurement organisation both encompasses supply and demand, both center-led and local-led consideration, in order to absorb the complexity of procurement management. In terms of direct guidance to the procurement professional about



organising procurement, the claim from this study is not that center-led authority is disregarded. Such claim would reduce the probability of significant cost-savings through synergy effects. However, it must be stated that the boundaries are not enduring without continuous intervention. For example, it should not be a procurement management effort to negotiate many centralised frame agreements if there not at the same time are strategies in place for how to uphold the boundaries when other agents start to renegotiate these frame-agreement boundaries. This eventually denotes that it is not merely project implementation of contracts that is the difficult part but what happens afterwards; i.e. the continuous day-to-day implementation.

Hence, whereas the systems approach have underscored the implementation process where the intervention model compress reality, complexity science underscores in particular what comes after in terms of the complexity of endogenous processes. In the implementation phase, boundaries are decided at a given range to decide whether the project was a success or not. This is a difficult task on the long-term when procurement management is entangled in endogenous complexity and the power of decentralisation (and self-organisation) and the imprecision of boundaries. Due to how a complex system operates, installations such as the center-led procurement design tend to have an over-socialised character where a “culture” is implemented in the organisation. Again such implementation efforts are not enduring and for dotted lines to work from a complexity science point of view the boundaries around the lines will be constantly re-negotiated. They will only work according to the “use-principle” and that denotes that agents are to activate the dotted lines in order for them to work, and not just from a representation of center-led policy. Cause and effect are relational distributed in a complex system and therefore effects create new effects. In this study contradictions have been emphasised as well as oscillations of oppositions and bifurcation to demonstrate constrains and possibilities and capacities of human agency. Hence, it is what we do as actors that have the highest impact to how potentiality unfolds in the dynamics of bifurcation points but not any individual actor per se.

The procurement and supply chain management domain literature relies too much on a normative mind-set that is disconnected from present trends and struggles. For example, in the maturity model rationale the cost consumption from the procurement organisation is excluded from the analysis. The intended normative instalments come from other sources than trajectories of systems; i.e. they are abstractions with no connection to concrete experience. The endless introduction of management concepts that promise contradictions to dissolve will disappoint measured on that criterion. This kind

of normative thinking, then, affords us with consequences of the normative without causes. Thus there are no causes capable of producing such consequences; therefore the causes of the 'end' in maturity models have no consequences. Hence, as Ollman (2005) points to, in such cases, both the present and the future get distorted as the present does not exist in itself as a cause for its own future.

Any emancipatory project from procurement professionals must necessarily come from hopes, wishes, wants, dreams, and the construction of one's vision out of just such emergent properties. The dissatisfaction with the status quo has a vision of the future that differs from the past (Ollman 2005). However, because we cannot prioritise what the future should be before concrete experience a normative path cannot be realised without causes and these have consequences themselves. The critique towards the normative stance is not that of having a normative vision of the future but that the maturity model logic is too rigid and complete; we do not know whether it is the right path as well as there are no approach to test the normative model. It is not possible to draw a boundary between important procurement activities and those that are not before experience. Furthermore, as demonstrated in the cases we can probe and envisage that such ideal as stated in the maturity model requires an enormous effort in terms of demonstrating value against the cost of running the organisation. Due to the innate problems of measuring value of performance in a complex system, this struggle is a dynamic contradiction between increasing procurement professionalism and demonstrating significance. Although we may expect that procurement management will be demanded to ensure efficiency in terms of the company using minimum resources given a direction, this cannot be realised without providing the cost of being effective. Efficiency exist in significant cooperation with sub-optimality, the latter is not a sign of an unsustainable system but a part of what makes sure it is creative and able to survive. This is not a call for procurement management striving for inefficiency but that effectiveness and efficiency is a contradiction that produces both negative and positive feedback at the same time.

To sum up in terms of the contribution to procurement management and its domain literature, the conventional and current tendency to examine successful conditions before experience as idealism for procurement management should not be the dominant focus of procurement management research. Rather, is it important to analyse the process (as endogenous and complex) in order to understand how procurement management unfolds along with procurement management technologies when they leave their exogenous symmetry and travels in an endogenous process negotiated by other agents' abstractions. Furthermore, in order to guide consequential praxis for procurement management the

impetus should not be directed so resources is directed towards separating or ignoring contradiction in the anticipation that this is going to create sustainable procurement performance. Rather, the complexity science claim is that the more management chooses the one pole, the more can we expect the other pole striking back.

Contradictions co-exist in a double-moving bipolar feedback and it is the same energies that create breakthroughs and breakdowns. Procurement strategies should not to be regarded as a fixed determined teleological intention that is measured by either creating success or failure. Procurement management engages in bifurcations that have degrees of freedom and degrees of determinism as an actuality-potentiality relation. Strategies should have the plasticity that can contrive oscillation of opposites possessing both a supply and demand side. Procurement management exists in a contradiction between effectiveness (to do things right) and efficiency (use of minimum of resources to do things right). It is the same impetus in that contradiction that produces breakdown and breakthroughs.

## Dansk resume

Hvordan kan vi forstå dynamikken i indkøbsledelse? Det dominerende svar på dette spørgsmål har gennem indkøbslitteraturen været baseret på en forklaring, hvor indkøbsorganisationen har været karakteriseret som en administrativ og reaktiv enhed. Dette var en utilstrækkelig situation for indkøbsorganisationen som derfor udfordrede status quo med begrundelse i en klart argumenteret tese; at indkøb skal være et centralt element i virksomhedens overordnede strategi. Det primære argument er, at anskaffelse af eksterne ressourcer er involveret i en stor del af en virksomhedens forbrug af ressourcer og derfor er en alt for vigtig del af virksomheden til at blive ignoreret eller overladt til ”deltidskøbere” som har et andet primær fokus i virksomheden. Omvendt var det den samme energi, der modarbejdede indkøbets forandring, da der var visse indkøb som fra topledelsen og andre enheder var vurderet for vigtig til at blive håndteret af en indkøbsorganisation. Indkøbslitteraturen argumenterer for at denne forandringsproces af indkøbsorganisationen skal ske gennem trinvis modenheds faser, hvor drivkraften er en kombination af strategi, procedurer og processer der enten er i overensstemmelse med virksomhedens overordnede strategi, eller er en strategi ”der passer alle indkøbsorganisationer”, hvor indkøb bliver en mere og mere betydningsfuld del af virksomheden gennem dens succesfulde introduktion af strategier, processer, værktøjer osv. Selvom denne diskurs har eksisteret i indkøbslitteraturen i mere end 60 år, i mere eller mindre form, ser dette argument ikke ud til at bringe os nærmere en forståelse for, hvad der egentlig er dynamikken i indkøbsledelse og indkøbsorganisationens udvikling. Denne afhandling tager sit udgangspunkt i at den dominerende forklaring fra indkøbslitteraturen ikke er tilstrækkelig til at forklare dynamikken i indkøbsledelse og at der er brug for en mere kompleks teoretisk indgangsvinkel. Specifikt er afhandlingens problemstilling som følgende:

### **Hvordan kan vi forstå dynamikken i indkøbsledelse?**

- 1. Hvordan kan vi forstå forandringer i indkøbets organisering?**
- 2. Hvorfor og hvordan opstår nye indkøbspraksisser?**

Denne afhandling har i henhold til at besvare problemstillingen taget et kompleksitetsperspektiv, der forsøger at forstå forandringer i komplekse systemer, og derfor er relevant i henhold til at forstå indkøbsledelse og dets relation til hvordan efterspørgsel møder udbud, og i et større perspektiv, hvordan produktion relaterer sig til forbrug; dvs. et forsyningskædeperspektiv. Kompleksitetsteori er

således en betydelig del af afhandlingens teoretiske og metodiske forståelse af dynamikken i indkøbsledelse. Komplexitetsteori er specifikt diskuteret som en processteori indeholdende bifurkationer i en aktualitet – potentialitet relation, hvor modsætninger oscillerer i et konstant pres på processen. I denne forbindelse skelnes der i afhandlingen mellem endogene og eksogene processer. Eksogene processer er baseret på et lukket system med faste afgrænsninger, designet til at håndtere tilbagevendende udfordringer. Designet er ofte indbygget med et løfte om effektivitet (gøre de rigtige ting rigtigt) og efficiens (anvendelse af mindst mulige ressourcer for at være effektiv) og kan karakteriseres som en ledelsesteknologi. Endogene processer er baseret på at stabilisering sker gennem entiteter i processen i sig selv; processen er irreversibel og ikke-lineær. Endogene processer argumenteres i afhandlingen for at være komplekse processer, hvilket betyder at processen bifurkerer gennem modsætninger, er påvirket af negativ og positiv feedback på samme tid, og som ikke er styret af ekstern observant eller grundlæggende regel-bestemt adfærd. Begge proces typer er relevante for at forstå dynamikken i indkøbsledelse; imidlertid har endogene processer, fra et kompleksitetsperspektiv, konstituerende betydning for eksogene processer og dets anvendelse.

Dette studie omhandler således dynamikken i indkøbsledelse i form af, hvordan modsætninger interagerer, hvilket danner en ramme om de muligheder og begrænsninger, der omkredser indkøbet og dets ledelse. I indkøbslitteraturen blev der identificeret fem modsætningsforhold, hvor ledelse er en aktiv bevægelse i at separere disse modsætninger i henhold til en ide om at den ene pol er mere eftertragtet at stræbe efter end den anden. De fem modsætninger var disintegration – integration, omkostninger – værdi, operationel – strategisk, centralisering – decentralisering, og reaktiv – proaktiv. Gennem kompleksitetsteori er relationen mellem modsætninger en central del af forståelsen for, hvordan dynamik opstår og at disse modsætninger ikke kan separeres, men arbejder som aktive poler, der producerer både positiv og negativ feedback i en og samme bevægelse. Metoden til at belyse disse modsætninger empirisk er sket gennem tre kvalitative case studier, hvor hver enkelt case tager udgangspunkt i en indkøbsorganisation.

Case I havde udgangspunkt i en indkøbsorganisation i en mellemstor virksomhed fokuserende på en forsyningskæde med en langvarig leverandør relation og en stor kunde. Case I illustrerede i den langvarige relation en dynamisk proces, der oscillerede modsætningen mellem integration og disintegration. Relationen havde ud fra et konventionelt forsyningskædeperspektiv gode forudsætninger for at lykkedes igennem delvis fælles ejerskab, personlige relationer mellem topledelse, tidlig involvering i produktudviklings processer osv. Flere bifurkationspunkter fik dog

relationen til at oscillere og gennem den indbyrdes afhængighed skabtes både nye muligheder og begrænsninger. Indkøbsorganisationen havde en rolle i denne relation, hvor den introducerede indkøbsledelsesteknologier til at håndtere leverandører, men hvor denne relation samtidig illustrerede, hvordan grænserne blev bestandig genforhandlet af de forskellige agenter i systemet. Casen leder hen til en forståelse af, at det er vanskeligt på forhånd at vide, hvilke aktiviteter der producerer integration og hvilke, der producerer disintegration; samt at grænser ikke er mellem virksomhed og virksomhed men mellem agent og agent. Derfor en evt. antagelse at en intern-ejet leverandør er en lettere ledelsesmæssig proces at håndtere, end en ikke-ejet leverandør er udfordret betydeligt ud fra denne case.

Case II omhandlede en central indkøbsorganisation og dets investeringer i indkøbsledelsesteknologier i en stor global konglomerat virksomhed. Relationerne mellem den centrale indkøbsorganisation og de enkelte forretningsenheder fungerede som dynamikken i casen gennem en oscillerende af lokal (forretningsenheden) og central (indkøbsorganisation) autoritet over indkøbsprocessen. Især en bifurkation drev denne oscillerende i form af eftervirkningerne af finanskrisen i efteråret 2008, der først startede som en nedgradering af indkøbsorganisationen, men som over tid viste sig at skabe nyt momentum, der øgede dens autoritet samtidig med at forretningsenheder også var givet større autoritet over dets egne budgetter. Introduktionen af indkøbsledelsesteknologier var en del af denne oscillerende, som derudover også belyste de komplekse modsætninger, der var mellem deres løfte om effektivitet og efficiens i forhold til deres eksogene kvaliteter; herunder hvordan effektivitet og efficiens i sig selv blev en modsætning. Dette med udgangspunkt i hvordan en ambition om at gøre tingene rigtig var forbundet med øgede omkostninger samt øgede ressource forbrug på at identificere synergi effekter og håndtere interne kunder og interessenter.

Case III omhandlede en central indkøbsorganisation og dets investeringer i indkøbsledelsesteknologier gennem en nyformuleret forsyningskædestrategi i en stor offentlig udviklingsorganisation. Denne forsyningskædestrategi var en del af at blive en mere proaktiv, planlæggende og strategisk indkøbsorganisation fra at være karakteriseret ved at udføre administrative aktiviteter i en reaktiv agerende indkøbsorganisation. Strategien omhandlede to fokusområder, det ene var sourcing projekter af indkøbskategorier til anvendelse i projekter, og det andet var baseret på at udbyde forsyningskæde management service til udviklingslande. Case III illustrerede, hvordan denne strategi var forbundet med en oscillerende af en modsætning mellem variabilitet og standardisering og at alle de aktiviteter der var forbundet med at realisere strategien var

emballeret i denne dynamik. Case III illustrerede også dynamikken gennem en oscillering af lokal (regioner) og central (indkøbsorganisation) autoritet over indkøbsprocessen, hvor forsyningskædestrategien forsøgte at identificere de strategisk vigtige indkøbsaktiviteter, der skulle udføres af den centrale indkøbsorganisation mens de operationelle aktiviteter skulle udføres af regioner. Analysen viste dog, at dette ikke ville ske uden modstrategier fra regionerne; ligesom at ”buy-in” processen for at skaffe klienter og interne kunder ikke kun var en overbevisning om effektiv indkøbsservice, men en kamp mellem agenter for at kontrollere budgetter.

Afhandlingens bidrag til indkøbslitteraturen er således at den traditionelle og nuværende tendens til at undersøge succesfulde betingelser før erfaring (dvs. som idealisme) ikke bør have det overvejende fokus i forskningen af indkøbsledelse. I stedet er det vigtigt at analysere konditionerne i processen, for at forstå, hvordan indkøbsledelse udfolder sig sammen med dets indkøbsledelsesteknologier, når de rejser langt væk fra deres eksogene udgangspunkt med faste afgrænsninger, der bliver genforhandlet af forskellige agents abstraktioner. Endvidere, i henhold til at guide en praksis for indkøbsledelse følger således at ledelsesenergi og ressourcer ikke bør vendes mod at separere eller ignorere modsætninger i en forventning om at dette skaber bæredygtige resultater. Snarere, vil et kompleksitetsperspektiv argumentere at desto mere man vælger den ene pol, desto mere vil man få feedback fra den anden pol. Modsætninger sameksisterer og det er de samme energier, der skaber gennembrud og sammenbrud. Strategier bør ikke ses som en fast afgrænset teleologisk intention, som enten producerer fiasko eller succes. Indkøbsledelsen deltager i bifurkationer med visse grader af frihed, ligesom der på samme tid er grader af determinisme, og strategier bør derfor have den plasticitet at de kan manøvre i oscilleringen mellem modsætninger. For eksempel bør det ikke være et fokus i indkøbsledelsen at indgå mange centraliserede rammeaftaler, hvis der ikke samtidig er en strategi for, hvordan man håndterer andre agents ”genforhandling” af de grænser som rammeaftaler har sat op. Indkøbsledelse befinder sig i en modsætning mellem effektivitet (at gøre tingene rigtigt) og efficiens (brugen af ressourcer til at opnå effektivitet). Denne modsætning skaber både positive og negativ feedback på samme tid og som nævnt er det den samme energi i denne modsætning, der skaber gennembrud og sammenbrud.

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