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Expanding beyond life-cycle theory to explain MCSs development: The journey of two Swedish high-tech firms

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Abstract

This paper examines the development and the adoption of MCSs in growing high-tech companies. Until recently life-cycle theory has been the most common way to describe how MCSs change, and managers have designed MCSs based on life-cycle stages. This theory fits traditional companies but newer studies (Phelps et al., 2007) have shown that growing companies do not follow linear life-cycle stages; while others (Granlund & Taipaleenmäki, 2005) have argued that life-cycle theory is insufficient to explain the development of MCSs in high-tech firms. By introducing Van de Ven & Poole's (1995) four change theories (life-cycle, teleological, dialectical and evolutionary) to explain the development of MCSs in high-tech firms, we aim to contribute to this new research field. With a longitudinal study on two Swedish high-tech companies, we find that life-cycle/evolutionary change processes are linked to a linear increase in the formalization of MCSs, whereas the presence of teleological/dialectical change processes is linked to more abrupt changes in the formalization of MCSs. We propose two new models to display these linkages. Finally, we show that the role of life-cycle theory in explaining the development of MCSs in high-tech companies is much smaller than previously stated.

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1 Introduction

"*The metaphoric landscape is changing, from one in which growth is characterized by a series of life-cycle stages through one of growth as a response to predictable managerial challenges or problems and to a view of growth related to the management of key transition points.* " (Phelps et al., 2007)

In the 1980´s, life-cycle theory, which divides the life of a company into different stages, became the dominant theory (Hanks et al., 1994) in describing how companies developed over time. This theory has a very intuitive appeal as it views the company as biologists view a living organism, it starts with birth and ends with death, and in between there are a number of stages, such as growth and maturity (Van de Ven & Poole, 1995). Studies in the 1980´s (Miller & Friesen, 1984; Churchill & Lewis, 1983; Flamholtz, 1986) reached a consensus that corporate development at the time was quite structured, thus it was helpful to categorize the development into stages based on the underlying variables such as size, growth, age, etc., this to increase the generalizability. Later life-cycle theory was further used as a base to examine how companies developed their MCSs in the different phases. Moores & Yuen (2001) showed that it was possible to adopt life-cycle theory in traditional companies and that the level of formalization of MCSs could be linked to which life-cycle stage the company was in. Around the millennium, when digitalization had not yet had its break-through, high-tech companies were still in their nascent phase and not everyone was convinced of the importance of digitalization:

"*Internet is a craze that might just pass by*".

Headline of an article from 1996, where Ines Uusmann, Swedish minister of communication, talks about the future of Internet (translated from Svenska Dagbladet, a major Swedish newspaper).

Since then, the organizational landscape has shifted towards high-tech companies, which have a much more irregular development (Granlund & Taipaleenmäki, 2005), and modern high-tech giants such as Google and Facebook have risen to the top in just a mere decade. Yet, the research on the development of MCSs is still very much stuck with the life-cycle perspective (Moores & Yuen, 2001; Cassia et al., 2005; Silvola, 2008).

MCSs are essential for a company to develop in order to survive and reach maturity. Nevertheless, the trick is to know when to impose the right MCSs (Davila et al, 2009). Insufficient MCSs may lead to chaos, while excessive MCSs may lead to slow-moving- and bureaucratic companies (Kamoche & Pina e Cunha, 2001; Davila & Wouters, 2005; Cardinal et al., 2004). If management in today's high-tech companies is still basing their

choice of MCSs on life-cycle theory, it may result in a suboptimal usage of the company´s resources leading to unnecessary costly MCSs or postponing essential MCSs.
However, a few studies have begun to focus on the development of MCSs in high-tech firms and emphasized the need for a better understanding in this area (Hanks et al., 1994; Granlund & Taipaleenmäki, 2005; Phelps et al., 2007; Ditillo, 2004). Today's high-tech companies are affected by technological complexity, higher environmental uncertainty and external financing, and these are all factors that may disrupt the life-cycle. Indeed, there is a need to move away from the thinking that the changes a company faces in the future may be predicted long in advance and that they follow fixed stages. We argue that it is time to take a step back and look more critically at the appropriateness of life-cycle theory in explaining the development of MCSs in high-tech companies.
Change is complex (Quattrone et al., 2007; Van de Ven & Poole, 1995), and it is a simplification to think that only one change theory could describe the diversity of the change processes that occur during the life of a company.
In light of this, our study sets forth by pursuing the following research question:

How can we improve our understanding of the development of MCSs in growing high-tech companies by expanding beyond life-cycle theory?

We introduce Van de Ven & Poole´s (1995) four types of change theories: life-cycle, teleological, dialectical and evolutionary. By using these four change theories as building blocks we hope to be able to explain the development of MCSs in high-tech companies more accurately. We aim to do this by conducting a longitudinal dual case study on two Swedish Venture Capital (VC) financed high-tech companies, Edgeware and 21Grams, and we map the events that have shaped their development from 2004 when they were founded, until today in 2017.

The following chapter includes: a review of previous literature on the development of MCSs, divided between those that have applied life-cycle theory and those that have instead challenged its usefulness; the theoretical lens through which we seek to analyze our empirics (Van de Ven and Poole, 1995; Phelps et al, 2007); and finally the theoretical framework, through which we aim to contribute to our domain theory.

2 Theory

2.1 The development of MCSs and life-cycle theory.

Through the years many attempts have been made to describe change in organizations, from Darwin's evolutionary theories to more modern organizational change theories (Quattrone & Hopper, 2001; Quattrone et al., 2007; Burns and Scapens, 2000; Langfield-Smith,1997). Van de Ven & Poole (1995) categorize earlier literature of change in organizations and find as many as 14 different types of change processes. Change in organizations is complex to explain as it can be affected by actors from both inside and outside the organization and extends over time and space.

Life-cycle theory is the change theory that has been discussed and researched most frequently during the last decades, already in 1994 Hanks et al. analyzed and categorized ten of the most famous life-cycle models (Table 1). Life-cycle theory is based on the thought that the organization goes through different stages from cradle to grave, and that these stages are related to change. It is not surprising that life-cycle theory has gained such attention since it is an intuitive and an easily comprehended model and mostly traditional companies have been observed to follow the stages in the life cycle. Hanks et al. (1994) define a life-cycle stage as a unique configuration of variables related to organizational context and structures, yet, they state that life-cycle stage definitions remain vague and general, making it hard to apply to specific cases. Many studies have used variables such as the company´s: age, size, level of centralization, formalization of Management Control Systems (MCSs), etc. to describe and categorize the different stages in the life-cycle.

After comparing these ten life-cycle models and their different stages Hanks et al. (1994) claimed that the literature lacks some specific aspects, for example in investigating if all organizations evolve through the same series of stages and the contingencies that affect the numbers of stages.

Comparison of Life-Cycle Models: Names & Numbers of Stages

Model	Start-up Stage	Expansion Stage	Maturity Stage	Diversification Stage	Decline Stage
Adizes, 1989	1. Courtship 2. Infancy	3. Go-Go 4. Adolescence	5. Prime 6. Stable		7. Aristocracy 8. Early Bureaucracy 9. Bureaucracy 10. Death
Churchill & Lewis, 1983	1. Existence 2. Survival 3(D). Success-Disengagement	3(G). Success-Growth 4. Take-off	5. Resource Maturity		
Flamholtz, 1987	1. New Venture	2. Expansion	3. Professionalization 4. Consolidation	5. Diversification 6. Integration	7. Decline
Galbraith, 1982	1. Proof of Principle/Prototype 2.Model Shop	3. Start-Up/ Volume Production	4. Natural Growth	5. Strategic Maneuvering	
Greiner, 1972	1. Creativity	2. Direction	3. Delegation	4. Cordination 5. Collaboration	
Kazanjian, 1988	1. Conception & Development 2. Commercialization	3. Growth	4. Stability		
Miller & Freisen, 1984b	1. Birth	2. Growth	3. Maturity	4. Revival	5. Decline
Quinn & Cameron, 1983	1. Entrepreneurial	2. Collectivity	3. Formalization	4. Elaboration of Structure	
Scott & Bruce, 1987	1. Inception 2. Survival	3. Growth 4. Expansion	5. Maturity		
Smith, Mitchell & Summer, 1985	1. Inception	2. High Growth	3. Maturity		

Table 1: Hanks et al´s. (1994) comparison of Life-Cycle Stage Models: Names & Number of Stages

2.1.1 MCSs from a life-cycle perspective.

Moores & Yuen (2001) conduct a thorough study on the application of the life-cycle theory on the Australian footwear- and clothing industry, where they examine whether the MCSs differ across the different stages in the life-cycle. Miller & Friesen´s (1984) five-stage model is used where the life-cycle is divided into the phases of birth-growth-maturity-revival-decline. Moores & Yuen (2001) find distinct patterns between the different stages where the formality of MCSs increases from birth to growth, decreases to maturity, increases to revival and finally decreases to decline stage (Figure 1). Several factors explain this pattern of change; cash-flows and capital budgeting are two of them. These are crucially important in the early phase and in the phase of expansion such as growth and revival stages, but can be relaxed in the maturity and decline phase. The other factors are long-term planning and forecasts, which are tools also found to be used more intensely in stages of expansion such as growth and revival stages. The level of formality in the MCSs is further linked to the type of focus the company has. With a broad focus as in the growth and revival stages when the company is expanding rapidly in different markets, more formal MCSs are required, while when focus is narrower, the formality of MCSs can be relaxed (Moores & Yuen, 2001).

In similar fashion Cassia et al. (2005) study the relation between life-cycle theory and MCSs and examine whether they change simultaneously, the sample was of Italian firms mostly in traditional industries. Their results point out a positive correlation between the complexity of organizational configurations and MCSs relevance, which confirm the findings of Moores and Yuen (2001). Another related study is Auzair & Langfield-Smith (2005) who studied service organizations in Australia and found that the service process type, business strategy, and stage in the organizational life cycle influence the choice of MCSs design within an organization.

Silvola (2008) studies Finnish firms in different industries and life-cycle stages, the stages of the life-cycle of the firm was used as a contingency factor to explain changes in three MCSs (business planning, budgeting and management control techniques). The companies in the study were classified into one of the life-cycle stages: birth, growth, maturity, revival or decline. The study confirms the results of Moores & Yuen (2001) providing evidence on how the life-cycle stage of the firm affects the use of MCSs, in particular business planning, budgeting and management control techniques.

Moreover, life-cycle theory has not only been applied in relation to general MCSs, but also to specific areas. Kallunki & Silvola (2008) looked at it in relation to ABC-costing, Milliman et al. (1991) examined the human resource management in the organizational life-cycle model and Jawahar & McLaughlin (2001) found that different stakeholders are likely to be more important in certain life-cycle stages.

To summarize, life-cycle theory has been elaborated in numerous models and applied in a wide array of areas in management control. One of the reasons why the life-cycle model is important in practice is, as both Hanks et al. (1994) and Lester et al. (2003) state, that an understanding of which life-cycle stage the firm is in and the appropriate MCSs for that stage, could aid founders and management in forming accurate strategies and courses of action. It has also been proved in various studies like Moores & Yuen (2001), Silvola (2008), etc., that the level of MCSs is linked to the stage of the life-cycle.

2.1.2 Inappropriateness of life-cycle theory to describe the development of MCSs in high-tech firms.

However, there are still some problems when applying life-cycle theory to describe the development of MCSs in all companies. As Phelps et al. (2007) point out, there is little consistency between the elements that constitutes the numerous life-cycle models and no consensus has been reached about the number of stages or the time it takes moving from one stage to the next. The life-cycle models also suffer from being linear in the sense that all the models assume that every company goes through all stages in a sequenced order. Instead, the nature of small and growing companies is heterogeneous, which makes it hard to generalize the stages of the life-cycle model on these types of companies.

Most of the earlier studies focus on samples from firms in traditional industries, such as manufacturing, clothing- and footwear etc., even though today, a large portion of the start-ups and companies in the growing phase are in the high-tech industry. The differences between new high-tech firms and old manufacturing firms are obvious, as it will be further elaborated, and it would have been surprising if the life-cycle model could be used with as high accuracy on a small IT-company as on an old shoe manufacturer. This is especially relevant since at the time when the life-cycle theories were developed a major part of the market consisted of manufacturing companies and not companies within the high-tech industry.

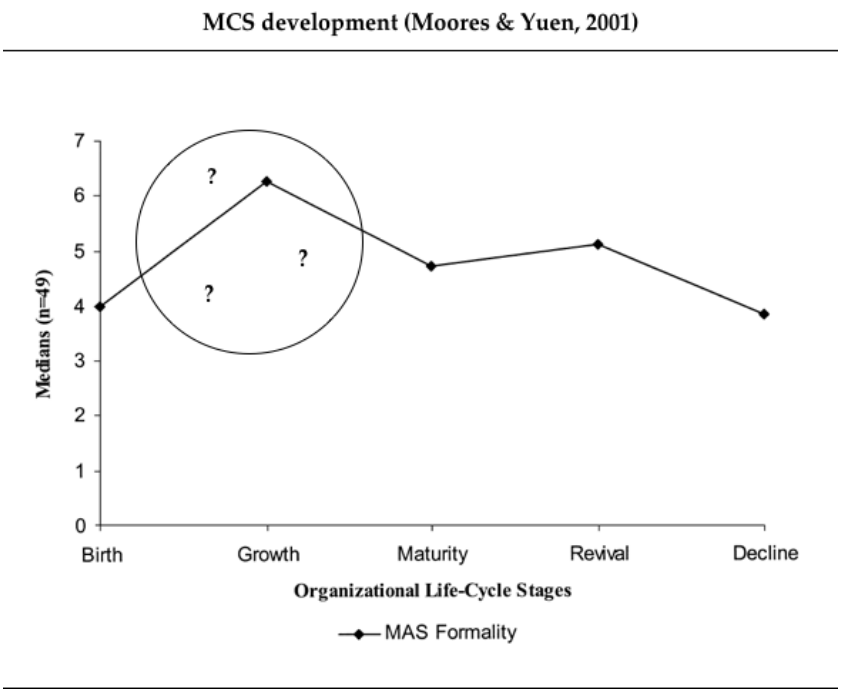

Figure 1: Adapted from Moores and Yuen (2001), pg. 374. It is difficult to apply Moores and Yuen's life-cycle model to small growing high-tech companies.

One of the studies that addresses this problem is Granlund & Taipaleenmäki (2005) who studied from a life-cycle perspective the MCSs in new economy firms (NEF), which are fast growing firms in the IT and biotech industries, and are characterized by strong R&D focus, knowledge intensity and VC financing. They argue that even though some studies have highlighted the need for suitable accounting systems for new high-tech firms, there is a lack of scientific evidence regarding MCSs practices for these types of firms. They note: "*Our observations indicate that there exist, in addition to certain similarities, notable differences between management accounting and control practices in NEFs and firms operating in traditional operating environments*" (Granlund & Taipaleenmäki, 2005). According to the authors it is hard to apply traditional life-cycle models, for example Moores & Yuen (2001), to describe changes in MCSs in new high-tech companies, since they would all end up in the stages of birth or growth, therefore traditional models would need to elaborate on these stages more thoroughly (Figure 1). In particular they argue that Miller & Friesen's (1984) life-cycle stages can hardly be applied to NEFs and so they decide to use the corporate evolution life-cycle model by Victor & Boynton (1998) instead. This model emphasizes the processes the firms go through, starting from craft work to mass production to process enhancement to mass customization and finally to co-configuration. Moreover, they also apply a generic life cycle model based on VC life cycle stages: seed capital, start-up financing, first stage financing, expansion financing, bridge financing, spin-offs. They find that since NEF are

very R&D and sales focused with limited financial resources, they keep MCSs on a low level during the growth phase and have more of a short-term focus. This is contradicting the study of Moores & Yuen (2001), that found that firms in the growth stage have a high level of MCSs and a long-term focus. Instead, Granlund & Taipaleenmäki (2005) show that NEFs try to push the formalization as far ahead as possible in order not to take resources from activities such as R&D and sales expansion. They also find that there is a great variation in the formality of MCSs and that the development to a more formal MCSs is far from straight, but they rather describe it as: "*a set of winding trails, shortcuts and wrong tracks*" (Granlund & Taipaleenmäki, 2007, p.43). Consequently, they do not support the idea that firms in the growth stage would rely on MCSs to a greater extent than firms in other stages of the life-cycle, neither do they support the findings of Moores & Yuen (2001), that the long-term focus would be relaxed when the company enters the maturity stage. This further highlights the differences when comparing new high-tech firms and traditional firms.

It is evident that differences between companies exist, because they operate in different industries and there can be large discrepancies in how MCSs are adopted in relation to the stages of the life-cycle between individual companies, due to a strong influence of the founder and of the culture. Collier (2005) conducted a longitudinal single-case study on a young Australian package company during ten years where he looked at how the MCSs changed over time. The company called TNA, with a high R&D focus, did not move accordingly to the life-cycle theory by formalizing the MCSs systems in the growth phase as described in the theory of Moores & Yuen (2001). The founder instead kept his company together through intensive informal- and cultural control and he managed the company almost without MCSs by devoting most of his daily hours to the company and placing important meetings with senior employees in bars, restaurants and in other informal meeting spots. The study by Collier (2005) shows, even though the case company is unconventional, that firms sometimes do not follow the sequential progress proclaimed by the life-cycle theory and this seem to happen more often in high-tech firms (Granlund & Taipaleenmäki, 2005).

2.2 Motors of change and Tipping Points.

Since life-cycle theory might be unsuitable to describe MCSs changes in high-tech firms, we looked at other models and theories to analyze the process of change more generally.

According to Van de Ven & Poole (1995), life-cycle theory has been a common explanation for the development of the organization in management literature. Yet, life-cycle theory is just one out of many ways to explain the process of change in organizations. Van de Ven & Poole (1995) examined the main theories of change within social and biological entities and compiled and categorized them into four ideal-types of

development theories. The first is *life-cycle* theory, which considers change as imminent and regulated by an underlying logic, as the entity progresses through stages in a sequential order. Second, the *teleological* theory, according to which changes are related to the goals set. The entity engages in a repetitive sequence of formulation, implementation, evaluation and modification of goals, because after a while it becomes dissatisfied with its previous goal and this loop spurs organizational change. Third, the *dialectic* theory assumes that the organization *"exists in a pluralistic world of colliding events, forces, or contradictory values, that compete with each other for domination and control"* (Van de Ven & Poole, 1995, p.517). Thus, change occurs when the competing forces gain sufficient power to challenge the stability and so they compete with each other to create something new, a synthesis. Finally, according to *evolution* theory, change is the result of a cycle of variation, selection and retention, affected by the competition for scarce resources.

Important factors that these four "motors of change" build upon are what Van de Ven & Poole (1995) call "units of change", which are divided between single entity and multiple entities. Single entity means that change within the organization is described as a function of factors within the entity and although other entities and the environment may influence change, they are not the main factors. *Life-cycle* and *teleological* theories are based on *single entity* units of change. In life-cycle theory the real push to development comes from within the company itself and is imminent, whereas in teleological theory the real push comes from the goals set. Instead, if one wants to examine the change between more than one entity, multiple entities is needed. Multiple entities mean that change is explained more by actors outside the company. *Dialectical* and *evolutionary* theory describe changes in *multiple entities*. In dialectical theory at least two competing forces are required to explain change, for example to describe child development the dialectical theory focus on the interaction between two entities: the child and his or her environment. Instead, evolutionary theory requires that change impacts an entire population and does not have any meaning at the individual entity.

Furthermore, the four models can also be distinguished by "mode of change", so, whether the change goes through a prescribed mode or a constructive mode. In the prescribed mode the change occurs through a sequence of events according to a pre-established program. *Life-cycle* and *evolutionary* theory describe changes as *prescribed*. The changes are predictable since they are based on the previous state of the organization, such as in the life-cycle theory where one life cycle stage evolves from the previous one, and in the evolutionary theory where many small changes occur that may cumulate and produce bigger changes over time. Instead, *teleological* and *dialectical* theories consider the mode of change as *constructive*, that may produce new features that break with past stages, resulting in uncertain outcomes.

Table 2 below summarizes the four motors of change described by Van de Ven & Poole (1995).

Van de Ven & Poole's (1995) change theories

	Prescribed	**Constructive**
Single Unit	Life-cycle	Teleological
Multiple Units	Evolutionary	Dialectical

Table 2: Adapted from Van de Ven & Poole (1995) p. 520.

Van de Ven & Poole (1995) explain that most often these models intermingle and that change is a mix of two or more of these models. Moreover, change is even more complex to explain as it can be affected by actors from both inside and outside the organization and as change extends over time and space.

When Phelps et al. (2007) review the literature on life-cycle growth models, they highlight the limitations of earlier life-cycle research and propose their own model. The model consists of two dimensions: the first dimension, 'Tipping point' (Gladwell 2000), describes the problems faced by the firm: "*the concept originates in epidemiological studies signifying a critical point in an evolving situation, before which relative stability is the condition, but after which a large change is observed*" (Phelps et al.,2007, p. 8); the second dimension describes the firm's ability to obtain and utilize new knowledge to successfully resolve the challenges presented by the tipping points. The tipping points are found during growth and are the consequence of environmental changes. Phelps et al. (2007) identify six different tipping points: people management, strategic orientation, formalization of systems, new market entry, obtaining finance and operational improvement, and finally consider organizational knowledge requirements. According to the authors, in order for a company to be successful it is important to be aware of these tipping points and acquire knowledge in how to navigate through the tipping points, when they appear. The ability to acquire, assimilate, transform and apply knowledge to navigate through the tipping points, is called "absorptive capacity" by the authors. They argue that to raise the absorptive capacity, companies often take help from external experts, such as academics or consultants who can help in the problem solution and implementation around the tipping points. The important key take-away that Phelps et al. (2007, p.8) attempt to convey is, as they say: "*a firm's growth is not a predictable sequence of stages characterized by increasing size and age. Nor is it a predictable*

sequence of problems to be overcome. Instead, it is complex, path dependent and unique to each firm, these encounters are recognizable as tipping points."

2.3 The development of MCSs explained by motors of change and tipping points.

Our aim is to contribute to the field of the development of MCSs in high-tech growing firms, by showing the inappropriateness of life-cycle theory to describe the development of MCSs in these kind of firms and proposing another framework.

While life-cycle theory assumes that the formalization of MCSs should be designed in relation to the stage of the life-cycle in which the company is, we rather claim that it could be related to Van de Ven & Poole (1995) change processes. In fact, the different modes of change, *prescribed* and *constructive*, and units of change, *single* and *multiples*, enable a better understanding of the "time-to-adoption" and the "reason-for-adoption" of certain MCSs (Davila et al., 2009). These kinds of companies operate in highly uncertain environments, where the outcomes of the change processes are characterized by *constructive* mode of change, which means that they are hard to predict and depend on the market response. Moreover they are strongly influenced by external entities such as VCs, customers or national regulations (multiple units of change).

With a dual longitudinal comparative case study on two growing high-tech companies, Edgeware and 21Grams, we aim to better explain the development of their MCSs, by linking them to the four change processes, described by Van de Ven and Poole (1995). In fact, since earlier research (Granlund and Taipaleenmäki, 2005; Phelps et al, 2007) has shown that life-cycle theory alone cannot fully explain the development of MCSs in growing high-tech companies, Van de Ven & Poole (1995) have broadened our view and made us consider other change theories. They end their reasoning by saying that change processes most often consist of a combination of change models; for example, they can start as a teleological process by setting a goal, then another actor may influence the development of the entity in a dialectical process, and finally, evolution may decide if an entity survives or not. We thus aim at understanding which change processes have characterized the development of our companies and consequently how they lead to the development of MCSs.

Phelps et al. (2007) reject that the life-cycle model explains change in modern companies, but does not give us an answer on which other change models would suit as a better alternative. Still, they answer the question on what could separate the different phases in the development of a company. So, by combining Van de Ven & Poole´s (1995) theories of change with Phelps et al. ´s (2007) "tipping points", we aim to identify the main motors of change, since those could help us better explain the development of

MCSs over time. Thus, determining whether these tipping points are linked to a certain type of Van de Ven & Poole´s (1995) change theories, will also enable us to explain the non-linear nature of MCSs changes.

If we associate the tipping points to the "mode of change" we would expect them to be mostly related to teleological and dialectical processes, since they are characterized by a constructive mode of change, which produces unpredictable results. Additionally, Phelps et al. (2007) relate their tipping points to crises and problems and similarly Van de Ven & Poole (1995) highlight the important factor of conflicts in dialectical change. Phelps et al. (2007) emphasize the non-linearity in the change of MCSs and in Van de Ven & Poole the non-linearity is also an important characteristic of teleological change, since: "*Unlike life-cycle theory, teleology does not prescribe a necessary sequence of events or specify which trajectory development of the organizational entity will follow*".

Thus, we hypothesize that dialectical- and teleological change models are the ones most closely related to the tipping points. Consequently, as teleological change, dialectical change and tipping points are linked to drastic changes, we also hypothesize that the most abrupt change in MCSs will occur when these are the main motors. To contribute to the field of MCSs changes in growing high-tech firms and to harmonize MCSs with change theory, we will also link the change theories and the tipping points to Merchants & Van der Stede´s (2012) types of control which consist of results-, action-, personnel- and culture control. More specifically, we aim to explore whether the different change theories triggers the adoption of a certain type of MCSs or if the relationship is the reverse, that the different type of MCSs triggers different change theories.

3 Method

3.1 Research Design

To explore and capture the in-depth events that shape the adoption of MCSs, we decided to conduct a longitudinal dual case study. "*Anthropologists argue that, if one has to understand a group of people, one must engage in an extended period of observation.*" (Silverman, 2013, p. 49). We believe in a similar fashion, that in order to understand in-depth which change theories affect the development of MCSs, a longitudinal study is the most effective method, as some changes go on for a long time it may be hard to derive what triggered the change in the first place. Additionally, with a longitudinal dual case study, we have the opportunity to link the changes together over time and to trace patterns accurately.

The research on the development of MCSs in start-ups and growing companies has been progressing during the last decades. However, more empirical research on high-tech companies is needed, in order to see what characterize the change processes in these kind of companies. Already in 1994, Hanks et al. stated that empirical analysis of the organization life cycle remained in its early stages and that longitudinal studies of the organization life cycle that trace changing organizational configurations over time were needed. Still, since 1994, there has been a lack of empirical longitudinal studies. Hanks et al. (1994) also add that there is a need for rich qualitative studies which capture the nuances of change within individual organizations. This type of studies has been very scarce, with the exception of for example Cardinal et al. (2004). Even more scarce are recent empirical longitudinal case studies in high-tech firms, which are almost completely missing.

Hanks et al. (1994) also comment on the practical importance of life-cycle studies: "*A valid life-cycle model could be of great value to those managing emerging growth firms. It could provide a road map, identifying critical organizational transitions as well as pitfalls the organization should seek to avoid as it grows in size and complexity*". To explore and explain the "tipping points" for two Swedish high-tech companies during the time period 2004-2017, we could aid management of today´s start-ups and of the future to navigate through these crucial events and provide guidance in when to formalize control and add MCSs.

We developed our thesis using an abductive approach, meaning that we derived our results from both the empirics and earlier literature. We started from the empirics of the previous SSE master thesis by Thiel & Widerström (2007) collected ten years ago. We then reviewed earlier literature to understand what has been studied in the field of MCSs in start-ups and high-technology firms. While looking for a theory that could enable us to describe the changes in MCSs over the life of these two companies, we found that life-cycle theory was the most applied in the literature, so, we set our domain theory as: life-cycle theory to describe MCSs changes.

The master thesis by Thiel & Widerström (2007), examined whether the VCs influenced the MCSs in three start-ups: Edgeware, 21Grams and Efield (not included in our study), which all received VC financing in 2006. Thiel & Widerström (2007) concluded that VCs influenced the adoption of MCSs both in Edgeware and 21Grams.

We also see the importance in making use of this opportunity to be able to triangulate our collected data that relates to the years 2004-2007 with the results of Thiel & Widerström (2007) as people's´ perceptions change over time. According to Hanks et al. (1994) longitudinal studies of the organization life cycle that trace changing

organizational configurations over time are needed, to capture the different aspects of change.

Edgeware and 21Grams are suitable companies for our research since they are both growing high-tech, Stockholm-based and VC-financed. They both received VC financing in 2006 and went through the economic crisis of 2008. Another interesting common aspect is that the founders/CEOs were not replaced through the entire journey of the companies, differently from the findings of previous literature (Bains, 2007). The main similarity has been that both the companies are operating in highly unstable environments and are subject to the influence of strong external actors, such as big customers and state-owned companies. Still, there are contrasts between the companies, which makes it reasonable to conduct a dual case study instead of a single case study. First, they are operating in two completely different industries, Edgeware within streaming and servers and 21Grams within postage. Second, they have different driving forces: Edgeware is more R&D-driven, while 21Grams is more customer-driven. Third, they have also experienced two different VC exits, Edgeware went public, while 21Grams was acquired by a Private Equity firm. These contrasting characteristics will let us trace more general conclusions, control more for the environmental variation than in a single case study and enable us to see the effect of a wider range of factors affecting MCSs. Another advantage of choosing the cases instead of random sampling is as, Eisenhardt (1989, p.537) stated, that "*[...] it makes sense to choose cases such as extreme situations and polar types in which the process of interest is "transparently observable"*". Instead of random sampling, we used theoretical sampling, since our research topic is related to MCSs change, these two companies provide a good opportunity to find data from essential events, such as founding, external financing and a change between financiers, which can be linked to the development of MCSs.

3.2 Data collection

The data collection from Edgeware and 21Grams consisted of 18 semi-structured interviews, nine with Edgeware and nine with 21Grams. All the interviews were conducted in English and both the authors attended all interviews except for one. To have both authors attending the interviews increases the objectivity of the information obtained since it was not interpreted solely by one person. All interviews were also transcribed, which enabled us to reproduce the information more accurately and to use correct quotes from the participants. We primarily interviewed employees from the management teams in both companies, since they have a greater influence than employees in the operational level of designing the MCSs and are more aware of what factors influenced the MCSs. Optimal for the goal of the study would have been to only interview people that had stayed within the company from the start, however, like in the majority of start-ups, the workforce and management had changed during the years.

In the case of Edgeware a lot of the management team changed in the years 2010-2017 with the exception of the founder/CEO, but we got the opportunity to interview the previous CTO and CFO and this added a lot information for the longitudinal data collection. 21Grams has had an exceptionally low employee turnover where only a few people left since the start. When mapping a period of 13 years (2004-2017) there is always a risk that exact dates and lapse of time periods of past years may be blurry for the participants interviewed. To cope with this and to verify the dates of key events we asked multiple participants similar questions. Moreover, to get a more nuanced picture of Edgeware and 21Gram's relationships with the VCs and the PE-firm, we interviewed people from the VC firm Creandum who financed Edgeware until 2016, Innovationskapital who financed 21Grams until 2015 and Priveq, the PE firm who is currently a minority owner in 21Grams. Most of the interviews were conducted on site at the office of Edgeware or 21Grams, while the rest were done over telephone, Skype-calls or at the office of Innovationskapital. Information from the annual reports was also used for the general understanding of the business models, historical events and to confirm the timely accuracy of some of the events described by the participants in the interviews.

We used a grounded theory approach, where questions were re-designed along the interviews to be more relevant for our emerging theoretical construct (Cardinal, 2004). We conducted semi-structured interviews where we prepared different questions for each participant depending on their position and whether they worked for Edgeware or 21Grams. Before the interviews the participants received the questions in advance in order for them to be better prepared in giving thoughtful answers. We also added or removed questions to the questionnaire along the interview since, "*adjustments allow the researcher to probe emergent theories or to take advantage of special opportunities which may be present in a given situation*" (Eisenhardt, 1989, p.539).

The participants in our study, at the beginning of the interview, have received an explanation of the purpose of our study and how the collected material will be used. All participants in Edgeware and 21Grams have had the option to remain anonymous in our study.

3.3 Data analysis

After having conducted the first interviews we were able to identify four main phases in the life of the two companies and divided by what Phelps et al. (2007, p.2) called "*tipping points*", i.e. the main events that shaped the companies. We then started all the subsequent interviews by explaining our analysis and by asking the employees to confirm each phase and the triggers. To increase the reliability of our study we asked all the people interviewed to confirm all of the phases or part of them, depending on when they joined the companies. The next step was then to more specifically ask the participants

how the MCSs changed and whether sudden increases in the formalization of MCSs were affected by certain events.
The MCSs were described using Merchant Van der Stede (2012) framework characterized by direct controls, such as results and action controls; and indirect controls, such as personnel and cultural controls. Results control means controlling the output, for example creating budgets and using KPIs, this gives individuals freedom in their work, as long as they the fulfil the required results. Action control means to control the working processes, it constrains the individual in managing his/her work, examples of this are manuals and supervision of the employees. Personnel control means to control that the employees fulfil the work requirements, examples are recruitment policies and training programs. Finally, cultural control is to control that the employees adapt to the shared values in the company, examples are codes of conduct and group-based rewards.

Merchant & Van der Stede (2012)'s MCSs framework

Category	Results control	Action control	Personnel control	Cultural control
Mode of control	direct	direct	indirect	indirect
Definition	enforce target achievement through monitoring and rewarding outputs	prevention of undesired behaviour and promotion of desired behaviour for task accomplishment	fulfilment of job requirements	control through establishment of shared values, social norms and beliefs
Notion of control	control of outputs through management	control of behaviour through management	exercise of self-control by individual employees	group control among organisational members
Examples of control techniques	- Performace measurement (e.g. ROE, net income, inventory control, quality) - Budgeting - Reward structures - Report of achievements	- Procedure guide - Operating manuals - Supervision of rules - Physical or administrative restrictions (eg. Expenditure approvals, passwords)	- Recruitment policies - Training programmes - Job design - Provision of sufficient resources for the job	- Codes of conduct - Group-based rewards - Interaction -Manager serves as a role model

Table 3: Merchant and Van der Stede's (2012) object of control framework (adapted from Haustein et al. 2014, p.8).

The final step was first to structure and categorize the change processes that occurred within the phases into Van de Ven & Poole´s (1995) four ideal models of change; second to identify to which of these models, the main changes in MCSs were related; third to explain why a certain type of MCSs change was related to a certain model of change.
During the interview process we always took the logic of pattern-matching (Yin, 2014) into account to re-design questions to reach a higher validity in assessing the relationship between cause and outcome with regards to change processes and increases in MCSs. We also used what Miles & Huberman (1994, p. 69) call "*pattern coding*", where we actively looked for common themes and contrasts between the two cases. Two advantages were that it made the field work more focused and it enabled us to start analyzing the data during the interview process.

The following chapter presents our empirics. We present the development of Edgeware and 21Grams through Van de Ven and Poole's (1995) change theories and Phelps et al. 's (2007) tipping points; and the resulting effect on the MCSs using Merchant Van der

Stede's (2012) framework. The analysis of our empirical findings is then presented in chapter 5.

4 Empirics

4.1 The development of 21Grams and its MCSs.

2004-2006: Phase 1

In 2004 Stefan Blomqvist and Kaj Petersson worked on a project together with the Swedish Royal Institute of Technology (KTH) to do a service for large postage buyers to decrease their mailing costs. The idea behind this project was to calculate the optimal combination of different post operators for each category of mail, in order to get as low postage costs as possible. The company that Stefan was working for wanted to sell the postage optimization in the form of licenses to get much of the revenue as early as possible. Instead, Stefan and Kaj saw a market opportunity where the postage optimization could be sold as a tic-based model, and so they decided to start their own company, 21Grams. They had both experience from the postal industry and knew that in 2009 the postal market was about to be deregulated on an EU level. 21Grams was quite alone in this niche market, not just in Sweden, but also in Europe, since most companies didn´t see that decreasing postage costs was a possible market. The idea was presented to a member of the Bartholdson family, that later became the business angels, who decided to invest in the company and was also very operational in the beginning.

As most start-ups, 21Grams also started in a *teleological* process where the founders saw a market opportunity and decided to start the company with the goal to become a leader in the niche market of postage optimization. Since 21Grams consisted of only the founders, the early change process occurred within the company and without conflicts between different entities.
Stefan and Kaj saw the market opportunity, but they did not create the algorithm for postage optimization themselves, instead they hired consultants. Stefan (CEO from the beginning) has always been very sales-oriented and not a "tech-guy" and he also had previous experience of leading a mid-sized company. 21Grams needed financing at some point for its continued development, so a *life-cycle* process was initiated, since this was an internal need of the company with a prescribed mode of change. 21Grams received multiple financing offers, but chose the VC Innovationskapital. The strong sales-focus of the management lead 21Grams into many customer contracts early on. They were relying to some extent on a single print supplier, but they avoided the strong dependence of a few big customers, in contrast to the majority of start-ups.

As soon as external actors in the market, such as competitors, customers, legislative authorities and financiers started affecting 21Grams, an *evolutionary* change process started, that determined if the product would survive the selection process of the market. The main changes in MCSs were related to *results* control, especially in terms of cash flows, due to the limited financial resources the company had at the beginning. Moreover to receive VC financing it was important for 21Grams to show a positive development and setting targets on how many customers and the size of the market share the company would have in the future.
As this phase was mainly characterized by a *teleological* process of setting and envisioning goals and partly by an *evolutionary* process of entering the market, it is then logical that the main changes in MCSs were related to *results control* since the progress towards the goal and the reaction of the market needed to be measured. This to be able to change the goal if necessary in order to adapt to the market.

2007-2010: Phase 2

In the following years 21Grams continued towards their goal of international expansion in Europe, starting from the UK, since it was the first country expected to be deregulated. This was a natural step since the VC and the business angels based their investments on this aggressive expansion plan. The sales and marketing orientation of 21Grams were essential for their expansive strategy and this also affected how the R&D department in the company worked, since it became more market-driven.
"*Every product that goes into R&D has some kind of mission or purpose, we don't develop on speculations.*" (Stefan Blomqvist, CEO, 21Grams).

Unfortunately, the deregulation became a huge disappointment for 21Grams since the state-owned companies still controlled their quasi-monopoly market and effectively shut the door for new entrants. 21Grams was bleeding from the expansion in the UK and the result was a loss of 20millions in 2010, so something had to be done quickly. The VC Innovationskapital put pressure on 21Grams to abandon UK and to focus on the Nordic market. The discussions were initially rough since the CEO and the business angels had invested emotionally for many years in the European expansion. If they did not find a consensus with the VC, 21Grams would have had to be re-financed in five months.
A *dialectical* process was then in place, when the VC argued against the CEO and the business angel for the exit from UK. Two groups, Stefan and business angel and VC were arguing for opposite directions holding a status quo in the beginning, but the discussions ended up as one of Van de Ven & Poole´s (1995, p.517) possible dialectical outcomes: "*Sometimes an opposition group mobilizes sufficient power to simply overthrow and replace the status quo*". A consensus to withdraw from the UK was reached fairly quickly and, since 21Grams was still a small company, the process was

fast. In fact they managed to turn a 20 million loss into a 3million profit in just two years.

In this phase the development of 21Grams started in a *teleological* change process by implementing the new main goal of European expansion and establishing operations in UK. Yet, the backlash that followed in UK was extremely *evolutionary,* as 21Grams did not manage to stand up to competition from the state-owned post companies and other private companies with a stronger network. This corresponds to Van de Ven & Poole´s (1995, p.518) description of an evolutionary process: "*Selection of organizations occurs principally through the competition for scarce resources and the environment selects entities that best fit the resource base of an environmental niche*".

During this phase the most significant formalizations came in the form of *results* control, such as budgets and performance measurement, since the VC put a lot of demands in terms of reporting. "*We did not create those reports because we needed them from a management perspective, since we were not more than 2 years old, it was more because we had to report them back to the investors*" (Stefan Blomqvist, CEO, 21Grams). Also *personnel* control increased, such as recruitment policies, because the number of customers grew in 2007 and the Board requested more experienced people from larger companies to run the production and manage the sales. A reason why *action* controls such as operating manuals and supervision of rules were used scarcely in 21Grams from this phase and forward was that, as mentioned with the sales driven R&D process, the people working in R&D did not have much room to drift away from value creating processes. The requests from the sales side forced them to fulfill customer demands. "*The sales part has always been before the development. There hasn't been too much room for freaking out from a development stand-point*" (Stefan Blomqvist, CEO, 21Grams).

The VC wanted the company to focus more on sales margins, since it was a perceived value-driver and this was handled through the recruitment of a finance manager in the company. Moreover, initially 21Grams' management team had proved to the VC that they were competent in running the company and that they had more knowledge of the market, so the VC mostly imposed results control which is the freest form of control. The information requested were mainly related to sales, organization's growth and budgets.

This second phase was mainly characterized by *evolutionary* changes, driven from external entities, such as competitors, the VC and legislative authorities. However, what drove the main changes in MCSs was the *dialectical* tensions between the founders and the VC. In fact when the company started providing negative results, the VC had to

impose more *result* controls by checking for example cash-flows from the operations and the investments in the UK more closely.
The two tipping points that defined the second phase were the financing and the strategic change, which resulted in drastic changes in MCSs. We hypothesized this due to their dialectical and teleological nature. 21Grams needed to adapt quickly to external demands of the VC in terms of *results* control after the financing and also after it was providing negative results from the expansion in the UK, which then lead to the strategic change.

2011-2015: Phase 3

21Grams had to adapt to the actual effects of the European deregulation, which lead to a dissatisfaction with its previous goal of international expansion. Hence the company set a new goal to focus first on Sweden and then to successively expand in the rest of the Nordic countries. Indeed, a *teleological* change played a major role at the beginning of this phase.

One of the key events in growing the Nordic business was the acquisition of a customer base from DataMetrix, a company doing pre- and post-payment services, from this point e-services became an important part in 21Grams' business. The management team and the VC had known almost from the start that the company eventually needed to move into the digital market to be able to expand long-term, however they were afraid of ruining the relationships with some of their partners. The transition process from postal to digital services was mainly *evolutionary*, since it was not something that 21Grams could affect, it was rather a shift that affected all the companies in the postal market (prescribed mode of change) in an incremental and stable way.

In 2013 Innovationskapital´s third fund, to which 21Grams belonged, was about to end, so Innovationskapital started to actively look for an exit. This also contributed to a change in focus for 21Grams: from just expanding sales to improving margins. This was also driven by Innovationskapital, who wanted to show some years of rising profits to potential buyers. The flip-side of Innovationskapital´s exit plan was their increasingly cautious attitude towards spending, "*I should not say we got stalled, but we did not really have the means to invest a lot of millions in acquisitions*" (Daniel Thoresson, CFO, 21Grams). Innovationskapital´s exit and Priveq´s entrance were not without conflict since as in most cases PE firms acquire a majority of the company's share, but the CEO and the business angel were not interested in selling, so they needed to find an agreement with the minority buyer.

In this phase the *dialectical* processes were crucial. First, the process of entering into the digital market was characterized by possible tensions with some of 21Grams' customers,

who were already providing digital services. However, the company managed these tensions and found a solution by collaborating with its partners, who otherwise could have stopped to buy 21Grams services . Second, the clashes between Innovationskapital, who needed to exit due to the time-frame of their investment fund, and the founders and the Bartholdssons, who instead wanted to remain since the company was still growing. However, the exit of Innovationskapital also contained elements of *life-cycle* change, since it was already set already from the start and VC exit is the final sequential stage in the VC financing process.

The changes in MCSs were mainly related to *personnel* control, again related to recruitment policies, but also to job design. As the company grew and needed to be more structured, 21Grams hired managers from bigger companies to help them formalize processes and implementing MCSs. The problem with these managers was that they were not used to work in small companies, having broader roles, without assistants, and this resulted in cultural clashes. The solution was to replace them with people that previously had lower positions in 21Grams, since the company needed to react faster to the *dialectical* processes that characterized this phase. Internal people knew better how to work in a less structured company, where the roles and working tasks are broader.
"I was not really a CFO at the time, but more a business controller. Since the company was quite small then and quite big now, I have always had quite a broad role, I worked as business controller with the focus on forecasting and working closer to the sales department. [...] It was only around two years ago, shortly after Priveq came on board that I stepped up to a formal CFO role" (Daniel Thoresson, CFO, 21Grams).
Consequently, the change in management team also lead to significant changes in *results* control, since they then established monthly formal management meetings and started to report internal figures on profitability.

2015-today: Phase 4

In 2015 21Grams and Innovationskapital finally reached an agreement and found an acquirer, after an extensive bargaining process. It resulted in Innovationskapital selling their shares, which amounted to 45% of the company, to the PE-firm Priveq. This meant a revitalization for 21Grams, since Priveq had a horizon of 4-5years and therefore was eager to go back to a more expansive strategy. The goal remained to expand in the Nordic market, so the dissatisfaction with previous goal and the goal reformulation processes were absent (*teleological* process).
The main changes in this phase were related to Priveq's acquisition and classified as an *evolutionary* process, since 21Grams first had to survive the selection process again to receive new financing, but afterwards enabled the company to evolve.

Following Priveq´s investment, 21Grams did several small strategic acquisitions in an opportunistic fashion, the biggest one was the company Addoro with four employees situated in Ukraine. According to the CFO the acquisitions had non-significant effect on the MCSs: "I don't think they have impacted the MCSs so much, we more absorb and change MCSs just to get them into our organization" (Daniel Thoresson, CFO 21Grams).

Already in 2015 the postal market had been declining for many years, but up to that point 21Grams had been able to increase its sales by enlarging the market share, but from this point 21 Grams´ growth in sales in this sector started to slow down. This lead to a further shift in focus to the digital side, which was growing around 10-12% per year. 21Grams was at the time operating in two distinct areas, postal and digital e-invoicing, and each area had started to grow in its own direction.
The transition into digital services was another *evolutionary* process, since it affected all the companies in the postal industry, and was characterized by a prescribed mode of change. In 2017, 21Grams decided to split the operations into two separate business units, each reporting its own numbers. "*So I really think we were already working separately, but from a management point of view it was necessary to clarify that we needed more employees to be able to support and to continue develop each product and even from a sales point of view, we could not sell each part together, because you needed to have the knowledge and the updates. From sales, developing, support you needed the split and the actual organization split clarified it in a really good way.*" (Anders Lindén, Customer implementations VP, 21Grams).

Often, the competition in newly deregulated markets with state-owned companies is tough, as 21Grams experienced with PostNord, the Swedish state-owned post company. They wanted to abolish one of four types of discounts that private companies, such as 21Grams, benefit from. This resulted in a dialectical tension and a legal conflict between the two parties. The verdict came the same day in which 21Grams decided to split the company into two business units and it turned in PostNords favour, which lead to abolishment of the discount, affecting the postal unit of 21Grams.

The changes in the MCSs in this phase were mainly driven by Priveq's acquisition. They occurred mainly in terms of *results* control, since each quarter 21Grams had to report the consolidated P&L, BS, CF and ratios between operating income and the net debt level, because Priveq itself had to report these figures to the banks that financed its acquisitions. The numerous M&As were also followed-up closely and their separate financials were reported to the Board, on a monthly basis. Moreover, the product development process became more structured: first determining whether the services could be sold in the market, second testing them on 5-15 customers and last, selling them to more customers. Still, the ROI was not calculated on the new product's features

that 21Grams was offering. Finally, Priveq pushed the company to adopt IFRS, which is part of what Priveq calls IPO readiness, a preparation for portfolio companies to make a possible future IPO process less painful.
Already when Priveq entered into 21Grams they knew that the investment horizon was 4-5 years and could therefore plan the necessary steps before the future exit. This implementation of MCSs thus resembled an *evolutionary* change process, since it was characterized by a predictable sequence of stages to prepare 21Grams for the prescribed future exit of Priveq.

21 Grams's change processes and main MCSs changes

Motors of Change	Phase 1: 2004-2006	Phase 2: 2007-2010	Phase 3: 2011-2015	Phase 4: 2015-Today
Life-cycle	Financing	Larger customer base	VC need to exit	Split into 2 business unit
Teleological	Optimization of postage costs	UK expansion	Dissatisfaction and new goal formulation: Nordic Leaders	N/A
Dialectical	N/A	**VC vs Founders and Business angels**	**National Regulations vs private company & VC vs Founders and Business angels**	National-owned companies vs private companies
Evolutionary	**Enter the market and survive (selection)**	International Competition with national-owned companies	Switch to Nordic markets and Digitalization	**Priveq acquisition & split into 2 BUs**
MCS	Results control (eg. cash flows)	Results control (eg. sales and budgeting) & Personnel control (eg. Recruitment policies)	Personnel control (eg. change in management team)	Mostly results control (eg. IPO-readiness)

Table 4: Summary of 21Grams' change processes and main changes in MCSs.

Summary

The development of 21Grams during 2004-2017 was characterized by a flexible way of working and a steady fine-tuning strategy. The original goal was to expand aggressively within Europe, but the focus had to be moved to the Nordic market (*teleological* process), since the deregulation of the postal market did not enable fair competition. 21Grams always knew that the postal market would not last forever and that the importance of the digital channels would increase, therefore the strategy has slowly shifted to the digital side (*evolutionary* process).
The changes in MCSs were mainly driven by *evolutionary* processes, of first entering the market while surviving, then competing with state-owned companies, and then to finally prepare for the future prescribed exit of Priveq. Those changes had a more linear and

sequential character, compared to those driven by *dialectical* changes that characterized the second and the third phases. Indeed the change in management team and the introduction of formal monthly reporting (*results* control), after the UK withdrawal, were a response to the need to quickly adapt to the "tipping point" of a change in strategic focus. An explanation to the low amount of operating manuals and supervision of rules (*action* controls) in 21Grams is the strong culture control, this has contributed to an exceptionally low turnover in the workforce, since almost no one in the management team has left since 2010. The company has a strong commitment to keep good employees within the company by giving them new challenges and letting them try other positions that might suit them better. The culture stems from good leadership and as the Customer Implementation VP calls it: "*Freedom under responsibility. I mean I don't know if we can compete with salaries or money but we can always give each employee the freedom to work from home or go home early to pick up the kids*" (Anders Lindèn, 21Grams).

Moreover, one of the big competitive advantages 21Grams has always had is that it offers a complete set of services in this "hybrid market". Customers want the digital side, but at the same time need to send regular mail until the transition to digital is complete. The other advantage is the know-how, described by Product Development VP: "*We are B2B, but then it is important to know your connections, I know the 600 biggest postal buyers in Sweden, I know exactly which company we should target, you don't need anybody to find that out for you. I can always arrange a meeting with any of them*" (Kaj Petersson, Product Development VP, 21 Grams). This could explain the lack of *dialectical* processes in 21Grams. For example, due to their good knowledge of the market when they entered the e-invoicing sector they avoided clashes with some of their partners who were already providing those kind of services. The market knowledge also lead to a steady fine-tuning strategy that made the MCSs changes smoother compared to when dialectical conflicts arise, which demand abrupt changes in MCSs.

4.2 The development of Edgeware and its MCSs.

2004-2006: Phase 1

Edgeware was founded in 2004 by Joachim Roos, Lukas Holm and Kalle Henriksson, all with an engineering background, experience from VC-financed start-ups and previously employed by the VC-financed high-tech firm Xelerated. They had seen how linear TV-viewing was starting to slowly decline and was being replaced by video-on-demand (VOD), this needed an enormous increase in capacity to transfer data to the TV-viewers. Even though the founders did not have a product ready for the market, they decided to start a company to realize their vision of becoming a leading player in the streaming

sector. The founders realized that the solution to the data transferring problem was to store data far out at the "edge" of the networks, which is where the name Edgeware comes from.
As in 21Grams, Edgeware started with a *teleological* process where the founders saw an opportunity in the streaming market. Moreover, since Edgeware was mainly constituted the founders, the early change process occurred *within* the company and without conflicts between multiple entities.
The company remained more of a "hobby project" with the office in the basement of one of the founders, until they were able to find VCs willing to invest in their business idea. This process resembled *life-cycle* change, since to start developing their product, external financing was needed. It had a prescribed mode of change and it was an internal necessity.
However, the main change process in this phase was *evolutionary*, since Edgeware had to be selected among a number of different competitors to receive VC financing, in a market characterized by high product complexity and uncertainty.
In 2006 the VCs Amadeus and Creandum invested in the company and from that moment Edgeware could recruit personnel and start manufacturing product prototypes and pre-series.

As this phase was mostly characterized by this *evolutionary* process of being selected to get VC financing, to start creating the first prototypes, no *MCSs* were really in place, since the founders could control everything by themselves without the help of any formal MCSs.

2006-2013: Phase 2

After receiving VC financing, Edgeware's main goal of leading the streaming market lead to a focus on growth at any cost. This can be classified again as a *teleological* process, since it was an *internal* need, defined by a *constructive* mode of change, because it was leading to an unpredictable final result, depending on the market reaction. Indeed, this second phase was characterized by a strong environmental uncertainty, since the market for streaming was not really there until 2010, and Edgeware relied heavily on few big customers.

The VCs measured their investment using IRR and so the key was then to increase the value of the company as much as possible. Even though Edgeware had the possibility early on to improve margins and increase the yearly profits, expanding sales remained the main focus. The strategy behind it was to grab as much market share in the streaming market as possible, before the market matured and competitors had time to

establish. Still, the founders remained cautious in spending the VC financing that they received.

The first trigger came in 2007 when Telia, the big telecom operator, signed the first major sized contract and went live in 2008 with Edgeware´s technology, which contributed to Telia´s rapid growth in TV on demand. Telia has remained one of the largest customers during Edgeware's existence and has shaped the whole company.
The second trigger came when Edgeware signed a partner agreement with both Ericsson and NokiaSiemens. These two big customers were extremely demanding and enabled Edgeware to grow by giving it new customer projects frequently. However, the flip-side was that all of Edgeware´s sales came through the channels of these two customers, so the company had to concentrate just on satisfying their needs. This made Edgeware very vulnerable. Indeed, a *dialectical* process emerged, characterized by the need for a balance of power between Edgeware's own needs and customer needs.
These tight connections with customers resulted in different acquisition proposals for Edgeware and one of them came from Ericsson in 2010, which required the company to go through a long due diligence process.
This was the moment in which the company really matured, as the due diligence document consisted of 45 pages of questions and requirements that Edgeware needed to fulfill. The newly hired CFO and the CEO started to formalize and to digitalize processes and procedures from that moment, such as regular employment contracts and customer obligations.
"In that process Edgeware matured a lot. It was so painful to go through that exercise and we just agreed never to have that pain again and just do everything right from the beginning. Everything documented and in digital way. Agreements with customers, documents, deviations from the agreed documents, a lot of things." (Helena Holmgren, previous CFO, Edgeware)
However, the acquisition was terminated very close to completion and the relationship deteriorated slowly from that moment. In 2013, when Ericsson acquired a competitor of Edgeware providing streaming services, the sales to Ericsson decreased from 70% to 15% in just one year.
In this phase the company also moved from 20 to 60 employees and this contributed to a dilution of the "family feeling" typical of the initial years and the relationships between individuals, especially with the most recently hired, became less tight. In fact *cultural* control is naturally stronger when information is exchanged informally between the management, as opposed to when more formal MCSs are in place. Nevertheless, most of the main decisions were still taken by the CEO and the CFO, a tight duo characterized by strong collaboration and complementation.

The formalization of MCSs increased overall, as the company was growing, however as external actors came in, the MCSs changes tended to be more drastic.
First, the VCs increased the focus on growth, giving rise to the *teleological* process, and needed to monitor Edgeware's results. The MCSs in Edgeware changed more than in 21Grams, since it was necessary to work strictly focused on only high-value creating projects in order fulfil the VCs high IRR target. The VCs imposed *action controls* in the form of a new business plan for the next 1-2 years, because the VCs Amadeus and Creandum had a business model that forecasted that 2 out of 10 of their portfolio companies would be successful and generate a high IRR. So it was important that Edgeware maintained the aggressive business plan and was able to achieve high growth in the long run. This in order to generate a good IRR to cover for the other 80% of the VCs investments that failed or did not generate any profit. Innovationskapital (21Grams' VC) had a different strategy with less aggressive expansion plans in their portfolio companies. Moreover the founders of Edgeware were much more technology oriented than the founders of 21Grams, who were sales oriented since the beginning. Hence, the VCs pushed Edgeware to increase the focus on sales and, since the founders did not have enough sales competence, the VCs suggested to hire people with sales- and partnerships background. So, they imposed *personnel* control by recruiting an advisor to the Board and introducing customers and partners to increase Edgeware's sales. This was possible also because, unlike Innovationskapital, the VCs of Edgeware had good knowledge of the industry (Theil & Widerström, 2007).
Second, the due diligence, a consequence of the major *dialectical* process, resulted in big MCSs changes. Ericsson wanted to ensure that it knew what obligations it was assuming before committing to the transaction, the nature and extent of the target company's contingent liabilities, problematic contracts, litigation risks and intellectual property issues. This contributed to a steep increase in the formalization of MCSs, especially in terms of *action control*, such as the recognition of outstanding customers' obligations, and of *personnel control*, such as the formalization of all the employment contracts.

2013-2015: Phase 3

After the break with Ericsson, Edgeware was still able to keep the overall revenues more or less the same, thanks also to KPN and Belger, two big customers that came in through the Nokia Siemens deal and which turned out to be crucial for Edgeware´s survival at the time.
"Without those two customers Edgeware would not be around, they have been super crucial for Edgeware's success" (Göran Appelquist, previous CTO, Edgeware).
From that moment Edgeware shifted its sales to smaller partners, in order to mitigate the risk of being dependent on big customers like Ericsson in the future. We classified this process as *teleological* since it was an internal decision, driven by the dissatisfaction

with the previous goal to grow at any cost, even if this implied letting a few big customers influence your company.
This had two main effects: first, it put more demands on the sales side of Edgeware, since the sales force now had to look for new customers themselves, instead of relying on Ericsson's contacts; second, it allowed Edgeware to start selling directly and be closer to the customers, also receiving their inputs and adapting the products to their demands.

The R&D and the product department at the time were one single department divided into three different units, one building the hardware, one doing the embedded software and a management unit that was coordinating the two.
However, as Edgeware started dealing with more customers, the productivity of the R&D was far below the desired level, so the way they were producing their products had to be changed. A change was initiated: new professional people were hired to manage the product and the R&D department respectively and an Agile software development methodology was introduced in 2014. The idea with the Agile transformation is that it breaks projects down into small pieces, and the software is developed incrementally instead of being delivered all at once. The line managers were removed and there were no longer any team leaders, which caused a loss of control and ownership of special parts of the products, since everyone was supposed to be able to deal with everything. This in turn lead to dissatisfaction among the employees working in the R&D department. The Agile transformation took one year and a half to be implemented. In the end it was modified with more traditional development methods and a reintroduction of line managers to better suit Edgeware´s needs and to mitigate dissatisfaction. This process resembled a *life-cycle* change since, as Van de Ven & Poole (1995, p. 515) state about life-cycle change: "*each of these events contributes a piece to the final product*", the final R&D department contained elements of both project based R&D (the previous method) and of Agile.

At the same time, Edgeware saw companies in the encoding sector targeting the Origin solutions (a device for converting raw content to Video-On-Demand) market, which was an adjacent market to Edgeware´s Content Delivery Network (CDN) market. Edgeware saw the threat of increased competition in the CDN market and as a consequence of this *evolutionary* process, they decided to start developing Origin solutions to get more control over the supply channel. In the first step they hired a separate business development team to produce their own Origin solution, though this created frictions between the business development and R&D teams. Therefore, the Origin was moved and produced within the R&D department.
The loss of control and ownership of special parts of the products, due to the Agile transformation and the introduction of the Origin solution, lead a lot of high-performing and high-skilled engineers to leave the company.

"*There was a number of people that left and those people were the high performers, they don´t want to work in that way, in a complete Agile regime, for various reasons. One reason is that they want to be in control over what they do and want to be specialists, so they don´t want to be all over the place, they want to continue working on what they do best and that is still a problem I think in Agile transformations"* (Joachim Roos, CEO, Edgeware).
So, we saw a *dialectical* process between two main forces: on one hand the company that needed to be more efficient and competitive, and on the other hand, the goal of the high-skilled engineers, who wanted to remain experts within their field.

The MCSs changes in this phase were mainly driven by this last *dialectical* process.
New professional managers were hired such as a new CFO, an Operations manager and a Product and R&D VP, according to the recruitment policy of hiring managers with experience in creating structures and formalizing MCSs. This together with some jobs being redesigned resulted in an overall increase in *personnel* control.
Moreover Edgeware had to specify and divide some of the management roles, for example the VP product and VP R&D roles, which were managed by the same person before.
These people, who were coming from bigger and more structured companies, started trying to introduce some changes related to *action* controls, such as procedure guides and operating manuals, necessary to handle the *dialectical* tensions. The Agile process also resulted in an increase in *action* controls since the employees in the R&D department were forced to work in a certain way, and not anymore as experts in small special parts.
"You've employed someone to change the organization, then you don't want that person to listen to every individual who wants to do things the way they did" (Joachim Roos, CEO, Edgeware).
Edgeware also tried to impose *action* control by creating templates for customer contracts that would make the process more efficient. Though, with moderate success, since the streaming market was changing quickly and many of the customer contracts were customized, which made standardization very difficult.

2015-Today: Phase 4

This phase was mainly characterized by the IPO process, that has *life-cycle* and *dialectical* aspects.

Edgeware first planned a listing on the smaller First North stock exchange list as an intermediate step, mainly because of revenue volatility, but then decided to go on the main list to have better access to liquidity and due to the VCs influence. However, the structure and the processes were not in place for an IPO and for this reason they hired

both a business- and a financial controller, to take care of the IFRS adoption. The IPO process brought a lot of formalization into the company, especially from a revenue recognition perspective, before the IPO they could actually promise customers features that they did not have ready at the moment of signing the contract. A *dialectical* process then emerged, characterized by two entities: the stock-market, constituted by external investors, which required to bring in structure and formalization; and Edgeware, that needed to remain flexible to deal with a very unstable environment.

A large number of new customer relationships were created and expanded and, at the same time Edgeware started outsourcing R&D processes, especially maintenance projects, to Vietnam. The company also became more decentralized, with around 60 employees in Stockholm and 40 spread around the world. These processes resembled typical stages of *life-cycle* models, since each of them set the stage for the next and contributed to Edgeware's growth and international expansion.

Edgeware´s Board of directors was strengthened and the company´s shares were listed on NASDAQ Stockholm on the 9th December 2016. The VCs exited but today they are still owning 20% of the Edgeware's shares each.

In this phase results-, action- and personnel control increased step-by-step and significantly in the IPO process.

The main changes that related to *results* control were four financial targets: grow the company organically above 20% annually; have an EBIT margin above 15%; not give any dividends and invest all the money back into the business; and have a debt structure that is below two times EBITDA. However, the introduction of more formal KPIs was postponed to enable flexibility to react to the market and grow with short decision-making processes.

The main change related to *personnel* control was the job redesign and the recruitment of senior people in the finance function, like a business and a financial controller, and in other areas, such as a legal counselor and an Investor Relations Manager.

"*I knew the people that I needed, not just because they are who they are , but we were in such a hurry that we would not have time to develop staff and get them to their specific level. We needed someone to perform from day one, because the timing for the IPO was so short. I think it is always the right thing to do, to get Senior people first and then start to build the rest*" (Steeve Fuhr, CFO, Edgeware).

The recruitment of senior employees to the finance function enabled the company to handle the *dialectical* tensions and impose the control needed for the IPO process, while maintaining the flexibility necessary to run the operations.

"*And this would never be possible to do with two people in the Finance department. You really need to divide the work, and rely on the people. Do your job and be sure the others are doing what they are suppose to do*" (Steeve Fuhr, CFO, Edgeware). "*Yes because also you should not forget that just the day to day business takes a lot of time*" (Annika Norin, Financial controller, Edgeware).

Finally, the IPO process brought in changes in *action* control, mainly related to the communication of quarterly results, since not all employees are part of the insider list, but also the disposition of the different offices was rearranged. These changes especially affected the weekly sales meeting, since one of the things that kept the Sales department together in the past was that everyone was informed during these meetings about the overall financial situation and the possible deals that the company had.

"*This can really be a challenge going forward. People want to see the big picture and they can also understand our decision* better*"* (Steeve Fuhr, CFO, Edgeware).

Edgeware's change processes and main MCSs changes

Motors of Change	Phase 1: 2004-2006	Phase 2: 2007-2010	Phase 3: 2011-2015	Phase 4: 2015-Today
Life-cycle	Financing	N/A	Agile Software development	Decentralization & International expansion
Teleological	Leading the streaming market	Sales growth	Less customer dependence	N/A
Dialectical	N/A	**Customer Dependence**	**Company's efficiency vs high-skilled engineers' goals**	**Structure and Formalization vs Flexibility**
Evolutionary	**Selection to get VC financing**	N/A	Securing market position (Origin)	N/A
MCS	N/A	Action control & Personnel control (eg. due diligence)	Personnel control (eg. job design) & Action control (procedure guide)	Results -Action- Personnel control (IPO-process)

Table 5: Summary of Edgeware's change processes and main changes in MCSs.

Summary

The history of Edgeware was mainly characterized by a strong dependence on a few big customers, such as Ericsson and Telia, which on one hand enabled the company to grow by giving Edgeware new customer projects frequently. On the other hand, they restricted the company's ability to innovate and to adapt their product to the customers' requests, since it was not in direct contact with them. A *dialectical* process then occurred, characterized by two opposing forces: the customers' and Edgeware's interests. After the

break with Ericsson, Edgeware started to sell to more and smaller customers and reformulated its goal as part of a *teleological* process. This created the need for a shift towards an Agile R&D production method. As the company grew the main struggle was to find a balance between the two *dialectical* forces, flexibility and control: flexibility was crucial to respond to the high uncertainty that characterized the streaming market, while control was needed since the company was becoming bigger, more decentralized and went public in 2015. This struggle was also reflected between on one hand the high-performing and skilled engineers who wanted to remain experts in their fields, but became bottlenecks, and on the other hand, the overall coordination and efficiency in the production process.

*"In R&D you have these prima donnas and they are the ones that you need, you rely on these prima donnas, because they are 10 times more productive than anybody else and they can invent fantastic things, but it is complicated, it is easier to have people that are just obeying orders, but you can never build a company with those people". (*Joachim Roos, CEO, Edgeware)

These *dialectica*l tensions that needed to be managed resulted in drastic changes in MCSs, especially in terms of *action* control, which consequently created some frictions between the management team and the engineers working in the R&D department. Moreover we noticed that, as soon as external actors, such as customers and external financiers were involved, other *dialectical* tensions emerged. Edgeware, being strongly R&D driven, tended to focus more on technical aspects and market opportunities, rather than financial measures, whereas external parties needed information that related to *results* control and required a higher formalization of MCSs. The VCs wanted sales reports and updates on CF statements to see how the company progressed and to safeguard against illiquidity. Ericsson required customer obligations, employees contracts among other things, to see if Edgeware was a worthy investment. Finally, the stock market wanted quarterly results to have reliable information to assess the fair value of the company and IFRS accounting to compare Edgeware's financials to other companies' results.

5 Analysis

5.1 Inappropriateness of life-cycle theory to describe the MCSs of Edgeware and 21Grams.

As we have previously demonstrated, it is problematic to apply life-cycle theory to describe MCSs changes for companies in other industries than traditional manufacturing, for several reasons.

Fixed life-cycle stages
First, it is difficult to divide the development of all companies into fixed life-cycle stages, since all companies encounter different tipping points and because there are many different life-cycle models, which has a different number of stages. In fact, the life-cycle literature has not even been able to agree on one model (Hanks et al, 1994).
We divided the development of Edgeware and 21Grams into four phases, and out of them only phase one could be considered similar, before they received the VC financing, as the companies set their goal and strived to survive the selection process of the market. However, the other three phases were characterized by completely different factors: big customer decisions in the case of Edgeware and national regulations in the case of 21Grams. These are specific to the industries in which the two companies operate.

Linearity
Second, the life-cycle models suffer from being linear, in the sense that they assume that every company goes through all stages in a predetermined order. In Moores & Yuen's (2001) study, a life-cycle model is used to explain changes in MCSs in traditional manufacturing firms. They found that MCSs are expected to linearly increase from birth to growth, decrease to maturity, increase to revival and finally decrease in the decline phase (Figure 1). We disagree with their findings. Instead, contrarily to the traditional life-cycle theory, we argue that the process of adopting MCSs can never be completely linear, and rather that tipping points exist where the MCSs suddenly increase as reactions to change processes that affect the company (Phelps et al., 2007) and to external actors.
For example, Edgeware was forced to formalize its MCSs when it went through Ericsson's due diligence process for the acquisition, and Innovationskapital (VC) required 21Grams to deliver extensive reporting for being a newly formed start-up.

Heterogeneity

Third, the nature of small and growing companies is heterogeneous and consequently makes it hard to generalize the stages of the life-cycle model.

Collier (2005) has shown in his study, that the development of a company and its adoption of MCSs depends to a large extent on industry and founder. In the case of Edgeware, several managers mentioned some difficulties in measuring the progress in R&D, ROI on a small improvement/upgrade of a product, or defining KPIs. In 21Grams, they also expressed their concern about finding performance measurements for small service feature upgrades. They would pre-test these features on few customers, rather than measuring their performance, after they have been launched in the market.

Concerning the founders' influence, in both Edgeware and 21Grams, the founders were more business oriented and reluctant to impose too much controls, and that was of course reflected in the entire organizational culture. Moreover, while 21Grams' CEO was sales-oriented since the beginning, Edgeware's CEO has always paid attention to the quality of the technology.

"*And again that very much can stand to Joachim (CEO), because in the end if he does not care about his numbers than it is really hard to make people really care about it*" (Göran Appelquist, previous CTO, Edgeware).

No expected decline in the formalization of MCSs from growth to maturity.

As shown in figure one, we disagree with Moores & Yuen (2001), since they expected the formality of MCSs to decrease from growth to maturity. Even though neither Edgeware nor 21Grams have reached a maturity or any of the following life-cycle stages, we see a trend of increasing the formalization of MCSs. We have analyzed the adoption of MCSs in the birth and growth phase and "forecasted" a possible development of MCSs in the maturity phase.

We found that both Edgeware and 21Grams have steadily increased their MCSs in the transition from the birth to the growth phase, but we did not see any indications that a culmination in the formalization of MCSs would be reached or that the management was planning on relaxing the MCSs in the future (Figure 1). In Edgeware, which is in a growing phase, many people were recruited at top management level from mature companies, such as Nokia Siemens and Motorola, to formalize the MCSs more in the long run (Phelps et al.,2007). In 21Grams, even though they valued flexibility in order to be agile and to be able to grab market opportunities quickly before the big players reacted, the managers also claimed that more structure and control will be needed in the future, as the number of employees increases. Therefore, we think that in Edgeware and 21Grams the MCSs will most likely continue to increase, even when the companies enter the "maturity" stage, contrarily to what one would expect following Moores & Yuen´s (2001) model.

Postponing the adoption of more formal MCSs
Another trend we observed which better explains the development of MCSs is to postpone the adoption of more formal MCSs as much as possible. This is in line with Granlund & Taipaleenmäki (2005), who claim that high-tech firms want to push MCSs as far ahead into the future as possible, in order to not take resources from activities such as R&D and expansion. This was especially evident in Edgeware.
"*When you start a company like this you need people who can innovate, you don´t care about KPI:s, [...] but then of course, at some point you become more and more a regular company, a company that is not innovating that much and has a run-rate business, that you need to take care and fine-tune. I would say we are not there yet, but quite far on that path*"(Joachim Roos, CEO, Edgeware).

So we would conclude that Granlund & Taipaleenmäki´s (2005, p. 42) description of the development of a company's MCSs as "*a set of winding trails, shortcuts and wrong tracks*" is more appropriate to growing high-tech companies, than Moores & Yuen´s (2001) linear trajectory.

5.2 Linkage between the development of MCSs and specific change processes.

When comparing Edgeware and 21Grams we were able to see some patterns that characterized the change processes and the changes in MCSs.
As mentioned earlier, the development of the companies did not follow a single change process, but a mixture of Van de Ven & Poole´s (1995) four ideal change processes.

Life-cycle change: We observed that life-cycle processes were related to some imminent changes that basically every company must go through. The most prominent in our cases was the *financing*, a start-up cannot evolve without financing, and most often the founders need external help from business angels, VCs or other sources. Both companies knew that the VC financing and their exit would be part of the journey, so those events could be predicted beforehand, as they followed a sequential pattern and the outcome built on previous stages, typical characteristics of life-cycle theory.
Teleological change: We observed that this type of change process played a substantial role in the early stages of the development of the companies. Start-ups often emerge with just an idea and a goal, and until the product reaches the market, changes mostly come from within the company (single entity). Moreover, the outcome of this change is constructive, meaning that it is unexpected, since the company need to adapt the initial goals to the market response. The teleological change processes also appeared in the later phases of Edgeware and 21Grams, as the goals of the companies changed, but their role never became as dominant as in the early phases.

Dialectical change: We observed that this type of change had a minor role in first phase, but as the companies created relationships with other actors they ended up in conflicts that lead to outcomes of a constructive mode. For example, Edgeware´s early relationships with a few big customers lead to an abrupt break with Ericsson and a change in strategy; 21Grams' relationships with national authorities lead to a brusque change in strategy and the withdrawal from the UK. Dialectical changes appeared also in the later stages, but it is in the early growing stages where these changes were most apparent and the companies were most vulnerable to these types of clashes.
Evolutionary change: We observed that in contrast to life-cycle changes which appeared at few points in time, the evolutionary changes emerged almost in all the phases in the two companies. The evolutionary changes were subtle, but over time they significantly affected the companies. For example, 21Grams´shift into digitalization did not occur over night, but little by little the focus began to turn from postal to digital and from being a 100% postal company it is now divided into two different business units, postal and digital.

MCSs: All the different types of change processes and the triggering events changed the MCSs in the companies to a varying extent.
Results control: This type of controls were essential in the early phases of the company and we see that they have been used especially to measure the progress in the teleological change processes. Likewise, results controls were also increased by the initiative of the external financiers, both for reporting, but also to prepare the company to be acquired in the future.
Action control: we noticed, as earlier literature expected (Haustein et al., 2014), that action controls are kept low in highly innovative companies. In both companies there was constant dialectical struggle between keeping the company flexible on one hand, but on the other hand increasing action controls for efficiency. This struggle was evident in Edgeware, when it shifted to the Agile development process to improve efficiency, and had to impose more action control, at the expense of losing some of the R&D work force.
Personnel control: this form of control, as previously stated, was used by both companies in the recruitment of new employees to bring more structure into the company and to adapt to external events. 21Grams changed management team because the company was growing and needed people who were able to have broader roles in order to react faster; Edgeware also recruited new people and formalized their role, especially in the IPO process, when more control was needed.
Cultural control: we argue that this type of control links more to life-cycle processes with regards to the number of employees in the company. Edgeware's "family feeling" was diluted as more people were recruited, specifically from larger and more formalized companies; in 21Grams the management predicted that the company will need to formalize the cultural control with code of conducts, when more employees are hired.

Figure 2 displays some distinguishable patterns in the change processes that dominated the development of Edgeware and 21Grams. At the start teleological change was dominant, as the goal of the company was formulated. However, as the companies started dealing with external actors, some conflicts emerged and gave rise to dialectical change processes. Life-cycle change appeared at some distinct points, especially the financing process, while evolutionary change was present in the background most of the time, affecting the strategic direction of the companies. This had in turn effects on the development of the MCSs, as these evolved gradually during life-cycle- and evolutionary change and more abruptly during teleological- and dialectical change as shown in Figure 2.

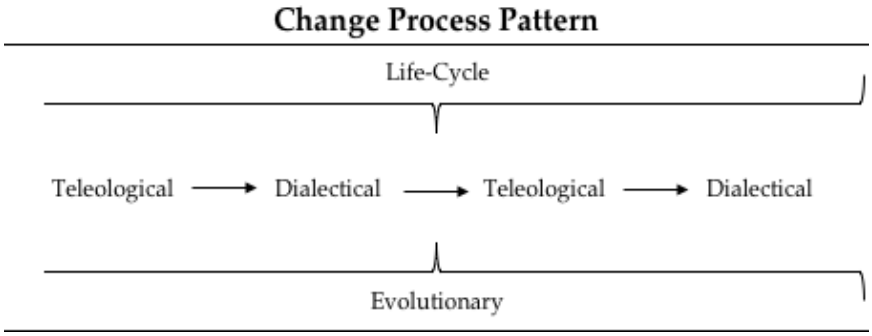

Figure 2: Change process Pattern

These patterns in change processes lead to different outcomes in the development of MCSs. When the "modes of change" were prescribed (life-cycle and evolutionary) the MCSs changed in a smoother way. The companies perceived that some changes were needed sooner or later. They both knew that in order to receive external financing they needed to create a business plan and report the results in the future. 21Grams was also conscious that the postal market was moving into digital services, so it adapted smoothly by changing the organizational structure. Whereas when the “modes of change” were constructive (teleological and dialectical) the MCSs changed in a drastic way. For example, when the deregulation of postal markets did not happen, the company had to quickly change its strategy by withdrawing from the UK, and consequently change its MCSs. Also, when the VCs needed to exit, both Edgeware and 21Grams knew that they needed to find new financiers, but they were not sure if they were going to be acquired by a private company, a PE or go to the stock market. Especially for Edgeware, the IPO resulted in drastic changes in the MCSs as shown in the bottom-left part of Figure 3.

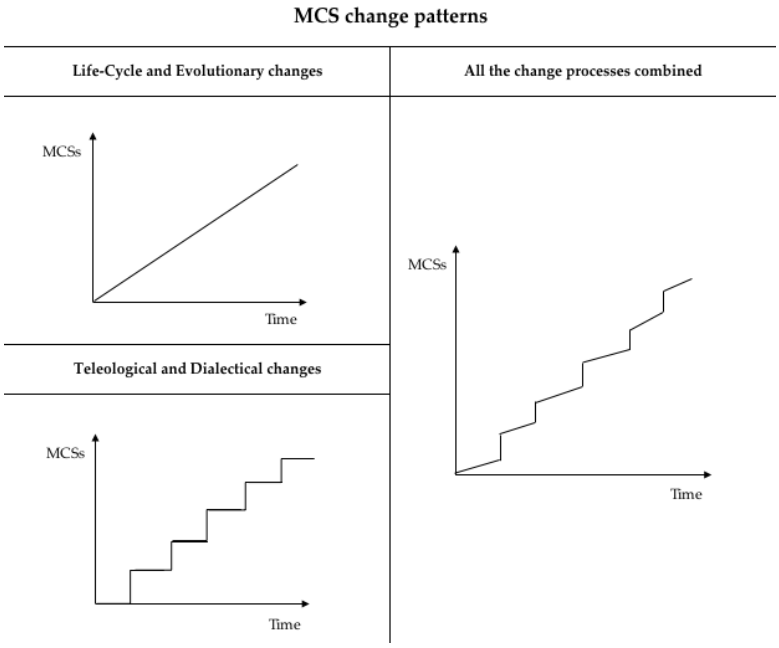

Figure 3: MCSs development pattern

The aim of our models (Figure 2 & 3) is to make some analytical generalizations of how Van de Ven & Poole´s (1995) change theories lead to the development of MCSs in our growing high-tech companies. The industry in which a company operates does of course affect the development process and what tipping points the company will encounter. However, even though Edgeware and 21Grams operate in different industries, we could still observe similarities in the change processes. As can be observed in Figure 3, life-cycle- and evolutionary change processes lead to a linear increase in the formalization of MCSs, whereas dialectical and teleological change processes lead to more abrupt increases. These four processes combined lead to a steadily and stepwise increasing development of MCSs. The model could be elaborated on a more specific level in regards to both industry and time period and it could also be extended to include later stages in the life of the company, all the way to decline and death. Additionally, we are not completely rejecting the usefulness of life-cycle theory to explain changes in MCSs, but we claim its role is much smaller than what was previously stated, especially in high-tech companies. Nevertheless, we hope this model could be used as a starting point for research that trace the development of MCSs in growing high-tech firms and attempt to elaborate more advanced models that can be generalized to a broader range of companies.

MCSs as a motor of change

After having analyzed the patterns of changes and the subsequent development of MCSs, we have then tried to understand whether the MCSs have always been a reaction to the main change processes or whether they were also used as motors for future changes.

Since they had limited financial resources to put in MCSs, Edgeware and 21Grams seemed to prefer to change their MCSs in a reactive way rather than proactively.
However, especially when pushed by external actors, such as customers or external financiers, MCSs have been used as motors of change to proactively prepare the company to have sufficient structures to handle future growth in sales.
The main example was the due diligence process required for Ericsson's acquisition: when Edgeware went through Ericsson's due diligence process, the formalization of MCSs increased drastically, and that was fortunate, since as the previous CFO pointed out "*It it is impossible for the company to know when the scale is coming. One day is there and then if you are not ready you just die. So you need to prepare*" (Helena Holmgren, previous CFO, Edgeware).
So, even if the general trend in these high-tech companies is to push the formalization of MCSs as far as possible in the future and to employ all possible resources to grow, it has been crucial for Edgeware to have all the structures in place before the market was there. When the market was ready, the company could solely focus on grabbing market opportunities.
Also the IPO-readiness process that 21Grams went through can be considered as a motor of change, and it was actually at Priveq's initiative. The IPO-readiness process included the adoption of IFRS and it aimed at preparing 21Grams for the future exit of Priveq. Most likely 21Grams will go public or will acquired by a bigger multinational company. In any case, with the structures in place, 21Grams will have the opportunities to focus only on growth and taking market shares.

5.3 Managerial implications

To assess the point in time when a company exits one life-cycle stage and enters the next is very hard in retrospect, and for a manager working in the company every day it is even harder. Therefore, it does not make much sense for the management to design the MCSs based on life-cycle stages, if it is not even possible to accurately assess in which stage the company is. Rather, we adhere to Phelps et al´s. (2007) reasoning that the key for management is to obtain as much knowledge as possible about the kind of tipping points the company may encounter. So, when the company encounters these tipping points, the management knows which actions to take and how to navigate the company through these critical points in time, designing the MCSs accordingly. Two of those tipping points were the strategic changes, that came as a consequence of international regulations for 21Grams and the dependence on big customers for Edgeware. After these tipping points, the companies learned to safeguarded themselves against similar tipping points in the future. 21Grams became more careful in their expansion by focusing on the Nordics, while Edgeware broadened their customer network with smaller customer. To conclude, we argue, that to timely design the MCSs in high-

tech company, it is more useful for the management to forecast potential problems, for example with large customer dependence or a VC exit, than to know in which phase of the life-cycle the company is in. By introducing Van de Ven & Poole´s (1995) four ideal models of change in our study, we showed that for management the development of a growing company is far more complex than a few life-cycle stages.

6 Conclusion

The aim of this study is to contribute to the research on the development of MCSs in growing high-tech firms, by showing the inappropriateness of life-cycle theory to describe the development of MCSs, while proposing another framework.

The development process of MCSs has earlier been associated with life-cycle theory, but we show that fast-moving high-tech companies are different from traditional manufacturing companies in how they develop MCSs.
In fact, high-tech companies develop their MCSs differently from what the previous life-cycle literature has stated (Moores & Yuen, 2001; Cassia et al., 2005; Silvola, 2008) for three main reasons.
First, life-cycle theory assume that MCSs are developed linearly over the life of the company and that the company moves in a predetermined order from one life-cycle stage to the next (Moore & Yuen, 2001). Instead, we saw that the MCSs development is irregular and affected by different events that the company faces.
Second, we could not clearly identify distinct life-cycle stages, as the ones described by Miller & Friesen (1984). Rather, we believe that "tipping points", as described by Phelps et al. (2007), which are events such as financing or strategic changes, better illustrated the development of the companies, even if these did not occur at the same time in the two companies.
Third, we saw that factors, such as the founder and the industry, had big effects of the development of MCSs in the companies, and the rigidness of a life-cycle model would not have enabled us to describe the heterogeneous development of MCSs in our two high-tech companies.
Since our standpoint throughout the study has been that the change processes explaining the development of MCSs are far more complex than just a sequential life-cycle model with several stages, we have introduced Van de Ven & Poole´s (1995) different theories of change. With our contrasting case study on two high-tech companies, Edgeware and 21Grams, we have answered the following research question: *How can we improve our understanding of the development of MCSs in growing high-tech companies by expanding beyond life-cycle theory?*

Mapping the change processes, described by Van de Ven & Poole (1995), characterized by different modes of change (*prescribed* and *constructive*) and units of change (*single* and *multiple*), has enabled a better understanding of the "*time-to-adoption*" and the "*reason-for-adoption*" (Davila et al., 2009, p. 328) of MCSs in high-tech firms. These kind of companies operate in highly uncertain environments, where the outcomes of the change processes are characterized by *constructive* mode of change, which means that they are hard to predict and depend on the market response. Moreover they are strongly influenced by external entities such as VCs, customers or national regulations (multiple units of change).
Common for both companies was that all four of Van de Ven & Poole´s change processes (life-cycle-, evolutionary-, teleological- and dialectical change) appeared during our observation period and affected the MCSs in various ways. We observed that the *life-cycle-* and *evolutionary* change processes, which have predictable outcomes, lead to a smoother increase in MCSs over time, this was because the changes were not sudden and the companies could proactively plan the MCSs to meet future demands, such as a planned expansion and requirements from external financiers. *Life-cycle* changes appeared at some specific points essential to all growing companies, such as financing and division of functions. *Evolutionary* changes were present in the background almost during the whole life of the companies, and it produced small changes continuously that eventually shaped the entire development of the companies, such as regular competition and shifting trends in the market. In contrast, *teleological-* and *dialectical* changes which have unpredictable outcomes produced abrupt changes in the MCSs. Examples of this was a change in strategy/goal and conflicts with customers or regulatory authorities. When these changes occurred the companies had very little time to adjust their MCSs to meet the new sudden pressures, therefore the companies had to change their MCSs quickly in a reactive way. *Teleological* change which related to goal formulation, was most important in the early years for both companies as they set their main goal and strategy during this time. *Dialectical* change which related to conflicts appeared mostly some years after the *teleological* change as the companies created relationships with various parties that sometimes lead to conflicts. We created two figures (Figure 2 and Figure 3) that show these patterns, Figure 2 shows the presence of the different change processes throughout the life of the companies, while Figure 3 shows the effects that these change processes had on the MCSs development.

By dissecting the processes that lead to a change in MCSs, we have showed that life-cycle theory is merely one out of four types of change processes present in the development of MCSs. Hence, it is not meaningful for high-tech companies to base their MCSs solely on which life-cycle stage the company is, rather, since few companies follow a linear path, all types of change processes that may appear along the way have to be taken into account. Once again, we wish to highlight the complexity in the development

of high-tech companies, since just in our two cases we saw a diaspora of different challenges such as VC exits, an IPO process, customer dependence, conflicts with regulatory bodies, reformulation of strategy. All these challenges are too disparate to be accommodated within the stiff life-cycle model, whereby we argue for a broader framework that incorporates more types of change processes to explain development of MCSs in high-tech companies.

We then agreed with Granlund & Taipaleenmäki´s (2005, p.42) description of the development of MCSs as "*a set of winding trails, shortcuts and wrong tracks*", for three main reasons. First, sometimes the MCSs were developed in a reactive way due to requirements from the stock market and sometimes in a proactive way to foster the future growth of the companies. Second, the companies did not prepare their MCSs for the next stage in the life-cycle, but more to crises and "tipping points" (Phelps et al., 2007). Third, the founders were often reluctant to increase the MCSs, since this would make the company less flexible and it would take resources from other important activities, such as R&D and expansion. This confirms Granlund & Taipaleenmäki´s (2005) claim that high-tech companies want to "push" MCSs as far into the future as possible.

7 Limitations and suggestions for further research.

Our longitudinal dual case study, is naturally subject to a number of limitations and boundary conditions, typical of every case-study.
First, we cannot generalize our findings, since we are limited to two cases. However, we strive for a better understanding on the development of MCSs in growing high-tech companies, since as Miles & Huberman (1994, p.253) pointed out "*the hallmark of qualitative research is that it goes beyond how much there is of something to tell us about its essential quantiles*".
Second, although we have classified our study as longitudinal (Langley, 1999), since we have used the empirics collected ten years ago by Thiel & Widerström (2007), we have not conducted the interviews over the life of the two companies. Therefore, there is the risk that exact dates and lapse of time periods of past years were blurry for the participants interviewed. To cope with this and to verify the dates of key events we asked multiple participants similar questions.
Third, since we have only analyzed the first 13 years of the companies' lives and they have not yet fully matured, we can only draw conclusions on how the change processes affect the development of MCSs up to this point.

Fourth, as mentioned earlier, life-cycle research has not been able to agree on one model, which has resulted in dozens of models with a different number of stages. Even though we have tried to avoid to divide the life of our two case company into life-cycle stages we are still referring from time to time to growth stage and maturity stage. This can be seen as a paradox, thereby we cannot omit the life-cycle model entirely when describing change and the development of MCSs, but we give it a less important role compared to earlier life-cycle research.
Lastly, it would have been optimal to have also analyzed the development of an additional growing high-tech company that did not survive and observe the events related to a crisis situation that could not be solved, this means that we could not draw any conclusions what change process and MCSs development that occurs in unsuccessful scenarios.

Our findings also open up several suggestions for future research.
We have laid the foundation to a new way of structuring and looking at what change processes affect the MCSs in high-tech companies, and we created a model that shows these patterns. We developed our model studying growing companies in early stages, but it can be elaborated further, since there are many factors that we did not encounter in our cases. For example: "How is the development of MCSs in a high-tech company affected by other sources of external financing than VC? or, What dialectical tensions affecting MCSs would emerge if the founding CEO was removed?".
By conducting more longitudinal case studies, the effect of other different kinds of factors would be covered, leading to a more complete picture on how the different change processes actually affect the development of MCSs.
We have studied the start- and growing phases of Edgeware and 21Grams and we saw that the formalization of MCSs increased over time. Differently to Moores and Yuen´s (2001) study, we actually expect the MCSs to increase even in the following years, that Moores and Yuen (2001) would classify as part of the maturity phase. Indeed, it would be interesting to examine the *entire life* of a high-tech company, to see which change processes dominate in the later phases and whether MCSs keep increasing or if they will decline.
Furthermore, as we have mentioned before, Edgeware and 21Grams are both *success stories* and this affected the level of supervision they received from the VCs, since less supervision and controls from the VCs are a direct consequence of good results, as Stefan Blomqvist, CEO of 21Grams, has also mentioned. Hence, it would be interesting to see cases of less successful high-tech companies and observe whether more dialectical tensions would arise between the VCs and the firm, and which kind of actions the VCs would take to bring an unsuccessful company back on track.
Finally, as we have stated before: change is complex, and the four ideal theories of change often intermingle and mix, so Van de Ven & Poole´s (1995) change theories offer more

possibilities to combine the four change theories and examine which combinations would cause the greatest shift in MCSs.

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9 Appendix

Interviews List

Interview Numbe	Title	Name	Lenght (minutes)	Company
1	CEO	Stefan Blomqvist	92	21Grams
2	CEO	Joachim Roos	60	Edgeware
3	CFO	Daniel Thoresson	74	21Grams
4	CFO & Financial Controller	Steeve Fuhr & Annika Norin	94	Edgeware
5	Business Development VP	Kaj Pettersson	99	21Grams
6	CTO	Markus Fredholm	36	21Grams
7	Product VP	Johan Bolin	62	Edgeware
8	PE Partner	Henrik Jatko	50	Priveq-21Grams
9	Previous CFO	Helena Holmgren	62	Pricer-Edgeware
10	VC Partner	Gunnar Fernström	40	Innovationskapital-21Grams
11	VC Partner	Staffan Helgesson	30	Creandum-Edgeware
12	Customer Implementation VP	Anders Lindèn	47	21Grams
13	Operations VP	Magnus larsson	55	Edgeware
14	Previous CTO	Göran Appelquist	50	Crosser Technology-Edgeware
15	VC Partner	Martin Falkevall	47	Innovationskapital-21Grams
16	R&D VP	Anders Westin	54	Edgeware
17	CEO	Stefan Blomqvist	54	21Grams
18	CEO	Joachim Roos	76	Edgeware
Total Length			**18**	**hours**
Average Length			**60**	**minutes**

Table 6: Interviews List

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