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MANAGEMENT CONTROL SYSTEMS IN THE INTERNET-ENABLED BUSINESS MODELS

A Case-study on control dynamics:
unravelling the interplay within an open-
source business model and its ecosystem

Anne Saarinen



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ABSTRACT

This study builds on two concepts: management control (MC) and Internet-enabled business model (IEBM). MC is a wide set of formal or informal mechanisms that the management has implemented for aligning people's behaviour towards the set organisational goals and answering to control needs that arise from the business environment. In this study, the focus is on a business model context-driven set of controls. Unlike in the discussion of MC as a system is typical, I use the word system to describe such management control that is implemented by the company management for aligning employees' behaviour towards the strategic targets. In the IEBM, the Internet is crucial infrastructure and enabler for existence. The choice of technology made by company management divides IEBMs into utilisers of paid and free technology. Value creation and capture can only realise by acting as part of an ecosystem of the same technology users. Technology, the ecosystem, value creation mechanisms, and innovation are the central attributes that describe IEBMs. Those significantly affect the design of MCS as well. However, whilst the MCS literature has concentrated on strategic features of innovation and development, the IEBM level of decisions and the MCS package designed because of them, has not yet been explored much in the MCS literature. The case company of this interpretive study is a free technology software developer for system coders globally. This study contributes to our existing knowledge by showing that the MCS package design is two-fold: MCS for the behavioural control within the organisation, and MCS for the external actors in the ecosystem. Further, the MCS package for the organisation is designed around three main control questions: ensuring value creation and capture, diminishing risks, and enabling of innovation. In addition, the package has another layer, where IEBM control systems aim in the direction of external actors, the ecosystem. That layer builds on a strong organisational culture, some very labelling activity, an anchor/core practice, and also on such social, technical, economic, and institutional minimal structures, which provide governance but allow considerable independence at the same. Those structures govern the ecosystem and the IEBM reciprocally.

KEYWORDS: Management Control Systems, MCS, anchor practice, ecosystem control, minimal structures, Internet-enabled business model, open-source business model

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TIIVISTELMÄ

Tässä tutkimuksessa tarkastelen yrityksen ohjausjärjestelmiä (management control, MC) Internet-pohjaisen liiketoimintamallin (Internet-enabled business model, IEBM) johtamisessa. Ohjausjärjestelmät ovat virallisia tai epävirallisia käytänteitä, jotka yritysjohto on käyttöönottonut. Niiden tarkoituksena on edistää määriteltyjen tavoitteiden saavuttamista ohjaamalla ja yhtenäistämällä työntekijöiden käyttäytymistä organisaatiossa. Tässä tutkimuksessa käsittelen ohjausjärjestelmiä ensisijaisesti Internet-liiketoimintamallin näkökulmasta. Käytän sanaa järjestelmä (system) kuvaamaan sellaista ohjausta, joka on yrityksen johdon toteuttamaa, ohjaa työntekijöiden käyttäytymistä, ja joka ohjaa kohti organisaation strategisia tavoitteita. Internet-pohjaisella liiketoimintamallilla tarkoitan liiketoimintamallia, jossa Internet on elinehto. Yritysjohto voi valita maksullisen tai maksuttoman teknologian käytön liiketoimintamalliinsa. Teknologia on avainasemassa, ja arvonluonti onnistuu vain toimimalla osana samaa teknologiaa käyttävien toimijoiden ekosysteemiä. Teknologia ja sen mukanaan tuoma ekosysteemi, arvonluonnin mekanismit, sekä innovatiivisten tuotteiden ja palveluiden kehittäminen ovat IEBM’ien keskeisimpiä piirteitä. Nämä vaikuttavat oleellisesti ohjausjärjestelmien kokonaisuuteen (MCS package), mutta tätä yhteyttä ei ole MC-kirjallisuudessa juurikaan tutkittu. Tämän tulkitsevan tutkimuksen tapausyritys käyttää maksutonta teknologiaa kehittäessään ohjelmistotuotteita maailman järjestelmäkoodareille. Tutkimus osoittaa, että ohjausjärjestelmien paketissa on kahden tasoisia järjestelmiä, käyttäytymistä organisaation sisällä ohjaavia sekä ekosysteemin ohjausta tavoittelevia. Organisaation sisäistä käyttäytymistä ohjaavat järjestelmät keskittyvät kolmeen ohjaustarpeeseen: arvonluontiin, riskien pienentämiseen ja innovaatioiden mahdollistamiseen. Ekosysteemin toimijoihin, eli yrityksen rajojen ulkopuolelle, suuntautuva ohjaus rakentuu vahvalle organisaatiokulttuurille. Lisäksi ankkuri-/ydinkäytäntö liittyy organisaation koko toiminnan tiiviisti ympäristöönsä. Sosiaaliset, tekniset, taloudelliset ja institutionaaliset minimaaliset rakenteet, jotka toisaalta ohjaavat, mutta samalla sallivat laajan itsenäisen toiminnan, luovat vastavuoroisen ohjausjärjestelmän liiketoimintamallin ja ekosysteemin välille.

AVAINSANAT: johdon ohjausjärjestelmät, MCS, ekosysteemin ohjaus, vähimmäisrakenteet, Internet-pohjaiset liiketoimintamallit, avoimen lähdekoodin liiketoimintamalli

Tunnustus niille, joille tunnustus kuuluu

Elämäni ensimmäinen väitöskirja on valmis. Vaikka edesmenneen kirjailija Sinikka Nopolan sanoin ”ei tehrä tästä ny mitään numeroo”, on kuitenkin aika mittailta mennyttä ja palata pitkän prosessin parhaisiin hetkiin. Kymmenen vuotta sitten, kesäkuussa 2013, vastaanottaessani jatko-opiskelupaikan Turun Kauppakorkeakoulussa, en tiennyt mitään tutkimusmatkasta tieteen maisemiin. Minulla oli aavistus suunnasta ja määränpäästä, mutta ei tarkkoja koordinaatteja, saati ymmärrystä siitä, milloin tulisin perille. Sen tiesin, että matka tulee olemaan pitkä. Alussa kaikki vastaantuleva oli uutta ja täysin erilaista, ehkä vähän pelottavaakin. Etenin hitaasti välillä pysähdellen, mutta huomasin pian, ettei mitään hätää olekaan: ympärillä on ihmisiä ja auttajia kaiken aikaa.

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Salossa 20.4.2023

Anne Saarinen

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1 Introduction

1.1 Motivation for the study

The question of how to arrange management control (MC) activities in organisations has interested researchers for several decades. It has been discovered and proved many times in earlier research that such arrangements depend on the company's strategic context, but as I will show in this dissertation, the context of the selected business model also influences management control.

MC is a wide set of formal or informal mechanisms in an organisation that the management implements in order to alter employee's behaviour towards the company's targets (Chenhall, 2003; Ferreira & Otley, 2009; Merchant & Otley, 2007). Although the long tradition of MC studies has created varying definitions for what constitutes MC, there is a broad consensus today that management control activities in a company need to be studied as a whole, taking into account how they work as an overall package (Abernethy & Brownell, 1997; Chenhall, 2003; Malmi & Brown, 2008). The MC package discussion has divided opinions into at least two branches: one that emphasises the relationship between the controls and their environment (Müller-Stewens et al., 2020; Widener, 2007) and one that places more stress on the interrelationships between the control systems (Grabner & Moers, 2013). Before considering any system to be part of the package, some researchers have also required that MC exhibits continuation, repetition, and active management of the control system (Ferreira & Otley, 2009; Malmi & Brown, 2008; Zimmerman, 2001). In this study, the focus of my approach is a context-driven set of controls. However, I will also describe the inter-connections between the controls where relevant. In contrast to the discussions on MC as a system, I use the term 'management control system' (MCS) to describe those management controls implemented by the management and that include continuation in use, have become an established practice, involve a complete process with an obvious purpose of promoting the strategic target reach.

Parallel with the decades of interest in management control, the development of fast data networks has enabled new ways of conducting businesses. Value creation and capture are at the core of all business models (Amit & Zott, 2001; Aspara & Tikkanen, 2013; Gordijn & Akkermans, 2001), but in some models only the

existence of the Internet enables the value proposal. An Internet-enabled business model (IEBM) is a type of business model in which the Internet plays a crucial role as an infrastructure, application provider, intermediary or as a context provider (Mahadevan, 2000). This study builds on these two concepts: management control (MC), and an Internet-enabled business model (IEBM).

A technological choice of the IEBM determines the need for a paid licence or an open-source licence, which choice has an impact on the ways of building a value proposal (August et al., 2021). The value proposal of a company can only be realised in an interaction within a set of multilateral actors, i.e., within an ecosystem (Adner, 2017). One of the actors within the ecosystem is an open-source community. The community comprises all users of the same technological solution and according to the open-source principles, that community also shares development work for the benefit of all members (<https://www.fsf.org/>, n.d.). This means that the IEBM value creation and capture only succeed in terms of the community. I explore the MC package in a case company, which utilises the open-source technology of Google Inc., and therefore belongs to the Google ecosystem. Its' value proposal realises in alignment with other members of that ecosystem.

After setting the strategic targets, a company's management will make several decisions on formulating the business model for the company. Examples of such decisions are a technology selection and an overall business architecture, i.e., the selection of business partners (Casadesus-Masanell & Ricart, 2010; Gordijn & Akkermans, 2001; Osterwalder, 2004; Shafer et al., 2005). These decisions lead to a certain ecosystem and to some given structures which affect the design of the control systems and may directly alter the behaviour of employees in the company that operate the business model. This context of IEBMs has been mostly ignored in the current MCS package discussion.

Earlier MC research concentrated on such strategic premises as control in the context of innovation and product development (Feeney & Pierce, 2018; Henri & Wouters, 2020; Müller-Stewens et al., 2020; Ylinen & Gullkvist, 2014). The environment of innovative new product development, of course, applies in IEBMs, but like the case of this study shows, the business model level decisions need to be recognised entirely as different requirements in MCS design. The case company's strategy is to develop high-quality software products that accelerate system developers globally as much as possible in a market created by the development of the Internet. The difference between the strategy and the business model can be seen in the decisions made after the locking of the strategic intent. The case company management has developed and changed its business model during the years it has operated but has not changed its strategic targets. In the early years of operation, they helped customers in their web development projects with quite specific coding and only limited re-usability of the solution. The earning logic was similar to any

hour-based service business nowadays. With no change to the original strategy of helping with web development, they selected a different technological approach and a different earning logic with their own exploitable set of software code. From several technological alternatives, they selected the open-source code of Google Inc., which brought with it a world-class technology ecosystem, an open-source community, and a completely new way of doing business. The strategy remained the same, but the business model changed.

Uncertainty relates very much to the choices made by the management of the IEBM. Operating as a part of an ecosystem increases external uncertainty because the influential actors are not in the company's control, but nevertheless their coming actions have to be anticipated. Usually, the technology selection is so profound, and the supplier is so dominant that there is virtually no alternative plan. Risks cannot be reduced by expanding the supplier field or making backup plans in case the chosen technology fails. It is also possible that the giant technology provider might make decisions fatal to some business models in order to enhance its own business possibilities. Constant vigilance and observation of what is happening in the ecosystem compel the management of the business model to develop systematic ways of managing this uncertainty. The case provides examples of metrics as well as other MCS practices, which clearly indicate the need and wish to diminish the business model uncertainty, while at the same time ensuring constant value creation and proper capture.

The use of measuring and/or accounting controls have received much attention in studies on 'traditional' business environments, such as in operational management (Wouters, 2009), in innovative environments (Ylinen & Gullkvist, 2014), and in highly decentralised organisational set-up (O'Grady, 2019), however, studies on metrics in IEBMs control of value capture are rare. In this study, I present a set measures which combine monetary values with non-monetary values, the hybrid measures, which are used to ensure value creation and capture (Amit & Zott, 2001). The case company management defined the content of the measures as well as the systematic processes, including activities of planning, follow-up, and reporting in the monthly management meetings. Discussions on the measures led to some necessary decisions and changes in behaviour with the purpose of promoting customer value, i.e., the value found within the open-source community. The studies of organisational practices as MCS have found them in mediating, aligning, and enabling roles in product development (Akroyd et al., 2016; Biswas & Akroyd, 2016), and in the role of an organisation's anchor practice, which labels the functioning of the whole organisation (Ahrens, 2018). In the case of this study, I will show how the practice of community discussions not only anchor, i.e., promote development activities, but also reach out to control the behaviour of external actors.

The fact that the ecosystem and the community are external to the firm, but inside the business model structures, is particularly noteworthy. Contemporary way of operating and conducting business is increasingly centred around the networking of organisations, collaborative partnerships, and ecosystems (Caglio & Ditillo, 2021). This has also given rise to a new branch of research within the field of management controls, focusing on inter-organisational control questions. Within this expansive field of research, there are several sub-areas that clarify and even explain some phenomena in MCS package studies. In the analysis, I present a few angles from research on inter-organisational control and apply them to MCS package research, as I detect connections between inter-organisational control and initiatives towards ecosystem control. Earlier studies have examined this collaboration and control in supply chains (Beuren & Dal Vesco, 2021), in procurement (Agndal & Nilsson, 2010), but also in product development, where it means revealing of innovations and even trade secrets between collaborators (van der Meer-Kooistra & Scapens, 2015). This has brought a new challenge to MC, because usually the behavioural impact can be directed only to employees within one legal unit. The members of the open-source community are conducting joint development work. As mentioned earlier, much of the development work and solutions are shared among the community. The situation is comparable to a large product development project, where everyone brings one solution to an extensive list of development objects. However, within the community, there can be actors following very different, even contradictory, overall strategies. This might mean quite a diverse prioritisation list for product development, which again requires strict management and orchestrating from the case company. The study of van der Meer-Kooistra & Scapens (2008) on control in lateral relations suggests that social, technical, institutional, and economic structures provide strong governance in the lateral relations, where none of actors have officially power over others. (van der Meer-Kooistra & Scapens, 2008). Minimal structures refer to formal or informal practices that, in the hands of the parties involved, develop into guiding and even relatively strong control systems. An example of a social minimal structure could be regular meetings among the parties. As Van der Meer-Kooistra & Scapens (2008) assumed the lateral parties mutually accepted and somehow agreed to the co-operation, even secured the continuation of relations. In the IEBM context, lateral parties are not all aware of or mutually agree with the need for lateral control, yet the minimal structures work in that context, too. I will indicate how the IEBM itself creates all four types of structures and can control the external parts of the ecosystem through them.

The business model as a separate research object divides opinions among researchers, and they are encouraged to take a clear position on the nature of business models (Prescott & Filatotchev, 2021). Those few who have studied

management control in connection with a business model did it at a rather high level of investigation (Globocnik et al., 2020) or without separating the strategy from the business model (Aaltola, 2018). In this study, I recognise and point out the difference between the strategic level of decisions and the business model level of decisions, suggesting that both levels have their own, and at least partially independent, influence on the content and use of the MCS package. The current debate on MCS overlooks the specifics of the IEBMs and leaves the details of the MCS package design unexplored. This study endeavours to answer these gaps.

1.2 Purpose of the study

This study examines the details of the MCS package in the IEBM context. The study identifies the specifics in the management control of an IEBM and how these differ compared to a traditional business model. The purpose of the study is to unpack the MCS package, describe the control systems it encompasses, and integrate each control system into IEBM-level decision-making. This helps to understand the reasons why the IEBM's MCS package is designed the way it is, which in turn facilitates future MCS package designers. Understanding the IEBM context draws attention to those drivers that are essential for the earnings of IEBM. With this knowledge, in practice, IEBM management can design and balance an MCS package in order to reach their business targets.

Most of the earlier MC literature has concentrated on the strategic context, such as uncertainty, which rises from the innovation strategy. The study of Ylinen & Gullkvist (2014) explored the effects of different forms of control in innovation and via this control to project performance in development organisations. Their study suggests that the measures, or mechanistic controls as they call them, are needed to complement the informal, less structured forms of controls (Ylinen & Gullkvist, 2014). They emphasised the interaction between the mechanistic and non-mechanistic controls, and the positive impact on performance. In radical innovation, especially, the interaction between the control types was found meaningful. In less radical projects, the measures complemented the informal controls, but they had less impact on performance. O'Grady (2019) studied formal controls in a highly decentralised organisational set-up, where managerial autonomy was important as was flexibility towards contingencies. She discovered that creating internal and global transparency throughout the processes of performance measuring and internal practices increased the sense of flexibility and ability to influence. She again found this enabling for business managers when running daily activities (O'Grady, 2019). In this study, I will demonstrate that the role of the measuring systems is

connected to the business model level of decision-making that controls value creation and capture. Only the MCSs that accurately target the value creation process, regardless of whether the process activities are external or internal to the legal company, ensure that business model level decisions meet the strategic targets.

Akroyd et al. (2016) and later Ahrens (2018) explored organisational practices as control systems, finding some of them very profound, not only for the MCS package but also for the whole business unit. While they control the behaviour, they are so deep a part of an organisation's functioning they even define its character (Ahrens, 2018; Akroyd et al., 2016). Akroyd et al. (2016) suggested the operational level strategic alignment as an explanation for such a profound practice, when Ahrens (2018) explains these practices with sociological reasons. According to him, the practices are for structuring and diminishing antagonism within the organisation. I add an ecosystem perspective to this organisational alignment and structuring. The MCS practice can be an essential bridge between the company and the independent actors. The practice brings control to the organisation's behaviour, but reciprocally impacts to the business model structures as well.

All the studies above discuss, at least at some level, controls as enablers for innovation rather than constrain, and as combined with an informal, value-based organisational culture, together forming an MCS package. Ylinen & Gullkvist (2014) explained the use of enabling controls with different information needs in projects; these needs were then answered with performance measures. The need for information is emphasised in IEBMs because movements in the ecosystem are so decisive. Developing anything new always requires a sense of what is reasonable to develop, but in an open-source business model where development is shared with the community, the reason is even more important. Well-designed formal controls link innovation and product development to the value creation process of a company. The interactivity that O'Grady (2019) describes in their use ensures that the controls are aligned with the business context, in my case with the IEBM. The alignment refers to the impact of controls on the IEBM, but also vice versa, the impact of the IEBM on the organisation. Although numerous researchers discuss the enabling role of controls in the package, I argue that in the IEBM's MCS package, they are more than enablers. I would equate them more with ensures or even essentialities that are needed for the ecosystem control, and which reflect the ecosystem back to the IEBM organisation.

For indicating the relationship between the IEBM and MCS and proceeding through the study, I have raised the following research questions:

1. How is the IEBM's MCS package designed and why?
2. How is the IEBM reflected in management control practices and vice versa?

The explanatory power of control theories improves when the contextual associations and control types are examined in more detail (Bedford & Malmi, 2015). To answer the research questions above, I prepare a detailed breakdown of the MCS package content. I also examine the concept of the IEBM in more detail, to find out what are characteristic features for IEBMs, the attributes that describe them, because investigating the business model with such details creates structural clarity supporting the idea of the business model as a separate structure from the strategy (Prescott & Filatotchev, 2021). I demonstrate how the management decisions, the architectural selections, form a business model and reveal the structures that require an MCS that stretches beyond a company border.

Van der Meer-Kooistra & Scapens (2008, 2015) discuss the control ability of economic, institutional, social, and technical structures in lateral relations where independent, but interdependent actors co-operate towards common goals. They define minimal structures as arrangements of knowledge sharing (and benefiting both parties in that sense) but giving room for suitable reactions of parties at the same, i.e. governing but flexible. In their study of co-operative product development, they found that the minimal structures bring firmness and flexibility to the projects, but they also suggested that these structures should be explored in all inter-organisational relations, in order to understand their governance (van der Meer-Kooistra & Scapens, 2015). I will analyse the relationship between the business model and ecosystem through the lenses of minimal structures and demonstrate their effectiveness as robust governance methods within the business model environment. In the investigation of van der Meer-Kooistra & Scapens (2015) independent parties formally agree to co-operate and are mutually aware of their lateral relationship. I suggest that the minimal structures can also function in an ecosystem where there are no official agreements between parties, but the structures are formed through the management decisions of the independent legal units and through actual operations of a business model. Explaining the causal mechanisms behind the setting improves the theory development of the management control combinations (Bedford, 2020). Management decisions, the IEBM structures, and ways of operating are exactly those causal mechanisms behind the MCS. They cause the control questions into which the balanced MCS package answers, they are the keys for explanation.

This study addresses the calls for further MCS studies in collaborative technology settings (Moll, 2015), business model innovation environments (Lill, Wald, & Munck, 2020) and controls in the business model organisation (Globocnik et al., 2020). First, it contributes to the MCS literature by adding the business model perspective, i.e., the value creation and capture role of formal measures and the core practice role for essential organisational practices in the package. This reveals the possibility of looking at IEBM as an inter-organisational control question. The

management of the company can use control systems for directly influencing the behaviour of employees, however, external actors need a different type of governance. Second, the study contributes to the MCS literature by demonstrating how the IEBM itself, without further agreements, creates minimal structures, which act as controls for the ecosystem.

The MCS practice level has a special meaning in this study. Design and implementation of the MCS are usually the responsibility of the company management in close co-operation with the business controller or other finance and control personnel. This study contributes also on the practice level of MCS design.

1.3 Methodological considerations and interpretative case study

All researchers make assumptions about their surrounding reality: what is there to be explored, how can this knowledge be obtained and is this a subjective view of reality or an objective observation? Objective realism assumes a perspective on reality that has no interference from an individual or a cognitive mind (Burrell & Morgan, 1979). In social sciences, the assumption is that a human mind distracts the surrounding reality. Theories and theory contributions are situational, context-driven, and their importance and meaning are determined by the other members of the scientific community (Locke & Golden-Biddle, 1997). Of course, the evaluation process also applies to this dissertation, giving the final meaning for the study. In this section, I briefly present the position of this dissertation in the philosophy of science, and the links to the scientific methods of rationale.

A context affiliation does not reverse objective realism but includes and enfolds both subjective and objective together (Kakkuri-Knuuttila et al., 2008). The ideas subjectively observed and individually processed may become objective through the consequences and influences which they have caused (Kakkuri-Knuuttila et al., 2008). Contextual linkage of theories allows a contradiction between previous research and empirical, real-life practice, which can lead to a change in previous theoretical statements — either the researcher's own previous observations or others (Locke, 2007). It is this contextual nature, a conflict, a mismatch, or some contradiction in the results of two studies, which provide an opportunity for new theorising (Shepherd & Suddaby, 2017).

This is an interpretative study recognising the subjective world view. The MCS and business model are abstract concepts, including a great deal of subjectivity. Every earlier study and each researcher have included their own subjective thoughts to these concepts, which are utilised here as such, but I have also added my own interpretation of reality. Boundaries of subjectivity, objectivity, abstract and concrete, are intertwined both in the concept of the business model and the MCS,

but also in processes related to the results of the study. The outcome of earlier research, similarities in definitions, parallel observations, and results, have become objective through their real-life consequences. I utilise them as attributes of the IEBM and link the earlier findings in the analyses of the IEBM MCS package.

Epistemological options are related to the sources of knowledge and to an understanding of what is regarded as ‘true’ or ‘false’ (Burrell & Morgan, 1979). Burrell & Morgan’s four paradigms — radical humanist, interpretive, radical structuralist, and functionalist — have been the main approaches to exploring social theory since their publication in 1979. Both the radical humanist and the interpretive paradigms assume the subjectivist ontology. The difference stands in an assumption of regulative change, which is quite implicit in the interpretive paradigm (Burrell & Morgan, 1979). The interpretive paradigm recognises a single result of a study as valuable knowledge for society, without a large mass of empirical data (Burrell & Morgan, 1979). In realism the world and knowledge are independent of human perception, and the knowledge can be acquired through sensibility and thinking (Niiniluoto, 1997). Interpretive approach is powerful with regard to the deep understanding of a single research case or a limited number of research cases (Berry & Otley, 2004; Lukka, 1991).

My research questions emphasise how the MCS is structured, and how they function. The aim is a deep understanding of the MCS design and the constituents of a balanced package in the IEBM context. The change opportunity to society is rather limited, but exists implicitly through the case, interpretation, and results that can apply to the design of MCS in practice. Wickert et al. (2021) emphasise that problem-driven or phenomenon-driven research is more impactful than theory-driven studies in society. It can increase the effectiveness of some organisations, and the impact can be achieved through careful listening to practitioners first and then by giving recommendations (Wickert et al., 2021). In this study, I aim for the link between the practical functionality and academic theorisation. Support for practice is greatly important to management and controllers when in the MCS set-up or re-build. Therefore, I am adding recommendations on the details they could consider when implementing the MCS.

Reliable and valid research has a better prospect of having an impact on society. The overall generalisation as well as the reliability and the validity have all raised criticism of the interpretive case studies in management accounting. The reason for the criticism is the evaluation criteria used for natural sciences, which criteria are not suitable for interpretative studies (Lukka & Modell, 2010). Obviously, the traditional, objective measuring techniques do not apply (Kakkuri-Knuuttila et al., 2008), but the criticisers miss the opportunities that a non-linear, intertwined type of research process offers (Dubois & Gadde, 2002). Validity and reliability are

obtained by constructing a valid path from the research questions to the results, a deep exploration of the subject, reliable materials, multiple methods, and authentic quotations (Mckinnon, 1988). Interpretive case research requires a wide theory background and proper connections to earlier studies, a thick case description, and good argumentation (Lukka & Modell, 2010), in addition, it also allows for the discovery of explanations that other research methods cannot find (Dubois & Gadde, 2002). There are a wide variety of alternative ways to conduct an interpretive case study. Ethnographic-derived practices are the method most often used, but the nature of interpretive research varies depending on how strongly the researcher intervenes in the case. The researcher may act only as an outside observer or as an active participant in the case (Jönsson & Lukka, 2007). This is a non-interventionist study where there is a minimum impact of the researcher on the case. I did not have any connection to the selected company other than of obtaining the research materials.

In response to the requirements of reliable and valid research, I have explored both the MCS and the business model literature widely. I have explained the validity of the research questions in chapter 1.1 and 1.2. The authentic quotations from all interviews form the main part of the narrative. I describe the case in detailed level, with disguised examples from the authentic materials of the company. The answers to the research questions are searched through interpretation of the case empirics, with support from the earlier literature, by an active, abductive process ¹, on which process I discuss more on the next chapter.

1.3.1 The process of abduction

Abductive reasoning searches for an explanation of surprising results which cannot be explained by the initial domain theory. The process differs from an induction or a deductive process because its searching of explanations is iterative: the search continues as long as the research questions and a plausible answers are consistent (Philipsen, 2017). Abduction is a method of ‘good guessing’, which can be a part of a deductive reasoning process as well, but it is considered beneficial especially in the theory-building of case studies in business research (Philipsen, 2017). By including all available, relevant information, and by allowing incompleteness and uncertainty, a researcher, through a cognitive process, selects an explanation that could be the most reasonable (Gabbay & Woods, 2005). Instead of only

¹ MOT ® Oxford dictionary of English: Originally in the writings of C. S. Peirce (of reasoning, etc.) characterised by a process of abduction. Peirce’s ‘process of abduction’ includes active judgement and ‘putting concepts together’ rather than just perceive.

concentrating on the reasoning, Philipsen (2017) describes abduction as a search strategy, covering the entire research process from discovering ‘peculiar anomalies’ in the empiric material to explanations and theory-building, where the abduction can appear at multiple points or at only one part of the process (Philipsen, 2017).

During my long, ten-year research, the abductive search process has been more or less curvy. After a couple of rounds of analysis, the findings, which I considered anomalies, did not transpire to be so in the light of the existing literature, thus I returned to the construction phase of the study. Only the third round of the analyses led to new intuitions, which led to explanations. I also gathered more data from the case, for proving my hunches until knowledge. In addition to the individual process of the abductive search, the actual research process highlighted the collective level of abduction (Sætre & van de Ven, 2021). All attendees at the research seminars, colleagues on courses, teachers, and most of all, the tutors have helped in each round of going backwards and forwards and have given valuable clues where to look next. I could only continue with the individual processing with the help of occasional visits to this collective abduction process level.

Traditional science places trust on causal explanations. In interpretive studies, the causality is not so explicitly exposed, but it offers a way to explain relationships between items. Knowing the relationship helps in understanding how things are connected and structured; this understanding is important when studying behaviour (Lukka, 2014). Understanding causality between the IEBM structures and control systems has helped me to generate plausible hunches and offer them as explanations. Identifying the relationship and consequences between the operations of the case IEBM and MCS, as well as between the actors in the whole ecosystem, is fundamental in indicating the business model level impact to MCS and vice versa.

Dubois & Gadde (2002) describe the abduction process as a systematic combining of both reality and theory, as well as the case and the framework used (Dubois & Gadde, 2002). In cases where the observed data does not fit the previously set categories in the framework, the framework must develop and capture the essence of the theoretical model (Dubois & Gadde, 2002). When I systematically collected the case data of the control systems onto an Excel template, I noticed how the emphases of measuring was placed on the sales figures, and how many of the MCSs were because of the process of value creation and capture. It was not a matter of the control type, but what was attempting to be solved with the systems, i.e., ensuring the realising of their value proposal, which is the most crucial part of the business model content. This observation led to explanations of how the business model affects the design of MCS package but how it also controls with its structures as such. The systematic combining process of Dubois & Gadde (2002) revealed main control questions, which might help any managers and controllers in practice when designing an MCS package for any IEBM.

1.3.2 Theoretical development within the abduction

As I have presented above, completing an interpretive study and abductive searching for explanations is not a straightforward process. The process includes familiarising oneself with the theory created by earlier literature, collecting empirical material, and analysing that material in the light of alternative theories. Inevitably, there are no clear temporal differences between when those tasks occur, but the phases are intertwined (Dubois & Gadde, 2002). In such a fuzzy but demanding research process, it can be challenging when the researcher finds oddities in the empirical material that require explanation, and even more so when attempting to contribute to knowledge with explanatory or other forms of theoretical outcome (Sandberg & Alvesson, 2021). Pfister, Peda & Otley (2022) provided a methodological framework for helping MCS researchers, particularly on their way from the description of empirical phenomena through the analyses to rigorous theoretical explanation. The three-level framework presents descriptive, analytical and explanatory levels of theory-building, providing indicative questions at each level through which the abstraction increases, and it is possible to succeed in theoretical development. On the descriptive level of theory-building, a researcher pragmatically describes the ways and practices used by the organisation under study. Adding the concepts and perspectives of earlier literature increases the theoretical abstraction. The framework of Pfister, Peda & Otley (2022) offers four categories of analysis: context understanding, expected and realised control outcomes, ways of using the systems in relation to their control objectives, and the analysis of deeper meanings of controls. The levels of the framework are not tied to the stage of the research process but are dynamic depending on how the theory development progresses. The description of the concepts, the research material and the theory developed by previous studies may be revisited several times, even in the final phase of the research process.

As preparation for finding all the control systems of the case, I familiarised myself with the previous research on different MCS types, control mechanisms, and definitions of MCSs. I also familiarised myself with the theoretical basis of technology-driven business models. I collected such features of technology-driven business models that the earlier business model studies have brought out, and about which they are quite unanimous, into a table. After learning more about technological business models and MCS, I could proceed to the interviews with the capability of recognising all MCSs that emerged in the discussions. I have described those in the narrative with authentic quotes and added MCSs fulfilling the pre-set criteria of a managed, full system with a strategic purpose in the list presented in Appendix 1 (descriptive level of theory-building). I added the details of the measurement control systems from the reporting material of the case company to Appendix 1. Based on what earlier studies have revealed on the functioning of

different types of MCS, I added to the list of MCSs information on control mechanisms that are usually attached to certain types of control systems. Based on the interview discussions, I determined the level of importance for each of the MCSs. I interpreted the importance based on how actively the MCS is used in various situations in the case company and how it is valued in its decision-making (analytical level of theory-building).

I continued my analysis of the business model context by adding the characteristic features of IEBMs to each MCS in the list. That connected the MCSs to the operations of a business model and revealed what each specific MCS was trying to solve in the package. I noticed that formal control systems like hybrid measures, planning and budgeting were heavily used in the company when following an innovative strategy. Often companies in such a strategic context have been found to trust in informal control and complement the package with some specific formal controls, like measures. I also recognised that MCSs are connected to only a few features of business models – value creation and capture, risks from different sources, innovation, and community/ecosystem, of which the last aroused my interest. The ecosystem is a structure of independent business actors, which means, in practice, that the control object for some MCSs is beyond the case company organisation. This means an inter-organisational control dilemma.

The new finding of an external control object encouraged me to gather more information about all interactions between the case organisation and the ecosystem, in this case, mostly the open-source community (descriptive theory-building). A new round of interviews revealed further information on practices that firmly connect external actors and the internal organisation. I noticed how the ecosystem and the community influenced most of the operations of the case company. After familiarising myself with the open-source principles and earlier literature on strategies with open-source technologies, I was convinced that the actors external to the company organisation definitely influenced the structure of the MCS package. Most of earlier MCS studies have given explanations of strategic premises, for example, that innovation and investing in R&D usually increase risks, which are reduced by building a strong organisational culture that unifies behaviour inside the organisation and strengthens common efforts towards strategic targets. I decided to follow a different path. I explored the business model level of decisions related to technology selection, the ecosystem, and realising the value proposal within that ecosystem (explanatory theory-building). Organisational culture is important for that architectural level of business decisions, but for a different reason than on the strategic level of decisions. By exploring MCSs connected to the business model level of decisions, I could find some additional explanations for the package design.

I returned to the business model literature and learned more about how the ecosystem environment is another source of risks apart from innovation and how

crucially the ecosystem connects to value creation (analytical theory-building). A picture began to emerge of what issues IEBM management is trying to control with its chosen MCSs inside the organisation, but also, in addition, outside it. Indeed, there seems to be a different package structure compared to non-technology-driven business models, and this different structure appears as two-fold roles of some MCSs. However, the business model level of MCS design does not overrule the explanations that the earlier MCS package literature on strategic premises provided but adds to them. The ecosystem context only brings another perspective when considering the full governance of IEBMs (explanatory theory-building). Therefore, I continued to learn more about the theory and findings of the MCS package literature to understand the usual roles that certain types of MCSs are usually put into within the package (analytical theory-building).

To address the ecosystem perspective, I familiarised myself with the inter-organisational control literature. In that branch of control theory, many findings can be identified in the case of the ecosystem. For example, the strategic ambidextrousness of organisations applies in the ecosystem context, but the structures that bring guidance while allowing the actors to be independent were particularly interesting in explaining the ecosystem dimension. I also returned to the research material once more and found obvious correspondences to minimal structures when the case company is operating its business model in the ecosystem, like what van der Meer-Kooistra and Scapens (2015) found in their research on product development co-operation (descriptive theory-building). Based on the case interviews, I was convinced that IEBM's complete control package also includes the minimal structures that arise between it and the ecosystem, although no formal co-operation agreement has been drawn up between the actors. Since they are structures of several parties, they mutually affect both the individual business model and other actors, which means that the ecosystem controls it as such (explanatory theory-building). These ecosystem-level efforts of control with mutual governance explain why the MCS package of the IEBM has a different, two-fold structure to non-technology-driven business models.

1.4 Theoretical introduction

This study builds on the relationship between the two main concepts: an MCS as a package, and an Internet-enabled business model (IEBM). In this chapter, I briefly present the basic concepts, how they are varied over time and how I will use them in this study. I briefly introduce earlier frameworks, and the framework to be utilised as a frame for this study.

The vast literature on management control has generated several varying definitions for what controls are considered to be. Over the decades, the

development has gone from a narrower view of control systems (Abernethy & Chua, 1996; Merchant & Stede, 2007) to a wide set of practices that serve the control purpose (Chenhall, 2003; Ferreira & Otley, 2009; Merchant & Otley, 2007). In this study, I use the term management control systems (MCS) for such formal and informal mechanisms that are 1) implemented by the company management for 2) aligning employees' behaviour and are for 3) ensuring the attaining of strategic targets. The MCS involves a practice, a process, and a technical solution, which all together form a complete system. Unlike in the discussion of MC as a system, I use the word system to describe such management control that has some continuation in use, has become an established practice, including a complete process with an obvious purpose of the strategic target reach. This definition follows that of Chenhall (2003), Merchant & Otley (2009) and Ferreira & Otley (2009), but rules out pure information systems, ad hoc decision-making, operational supervising or internal control (Malmi & Brown, 2008; Zimmerman, 2001). I make this delimitation because the practical examination and the practical recommendations of this study are thus more successful, although I do recognise that there may be other mechanisms affecting the behaviour of employees without certainty on strategic alignment.

Studying the numerous control systems has forced researchers to arrange, classify, keep track, and provide a structure for them all. Anthony (1965) stressed the importance of frameworks in research. The selection of a certain framework enables the researcher to reach generally applicable conclusions for that specific classification and not for any other set of definitions. The framework indicates the limits within which the researcher's findings are relevant, and for which the statements are valid (Anthony, 1965).

With slight conceptual discrepancies, the earlier studies have classified control systems as: strategic and operational level controls, programmed and non-programmed controls (Anthony, 1965), explicit or implicit control systems (Birnberg & Snodgrass, 1988), accounting, personnel, and behaviour controls (Abernethy & Brownell, 1997), belief systems, boundary systems, interactive- or diagnostic control systems (Simons, 1995; Simons et al., 2000), results controls, action-, personnel- and cultural controls (Merchant & Stede, 2007). All the classifications have been chosen from the specific interest of the researchers and their need to explain the findings of their studies. Control systems are divided according to their acting mechanisms of *ex ante*, impact before actions, and *ex post*, impact after actions (Flamholtz et al., 1985).

Malmi & Brown (2008) reviewed a wide range of MCS studies from the past decades. They gathered a typology of five groups: cultural controls, planning, cybernetic controls, reward and compensation, and administrative controls. The typology of Malmi & Brown (2008) is depicted below:

Cultural Controls						
Clans		Values			Symbols	
Planning		Cybernetic Controls				Reward and Compensation
Long Range planning	Action planning	Budgets	Financial Measurement Systems	Non-Financial Measurement Systems	Hybrid Measurement Systems	
Administrative Controls						
Governance Structure		Organisation Structure			Policies and Procedures	

Figure 1. Typology of Malmi & Brown (2008).

The establishment of a clan, encompassing shared values, symbols, and individual personalities, contributes to the development of informal control systems within an organisation. These control systems, known as organisational culture, continue to evolve among employees. Cultural controls play a role in determining the level of strictness and formality of the overall MCSs within a company (Birnbrerg & Snodgrass, 1988). By fostering unity and commitment to the organisational goals, cultural controls enhance the possibility of achieving them, thus serving as a control mechanism (Ouchi, 1979). Planning as a control system clarifies the objectives and sets expectations for the behaviour of organisation members (Malmi & Brown, 2008). Malmi & Brown (2008) divide planning controls into the long-term planning and action planning with the corresponding connections to the strategic and tactic levels of operations. According to Malmi & Brown (2008), the cybernetic control systems are within the MCS if they link behaviour to targets, and if variations establish an accountability towards management. They divide the cybernetic control systems into sub-groups of budgeting, financial measures, non-financial measures, and hybrid measures (Malmi & Brown, 2008). Reward and compensation systems, often linked to cybernetic controls, are to provide motivating reasons, and to strengthen the organisational culture (Malmi & Brown, 2008). Administrative control systems, organisation structure, governance structure, and policies and procedures help in organising, building, and monitoring individuals and groups, and the chain of command. They define how tasks should or should not be performed. Such informal common characteristics like unified values, symbols, and forming of the clan create the organisational culture, which can be considered as a control systems when it is deliberately implemented by the management for aligning the behaviour of employees in order to reach the strategic targets (Malmi & Brown, 2008). The typology is a broad model of an MCS package: “The strength of the typology lies in the broad scope of the controls in the MCS as a package, rather than the

depth of its discussion of individual systems. An MCS typology, such as the one presented in this paper, cannot be too narrow, as there is a risk that some controls may go unnoticed and existing links to other controls may obscure the research findings.” (Malmi & Brown, 2008, p.291)

The wide coverage was also the reason for my selection of this typology for the framework. By following the wide framework as a guide, I avoid overlooking any controls in the case company, although I have narrowed my explanations to only a few. The MCS package literature is the domain theory basis of this study (Lukka & Vinnari, 2014). I have also added to that part of the literature.

A business model² as a term refers to all activities of earning money in a way that is systematic and repeatable. The business model presents the details of value creation and the logic of value capture (Amit & Zott, 2001; Gordijn & Akkermans, 2001). Decisions on architecture, organisational functioning, and the earning logic are choices made for the business model (Osterwalder, 2004; Osterwalder et al., 2010). The history of business models is derived from the very beginning of modern companies, even if the term may not have been explicitly used. The development of the fast Internet and e-business opportunities has exponentially increased the discussion on sources of value creation (Amit & Zott, 2001). The value creation discussion stems from the strategic literature, which has caused the term to be used inaccurately, and even interchanged (Hedman & Kalling, 2003). For example, Porter (2001) discusses the Internet’s impact on strategies with descriptions like ‘industry structures that are not fixed’, ‘network effects’, or ‘virtual enterprise’ when referring to the business model level structures (Hedman & Kalling, 2003; Porter, 2001). Osterwalder (2004) emphasised the difference between the strategic level decisions and business model level decisions in business. The strategy level is concerned with the planning of visions, goals, and objectives, while the business model level converts that into a certain business architecture and earning logic (Osterwalder, 2004). A business model presents the details of value creation and the logic of value capture, after the strategic goals have been decided (Amit & Zott, 2001, 2012; Gordijn & Akkermans, 2001). The terms ‘value proposal,’ ‘value creation,’ and ‘value capture’ are closely related, and business model researchers use them somewhat interchangeably. In this study, ‘value proposal’ refers to the promise or offer made by a business model to the market, specifically from a market perspective. ‘Value creation’ denotes the same activity but is used when discussing the business model’s perspective. It is synonymous with the value added by a

² MOT ® Oxford Dictionary of English: A plan for the successful operation of a business, identifying sources of revenue, the intended customer base, products, and details of financing.

company. The term 'value capture' is employed to refer to the mechanisms by which the created value is monetised from the market into the firm. The business model level decisions define the implementation of the strategy (Hedman & Kalling, 2003), as well as validate and test the success of the strategy (Huelsbeck et al., 2011; Shafer et al., 2005). The essence of this study lies in this difference between the strategy and the business model of the company. This is new to the discussions on MCS packages, even familiar in the business model literature.

In contemporary business, it is very rare for companies to be able to operate in isolation from other companies. Although there is still much debate on whether the differences in the strategic structures are theoretically relevant (Prescott & Filatotchev, 2021), the vast literature on IEBMs has generated attention to some features that are interesting from the MCS point of view. The IEBMs operate in an ecosystem context, a structure of multilateral actors, which increases the uncertainty (Prescott & Filatotchev, 2021; Schneckenberg et al., 2017), but decreases the possibility of control for one actor over any other. An inter-organisational control solutions refers to all the means and practices in a situation where independent organisational entities operate their businesses in co-operation (Caglio & Ditillo, 2008). For such lateral environments, the necessary flexibility and firmness have been created through social, technical (Kamoche & Cunha, 2001), and institutional as well as economic structures (van der Meer-Kooistra & Scapens, 2008). This phenomenon of the minimal structures will explain the roles of certain MCSs within the package. It also helps in understanding the business model itself as a control structure.

1.5 Methods

The roots of interpretative case studies are in anthropology. The use of qualitative methods in management accounting has raised intense discussion, especially in relation to practices versus theoretical knowledge advancement (Ter Bogt & van Helden, 2012). The advantage of qualitative methods lies especially in the communication between academics and practitioners about the practical implications of management accounting research (Ter Bogt & van Helden, 2012), as well as in the making, analysing and verifying the linkages between the real organisational functioning and the theoretical base (Ahrens & Chapman, 2006). The practical aspect is one of the cornerstones of this study. As a practitioner of management accounting, I want to promote the discussion between academic theory development and practice. Qualitative research methods are well suited for this purpose.

Because of the great number of companies operating with the IEBM, the finding of a possible case organisation was not problematic at all. The problem was more

about how to select only one and how to convince them to participate. I was fortunate to find a volunteer even though I had some pre-defined selection criteria. For finding at least some established control practices, the company had to have a certain number of employees – at least ten or more (Davila, 2009). With the expectation of having established processes and practices, the company had to have passed the start-up phase, and preferably have been established for a number of years. Obviously, operating within the IEBM was a criterion, and having their own open-source software development would make the company a perfect fit. I negotiated with two companies in South-West Finland, and the granting of access to the company decided the final selection. It is always a generous act from a business enterprise to the academic community when a company allows access and allocates time for research without receiving any compensation.

The first eight interviews took place between April and August 2017, one interview in September 2019, and the second round of interviews in February 2022. All the interviews conducted in 2017 and 2019 were held at the company's premises. The Chief Operating Officer (COO) of the company selected the first-round interviewees, and they were all members of the management team. For the second round, I proposed some interviewees based on various positions so that I could ask more specific questions to support my findings. The general functioning of the company and the content of the MCS package was already quite clear from the first round of interviews. Saturation was reached early in the first round. The second-round interviews were conducted in order to complement any gaps of empirics in the abductive search process.

The interviews were duly recorded, transcribed, and appropriately documented from spoken Finnish to a written, general language form, where unnecessary filler words and repetition were removed. The elucidated texts were sent to each interviewee for a content check, with no requests for corrections afterwards. Granlund & Lukka (2017) questioned the methodological 'black-boxing' of commonly used concepts and practices, because it prevents the development of those along the research process (Granlund & Lukka, 2017). The interview questions were left open as themes for discussion so that respondents did not focus too much on the concept itself and did not present any pre-defined approach as a control system. The definition of the concept was left deliberately unexplained to avoid any restrictions in the answers. The differences in understanding the concept in question might cause some concealing of practices that are relevant for the whole of the MCS package. The depiction of the MCS structure and its practices is based on data from the day-to-day operations and fundamental selections, like the strategy and the business model, that the management has decided for the company. Altogether, 16 interviews took place, totalling 8 hours and 27 minutes. One of the interviews was conducted via email and was not included in the total time. The

discussion themes and all the details of the interviews are found in the Appendix 2. In my narrative, the chapter 4 of the study, I have added a year of the interview after the quotation, where the specific time of the interview has relevance for the findings. As there were several years between the interview rounds, changes had taken place in practices and processes in the case company. Therefore, the year indicates situation where there has been development of affairs, also possibly regarding MCS, between interview rounds.

In addition to the interviews, I analysed the published profit & loss and balance sheet reports from 2000 to 2021, the public website of the company, the long-term business planning materials, the monthly management reporting materials, and the memos from the management team weekly meetings. Additionally, some interviewees sent examples of the reporting dashboard they were regularly following in 2017. The use of multiple methods increases the validity and reliability of case research (Mckinnon, 1988), and the above-mentioned material supported the information gained from the interviews. Details could be detected and triangulate through the other research material. In order to protect confidentiality, I have anonymised and modified all the presented graphs and figures from the case company so that they only deliver information on the control system, and not the exact figures. The anonymisation of products was the one and only correction request received from the case company. I fulfilled the request without jeopardising the relevance of the findings.

1.6 Introduction to the case

The case company's (hereafter the Company) business idea is to create value by providing software coders with extremely efficient and high-quality web coding tools so that the end-users around the world are attracted by the applications coded with them. There are two business segments in the Company: developing software products and producing services. In 2017, three quarters of the turnover came from the service segment and one quarter from the products. Two years later, the shares were the opposite: 75% from the products and 25% from the services. The business model is based on open-source technology. A free-of-charge product acts as a major part of the business model. The value capture occurs through some additional and complementing products (including Software as a Service, SaaS), to which the developers can subscribe.

The company operates globally. The head office and the largest proportion of the employees are in Finland. Other offices are located in Germany and in the United States. The business idea was invented by two software engineers, who originally struggled with some system usability issues in their employer organisations. The Company was founded in 2000 and had five business partners at that time. The

Company's sales grew steadily as did their headcount until 2018. The Company has now a well-established position on the market. In June 2018, the Company released a largely rewritten new product platform, which had been developed since 2016. The new product platform shifted the business from a service provider to more of a software product company, which is clearly reflected in the number of employees, but also in the sales. The sales slowed down a little, as it took some time for customers to move from the old product framework to the new one. Moreover, the COVID-19 pandemic postponed and slowed down the system development projects in customer companies (CFO, 2022).

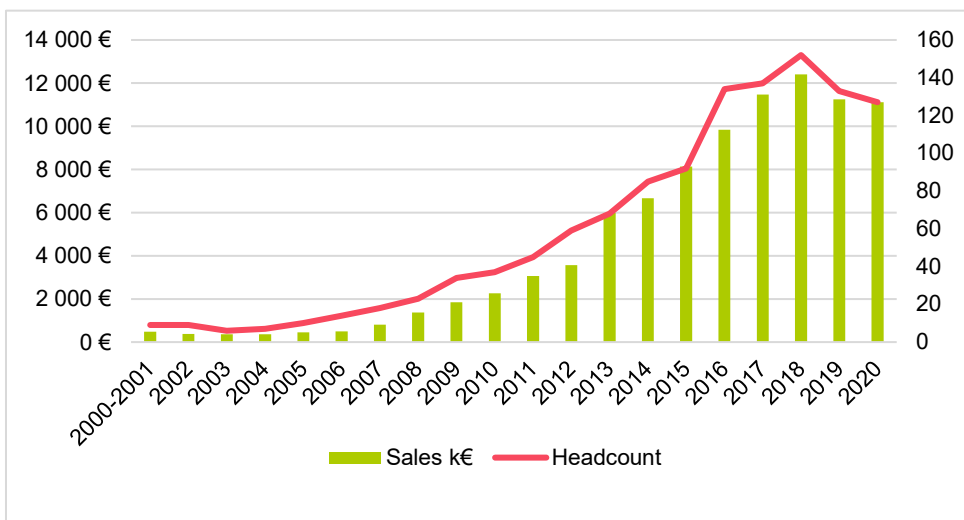


Figure 2. Development of Sales (k€) and number of personnel from the published closing of accounts.

The move away from being a service provider had been the vision for some time, as the Company wanted to be a producer of software products. This was not the only development of the business model over the years, as the Company has also made business model innovations earlier. These innovations started with a model of a user interface providing larger, ready-made solutions for systems; it was offered as Software-as-a-Service (SaaS) and included a licence fee. The solutions were rather laboriously changeable, but they had some possibilities for replication, and therefore, a business opportunity. After a few years of operating, the business model was transformed into an open-source, free product model. Complementary services were then added gradually to their offering.

The IEBMs live on technology, and the Company makes no exception to this rule. Technological innovations and investments for the R&D are visible as growth

in sales, as shown in Figure 2 above. The first large technological step was implemented during 2007 - 2008, and the second during 2011-2012, when the company also expanded its operations to the United States and Germany. At the time of the first research interviews in 2017, the third extensive change in the Company's technological solution was under development. Prediction of the right technological choice is of enormous significance to the Company, and it requires a constant 'testing of the atmosphere' and bold actions when necessary:

“... in our co-operation with Google we noticed some early-bird signals of technological change, which have usually ended up in the public standardisation processes. We noticed the signals in the early phase, draw them within our technology strategy and started to implement a comparably big product change... in practice to re-code the main product completely.”

(CEO, August 2017)

An extensive technology renewal, like the one launched in 2018, is always an enormous risk to any actor in a similar sized business. In addition, at that time, the transition from the old products to the new technology platform limited the demand for services, which impacted the sales. However, the earlier steady growth aroused the interest of financiers, both private and public, which enabled the continuation of heavy investment in the development. R&D work is allowed to be included in the Intangible Assets of a Balance Sheet, if the company is able to show the technical and the commercial feasibility, the intention of completing the development work, and if it is able to demonstrate, how the investment is going to benefit the company in the future (International Accounting Standards Board, 2018). Figure 3 below shows the level of R&D investment, equity, and yearly earnings. The earnings have become negative after the large development efforts.

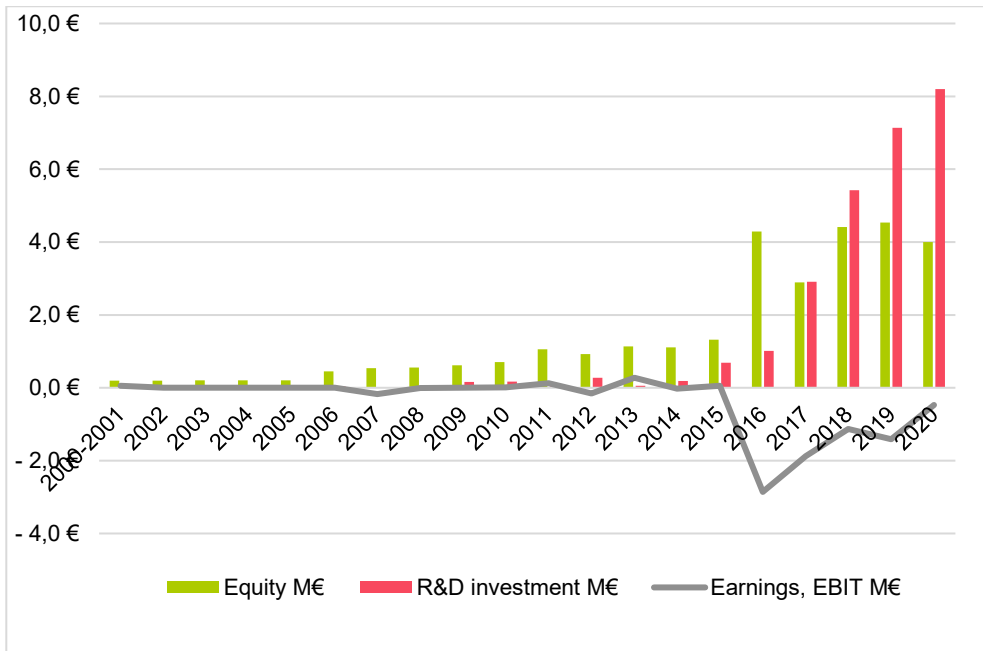


Figure 3. Development of equity, R&D investment and earnings M€ from the published closing of accounts.

As a short summary, the case in this study is an open-source technology company, with approximately 11 MEUR turnover and has personnel of 127 employees (2020). Their products are sold on the global market and help professional software developers to build a user interface for any web application that is used to integrate systems. I will present the business model of the Company in detail in section [4.1](#).

1.7 Structure of the study

I have divided this dissertation into six main chapters: the introduction, the theoretical basis of the business models, the theoretical basis of MCS, the presentation of the case, the analyses of the MCS in the case company, and the conclusions. In the introduction, I provide the reader with an idea of what this study is about, the main concepts, and how the subject will be studied. I also briefly present my case company. In the second chapter, I present the theoretical background of business models and the existing definitions as well as their general characteristics. The presentation starts with a general idea of the business model and is then narrowed down to technology and IT business models; this is the category into which the IEBMs fall. My presentation continues with the basic principles of the business models operating with open-source technologies. I present the previous

business model literature quite extensively because it contains important descriptions and attributes concerning the IEBM environment. Understanding more on the circumstances of IEBMs promotes an understanding of the difference between strategic management control and the business model level of control.

Chapter 3 constitutes the domain theory basis of the study. I briefly present each group of control systems included in the framework of Malmi & Brown (2008). I also cover the MCS package literature and findings that apply to the IEBM context.

Chapter 4 is a narrative of the operations in the case company. The structure follows the framework of Malmi & Brown (2008). In chapter 5, I discuss the MCS package of the IEBM and connect the findings of this study to the earlier literature. Chapter 5.6.1. is an introduction to the inter-organisational control theory, which I find explaining some of the ecosystem layer of the MCS package. The practical implications and recommendations are also in chapter 5. The last section, chapter 6, presents the Conclusions of this dissertation, limitations, and proposals for ideas, that researchers could explore further in their future studies.

2 The business model as an object for management control

2.1 Introduction to business models

To better understand the business model as a separate concept from the strategy, I will briefly introduce the concept, and its operational context, which affects the MCS design. The IEBM context emerges most clearly in the light of the previous business model literature, a fraction of which I present here.

The business model literature stems mainly from strategy research. However, in numerous studies, the border between the company's strategy and business model is often blurred, and terms are sometimes used interchangeably (Hedman & Kalling, 2003; Magretta, 2002). Strategic decisions concentrate on market positioning, competitive advantage and how to achieve this compared to competitors (Porter, 1985, 2001). While strategic planning concentrates on the strengths of a company, the business model does not take any stand on competition (Magretta, 2002). Even though there might be similarities in the decision process, the difference lies in the details, which are answered in business modelling (Gordijn & Akkermans, 2001). Osterwalder (2004) separates the strategy and business model, presenting them as certain types of decisions based on their consequences. In his three layers of business, each has a distinct function (Osterwalder, 2004). I present the three business layers in Figure 4 below:

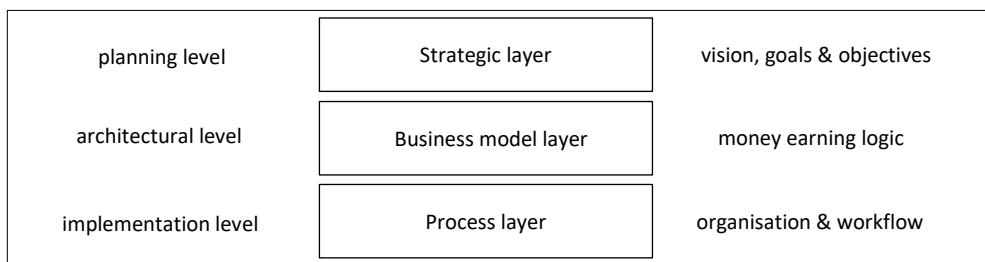


Figure 4. Business layers - Osterwalder (2004).

The strategy level is concerned with the vision, goals, and objectives. The business model layer level covers decisions about the business architecture, organisational

functioning and, above all, the logic of making money (Osterwalder, 2004). There is a connection between the business layers and the time span. Strategic decisions have long-term consequences, and after the management has decided on the strategic-level direction, there are still a few options regarding how to implement it in practice. Those decisions are for a shorter time span than the strategy, and, usually, the business model evolves after the fixed strategy (Chesbrough, 2007, 2010). The business model integrates resourcing, the organisation’s operations and strategy implementation in such a way that the layers are interdependent on each other (Hedman & Kalling, 2003). It is also noticeable that the levels of business decisions are not directly connected to the organisational structures, but managers at any organisational level can make strategic decisions (Johnson, 1992) and value-capture decisions (Shafer et al., 2005). In practice, the same management team in the organisation may be responsible for both, together with the design of the MCS (Huelsbeck et al., 2011).

Discussion about business models among researchers has been vivid and can be divided roughly into two areas. The first area of discussion concentrates on the business model as a meta-level concept and how it fits in different typologies. The second area of discussion presents company-level business models, usually with a real-world dimension as an example case (Osterwalder et al., 2010). Weill et al. (2005) describe a business model in terms of two aspects: what it does and how it makes money. In their typology, the ‘what’ part is answered by four roles: creator, distributor, lessor and broker. The ‘how’ question is answered using four assets: financial, physical, intangible and human. They call these 14 applicable variations in Figure 5 below the MIT business model archetypes (Weill et al., 2005).

	Type of Products/Services offered			
	Financial	Physical	Intangible	Human
Creator	Entrepreneur	Manufacturer	<u>Inventor</u>	n/a
Distributor	Financial trader	Wholesaler, retailer	<u>Intellectual Property (IP) distributor</u>	n/a
Lessor	Financial lessor	<u>Physical lessor</u>	<u>IP lessor</u>	<u>Contractor</u>
Broker	Financial broker	Physical broker	IP broker	Human broker

Figure 5 Typology of general business models (Weill et al., 2005).

This general business model typology does not take any stance on the business sector or industry in which it is applicable. A company can also adopt a combination of several archetypes to make earnings. It can act as a manufacturer of a product but also distribute the products of some other manufacturer.

Creator, Distributor and Lessor of intangible products or services are common business model types of IT businesses. In addition, Physical lessors of devices and Contractors working as IT experts are usual in the IT business. These are within the thick line in Figure 5 above. Regarding intangibles, acting in the inventor role, a firm creates software code of its own and makes a business out of this creation itself. In the IP distributor role, it sells the full rights to the created code to outsiders. As an IP lessor, a company sells the right to use the software (for a fixed time period) with monthly payments. The case company of this study combines the Inventor, IP lessor, and Contractor archetypes in their value capture. The functioning of the case business model is presented in chapter 4.1.

The discussion on company-level business models has generated various definitions for the term ‘business model’. Each study defines the concept for its research purposes using a slightly different approach depending on their main interest within business models (Zott & Amit, 2013). Those practical definitions usually include the building blocks from the business model under exploration (Baden-Fuller & Mangematin, 2013). Ingredients in definitions have comprised products and services, including a revenue and distribution model (Buxmann et al., 2012), offering, activities, value network and revenue logic (Valtakoski & Rönkkö, 2010), or individual management choices and their consequences (Casadesus-Masanell & Ricart, 2010). The generic definition of Baden-Fuller & Mangematin (2013) has dimensions of customers, customer engagement, monetisation and value chain linking. Unique to other definitions is their notion that the final formula of the business model takes shape only through executives’ and managers’ cognitive interpretation of causal-effect relations within all four dimensions (Baden-Fuller & Mangematin, 2013). Business models are also ‘models’, as in the original meaning of the term: models for copying practices in scientific terms (Baden-Fuller & Morgan, 2010). Value creation, value proposition and value capture are the core content of varying definitions (Amit & Zott, 2001; Arend, 2013; Aspara & Tikkanen, 2013; Gordijn & Akkermans, 2001; Magretta, 2002; Teece, 2010), and business model researchers widely agree that these are the decisive factors in business models (Zott et al., 2011). Amit & Zott (2012) emphasise the system view of a business model and call it an activity system between the company and its customers, partners and vendors (Amit & Zott, 2012). Also, Saebi & Foss (2015) define a business model as “...the content, structure, and governance of transactions inside the company and between the company and its external partners in support of the company’s creation, delivery and capture of value” (Saebi & Foss, 2015). This draws attention from single business models more to the structures and the

ecosystem in which the viable value creation takes place (D'Souza et al., 2015), an approach which applies to this study.

Although many business model researchers have struggled with the diverse opinions on the conceptual definitions, they have revealed valuable knowledge about the context in which IEBMs operate. Some themes emerged more than others in the earlier literature, revealing common features within IEBMs (Zott et al., 2011). These 'streams of interest' portray a picture of them and distinguish the Internet-enabled business models from traditional, non-technology driven business models. Below is described in more detail the attributes associated with the IEBMs. This should help to better understand the world of business models and the context, and from this, connections to MCSs can be found.

2.2 Characteristics of IEBMs

I emphasise in this study the difference between strategy and business model. However, I need to note that business model research is largely done as part of strategic research. IEBMs are associated with unique products and services and high investment in R&D and innovation (Amit & Zott, 2001). They often follow a strategy of new development, called as a differentiation strategy (Porter, 1985), an entrepreneurial strategy (Miller & Friesen, 1982) and a prospector strategy (Miles & Snow, 2003) in the strategic literature. Innovative conditions are the background of most business model studies, and innovation itself and in connection to business models has been much studied (Chesbrough, 2007; Ciriello et al., 2018; Saebi & Foss, 2015; Teece, 2010). Compared to traditional development, innovation in business model renewal is a new branch. Investing in new products or new technology is not enough. The IEBM needs development (Achtenhagen et al., 2013; Magretta, 2002; Purkayastha & Sharma, 2016). IEBMs are usually formed on strategies that trust in the innovation of products and services and a novel way of earning from them.

R&D and product development require advance funding. This, as such, is not a special feature of IEBMs, but is related to the product development in any company. In the early stages, however, the IEBM often receives venture capital financing, the nature of which usually includes effective governance of the company by the financier (Lerner & Nanda, 2020). It can be assumed that this has some effect on the MCS package, and is, therefore, a notable feature for the analyses.

One perspective in business model studies has been IEBMs as expert organisations. Technological underpinnings in operating require highly educated, autonomic experts in the organisation (Deeds, 2001; Deeds et al., 2000). Expert organisations have been found to be quite resilient towards agile organisational changes (Granig & Hilgarter, 2020). However, the IEBM innovative environment is

demanding for experts (Rasche et al., 2016). Since management control systems aim to influence organisational behaviour, this typical feature of being an expert organisation is probably somehow reflected in the MCS package.

Of course, the defining feature of IEBMs is a fundamental trust on the Internet. Companies have innovated very different ways of collecting value streams from the technological infrastructure, with the help of web applications, by forwarding the Internet service, and by combining all three of these (Mahadevan, 2000). IEBMs benefit from large transaction efficiency (low cost), perceived customer value, and network value gained within the ecosystem (Chatterjee, 2013). The Internet enables virtual markets, which have changed the field of competition, as so many of those who were local actors can now operate globally (Amit & Zott, 2001). This is especially easy for the software industry because of its intangible products (Teece, 2010). Intangibility removes the need for logistics and solves capacity issues and scaling of production like in traditional business (Cusumano, 2008), but on the other hand, the technological choice anchors a company to a certain network and limits innovation to that technological network (Amit & Zott, 2001).

The network perspective and ecosystem have greatly inspired researchers. IEBMs operate inside a value network where independent actors realise their value offerings (Gordijn & Akkermans, 2001). Adner (2017) discussed ecosystems, which can be seen as an economic community, but also as the alignment structure of multilateral actors that interact to realise their focal value propositions. By aligned structures, he means usually latent, unnoticed structures, even the interaction across actors who have a joint value creation effort as a general goal. The structural approach to ecosystems focuses on activities, actors and links, without any predominant focus, and where all interactions are equal (Adner, 2017). The IEBM is a one-value proposal, with its connections and links and its own strategic target, which may or may not coincide with others inside the same ecosystem (Adner, 2017). The complexity of structures, combined with an ambitious innovation context, increases the risks, which are then mitigated by learning and capability development, but also by aligning the value proposal, creation and capture accordingly (Schneckenberg et al., 2017).

Previous studies have noted and discussed the features typical of IEBMs. These characteristics, or attributes, describe the conditions of value creation and capture, separating them from strategic decisions. I summarise the characteristics and example studies in the table below. Obviously, there is a wide range of research on every single attribute. The effect of these conditions is observed and analysed in connection to the MCS of the case. The characteristics are also added to the column of the MCS table in Appendix 1.

Table 1. Characteristics of IEBMs as a summary from above.

Value creation and value capture	Despite the number and diversity of business model definitions, value creation, value proposition and value capture are the core content of business models (Amit & Zott, 2001; Arend, 2013; Aspara & Tikkanen, 2013; Gordijn & Akkermans, 2001; Magretta, 2002; Teece, 2010), and on these definitive factors researchers widely agree (Zott et al., 2011).
Strategy	IEBMs are associated with unique products and services and high investment in R&D and innovation (Amit & Zott, 2001), which has been called a differentiation strategy (Porter, 1985), an entrepreneurial strategy (Miller & Friesen, 1982) and a prospector strategy (Miles & Snow, 2003) in the strategic literature.
Ecosystem	IEBMs operate inside a value network where independent actors realise their value offerings (Gordijn & Akkermans, 2001). The technological choice anchors a company to a certain ecosystem and limits innovation to that technological network (Amit & Zott, 2001). In addition to economic affiliation, the ecosystem is a complex structure of independent but highly interdependent actors (Adner, 2017).
Technology	Trust in the Internet plays a key role in a company's existence (Deeds, 2001), as they collect value streams from the technological infrastructure, with the help of web applications, by forwarding the Internet service, and by combining all three of these (Mahadevan, 2000).
Innovation and R&D	Innovation and development are directed towards the technology, products or the business model itself (Achtenhagen et al., 2013; Magretta, 2002; Purkayastha & Sharma, 2016).
Products and Services	Products and services are intangible and offered through the Internet (Teece 2010).
Expert Organisation	Technological underpinnings in operating require highly educated, autonomic experts in the organisation (Deeds, 2001; Deeds et al., 2000).
Operations	IEBMs operate through the Internet, collecting value streams from the technological infrastructure, web applications, the Internet service itself, or from combining all three (Mahadevan, 2000).
Risks and uncertainty	Complex ecosystem structures and ambitious innovation context increase risks (Schneckenberg, Velamuri, Comberg & Spieth, 2017).
Financing	In the early stages, the IEBM often receives venture capital financing, the nature of which usually includes significant governance of the company by the financier (Lerner & Nanda, 2020).
Markets	The Internet enables virtual markets, which have changed the field of competition, as so many of those who were local actors can now operate globally (Amit & Zott, 2001).

2.3 Operation of an open-source business model

The IEBM characteristics described above do not distinguish any particular business in which the company operates. A huge number of IEBMs earn their income from software development. The software business generally differs from traditional manufacturing business models for several reasons. In Cusumano's (2004) book and later in Buxmann et al. (2012), software has been described as easy and cheap to reproduce, and copying does not affect product quality. Preparing a copy or million copies of the product does not necessarily affect a company's direct costs at all, assuming that the expensive development phase is completed. Software products are very much defined by technology standards. An application runs only on a certain

operating system, which has greatly impacted the whole industry (Buxmann et al., 2012; Crowston, 2016; Cusumano, 2004).

From a single-company point of view, there is also a huge difference between proprietary software and software licensed for free use. A software product user pays a licence fee and gets the right to use a product for a fixed time or permanently (Buxmann et al., 2012). However, since the 1980s, the Free Software Foundation (FSF) has promoted free licensing, so that everyone can have some control over the surrounding technology (<https://www.fsf.org/>, n.d.). Continuing the work of the FSF, the Open-Source Initiative (OSI) sharpened concepts of software licensing and created the definition of open-source. This means, first of all, access to the source code but also its free re-distribution and modification or derived works. According to OSI principles, open-source licensing must be equal for all people and in all fields of business, research or any ventures of life. The rights attached to the program apply to re-distribution, and they are not product-specific, i.e., if the program is part of certain delivery or product package, it can be unpacked and re-distributed with the same rights as originally. Although all open-source licences are free, there are several distribution rights options, even though there must be at least some re-distribution attached. An open-source program cannot restrict any other software delivered at the same time or to the same device, whether it is licensed for a fee or free of charge, and finally, open-source is technology neutral. Any technology provider can offer its software as open-source if/when these criteria are met (<https://opensource.org/>, n.d.). It is good to note that the terms open-source software and free software³ both mean software released under a licence that guarantees access to the source code and a certain freedom to distribute it further, although some ideological nuances differ (<https://opensource.org/>, n.d.). The purpose of both organisations and open-source in general is to enable software development and make it freely available for all by creating communities where a healthy ecosystem can create wealth. In this context, community means that all members together develop software, solve related problems and share their own solutions for the benefit of everyone without any monetary compensation (<https://opensource.org/>, n.d.; <https://www.fsf.org/>, n.d.).

Raymond (1999) explores two methods of development in the open-source community: a cathedral and a bazaar. By the cathedral model of development, he refers to an open-source project which is completed piece by piece under one facet's strict management. There is, of course, management in the bazaar model as well, but in this model, multiple independent community members develop several features

³ Of course, 'free software' should not be confused with licensed payable products, which for some reason are free of charge, but without access to source code or any other rights.

simultaneously. Both methods have generated remarkable software advancement for users all over the world, but Raymond (1999) mentions the extreme communication skills required for a community member who manages a bazaar. Most of the IEBMs that utilise open-source commercially trust the cathedral model, where all the development management resides in one company (Raymond, 1999). Probably the most widely known example of the bazaar type of open-source development project is the Linux operating system, which has led to massive commercial solutions in the Google ecosystem (Duparc et al., 2022; Raymond, 1999). The case in this study is an example of the business model within that ecosystem.

Although open-source licensed technologies are free for all, there are plenty of possibilities for business. The added value has to come on top of the software because anyone with coding skills and time can program the same functionalities themselves if they want and, therefore, may not be ready to pay for them. The common way of building a business model is to add services onto open-source software and capture the value through service charges (<https://opensource.org/>, n.d.). Obviously, open-source technologies have distracted the software business. When IEBMs choose proprietary or free technologies, it impacts the business model design and competition. A competition perspective between free and proprietary technologies has inspired many in research. August et al. (2021) found that open-source licensing options should be carefully thought through in IEBMs depending on the market conditions. Especially when a company has unique capabilities, more restrictive open-source licensing is beneficial (August et al., 2021). At this point, it is good to remember that these choices and decisions about technology and licences are at the business model level and differ from strategic decisions. Answering them is part of building a unique business model.

Reciprocity⁴ in the context of open-source means that the results of the development of a free technology are shared within the community. Choi and Chengalur-Smith (2016) studied the motivation for reciprocity among developers in a project intended for technology experts' own use, compared to development directed to ordinary, non-tech people. They noticed a difference in reciprocity when the open-source was utilised in development involving only technology experts. Developers dedicated more time to the community when it was for technology experts, and less when the project was for the public. On the other hand, projects for the public were found to receive more monetary donations from the users of solutions, as the interest in compensating developers' efforts was quite high (Choi &

⁴ MOT® Oxford Dictionary of English: "The practice of exchanging things with others for mutual benefit, especially privileges granted by one country or organisation to another."

Chengalur-Smith, 2016). The case of this study represents an open-source project among technology experts.

The issue of reciprocity characterises the operation of an IEBM that has chosen open-source code as its technology. I will return to the subject in my analyses of control practices. The requirement of reciprocity in operational activities may be reflected as a control for the organisational behaviour, which actually might mean reciprocity between the IEBM and MCS.

In the chapter 2, I have described different perspectives on business models. There have been various definitions in the earlier research for what really is a business model, how they can be classified, and what is their role or impact in contemporary business overall. After the strategy decisions, the company management makes decisions on how value will be created and what kind of earning logic the company has to implement for the strategy. Decisions at this level form a business model (Gordijn & Akkermans, 2001; Magretta, 2002; Osterwalder, 2004), which activities in technology branches are usually structured around creator, distributor, lessor, and broker roles. and where they act by using financial, physical, intangible, and human resources (Weill et al., 2005). In addition to the logic of value creation and capture, the most typical features, attributes, which describe the Internet-enabled business models' circumstances are high risks that emerge from innovation, value proposal within an ecosystem, and from high technology (Schneckenberg et al., 2017). There is a great difference in operations of business models, depending on whether they use payable or free technology in their value creation (August et al., 2021). Free software, or open-source, both refer to a software, which source code a technology provider has licenced to be used free of charge also commercially. With that allowing of use associates an idea that the results of the development of a free technology, at least partially, are shared within the community (<https://opensource.org/>, n.d.). As the technology is free of charge with the presumption of reciprocity, the value proposal needs to be thought over and the typical business model in open-source is adding payable services on top of the software product. That is also the situation in the case of this study, which I will present in chapter 4. Next, I describe the earlier literature of MCS to the extent necessary for description and analyses of the case of this study.

3 MCS as a package

3.1 Introduction to MCS

In addition to what is briefly stated in chapter [1.4 Theoretical introduction](#) to the concept of MCS, I present in the following previous research on the MCS package relevant to this study in more detail. This is domain theory (Lukka & Vinnari, 2014).

Knowledge of the means of influencing, i.e., controlling behaviour in the organisation for target reach, has accumulated for over half a century. During this time, researchers have recognised the subject's complexity, diversity and multi-dimensionality. Abernethy and Chua (1996) concluded that the mix of company control systems depends on an organisation's internal factors but also the strategic choice and institutional contingencies (Abernethy & Chua, 1996). As control systems are not isolated from their operating environment, Chenhall (2003) encouraged researchers to focus more on the context and organisational and social outcomes as a whole instead of the mix of fitting control systems (Chenhall, 2003). The need for a wide perspective in MCS studies has been recognised, especially in contemporary organisations (Chenhall, 2008; Langfield-Smith, 1997), and that has led to the transition from studying what is included within the MCS package to emphasising more how they are used as part of the whole (Abernethy & Brownell, 1997; Bedford et al., 2016; Chenhall, 2003; Widener, 2007). In addition to the extensive body of MCS package research that specifically acknowledges the contextuality and environment of the package, there is another branch of research that focuses on MCS as a system. This branch of research specifically focuses on the fit between MCSs, examining their compatibility with one another and functioning well together (Grabner & Moers, 2013). The debate between the two approaches has been lively, to the extent that one could argue for two camps. However, as Merchant & Otley (2020) point out, MCS research likely requires both perspectives. The complexity of the contemporary business environment results in practical implications where every package also has its systemic aspects (Merchant & Otley, 2020). Many researchers have long been aware of the interconnections between MCS components, the interchangeability of the overall package, and control systems, even if they have focused their studies on specific parts of the package rather than examining in detail all the MCSs it contains (Huikku, 2007).

MCS package studies have discovered that it is possible to reach the same outcome, even though the selection of control systems appears different. This equifinality means equally good results with different control systems, even in a similar context (Sandelin, 2008). The equifinality assumption leads to the idea of changeable control systems that can substitute or complete each other or even be irrelevant to the control impact (Abernethy & Chua, 1996; Bedford, 2015; Bedford et al., 2016; Malmi & Brown, 2008). MCS package studies have also revealed important interrelations and combined effects of control systems. Some of them are part of the strategic management control literature. Although in this study I emphasise the business model level rather than the strategic decision level, next I discuss the findings of previous literature on the strategic context considered typical of IEBMs. There is no reason to assume that business model decisions would affect the validity of the findings, so this brief presentation also helps in understanding the business model level MCS.

3.2 Context of new product development and MCS

The business model literature stems mainly from strategic research, exploring different strategic choices and their success. In this study, the strategic context is a 'given' because IEBMs presuppose certain strategic choices (Porter, 2001). As I stated earlier on [the typical characteristic of IEBMs](#), such a strategy is usually followed in which new products or services are innovated using new technologies and the Internet. Researchers have named these types, for example, differentiation (Porter, 1985), entrepreneurial (Miller & Friesen, 1982) or prospector (Miles & Snow, 2003) strategies. Business models that follow this type of strategy aspire to unique products and services with high investment in R&D and innovation (Amit & Zott, 2001; Porter, 2001). The strategic management accounting literature has studied how an uncertain R&D environment affects the MCS (Govindarajan & Gupta, 1985; Merchant, 1985; Simons, 1995). It has been verified that companies implementing a technology strategy benefit from building a strong corporate culture and the associated behavioural and personnel controls (Abernethy & Brownell, 1997; Ouchi, 1979; Perrow, 1972; Rockness & Shields, 1984). The existence of MCS overall, as well as the systematic use after launch in R&D, has been found to be important (Davila, Epstein, & Shelton, 2013). The establishment and balancing of control systems in development organisations relate to uncertainty but also legitimate reasons, external contracts, reactivity, and the management's background (Davila, 2000, 2005b, 2009; Granlund & Taipaleenmäki, 2005; Taipaleenmäki, 2014).

Bedford & Malmi (2015) explored accounting and other control mechanism combinations as a package and how these combinations reflect the contextual

circumstances. They developed a taxonomy of five control configurations labelled as simple, results, action, devolved and hybrid, out of which simple, results and devolved controls have similarities to many previous studies, but action and hybrid controls are not as widely recognised. Action types of controls are flexible variants of traditional bureaucracy (including accounting), and hybrid types refer to a mixture of a wide range of control types, even conflicting ones. Bedford and Malmi's (2015) idea was to find out how controls combine in practice. By opening up the control context in more detail, they found combinations and nuances that do not emerge when forcing companies into the 'ideal types' of strategies and control systems. Consistent with earlier findings, the action controls were significant in companies in an uncertain and turbulent context. The action control type emphasises broad-scope information, with rather low use of accounting controls, especially for affecting individual performances, but accounting may function as a supplement to the direct observations of senior management (Bedford & Malmi, 2015).

Bedford and Malmi (2015) associated technological outcome measurability, task programmability, innovation and customer focus with the hybrid control type. Hybrid control is strongly associated with increased bureaucratic structuring balanced with participation, delegation and discretion in company activities, interaction, lateral integration (systems), and high reliance on socio-ideological controls (Bedford & Malmi, 2015). The last indicates the building of a strong organisational culture. Some companies, including those with significant bureaucracy in their structures, are operating in relatively uncertain and turbulent conditions, a condition associated more with a complex hybrid control mode. Strong organisational culture is often considered a substitute for bureaucratic controls, but the study of Bedford & Malmi (2015) suggests them rather as complements of each other. It also seems that results controls are not limited to a stable business context but also relatively dynamic and uncertain contexts, then usually combined with bureaucratic and socio-ideological mechanisms (Bedford & Malmi, 2015). In addition to the above, a special offering for this research from Bedford and Malmi (2015) is a detailed research approach. MCS package research is often at a very general level, but in the practical work of a controller, information is also needed about the details.

Abernethy et al. (2015) concentrated on the substituting and complementing roles between employee selection and compensation. They found that in an uncertain environment, employee selection receives more attention than rewarding. Rewarding and compensation become less-emphasised when output is more difficult to measure reliably (Abernethy et al., 2015).

Bedford et al. (2016) examined combinations of MCS effectiveness in a different strategic context. In the survey study, they used both the MCS package view and system view to enlighten how the different controls are used in a diagnostic,

interactive, tight or loose, subjective or objective way. In a prospector strategy (Miles & Snow, 2003), the organic use of structural controls combined with the interactive use of accounting controls was found to be beneficial (Bedford et al., 2016).

Globocnik, Faullant and Parastuty (2020) studied the strategic, business model, tactics, and operations levels of business and developed an integrated coordination and control framework for aligning the strategy and business model. In the framework, they suggested formal output and behavioural controls (Ouchi, 1977) for goal congruence and organisational alignment, as well as technical controls for aligning the business levels. They defined certain functions that control systems should monitor on each level of business, and presented verification of the efficient strategy implementation, provision of the needed resources, and smooth functioning between business model entities as most relevant for business model level control (Globocnik et al., 2020).

Ahrens (2018) continued Swidler's (2001) discussion of activity and practice hierarchies that underlie an organisation's MCS package. His approach differed slightly from earlier MCS studies, where the starting point is usually an organisation, with the MCS depending on the environment of that organisation. Ahrens (2018) takes practices as a starting point for his analysis because practices in large corporations are not even limited to one functional organisation or location but build from activities adapted to the environment and are the core of the organisation's activity. In the case of a change project of a big financial corporation, he identified central and marginal practices, which formed a hierarchy where an MCS of cost management appeared to guide all other practices. The more central MCS characterises, i.e. anchors, how the organisation acts, making it a constitutive rule (Ahrens, 2018).

Recently, Carlsson-Wall et al. (2021) continued on the constitutive rule of an organisation when they explored new product development activities and their management through MCS anchor practices. An anchor practice can emerge from the adjustment of new product development strategies and can apply a constitutive rule, i.e., the strategic grounding of a company. An anchor MCS practice relates to the organisational context and has a role in formulating organisational practices (Carlsson-Wall et al., 2021). The idea of an anchor MCS practice is very significant for this study. The choice of open-source technology brings with it practices, some of which are more decisive than others, but certainly, they characterise the organisation as a whole.

Although most of the strategic MCS literature does not clearly distinguish the strategy from the business model, there are valuable findings in the context of new development. In summary, it has been proved that in that environment, building a strong organisational culture with behavioural controls is the base, and other control types complement this. Hybrid-type MCS packages, i.e. combining behavioural and

bureaucratic-type controls, like measures, are found to be beneficial, as are organic and interactive ways of using them. Business model level decisions were not particularly discussed, but anchor practices relate to all levels of business and are especially interesting for this study.

3.3 Innovative environment and MCS

Strategies pursuing unique products and services require investment in R&D and innovation (Amit & Zott, 2001; Porter, 2001). Besides products and services, the IEBMs also require innovation of the model itself (Achtenhagen et al., 2013; Purkayastha & Sharma, 2016), which elevates innovation as one of the basic pillars of IEBMs (Amit & Zott, 2012; Chesbrough, 2010; Teece, 2010). Innovation as a term differs from creativity. Innovation already includes at least some idea of utilisation. A creative idea can lead to an innovation, a new product, service or process (Amabile et al., 1996; Chenhall & Moers, 2015). MCS research has been interested in innovation because of the tension it creates in an organisation between freedom and an appropriate level of control of behaviour. Earlier studies also support understanding the MCS of IEBMs as highly innovative organisations.

In his survey of using performance measurement systems, Henry (2006) explored the effects of four capabilities, one of them being innovativeness. He suggested that interactively used performance measure systems within the MCS package contribute positively to the deployment of innovativeness. In addition, the balanced use of measurement systems contributes positively to capabilities in a context of high uncertainty and an organisational culture of flexible values. He raised the role of MCS as a capability rather than a restrictive factor (Henri, 2006).

Pfister and Lukka (2019) identified the conditions where strict result controls, i.e. measures, enable rather than diminish innovation. Their case study showed that employees of a high-tech, highly innovative company can be productive and creative and develop process innovations, even under the pressure of stretch targets. In that study, the organisational culture and behavioural controls were also strong, but the specific interrelation between them and the measurement established conditions where employees could innovate even under externally induced pressure, indicating the enabling value of MCS (Pfister & Lukka, 2019).

Chenhall and Moers (2015) studied how innovation affects the design and use of management accounting (MA) techniques and, especially, how MCS functions in complex control situations relevant to innovation. In their comprehensive review of MA literature, including various practices and control systems, they confirmed the development from simple, calculative systems to more complex, broader control systems, and that a broad view of organisational engagement and processes has occurred over time in innovative context (Chenhall & Moers, 2015). A quite similar

outcome was found in Barros and Ferreira (2019) when they noticed the discussion had moved from the restrictive nature to enabling and supporting roles of the MCS. Innovation requires the simultaneous deployment of multiple controls, i.e., a package that evolves has specific times when it must be used, and types of innovation (Barros & Ferreira, 2019).

Bedford (2015) studied the individual and complementary effects of control on performance across two different innovation modes: exploitation and exploration. Using March's (1991) definitions, by exploitation he refers to operating with existing competencies with possible minor refinements, while exploration requires new competencies. When combining the modes of innovation with levers of controls (Simons, 1995), he found that different levers of controls supplement each other in firms specialising in one mode of innovation, either exploitation or exploration. In exploratory innovation firms, the interactive method of using control was found effective in performance, as the diagnostic use of boundary systems benefits companies that use exploitative innovation. Firms tend to benefit from emphasising diagnostic and boundary systems. In firms utilising both exploitation and exploration modes of innovation, the combined use of diagnostic and interactive controls in a balanced way creates a dynamic tension which benefits performance (Bedford, 2015).

The relationship between innovation and incentives has raised discussion because of its duality. Innovation cannot be dictated or 'ordered' by the management but is born from non-monetary motives. Speckbacher and Wabnegg (2020) studied two types of innovation sources, knowledge exchange and distal search, finding them complementary in driving innovation. The benefits from each of these two behaviours depend on the presence of the other. They found explicit incentives effectively support knowledge exchange, while implicit career incentives motivate knowledge search. The combination of adequately designed explicit incentives with implicit career incentives motivates both behaviours effectively (Speckbacher & Wabnegg, 2020).

Henri and Wouters (2020) studied whether the interdependence of management control practices with a mix of information supports or impedes product innovation. They investigated whether the diversity of non-financial measures and the functionality of cost information specifically and jointly contribute to product innovation and whether environmental unpredictability moderates control effects. They assumed that when environmental unpredictability increases, the need for information becomes greater and more diverse, and the benefits of both cost information and non-financial information become more relevant for innovation. Their findings showed that both the diversity of non-financial measures and cost information functionality positively influence product innovation, regardless of the level of environmental unpredictability. The interaction between the functionality of

cost information and the diversity of non-financial performance measurement does not influence product innovation. In a context of greater environmental unpredictability, they found the two control practices to be complementary, triggering product innovation. Conversely, in lower environmental unpredictability, the control practices were substitutes, disturbing product innovation (Henri & Wouters, 2020).

The findings of Henri and Wouters (2020) assure the idea of information trust in innovative companies. Information on all levels of business, including the business model level, connects measuring to the business model level of decisions. However, it is not only about the diversity of measures but the package design needs to be balanced, and the measures need to be used as bases for intensive and constructive discussion within the company (Bedford et al., 2019). The balance of performance measures, used together with vivid debate tools for the senior management, contributes to generating cognitive conflict and, through that, achieves both radical and incremental innovation outcomes (Bedford et al., 2019).

Recently, business model innovation and its relationship to management control have been taken in discussion. Aaltola (2018) explored management control in the strategic development of a business model and managerial innovations and connected Simon's (1995) levers of control with business model innovations. The main interests in his study were the strategic development of non-technological innovations with a business focus aiming to add customer value through creative, strategic work. The non-technical innovations were divided into three themes: strategic story, co-development projects and validating experimentation, where the strategic story benefits from both boundary and belief systems, and co-development projects and validating experimentation benefit from interactive control systems (Aaltola, 2018). The study showed the challenge of business model innovation, as only four of the ten development projects were successful. Although the business model innovation is not a focal subject of this study, it connects to an open-source way of working, as it is similar to co-development and even validating experimentation with community co-operation.

The discussion of MCS in an innovative environment has developed from a restrictive tone towards enabling. The earlier research has discovered that a broad range of interrelated measures, both financial and non-financial, provides information from all levels of business, which has been found to be beneficial for performance in innovation. Interactiveness and cognitive tensions, but a balanced MCS package, have also been found to be beneficial and supportive in an innovative environment.

Now, in the following, I move from the package view of MCS to the concepts of individual control systems within the package. I present a common definition, as well as mechanisms, of how each system is found to function in earlier studies.

3.4 Control systems within a package

Above, I have explored some MCS package studies in circumstances similar to the case of the study at hand. However, each type of control system presented in the typology of Malmi and Brown (2008) has a significant research path of its own. As I chose to use that framework for opening the MCS package of the case, I briefly present each control system here. Studied independently over the years, the concepts have been defined slightly differently for different purposes, and therefore, the following description will aid in understanding the concepts before analysing their appearance in the case business model.

3.4.1 Cultural controls

Culture, as a national or societal term, defines how a person experiences their environment. Along with personality, culture defines how an individual should act and make decisions within their own cultural group. When individuals bring personality and culture to an organisation, together with the organisation's norms and values, they form an organisational culture⁵ that continues to develop further among employees. The societal culture and the organisational culture both have effects on the design and interpretation of MCS. Culture in particular affects the formality and degree of bureaucracy in MCS formulation (Birnberg & Snodgrass, 1988).

Ouchi (1979) suggested that organisational culture as a control needs an implicit social agreement on values and beliefs between group members. Being informal, the results of cultural controls cannot be measured or otherwise objectively detected. Cultural controls are reflected in the commitment of group members and how actively they participate in actions. However, cultural controls need a legitimate framework – an organisation – to work properly as controls (Ouchi, 1979).

Cultural elements usually discussed in connection to MCS are beliefs, values, attitudes and patterns of behaviour. Similar patterns in the behaviour of several group members indicate the formation of a clan. Birnberg and Snodgrass (1988) define a clan as a homogeneous cultural subgroup in the sense of beliefs, values and norms (Birnberg & Snodgrass, 1988). That homogenisation does not happen overnight but requires a lengthy process of socialisation. Years of studying for a profession may be a socialisation process (Ouchi, 1979), but the process continues and strengthens by sharing beliefs, building trust and creating an organisational story (Clark, 1971).

⁵ The roots of studying organisational culture are anthropology and sociology, researchers in which areas have created the basis for the study of organisational sociology and culture (Ouchi & Wilkins, 1985).

Building a clan relies on selecting the right individuals, who share the same individual objectives, and whose objectives at least largely overlap with the organisation's goals. With strict selection, an organisation can expect a high commitment to the goals and start the socialisation process (Ouchi, 1979). Chua et al. (2012) compares the functioning of clan control and formal controls as follows: "Unlike behaviour and outcome control which rely on the direct application of formal power or organisational authority to control clan control draws on interactions among members of a clan to direct, influence, or regulate others to achieve project goals. These interactions are realised in the form of norms, peer sanctions, rituals, and ceremonies." (Chua et al., 2012). The main difference comes from interactions that are horizontal in clan between equal clan members rather than vertical between supervisor and subordinate.

A wide definition of symbolism, in the organisational context, covers all the members' ways of expressing shared values and ideologies. The first appearance of a company to outsiders is often a logo, a material type of symbol, but symbolism can take various unmaterial forms. Stories, myths, ceremonies, ritual events, and even jokes that spread around an organisation symbolise a certain organisation (Dandridge, 1980). Symbols and symbolic acts can direct actions in the wanted direction, for example, in an organisation's change management (Peters, 1978), and the power of symbolic elements can give authorisation for domination and control over the organisation (Golding, 1979). Although symbolism may seem like a gentle means of behavioural control in organisations, history proves otherwise. One only needs to think about companies in wartime to find examples of power.

3.4.2 Planning controls

Planning, as a control mechanism, drives actions towards the desired outcome before the actions take place. It is a proactive ex-ante control method, which aims to prevent possible unwanted future events. Planning control systems act effectively through three mechanisms: 1) clarity of goals, 2) goal congruence between individual and organisation, and 3) participation (Flamholtz et al., 1985). The planning process can be divided into two flows: resource planning and monetary planning, and the planning usually has tight connections to follow-up, measuring and rewarding (Flamholtz, 1983, 1996; Hansen et al., 2003). Anthony (1965) emphasises that planning is far more substantial than the planning of financials. It is a mental exercise, separate from an organisation's concrete, daily activities with wide engagement. Decisions are quite different depending on the level of an organisation (Anthony, 1965). Monetary planning, or financial planning as in Anthony (1965), is commonly referred to as budgeting. I describe budgeting further in the chapter on

[cybernetic controls](#). All planning, whether financial or of other resources, is often discussed in two different time perspectives: long-range and short-term.

The term ‘long range’ brings an idea of some specific time span to mind. However, long-range planning (LRP) is more about decisions and their long-lasting consequences rather than any absolute time frame (Anthony, 1965; Litschert, 1968). The strict connection to strategy building has caused terminological confusion, and ‘strategic planning’ has taken over from LRP almost as a synonym (Laamanen, 2017).⁶ LRP, as a control mechanism, clarifies and unifies goals and, when used interactively, commits employees to long-term target-setting (Anthony, 1965; Flamholtz et al., 1985). Because the time spans of the consequences of management decisions are quite different depending on the business, the LRP time span also varies. Planning time for sustainable use of forests and operations of pulp mills is in tens of years (Jones & Ohlmann, 2008), which is quite different from a technology-driven Internet company (Wirtz et al., 2010). LRP covers the planning horizon over one year to as long as it is feasible to make strategic decisions. The longer the period of planning, the greater the uncertainty about the business and technology towards the end. In high-technology IEBMs it is fair to assume an LRP of 2–5 years.

Action planning refers to a shorter time frame plan than the LRP, usually a year or less (Flamholtz et al., 1985). It is a process where company-level objectives are turned into team-level actions. In action planning, all possible problems for realising the strategy need to be solved (Cunningham, 1993).⁷ Anthony (1965) referred to action planning as “an operational level of control” focusing on the tasks and transactions of individual jobs (Anthony, 1965). Again, the attention should not be too much on the organisational level, but on decisions: they impact in the short term.

In both the short and long term, the proper control mechanism can only be effective when the employees are committed to the plans (Malmi & Brown, 2008). As noted earlier in this descriptive theory chapter, previous studies have found interactive use, i.e., involving employees, beneficial for commitment and outreach in uncertain and innovative circumstances (Abernethy & Brownell, 1997; Bedford, 2015).

⁶ In the 1970s, LRP was still in discussion, for example (Ackoff, 1974) and (Karger & Malik, 1975). In the 1980s, the discussion turned more towards strategic planning (Scott & Bruce, 1987; Ford, 1988; Mintzberg, 1982; Porter, 1985).

⁷ On arranging the action planning process in general, see (Cunningham, 1993; Schell, 1991).

3.4.3 Cybernetic controls

A cybernetic control system is a time-related, frequent feedback loop, which compares the outcome of the activity with the previously set standard or estimation, to change the organisation's behaviour towards its targets (Daft & Macintosh, 1984; Green & Welsh, 1988). The full power of the planning process is completed with a feedback loop from cybernetic controls (Flamholtz, 1996; Flamholtz et al., 1985). In Anthony's (1965) terms, programmed controls are those which can be applied in pre-set and standardised activities, with known input and output on the operative level of the organisation (Anthony, 1965). He excluded management supervision and monetary controlling from programmed controls but shared the idea of formality and systematic feedback. 'Traditional controlling' often refers precisely to cybernetic measures, especially the accounting type of controls. They have been called formal (Anthony, 1965), output (Ouchi, 1977), bureaucratic (Ouchi, 1979) and financial result controls (Merchant, 1985), with some different nuances in definitions. On a high level, they could all be categorised as measures and plans for the measures. The measures become control systems when there is a link to planning and someone accountable for the results. Only those steps or the process can cause a change in behaviour (Malmi & Brown, 2008). Following the framework of Malmi and Brown (2008), I describe the cybernetic control systems grouped into budgeting, financial measures, non-financial measures and hybrid measures (Malmi & Brown, 2008).

Budgeting⁸ is the most widely used management accounting method through time for businesses. It can be understood widely, including both the process and allocation of monetary values throughout the organisation (Hansen, 2003). The word has also been used in a narrower sense, meaning only the plan in monetary terms and financial target-setting (Covaleski et al., 2006). Budgeting is a combination of information flow and activity processes. It needs a tight connection to other control systems, such as measuring and rewarding (Merchant, 1981, 1985). In this study, budgeting is

⁸ The research field of budgeting is vast. The research started from practitioners' real-life concerns in the 1950s, widening to the three main theory perspectives of sociology, psychology and economics in the 1970s to 1990s, and finally towards the new millennium turning to integrative research combining different perspectives (Covaleski et al., 2006). On the bases of psychology and sociology theories, budgeting research has explored how to unify individual and organisational interests and direct behaviour in the desired direction, reaching set targets (Brownell, 1981; Dunk, 1993; Hopwood, 1972; Lukka, 1988; Shields, 1998; Stede, 2000). A general description of budgeting processes and techniques can be found in Handbook of Budgeting (Lalli & Lalli, 2012) <https://ebookcentral.proquest.com/lib/kutu/detail.action?docID=817440>

understood as a parallel and interactive process with planning, at the end of which ‘the budget’⁹ is set and agreed upon for all levels of an organisation.

The dominant reasons for using budgeting are operational planning, performance evaluation, goal communication and strategy formation (Hansen, 2004). However, another role of interactive budgeting is a dialogue and a process integration tool in strategic change (Abernethy & Brownell, 1999). An efficient budgeting process, as a control system, requires connections to other systems:

“It is possible that a budgetary system may operate as though it were a complete control system if there are certain implied or perceived connections between budgetary measures and organisational rewards.” (Flamholtz, 1983)

A large number of studies have explored budgeting in contemporary, research- and development-oriented businesses. Bedford (1985) claimed that the budget only used as a follow-up and the measuring tool is associated more with companies executing an exploitative strategy, whereas instead, interactive use of budgets is used in innovative, exploratory companies (Bedford, 1985). Budgeting combined with an active use of administrative controls in the MCS package, such as systems and tools, is found to be a beneficial combination in development strategies (Bedford et al., 2016; Chenhall & Moers, 2015), and especially in a complex project environment (Davila, 2000).

Besides budgeting, other management accounting practices may act as control systems if they are systematically used for that purpose. The following are some descriptions and definitions of cost accounting as a control system.

3.4.3.1 Cost accounting as a control system

Diefenbach et al. (2018) explored the benefits of cost management as a control system. Often, cost management control is implemented to increase general cost-consciousness in the organisation. To release all positive impacts, a sophisticated cost management system should be implemented, which means a system addressing the chosen strategy, organisation, information flows, methods and culture. Even in radically innovative firms, the evidence verifies a positive impact on cost efficiency and organisational performance when a cost accounting system is used (Diefenbach, 2018). This allows the assumption that I might find a cost accounting practice in the MCS of the case.

⁹ “The word originally meant a pouch or wallet, and later its contents. In the mid-18th century, the Chancellor of the Exchequer, in presenting his annual statement, was said ‘to open the budget’.” (MOT® Oxford Dictionary of English)

Cost accounting¹⁰ is an extremely broad term for several techniques and processes that aim at gathering information about the costing of different resources, which information is used for management decisions (Johnson, 1981). Cost accounting can be purely an information system, depending on how it is used in a company. The full process of setting the cost targets, comparisons to the realised costs and possible behavioural change based on that, makes cost accounting a cybernetic control system (Malmi & Brown, 2008).

The roots of cost accounting are deep in the time of industrialisation, the late 19th and early 20th century, when the standard costing¹¹ was entrenched into textile and smelting plants in Britain and the US (Fleischman & Tyson, 1996).¹² With its origin in the times of human-powered manufacturing industry, cost accounting was about the consumption of raw materials and labour processes. Changes in the economic and societal environment of companies, global competition, smaller and flat organisations, fuzzy organisation and work-life boundaries, customer focus, and fast and individual communication¹³ led to new methods of cost accounting (Fleischman & Tyson, 1996; Otley, 1994). Such management accounting methods as strategic cost management (Shank & Govindarajan, 1993), activity-based costing (Johnson & Kaplan, 1987), time-driven ABC (Kaplan, 2004), target costing (Cooper & Slagmulder, 1997), and life-cycle costing (“Life Cycle Costing and the Business Plan, IEE Colloquium On,” 1994) turned the discussion from standard costing to such methods that serve better the automation of production, but also modern business models, like those enabled by the Internet.

Value chain thinking in strategic cost management gives answers to what really drives costs inside but also, importantly, outside a company (Shank & Govindarajan, 1993). It benefits all kinds of businesses, but implemented into an ecosystem, it might fit well into such a new business environment as an IEBM. The activity-based costing (ABC) method concentrates on analyses of processes, activities and real cost drivers of activities and products. Compared to standard costing, the trick of ABC lies in handling indirect costs (overheads) according to the matching principle rather

¹⁰ There is a basic presentation of cost accounting methods in *Management and Cost Accounting* (Bhimani et al., 2015).

¹¹ Meaning the cost of manufacturing with standard efficiency and conditions, including variance analyses

¹² Johnson (1981) also describes the development of cost accounting.

¹³ The list is only an exemplary: there can be other reasons, and there also can be causality between the reasons

than using coefficients on direct costs (Johnson & Kaplan, 1987). The use of time-driven ABC,¹⁴ and efficiency analyses based on it, might particularly benefit IEBMs.

Target costing¹⁵ starts from the market price of future products, then the desired profit margin is discounted from that and the allowed manufacturing costs are between those two. A company needs to hit this ‘target’ by making the right decisions on product development, manufacturing, logistics and marketing (Matherly & Kee, 2013). Target costing fits well in companies with a large product development function. It may need other cost management practices and control systems to complement other requirements like time-to-market or criteria for product quality (Wouters, 2004). Companies with a large product or service development function also use life-cycle costing assessment to prepare business case analyses. Instead of costing a product or service at the time of selling it, the life-cycle costing method provides a holistic view of costs in the development phase, in manufacturing and the selling phase, and finally, at the time of disposal (“Life Cycle Costing and the Business Plan, IEE Colloquium On,” 1994). The idea of the long-term sustainability of any human activity cannot be over-emphasised, even in the choice of control systems and accounting methods. Therefore, the target costing and life-cycle costing methods might be very beneficial for the outcome in IEBMs of clean technology or environmental efforts.

3.4.3.2 Financial, non-financial and hybrid measures

Traditional accounting-related control systems, such as budget and profit-and-loss measures, are still used widely in management reporting. They are highly trusted in decision-making within the senior management of companies; even their deficit as the only measures is well-recognised (Ittner & Larcker, 1998).

Financial measures refer to the metric figures calculated from the profit-and-loss statement or the balance sheet with no information on any non-financial figure. Gross Margin, Return on Investment (ROI), Return on Assets (ROA), and Return on Equity (ROE)¹⁶ are examples of these kinds of measures. They were initially criticised because of their strict reliance on accounting rules and legislation, as well as their disregard for the cost of capital (Ittner & Larcker, 1998). Second, their use as the only measures or even the only control systems in an organisation of intensive

¹⁴ The difference from ABC is in the handling of resources: instead of analysing single activities, whole departments are handled as a ‘resource capacity’ and allocated to the cost objects according to the consumption of the resource capacity. More about time-driven ABC, for example, in Kaplan (2004)

¹⁵ For the basics of target costing, Cooper and Slagmulder (1997).

¹⁶ Calculation formulas of the basic financial measures for example in (Simons et al., 2000).

research and development has been found insufficient for ensuring strategic targets (Abernethy & Brownell, 1997; Brownell, 1985).

In reply to criticism, new measures have been developed over the years. The Economic Value Added (EVA)¹⁷ measure reduces the cost of capital from the operating income. Cash Flow Return on Investment (CFROI) is a long-term return measure but it also includes the cash-flow view. Although both new financial measures have pros and cons, their development is a clear improvement on traditional financial measures (Ittner & Larcker, 1998).

MCS package thinking has brought solutions for the second source of criticism. Connected with some non-financial measures, the financial measures are also relevant and form an efficient control system even in companies with intensive research and development (Bedford, 2015).

Also, as an answer to the shortfalls of pure financial controls, adding non-financial measures to the MCS package increases trustable information about the future value creation power of contemporary business models (Ittner & Larcker, 1998; Kaplan & Norton, 2001). To increase capabilities and to manage process-level efficiency, managers have systematically started to plan and follow different operational level measures, such as cycle times and quantities, to reach the management objectives¹⁸ (Greenwood, 1981). The further development of this driver-based value creation management led to the birth of the Balance Scorecard (BSC) (Ittner & Larcker, 2001). The term 'balance scorecard' refers to the balancing of financial and non-financial measures, result-oriented measures and future-oriented measures, as well as the balancing of different perspectives such as financial, operational (internal), innovation and customer perspectives (Kaplan, 1992).¹⁹

The benefits of the BSC compared to traditional financial measuring are in strict connection to the strategy. The BSC ties all levels of an organisation to a strategy, brings a customer focus to the management's attention and prevents sub-optimisation (Kaplan, 1992; Kaplan & Norton, 2001). It has been criticised for

¹⁷ Developed originally by Stern Stewart & Co.

¹⁸ More about the Management by Objectives (MBO) in (Drucker, 1954): "*The practice of management*", Harper, New York

¹⁹ The publishing of the book Kaplan, Robert S., Norton, David P.: "*The balanced scorecard: translating strategy into action*", Harvard Business School Press, 1996, caused bursting on the BSC research. Thousands of research articles have been published since, with three main discussions: a BSC implementation as an answer to the future value creation, BSC's in connection to the other management accounting techniques, and impacts on an organisation's performance and evaluation (Ittner & Larcker, 2001) As a latest 'trend' in the BSC research, the sustainability issue has been added as a perspective for balancing the score card..

assuming a logical causal relationship between measures and strategic results and directly combining a long-term strategic time frame and short-term operational measurement (Norreklit, 2000). However, using BSC brings formality to measuring. Behaviour-related biases in measuring cannot be completely avoided, and the objectivity of organisational level performance or individual evaluation does not automatically increase when there is a BSC in use (Cardinaels & van Veen-Dirks, 2010; Ittner & Larcker, 1998). Also, non-financial measures need connections to other control systems and a feedback loop to act as a proper control system (Bedford et al., 2016; Malmi & Brown, 2008).

By combining financial and non-financial measurement systems within MCSs, management has designed efficient hybrid systems. In these, the good sides of both types of measures complement each other. Hybrid measuring systems often contain figures in euros, but in relation to resource consumption, for example, work hours. Especially in an environment similar to IEBMs, hybrid control systems have proven to be beneficial for the outcome (Bedford, 2015).

3.4.4 Rewarding and compensation

Rewarding and compensation as a control method work through cognitive and motivational mechanisms.²⁰ The expected value of a reward motivates, and that motivation increases both the individual and team effort to reach the pre-set goals (Bonner & Sprinkle, 2002). Rewarding and compensation are an inseparable part of cybernetic control systems, as the realised values of measures act as feedback for employees (Flamholtz et al., 1985).

Monetary rewarding can be a powerful tool. The challenge lies in aligning and optimising the target level with the strategy, as well as in accurately and timely defining the appropriate level of compensation (Aguinis et al., 2013). In response to the latter complexity, the management can reduce subjectivity in the evaluation process with accurate input data and transparency of the full process of rewarding (Bol et al., 2016). Rewards positively impact performance when they are directly contingent on the performance, appropriate in relation to the efforts and given through an equal and efficient evaluation process (Flamholtz et al., 1985). Bonner and Sprinkle (2002) made a quite similar conclusion that monetary incentives are motivating when performance targets have been interactively agreed upon with employees and when the goals are moderately achievable (Bonner & Sprinkle,

²⁰ The majority of research in performance and measurement control systems uses psychology theories as a background theory. The main topics have been motivation, the concept of justice, role theory, socio-cognitive models, participation, risk models, expectancy-valence and leadership styles (Davila, 2008).

2002). Because of the results' timing, rewarding has been considered an ex-post control system before. However, the anticipation of probable reward makes it also an ex-ante control mechanism (Flamholtz et al., 1985).

Earlier studies have revealed some interesting findings related to IEBMs' circumstances. In their research on substitution or complementary roles between employee selection and compensation, Abernethy et al. (2015) discovered that when external uncertainty increases, employee selection receives more attention. Rewarding and compensation lose their overall importance when the reliable measuring of the outcome becomes more difficult (Abernethy et al., 2015). Bedford et al. (2016) did not find rewarding and compensation a core controlling method within prospector strategies. The role of incentives was mostly redundant or minor (Bedford et al., 2016). These results suggest that the personnel of IEBMs might be motivated by the innovative environment and challenges more than by monetary incentives.

3.4.5 Administrative controls

The group of administrative control systems includes a wide range of organisational practices that organise, instruct or guide the correct way of working. Unifying organisational practices diminishes risks, increases predictability and, via that, promotes reaching strategic targets. Malmi and Brown (2008) divide administrative control systems: a governance structure, an organisational structure, and policies and procedures. The variety of practices in organisations is, of course, wide and unlimited, and not all of them control organisational behaviour. In this study, I concentrate only on such practices that are set by the management, form a complete process (set of activities) and aim to reach strategic targets.

Sometimes, management controls are described as the systems and methods which exist for a company's management. This serving of managers' decision-making is, of course, an important role for some systems, but the managing process itself, i.e. the governance and decision-making as such, act as a control system (Abernethy & Chua, 1996). Internal governance²¹ refers to establishing teams and nominating team leaders who have authority over the other organisation members and have the power of decision-making on all team issues. An agreed schedule for regular management meetings, a standard agenda for those regular meetings and decision-making are examples of activities that form governance (Malmi & Brown, 2008). A board, company financiers, tax authorities and other regulators establish

²¹ MOT® Oxford Dictionary of English: “‘govern’ = 1. conduct the policy, actions, and affairs of (a state, organization, or people) with authority, or 2. control, influence, or regulate”. Originates from the same Latin ‘gubernare’, as ‘cybernetic’.

external governance. In the IEBM context, the technological ecosystem creates an interesting external structure, which may also govern to a certain extent. I discuss the governance of the ecosystem further in [chapter 5.5](#).

Governance unifies internal managerial processes so that all organisation members know what is expected from them, and through that knowledge, governance promotes the achievement of the strategic targets (Todeva, 2005). The governance structure may change during the company's lifetime. A change of strategy, or any change in the operational environment, may lead to organisational changes, which in turn may change the governance (Abernethy & Chua, 1996). It is quite natural to presume that there will be differences in the governance between start-up companies and companies established years ago. The case of this study already has established governance structures, ways and practices, which was easily detected from the interviews.

The term 'organisational control' often refers to MCS in general, influencing behaviour in the organisation to reach common goals. A control system, called the organisational structure, refers to the control method that a defined, structured organisation retains itself (Emmanuel et al., 1990; Flamholtz, 1983; Flamholtz et al., 1985). Some earlier studies suggested that an organisation is more a result of the environment and contextual influences rather than the intentional choice of the company management. A decision-making authority is connected to the organisational structure, which structure is usually altered and adapted according to the strategy (Chenhall, 2003). Therefore, the organisation structure itself has a role as a control system (Abernethy & Chua, 1996; Emmanuel et al., 1990; Otley & Berry, 1980). Flamholtz (1983) described the organisational structure as a determinant of the degree of centralisation,²² task functionality and integration, and a determinant of the span of control. With the said functionality in a company, the organisation unifies the behaviour, increasing predictability and adding control ex-ante. With connections to the cybernetic controls, the organisation structure also contributes to control ex-post (Flamholtz, 1983).

The magnitude of the said control impact depends on the degree of individuals' interactive involvement in an organisation set-up and the goal congruence (Otley & Berry, 1980). Davila (2005a) argued that there need to be more than only a few employees in a company to achieve a proper control impact on the organisational structure. (Davila, 2005a). Informal communication between a few individuals can replace a formal organisation, but in a larger group, formal information channels become critical for growth, setting of goals and performance evaluation, and in that situation, a formal organisation structure benefits a company (Davila, 2005a).

²² Description of centralised, de-centralised, divisional and functional organisation designs in (Daft, 2001): *Organization : theory and design* (7th ed), South-Western.

Written instructions are helpful when someone is handling a task for the first time. Policies and procedures are especially practical, because they ensure that employees perform tasks correctly, avoiding mistakes ex-ante. Instructions can be formal but are often also informal (Macintosh & Daft, 1987).

Policies and procedures as a control system refer to written instructions, such as manuals, standard operating procedures (SOPs) and general policies. The instructions are meant to guide all employees in their daily work situations. Nowadays, these are rarely separate documents anymore, but are in-built into the IT systems. A modern Customer Relationship Management system (CRM), Enterprise Resource Planning (ERP) and Human Resources (HR) systems, to name just some examples, guide the user through the correct process. By following instructions on the screen and filling in the required fields, the user follows the standardised and approved process and is exposed to control at the same time (Jazayeri, 2003). The use of systems standardises and unifies processes, increases predictability and, therefore, also promotes reaching targets (Scapens & Jazayeri, 2003). However, using systems instead of instructions has been criticised as well, as they divide users' attention on system requirements and content, which, together with a lack of personal communication, may disturb the process and deteriorate the control impact (Stone & Lukaszewski, 2009). The wide use of systems generates a mass of data, which leads to common problems in utilising it all for decision-making (Tan et al., 2017).

Bedford et al. (2016) noticed that companies with new product development and innovation as central parts of their strategy benefit from the organic use of administrative structures (Bedford et al., 2016). In addition, some processes and procedures may create circumstances where the management can delicately guide towards strategic targets and still enable innovation (Pfister, 2014).

In this chapter 3, I have described the most relevant MCS research for the study at hand. Although most of it is written from a strategy perspective, it is reasonable to assume that the findings on the effects of innovation and development strategy on MCS are valid in companies that implement it with an Internet business model. They are valuable for analysing the MCS package of IEBM. Research on the context of new product development has found that companies usually build a strong organisational culture (Abernethy & Brownell, 1997; Ouchi, 1979; Rockness & Shields, 1984) as a basis for their MCS, but balance the package with some, even bureaucratic, hybrid control systems (Bedford & Malmi, 2015), that are used in interactive way (Bedford et al., 2016), and which monitor an efficient strategy implementation, provision of the needed resources and a smooth functioning on each levels of business, including the business model level (Globocnik et al., 2020). Ahrens (2018) identified a certain hierarchy of MCS practices, some being more

central than the others in the package. The central MCS rules, how the organisation acts, i.e., anchors the activities of the organisation together (Ahrens, 2018), and can also act as a strategic grounding for a company (Carlsson-Wall et al., 2021). These findings of earlier research in similar strategic circumstances than IEBM's are important in analysing the package of the case in this study. Further to similar circumstances, the innovation context has inspired many earlier MCS studies because of the tension it creates in an organisation between freedom and an appropriate level of control of behaviour. Strict budgeting and measuring systems have been found a capability factor more than restrictive for innovation (Henri, 2006; Pfister & Lukka, 2019). The design of a control package has moved towards a quite complex and broad set of systems, with the idea of enabling of innovation (Barros & Ferreira, 2019; Chenhall & Moers, 2015). In exploitative innovation, the MCSs are used interactively (Bedford, 2015), with the idea that both cost information and non-financial information complement each other as relevant information providers, triggering innovation in uncertainty (Henri & Wouters, 2020). Used as a debate tool for the senior management, measures are found promoting for a cognitive conflict and through that advancing innovation (Bedford et al., 2019).

In this chapter, I also described the individual control systems, which together form a package, and which are included in the framework of Malmi & Brown (2008). An organisational culture is, as noticed above, the base for all other MCS in innovative, uncertain development environments. Informal systems like the clan and values can be detected by searching for their building activities (Ouchi, 1979), recruiting, socialisation, declaring of values, etc. They are all *ex ante* control systems, i.e., preventing unwanted behaviour before it takes place (Flamholtz et al., 1985). Unifying teams' values and building of clan helps in anticipating the behaviour which diminishes risks. Planning and budgeting are also an *ex ante* MCS, which purpose is setting, unifying and communicating targets to all in the organisation (Flamholtz et al., 1985). Interactively performed planning activities add employees' commitment to the plans, and are thus an effective MCS (Malmi & Brown, 2008). The feedback from the outcome is usually arranged with Key Performance Indicators (KPIs), including financial, non-financial, and hybrid measurements (Malmi & Brown, 2008). Measurement systems are often used as a valuation tool for rewarding and compensation (Flamholtz et al., 1985). The expected value of a reward motivates *ex ante*, and that motivation increases both the individual and team effort to reach the pre-set goals (Bonner & Sprinkle, 2002). However, in prospector strategies the role of incentives have been found as minor (Bedford et al., 2016). Administrative controls are a wide range of practices that organise and guide the ways of working, and by that diminish risks and increase predictability of task outcomes (Malmi & Brown, 2008). Earlier studies have found

those practices benefiting development organisations by creating favourable circumstances for innovation (Bedford et al., 2016; Pfister, 2014).

Now, in the following chapter 4, I thoroughly describe the case company activities for discovering the MCS package that the management has designed over the years.

4 The Case: MCS package of the IEBM

In chapter [1.6](#), I wrote a short introduction to the Company. In summary, it is a software product developer with an approximately 11 M EUR turnover and 130 staff. They operate in an open-source business model within the Google ecosystem. In the following, I explain the details of the case, also including the products and position on the market. Chapters 4.2 to 4.6 present the appearance of management controls as they reveal themselves in the research material. Here, too, the presentation follows the typology of Malmi & Brown (2008), and I collect all the found MCSs into a template (Appendix 1), which summarises the MCS package of the case. I discuss the findings in chapter 5.

4.1 The business model of the case

The core of all operations in the Company is the development of the toolkit for coders. As explained earlier, all parties can exploit the source code commercially without notifying the Company or the technology owner. Again, according to the open-source principles, all the users/coders form a community in which they share experiences, innovations, problems and their own opinions about the product. By discussing within the community, the users make their requirements known and, in that way, contribute to the product development. In terms of the cathedral and bazaar types of open-source business models (Raymond, 1999), the Company is a cathedral, strictly steering and leading the development of their product framework.

“...we are in the mainstream of open-source business models in the sense that usually someone controls the development... and in our case it is us who have strict control. Therefore, I value development as the most important aspect of our business model.”

(CFO of the Company)

The community is a crucial actor in all open-source business models. It is also relevant for this examination of the MCS, because some control systems have a tight connection to the community part of the IEBM. In Figure 6 below, the community is in the middle (1). For the community, the company offers a free product framework. Some of the community members will subscribe to a licence for a range of additional products or buy additional support services, which means that a proportion of the community become customers (2). In 2017, services were the biggest income source for the company, but in 2019, product sales exceeded service sales for the first time, and now software products are the main contributor to the turnover.

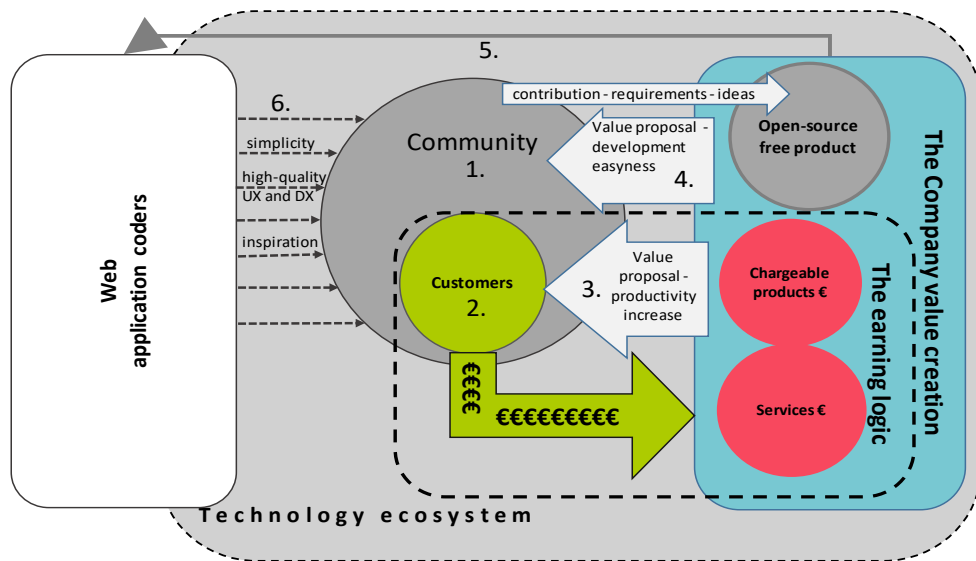


Figure 6. Business model of the Company - modified from the Company's vision & strategy material 2017.

A significant productivity increase in the development project is the value proposal of the Company for the customers (3). For the whole community, the value proposal is the ease-of-use of the tools and a moderate productivity increase in their development efforts (4). The efficiency needs to improve just enough to get them committed to the products because there is always a big threshold to change to a completely different technological solution later after using a free product. The community contributes to the toolset's content with their own ideas (arrow from the community to the free open-source product in Figure 6). In addition, the Company influences, intentionally or unobtrusively, the professional web application coders (5) who require a simple and high-quality user experience (UX) and designer

experience (DX). The needs of coders around user or designer experiences inspire and motivate the community, which then seeks and shares answers to any coding problems that appear (6). In Figure 6 I have framed the earning logic of the business model within the dotted line of a rectangle with rounded corners. In short, the idea is to convince coders of the value of the free product toolset, get them to join the community, and then actively market to them chargeable tools or services and capture the value-added from those as sales. The technology enables the whole structure. The ecosystem of technology providers is, of course, larger than the pictured business model. Therefore, the outer border is only a dotted line, as the ecosystem consists of other business models within the same technology.

In terms of Weill et al.'s (2005) archetypes (Figure 5, page 32), the business model of the case is a mix of 'Inventor', 'IP lessor', and 'Contractor'. The value creation through software product development puts the business model in the inventor role. Offering fixed-term subscriptions to chargeable products makes the business model an IP lessor, and finally, providing services for any web application projects makes the Company a contractor in human assets. The case is like a textbook example of an open-source IEBM. It develops a software product and adds services to its business model, which is the most usual combination for open-source business models. The Internet is the infrastructure, application provider, and commercial context for the Company. The IEBM characteristics discussed in chapter 2.2 are all present in the case: value creation and capture through the Internet, innovative strategy, operations as a part of the ecosystem, high technology utilisation, innovation in both new products and the business model, intangible products and services, expert organisation, risks and uncertainty arising from several sources, public financing and global markets.

The described IEBM context increases external uncertainty because vital actors are not within the power of the Company, yet it needs to anticipate their future actions. The technology supplier is so huge that there is virtually no alternative. They cannot reduce risks by expanding the supplier field or making backup plans in case the chosen technology fails because there are no alternatives in practice. Uncertainty arises not only from the strategy but also greatly from the choices made by the management on the IEBM level. With the choices, I refer to those that Osterwalder (2004) called as an architectural level in Figure 4. The company management decides on the earning logic but must also tackle the above-mentioned uncertainty. The management needs to affect the employees' behaviour cleverly so that it is sympathetic to the community and the ecosystem but simultaneously efficient inside the organisation.

4.1.1 Products and services

The main product of the company is a toolset for professional software coders. The toolset (later called “the framework”) consists of bits and pieces of software components. An end-user of the web-based system sees the product as icons, buttons, menus, text boxes and other visualisations on their screen. With the framework, all coders can integrate background systems and create uncomplicated access for the users of any web system. An example could be a system for managing and selling insurance in an insurance company. Several databases or subsystems, from the customer’s internal or external source, may need to be integrated as an efficient dashboard, for example, used in the insurance sales organisation.

The main product framework is free of charge. With a fixed-term or continuous subscription, a customer licenses use of an additional product package. The additional product package contains more components than the free version and a higher support level from the Company. Currently, three product packages are available, each containing a different amount of support service hours wrapped in the package. The wrapping of appropriate value-added to the package is quite crucial for the success of value capture.

“Packaging questions are far more relevant for us than pure pricing questions. We are just about to raise our [two premium products] prices, because I have made the analysis that those are not very price-sensitive now.”

(COO of the Company, acting VP of Sales)

The acting VP of Sales, emphasises the significance of packaging questions over pure pricing questions. On the other hand, the Product Marketing Manager highlights the value proposition of the products:

“...then we have this value promise, especially to Java coders, that you can do more [with the products]. And we can also add some more customer value because they don’t need a big development team including both front-end and back-end developers, but the back-end team can do more... that saves money.”

(Product Marketing Manager)

The appropriate level of value capture means the level where the community members feel they are getting enough value (time savings), but also the Company has a sufficient margin for further value creation in the future. This is the target when wrapping products and services in a subscription. In addition, the Company sells hourly charged services for customer projects related to web application

development. In that case, the Company offers resources as an external project member according to customer needs. This value capture by services does not differ from other service business models and is a very common model in the open-source business.

4.1.2 Customers

The Company's customers are scattered all over the world. Many of them act in global business themselves. They are a motley group of business entities with one common denominator: they are professional coders who struggle with an aspect of system usability. They are entrepreneurs in software businesses, or they can be employed in the developer team of a big corporation. There are more than one thousand registered customers, but their size varies from a one-person start-up to the largest corporations in the world. The needs of different customer groups are frequently checked, and the feedback influences the content of the product packages.

Entrepreneurs and micro-sized companies typically use only the free product framework and occasionally subscribe to some additional components. The licensed products are subscribed to quite evenly by mid-sized companies to big corporations. Consulting services and training are usually ordered by a growth company with more than a hundred employees. Common problems in all customer organisations are cost pressure and tight schedules. Customers need feasible, high-quality solutions fast, which makes them interested in the Company's products and services.

4.1.3 The market and competitors

The Company acts in a global business-to-business market. This directs the business to the areas with the biggest number of other businesses. Currently, 50% of the turnover comes from the United States and the other 50% from the European Union countries. Germany, Great Britain, Austria, Switzerland, Italy, Sweden, and Norway are the most important European export countries. Only 10% of the current turnover comes from Finland.

Competition does not come from any company as such, but from competing technologies. This means that web applications and system integration can be solved and implemented differently. Different solutions, including the technology used, compete in customers' decision-making, which creates competition for the Company. The core of the Company's technology solution is the web components standard of the World Wide Web Consortium (W3C). Based on that, the Company has created both the free and payable product framework with Google's technology. With the free product framework, the Company competes against other free-of-charge technologies which offer a similar solution for customers. Competing

technologies currently come from the other world giants, Meta Inc. and Twitter Inc. Google Inc. also offers other technology solutions.

Some smaller companies can be competitors of the Company as well. The small players may not have a full-range solution, but they can offer affordable part-solutions, which, together with their architectural decisions, can solve customers' development problems. The Company answers to the competition with simplicity. A wide product framework with a full range of services provides a full solution without a complex system architecture. They aspire to wrap a higher value proposal into the product framework and services than any competitors' solutions can offer. Competition and market position do not affect the business model functioning in any way. However, if the Company made a strategic move to serve some other type of customers, public institutions, for example, that might affect the business model, and probably the MCSs too.

4.1.7 Operative functioning

All functional operations in the Company are planned beforehand. I describe the planning in detail in chapter 4.3. Here, I explain how the Company operates in general in the open-source environment.

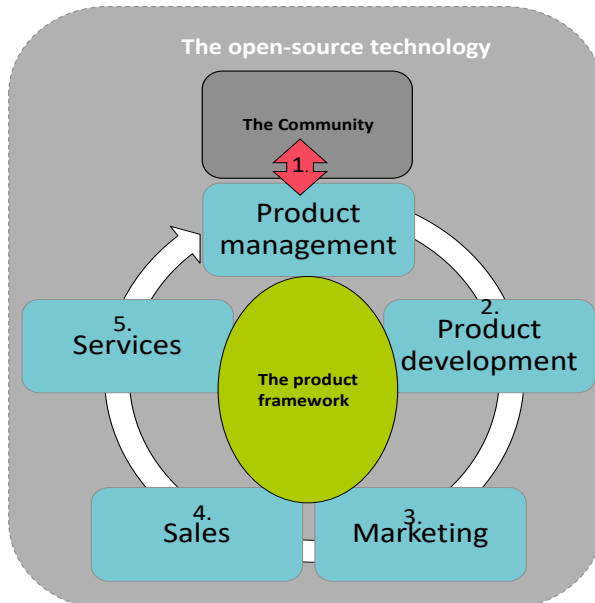


Figure 7. Operative functioning of the Company.

The Product Management team is in a key position in defining what is and will be available for customers in the product framework. Product Management owns the product framework, and they have open communication between the Company and the Community (1). They try to imagine how to best help them in their web development and what could be the next feasible addition to the product framework. In addition to participating in the Community's developer discussions, they participate in IT-related fairs, discuss with technology experts, read blogs and participate in discussions on various social media channels. They try to anticipate the directions of competitive solutions in the market. Product Management decides which group of tools is invested in next and what features are prioritised. The Product Marketing team is responsible for scheduling the product roadmap. They use all their expertise to answer the Community's expectations with an appropriate product specification for the Product Development team (2.). In the Product Development teams, new pieces of software are designed, coded and tested to be part of the product framework. The Product Development organisation owns the realisation of products according to the specifications. They commit to six-week project cycles, and in the case of any delivery problems, negotiate the priority of product features with Product Management. Operative weekly meetings are an essential part of this synchronisation of development.

Marketing (3) begins to provide information about new features to the community and existing customers. Of course, it also strives to inform the widest possible range of web developers in general about the news. The most important channels for marketing in the Company are direct emails, web advertising and social media channels. The aim is to get professional coders first interested, then experimenting with the product and joining the Community. From Community members, Marketing identifies prospects who are highly likely to order a chargeable product or service. Marketing selects leads for Sales, who then realise bookings and customer orders. Earlier, Marketing's efforts culminated in the industry's biggest fair at the beginning of October, but currently, efforts are being made to market continuously throughout the year. Marketing closely monitors all visitor numbers on the server of the free product framework and web page. Out of those visitor numbers, they generate leads, i.e., prospective customers for the sales organisation.

The Sales (4) team concentrates its efforts especially on leads qualified by Marketing. Sales analyses the leads, processes them further to be sales leads and engages them by an appropriate offer on value gain on development projects. These two organisations, Marketing and Sales, need a seamless information flow. That is implemented through the CRM system and deepened even more with the operative weekly meetings.

Services (5) focus on existing customers. Most of the personnel in the Services organisation act as consultants in customer-led projects. Only some execute a whole

project for a customer, like a turnkey project. Customers need help with system architecture or user interface issues, or they may need online support in using the product framework. They might also have a customised development suggestion for a piece of the product framework. Services arrange training on efficient use of the product framework and the development of web applications. The Sales organisation sells services to the customers. Because of the scarce resources in Services, it is vital to synchronise the promise and availability between the two organisations, Sales and Services. For that purpose, they use a Resource Planning and Management system (RPM) for capacity planning and alignment.

The white, round arrow in Figure 7 through all the organisations depicts the administration organisation. They call this administrative function as Operations. It takes care of all practical, routine, and repetitive tasks which can be handled from outside the business functions. For example, Operations is responsible for HR, internal IT, accounting and finance, including the closing of accounts and monthly reporting. The Operations organisation manages the tasks, even though they sometimes use external resources in their execution. The target of Operations is to tend the business functions urgently, avoiding any friction to the serving of external customers. Obviously, the use of external resources keeps Operations within the Company slim and efficient, but requires open and frequent communication between the external resources and the managers in the Company. In this communication, the IT systems have a big role.

Figure 7 shows that the most noteworthy part of the IEBM's operations is the red arrow between the Community and the Product Management team. Everything the Company does starts from that connection. Although the connection is officially limited to one organisation, there could be red arrows between the Community and all the functions. Employees of all the teams extensively follow the movements of the Community, as well as trends in the industry. I return to this practice more in the following chapters, especially chapter [4.6.3 Procedures and practices](#).

4.2 Creating organisational culture in the Case

I presented in chapter [3.4.1](#) the theoretical basis of how the building of organisational culture acts as a powerful control system. In the following, I describe how I experienced the building of the team, values, and symbols through the research interviews, materials, and observations on the Company premises.

First, the ethnic diversity of people is wide, which means that the foundation for the organisational culture cannot be tied to any national culture. The diversity has even increased between 2017 and 2022:

“Actually, right after this interview, I’m going to pick up one employee candidate from a hotel, an Albanian, who is moving here with his family. He comes from nearby, as we have people from Egypt and Nigeria. From Brazil we have a few..., we have Colombians, Uruguayans, Macedonians... I can’t even remember anymore... 15 to 20 different nationalities.”

(VP of Services in 2017)

And the diversity has even grown during the years:

“We are a truly diverse company. We probably have people of thirty different nationalities at the moment, and as such a company, equality is really important...”

(Human Resources Manager in 2022)

The building of a clan is especially important in companies like this. The strong ‘we-spirit’ moderates the differences between ethnical and national cultures. Clark (1971) and Ouchi (1979) emphasised the informality of clan controls, which makes them rather difficult to detect in an organisation, but they may be revealed through a careful selection of the clan members, and a socialisation process following that selection. I familiarised myself specifically with the company’s recruitment routines and the induction of new employees. By the time of the first-round interviews in 2017, the recruitment process, i.e., the selection of clan members, appeared to be very tight and thorough. Even though the whole IT industry suffered (and suffers still) from a limited availability of resources, the Company does not compromise on any requirements for getting new resources onboard. The recruitment process starts with an analysis of the needed skills and competencies. In almost all teams, these are “extremely high technical skills with high ability of communication”:

“Extremely good communication skills can replace a lack of technical competence, but technical capability also needs to be good.”

(VP of Services)

Similarly, the VP of Product Management highlights the need for a comprehensive job description that clearly outlines the desired qualities, including a technical background and an extroverted personality that facilitates effective customer communication. It is evident that striking the right balance between technical skills and communication abilities is crucial in these roles.

“I would prepare a very detailed job description, from which is clear what kind of person I’m looking for... the person needs to have a technical background, but also a noticeably extrovert personality, in order to communicate well with customers... a good balance between technical and communication skills is needed.”

(VP of Product Management)

When all candidates for positions already fulfil the requirements for similar basic capabilities and personalities throughout the organisation, it minimises fundamental disagreements over the values and goals later when the candidate becomes an employee. This also ensures a smooth socialisation process after recruitment.

A high education level with duly completed degrees was still a mandatory criterion in 2017. All employees had to have at least a Bachelor’s degree. Numerous employees, for example, in the customer support service, have doctorates. The requirement was said to stem from the CEO’s own doctoral qualification (interview with the VP of Sales), but without any proof of the origin, the principle was widely accepted and strictly followed in 2017.

“...well, it’s typical for this company. The requirement for a higher qualification has been almost like a supportive force here.”

(VP of Sales, 2017)

VP of R&D verifies the requirement of high education level:

“...Candidate or Master of Science levels, which we have as a minimum today, requires that you have had to learn certain basic things; otherwise you wouldn’t have passed the examination... it also says that you get something done.”

(VP of R&D, 2017)

Since then, the requirements for a university degree have been lowered. By 2022, the emphasis had turned from formal qualifications to expertise and skills:

“We test in the web-based coding test at least these technical applicants’ coding skills, so I would say we have lowered the bar. And also, that we absolutely required high education before is not an imperative anymore. We have noticed that skills may exist anyway. Even we still require... if you look at our job advertisements, there is still that criterion, but should we have an autodidact

applicant with a lot of work experience, for example, we will not dismiss them because they did not apply to the university.”

(HR Manager, 2022)

Now the HR Manager emphasises practical skills more than a degree. The change may be because of a global lack of coders and IT experts. Because the Company completely depends on expert resources, they may have to look at a wider range of applicants. Personnel changes in senior management may also be a reason for the slightly reduced criteria.

In 2017, interviewing candidates was also a lengthy, multi-step process. The HR Manager screened the candidates according to the defined job description and specifications. The recruiting team manager decided the criteria. The team manager was the first interviewer, some candidates proceeded to the next level, the head of function interviewed them, and finally, every final candidate was always interviewed by the CEO. In 2017, no one was recruited without the CEO’s acceptance.

“We are not recruiting people under my supervision, but to our teams below. We try to find very analytical and efficient people, who are good in communication. If there is any lack of clarity in any of these requirements still in my interview round, it will cut off the process.”

(CEO of the Company, 2017)

Several interviewees mentioned the practice of CEO’s final decision, like here VP of Marketing verifies:

“...well... [CEO] interviews everybody, and he makes the final decision on whether we can recruit the person or not.”

(VP of Marketing, 2017)

In 2022, after a change of CEO, the interviews have been cut to two, and the CEO rarely participates:

“... the CEO has been left out almost completely [from recruiting]. He participates in some... only in the key role recruits he still wants to see the candidate... but mostly he has been left out.”

(HR Manager, 2022)

As Ouchi (1979) described, clan control within the organisation reveals itself in signs of clan-building. The Company's careful recruiting process is one of them. The three phases were repeated in all interviews in 2017, no matter how desperate the situation was to get experts from the job market. Over the years, a change of emphasis from academic validation to practical skills and capabilities has taken place, but the clan-building remains strong. They still trust that all persons with a university qualification also have similar perseverance, core values and behaviour. However, in 2022, they may have exceptions to the rule.

The CEO's strong role before has more to do with the personality than the clan-building itself. The new CEO just trusts the organisation more, and therefore keeps hands-off where he is not needed.

After the appropriate selection of clan members, the building continues with the socialisation process, including a full introduction period, all-hands breakfast sessions, team-building days, etc. Obviously, the COVID-19 pandemic of 2020–2022 has affected all these events, but the socialisation process is important:

“Yes, I still pay a lot of attention to the fact that at the very beginning, a newcomer would get to meet a lot of people from different departments and get to know each other. Admittedly, it has now been more difficult during this corona pandemic and we have had to come up with new ways of doing things. But yes, we aim to get people inside that work community right from the start.”

(HR Manager, 2022)

The recruiting process and the subsequent socialisation build on the values. The official values of the Company are stated on the external website. They proclaim simplicity, great design, frankness, transparency, equality and approachability between all parties. All interviewees emphasised the importance of values, at least implicitly, but also put explicitly, as follows:

“We have an ongoing project for improving and making the recruitment process more efficient. Value-thinking is one part of that... it is a completely subjective matter now if a person is a team fit or not, and values are part of that team fit.

(VP of R&D, 2017)

Also, the Vice President of Sales, emphasises the organisation's commitment to values and their impact on the recruitment process

“...Operations already [HR Manager] eliminates persons [not fitting the values], and then finally, if not earlier, the CEO eliminates those... nowadays they officially go through values already in the Operations phase of recruiting.”

(Vice President of Sales)

I challenged whether interviewees also live according to the official values or only manifest them. All interviewees claimed that the written values are a reality in the company's everyday life (CEO, VP of Sales, VP of R&D as examples). When conducting the interviews in 2022, strategic work and a re-conceiving of the values were ongoing. However, I got the impression that only minor changes to the values were expected:

“We still have the same basic values, but we should probably update them a bit because of the new management... the basics are still the same. Transparency and open communication are of the utmost important for us. It becomes very clear the moment a person starts employment. We share all the financials monthly... and all possible information is shared... As we are a very diverse company, equality is very important. Kind of approachability also... everyone is worth your time. If someone has something to say, we try to help... co-operation... these are the basics, I'd say.”

(HR Manager, 2022)

The HR Manager's above quotation describes the feelings I experienced during the interviews. I could mention an example of how they respect everyone's time, even though I, as a researcher, was a complete outsider to the Company. There was some hassle with the calendar bookings of interviews, and two people had not received an invitation to the research interview at all. The interviews were supposed to be on that day, in the afternoon. I was sure the interviews would be forced to be postponed, but these persons arranged a time for the same afternoon, and I held the interviews as planned. The story pictures the attitude of “everyone is worthy of your time”. Another example of the spirit is the all-hands breakfast sessions on Mondays. Officially, they are for communicating all the topical issues to the whole personnel, but clearly, the breakfast sessions also have other roles in the Company. They execute the value of transparency and openness, strengthen team spirit and socialise the clan members. These Monday-morning breakfasts are repeatedly mentioned in the interviews. The sessions are always video-recorded for those who are unable to attend.

The atmosphere of the head office was warm and relaxed. There are open areas with beanbag chairs where people typed on their laptops. In the kitchen area, fruits and beverages were available for all employees (and visitors) all the time. People appeared to be calm and relaxed at their workplace. The fact that people want to apply for jobs in Finland from as far away as Southern Europe or even South America also speaks of the company as a place of work and an appreciation of the organisation.

Symbols and symbolism are not as evident in the interviews as the company's values. The logo can be seen on various objects in the company's premises, but only in a small size – not dominantly in any space. The rooms and furniture are colourful. They do not follow any particular colour scheme, but bright colours are present. Bright colours may communicate 'brightness', 'joy' and even 'happiness' in the workplace. The quarterly off-site planning days of the Management team were repeatedly mentioned in all the 2017 interviews with such importance and enthusiasm that they could be seen as a symbolic ritual. Some interviewees even checked their calendars in the middle of the interview, that they really had received their invitation to the next off-site meeting. It has a very strong meaning for the company.

In summary, the Company evidently has a strong, unified value base, team spirit and relaxed work environment, which is widely recognised among IT personnel around the western world. The management of the Company has successfully built a unique organisational culture which acts as a ground for the MCS package. I list the clan, values, and symbols as the MCS in Appendix 1, with an interpretation of their relevancy and role and in connection to the IEBM. Such a strong unity and spirit among the employees enables the use of other control systems in a way that could not be possible in a less unified or different value base. I return to that subject in the presentation on administrative controls.

4.3 Planning controls in the Case

In this chapter, I describe how the management of the Company has implemented a planning process across the organisation. Although planning as such is a very common and widely used MCS in all kinds of business models, I emphasise the points relevant to the IEBM context particularly.

Planning is a very thorough process in the Company. Firstly, it unifies the company's direction at the senior management level and, secondly, it aligns these goals throughout the organisation. The planning is executed as a top-down process starting in October when the management team retreats to an off-site facility to discuss the current state of business and set a five-year business target. This is

pictured on the left in Figure 8. Key elements of the five-year plan are technology directions and the related business opportunities based on the selected technology.

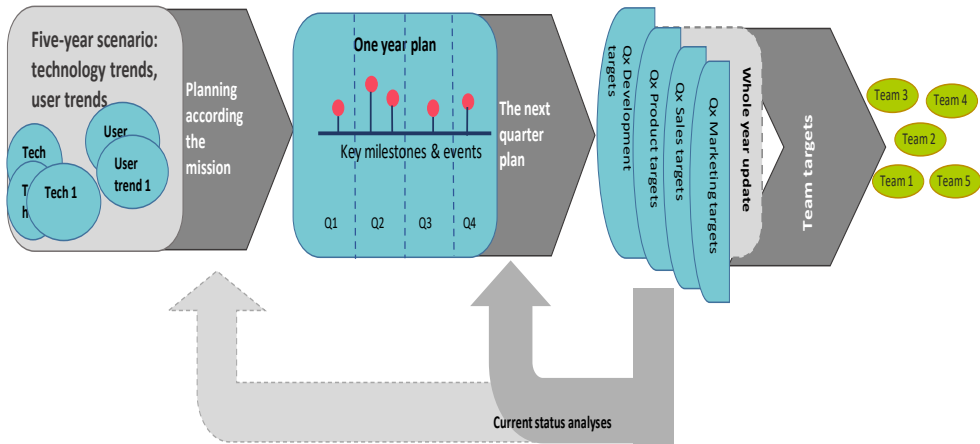


Figure 8. The planning process of the Company.

The senior management plans and sets the first-year targets, with quarterly and monthly targets. This is pictured in the middle of Figure 8. The planning process spreads through the organisation to the functional management level and finally to the team level. After the planning round, every employee knows their personal targets and connections to the top-level business plan. The short-term business plan, i.e., the plan for the coming four quarters, is updated four times a year in the quarterly business reviews. However, the lowest level, i.e., the employee targets, is set only twice a year. In 2017, the planned values for Key Performance Indicators (KPIs), meaning the measures in the monthly management report, were mostly missing. In 2022, the process has improved, and the measures are now duly planned. I further describe the follow-up and measuring in chapter [4.4 Cybernetic controls in the Case](#).

Planning is considered an essential and important activity by the interviewees. The quarterly off-site business reviews in particular were mentioned in every interview in 2017. The planning involves all functions, and I get an impression of well-unified targets throughout the organisation.

“...business reviews are all in the calendar already... The target-setting happens in the management’s off-site meeting... the next one is next week... it has to be before the quarter starts!”

(VP of Services)

Similarly, the VP of Product Marketing explains that a year plan is prepared, followed by the definition of targets for each quarter, allowing for tracking and forecasting.

“...we prepare a year plan... and then we define some targets for each quarter and follow them and forecast.”

(VP of Product Marketing)

The CEO emphasises more teams and their target setting. He also mentions financials, which he probably finds as important as non-financial targets:

“We have this year-clock, which shows financial planning (budgeting) and business plan for the next year, and which directs everything else. It is split into quarters and teams, and every team sets targets for every single employee.”

(CEO of the Company)

The company’s management uses actual data from previous years and their trends in planning. The functional level of target-setting includes key actions and events, an organisation plan (the structure and headcount) and targets for the key performance measures. The planning of subscriber targets is noteworthy. Sales and Marketing, in co-operation with the Company’s management group, estimate how many new subscribers they can attract for each product and, realistically, how many will leave. The number of subscribers is focused on when calculating IEBM value creation and capture measures. I describe the process of measuring and the functioning of metrics as a part of the MCS package in chapter 4.4. Cybernetic controls. The control systems of long-term planning and action planning are added to Appendix 1 as part of the MCS package.

4.4 Cybernetic controls in the Case

4.4.1 Budgeting practices

As I described in the chapter on planning controls, the company has four planning rounds during the year, one each quarter. The monetary plan for the fourth quarter is fixed as a budget, covering January to December. Apart from this fourth quarter fixed-budget version, other quarters' business plans are updated later alongside business reviews, and those updated plans are called forecasts. The metrics I describe later in this chapter on cybernetic controls are also budgeted.

The budgeting process is fairly simple after the business outlook has been discussed and agreed upon in the management's business review meeting. In budgeting, the function heads collect resource needs from the teams. Their relevancy and possible alternative ways to proceed are discussed within the management team. The heads of functions turn the resource use plan into euros, i.e., to be the functional budget. Sales, in co-operation with Marketing, turns product user plans into turnover. The Chief of Operations (COO) acts as a coordinator, outlining all the figures together and presenting the budget to the management team and the Board.

Like the yearly action plan, the budget is also divided into quarters and further into months. After the budgeting process, the first quarter of the coming year is 'locked'. All sales figures (and the related costs, Costs of Goods Sold) are re-evaluated within the business reviews, and comparisons are made between the actual and this new estimate, i.e., actual vs forecast. The importance of the budget will diminish as the year passes, but some financial measures, EBITDAC, for example, are compared to the budget for the whole year. In addition, the functional expenses are not all re-planned in business reviews, but the budget serves as a point of comparison for them. A fixed budget for a calendar year is not as lively a topic of discussion as the quarterly business planning process and forecasts. The high uncertainty of next year's resources will make the budget a bit boring, while the forecasts add to the interest. Budgeting is referred to in rather weak terms in the interviews:

“Budgeting is done... but then we have these reviews, where we check how we have done... reflect against the budget a bit in running mode and alter plans for the coming quarters.”

(VP of Servicers)

The VP of Product Management gives even fewer words for budgeting:

“I budget my own function... expenses and investments. That's it.”

(VP of Product Management)

The VP of Marketing acknowledges the existence of yearly budget and plans but highlights the additional importance of quarter-updates for the budget:

“Yes, we have yearly budgets and plans, but then we also have these quarter plans and budgets.”

(VP of Marketing)

The software business is a very resource-restricted sector overall. Therefore, the teams try to budget on a ‘what-we-can-get’ basis. The most obvious reason for being behind budget is over-estimating the number of new recruits and underestimating the time needed for efficiently getting new persons on board.

The budgeting process has also changed over the years. Earlier, the Company budgeted for a rolling twelve months, but with two new capital providers insisting on this, it returned to the calendar-year budget in 2015. This may seem like a step backwards, as the planning is a quarterly rolling activity anyway, but on the other hand, the calendar year is a clear benchmark for companies widely. It is common for financiers to monitor the financial statement information and the budget for the same period. As I showed in chapter [1.6 Introduction to the case](#), the Company has also received product development funding, which is quite typical of IEBMs and explains the need for the calendar-year budget.

4.4.2 Cost accounting practices

I investigated the internal accounting practices of the company, particularly regarding cost accounting. The CFO answered, “Yes, we do cost accounting to some extent,” and explained the practice as follows:

“Allocation of expenses is done to a certain point so that we can understand what the total cost of marketing is; for example,... rents are allocated and direct marketing expenses directly, of course. A profitability calculation for the products we also do so that the Gross Margin is calculated for all products [together]. Then we also calculate and follow up the average sales cost per customer.”

(CFO of the Company)

Costs that can be directly related to services and subscriptions are allocated to the Costs of Goods Sold (COGS). When the COGS is available, the management can follow the Gross Profit and Gross Margin% trends, which is one of the financial measures in the Company. However, cost accounting cannot be performed by product, service or customer groups so that their separate contribution can be reliably identified. Cost items below the Gross Margin are not systematically allocated at all.

Cost accounting practice by function is done systematically with comparisons to the plans (budget and forecast). Sales and marketing efficiency is actively followed by calculating the pay-back time of marketing and the average cost of a new customer. Below is a modified example of how they use cost accounting to see the Gross Margin and report the trends:

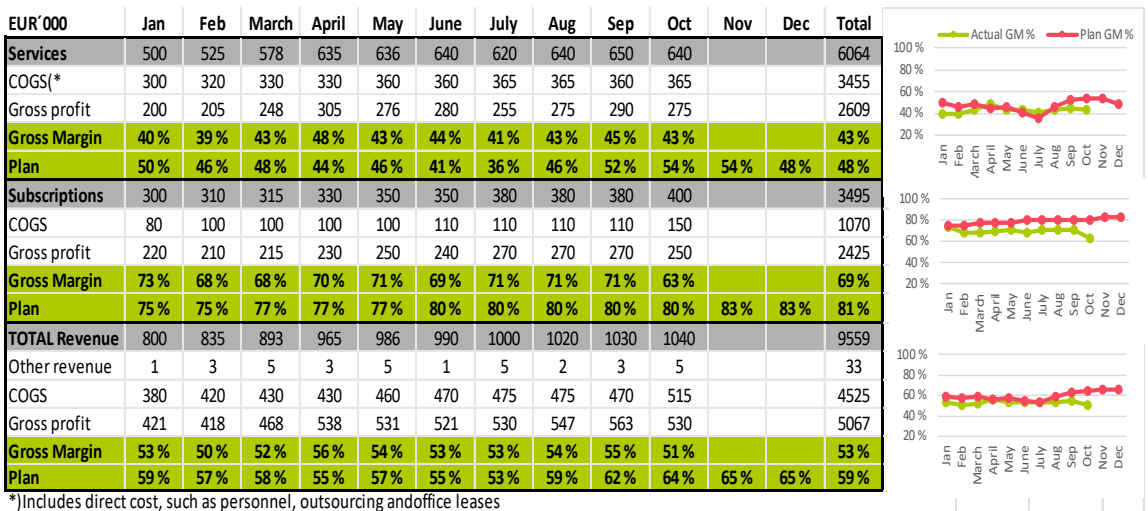


Figure 9. A modified Gross Margin report with COGS.

Although the cost accounting practices may be rarer in the IEBM environment than in non-technology business models, I can understand that regardless of the type of business model, it is necessary to understand how different parts of the business contribute to the profit. Customer groups or subscription type (product) do not fall under the cost accounting perspective. Overall, cost accounting as an independent activity in the Company does not meet the three criteria, I set for an MCS (a systematic practice implemented by the management, the target of which is to promote the realisation of the strategy). It is included in and supports the systematic process of other MCSs, mainly the cybernetic measuring systems above, and for the reason, I will not add the cost calculation in Appendix 1.

4.4.3 Financial measurement systems in the Case

In this chapter on financial measurement systems and the following chapters, 4.4.4 and 4.4.5, I describe the measures used in the Company. My description concentrates on those measures that are included in the Company's monthly management report. I briefly explain some other measures that are not considered complete MCS in this study. However, a brief description of the financial metrics gives depth and perspective on how the IEBM's management tries to get enough information to guide the Company towards its strategic goals. In the following chapters, I use the term 'measure' for all types of metrics just for consistency, although in the Company, they use the term KPI for all the metrics explained below.

The monthly management report includes twelve measures that I consider pure financial measurement systems. In that category, I include measurement systems indicating only financials, i.e., they are in euros, and no non-financial information is involved in the calculation process. The measures include Profit and Loss (P&L), where revenues are divided into product-level revenues and services. Cost of Goods Sold (COGS) is similarly divided, but the Gross Profit and Gross Margin percentage are reported only as one figure. The functional expenses are subtracted from the Gross Profit, and the last line is the earnings before interest, tax and depreciations (EBITDAC). There are separate reports on revenue details with trend graphics. Below is an example of the basic P&L reporting from September monthly reporting. A in the column title means actual, as the plain number indicates the forecast figures; in the example, the forecast for the third quarter.

EUR '000	A1	A2	A3	A4	A5	A6	A7	A8	A9	10	11	12	Total
Plan	900	900	1000	1100	1200	1300	1300	1 500	1 550	1 550	1 600	1 690	15 590
Revenue	800	860	1 000	1 000	1 090	1 210	1 250	1 300	1 440	1 450	1 550	1 640	14 590
Subscriptions	599	629	748	758	845	950	950	1000	1099	1105	1200	1249	11 132
Services	200	230	250	240	244	259	300	300	340	343	348	390	3 444
Other	1	1	2	2	1	1	0	0	1	2	2	1	14
COGS	340	373	424	419	449	492	525	540	602	606	638	687	6095
Subscriptions	180	189	224	227	254	285	285	300	330	332	360	375	3340
Services	160	184	200	192	195	207	240	240	272	274	278	312	2755
Gross Profit	460	487	576	581	641	718	725	760	838	844	912	953	8495
<i>Gross Margin</i>	<i>58 %</i>	<i>57 %</i>	<i>58 %</i>	<i>58 %</i>	<i>59 %</i>	<i>59 %</i>	<i>58 %</i>	<i>58 %</i>	<i>58 %</i>	<i>58 %</i>	<i>59 %</i>	<i>58 %</i>	<i>58 %</i>
Expenses	710	752	807	810	845	880	808	830	862	860	875	905	9944
R&D ²	270	280	290	300	310	320	300	300	310	310	300	310	3600
Sales	100	160	160	150	150	160	100	100	110	110	120	120	1540
Marketing	200	170	200	200	250	250	250	250	270	270	280	280	2870
CSM	25	25	30	30	30	30	35	40	45	45	45	50	430
G&A	120	120	130	120	120	125	125	125	130	130	135	135	1515
Other	-5	-3	-3	10	-15	-5	-2	15	-3	-5	-5	10	-11
EBITDAC	-250	-265	-231	-229	-204	-162	-83	-70	-24	-16	37	48	-1449
Plan	-250	-300	-150	-200	-200	-200	-700	-700	-150	-50	-50	50	-1600

Figure 10. Modified example of P&L financial measure.

The measures from the Balance Sheet include Bank Account Balance, Accounts Receivable, AR ageing, Bank Loans, Net Debt and Deferred Revenues in the monthly management report. The Balance Sheet measures are reported for a rolling twelve months. All six are small graphics on the same page, four shown as a modified example below:

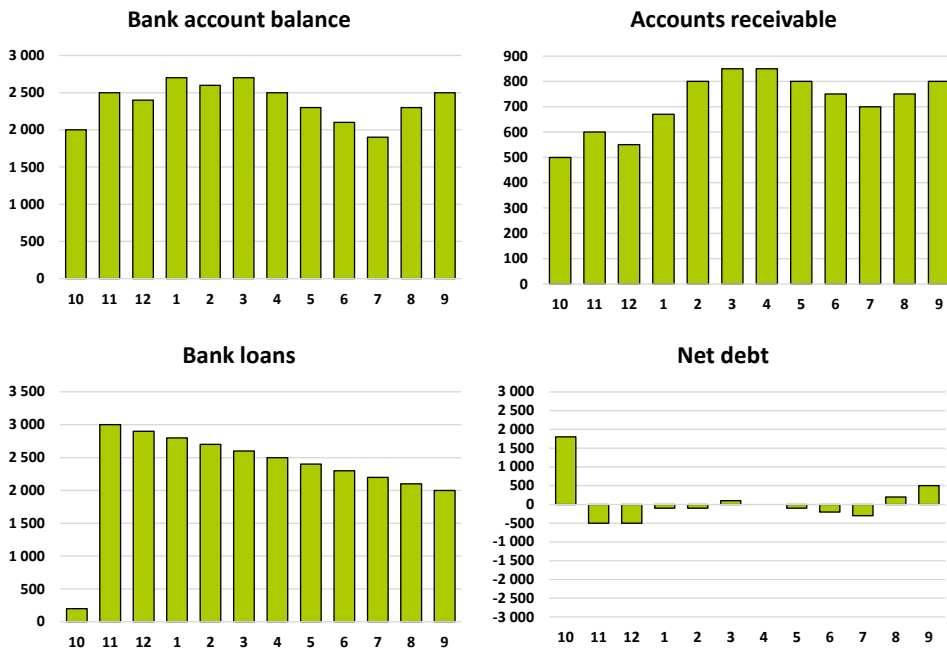


Figure 11. Modified example of the Balance Sheet measures.

These examples of financial measures are typical of any company. The IEBM Company is no different in this respect. Financiers of technology companies are usually interested in these basic indicators. In addition to external parties, the financial measures are considered important inside the Company, and are communicated regularly in all the functions:

“The most important matters, business review and financials, are gone through in all-hands sessions monthly.”

(VP of Sales)

Obviously, the COO who has also the CFO role defences the importance of his figures:

“... yes, these measures influence. It was just last week when the Board questioned our efficiency.”

(COO/CFO of the Company)

The CEO highlighted the significance of financials during the discussion on budgeting and here maintains a consistent approach:

“Financials are truly important to me, especially the Revenue, how it splits into service revenue and product revenue per category.”

(CEO of the Company)

It seems that the financials are in discussions on 2022 as well:

“... all our financial figures are shared monthly [to all personnel].”

(HR Manager, 2022)

The importance of financial measurement systems appears to be real. In late 2018, the Company invested in a new accounting system, which enables the reporting of subsidiaries easily and systematically, with consistency in accounting and calculation rules. Nowadays, unlike in 2017, all except the Balance Sheet measures are duly planned. Actual figures are compared to the plan or forecast; therefore, a behavioural impact in the organisation is more probable than without the plan. Some of the measures are also compared to the corresponding figures for the previous year. One of the remarks on financial measures is the desire for separate internal accounting instead of the usual P&L statement familiar from the official closing of accounts. As mentioned earlier, in relation to cost accounting, they perform cost allocations to increase functional cost accuracy.

In addition to the total profitability and revenue reports, the financial measurement systems include expense reports and a forecast and follow-up of the Cash Flow. A complete list of all financial measurement systems that are considered part of the MCS package is in Appendix 1.

4.4.4 Non-financial measurement systems in the Case

In this chapter, I describe the development of non-financial measuring in the Company from 2017 to 2022. Most of the non-financial systems are not MCSs according to my pre-set criteria. Their effect on behaviour towards the strategic targets remains unclear, although, without any question, they are management-implemented controls.

The old cliché, “You get what you measure”, stands well in the Company. In 2017, it had a large number of legacy reporting systems, which were implemented long ago for some specific purpose, but had since become redundant. Nothing was ever removed from the reporting, so the legacy systems engaged resources for nothing. The managers of the Company received much data, which they tried to analyse and make sense of. The reporting itself took valuable time from the value-added work, and overall, the reporting caused more headaches than appropriate actions:

“... oh, we do have quite many different measures...”

(VP of Services)

“We have too many measures!”

(CEO of the Company)

And the frustration continues to almost swearing:

“... oh, we have damn many of those [measures]”

(VP of Marketing)

In 2017, each function had several of its own measures. In addition, they reported the Company-level measures for management reporting. Not all measures were properly planned or actively managed, and their behavioural impact was questionable:

“Once a month, one of our employees does that report with SQL and puts the results in the Excel file for everyone who wants to check... whether someone wants it is another story.”

(VP of Marketing, 2017)

It is clear that the measuring practices need to change, as the CEO reasons in the following:

“... this has been a good system, as it keeps planning and forecasting on the surface of each organisation. Unfortunately, some measures are poorly updated, and the ownership is unclear.”

(CEO of the Company, 2017)

The VP of Marketing sent a file including 26 measures just for the Marketing function. They were gathered into an Excel file from several sources and called ‘statistics’, which probably indicates their role as pieces of information rather than actively managed measures. The VP of Marketing also admitted that these measures were more “for information only”, and I did not consider them part of the MCS package at any point.

Because of the challenges described above, a new dashboard measuring system was in the implementation phase in summer of 2017. The number of measures was reduced to 4-5 from each function, a number that fits on one page or screen. The new dashboard system was advanced and designed with intelligence. On each step of the value chain, measures were intertwined. When Product Management defined a new product launch, the measures for Marketing, like web visitors and Marketing Qualified Leads, show an increase, and onward, the Sales Qualified Leads should increase, leading to a greater number of new customers. Finally, the efforts should show an increase in the revenue measures of the whole value chain. The CEO was especially proud of this systemic connection to the dashboard measures:

“The dashboard scheme tries to simplify and reduce the number of measures radically... and it goes all the way through the organisation – and I’m pretty proud of this – with interim connections of the pipeline...”

(CEO of the Company, 2017)

Since late 2017, the functional measures have been reduced even further. In Sales and Marketing, they are still in place, but no longer in the Engineering functions.

“This kind of dashboard we no longer have in use. We only analyse the working hours, how much we spend on the free framework and how much on chargeable products, and what features we have got out from the pipeline.”

(VP of Engineering, 2022)

The reason for this development is that the non-financial measuring has been concentrated on a few factors that generate hybrid measurement systems, together with financial data. There is more about this in chapter [4.4.5](#). In the management team's monthly reporting, there are only two non-financial measurement systems in 2022: the number of subscriptions and the number of service hours. The number of subscriptions is split into products. Actual months from quite a long period, almost three years, appear on the report. Subscription numbers are not planned separately but only implicitly included in the revenue target levels, measured by hybrid measures. When the number of subscriptions increases, this is reflected in the calculated revenues, about which more can be read in the following chapter. The number of service hours is for following up on the efficiency of the Services organisation. The efficient utilisation of scarce resources in the service business is crucial for the Company. The number of hours is also forecasted in the report, and a possible decline in future bookings will affect sales efforts increasingly.

The element of balancing, often discussed in the context of the Balanced Score Card (BSC), is not very evident in the measuring. Although the measures were thought over with an interim connection, the balance perspective was not much considered. For example, innovation and customers were not covered. Customer satisfaction data is at least somewhat collected, but a process for its systematic use is missing.

The development process for non-financial measures described here gives an idea of how the management of the IEBM strives for information and invests in the process improvement of the business model. Currently, in the MCS package, there are two non-financial measures that I can add in Appendix 1. Measuring efforts are directed more towards the hybrid measurement systems, which I describe next.

4.4.5 Hybrid measurement systems in the Case

As a result of the measure development between 2017 and 2022, the focus is on seven hybrid measures that are calculated using financial and non-financial data. One of them shows actual and forecasted service bookings in euros, i.e., it uses the reserved service hours from the CRM system and turns that into euros with the hourly charging price. That differs from the actual service revenues, because not all the hours are chargeable, as there can be special deals with some customers or other reasons for not charging every hour. This measure reflects the potential of the Services function and, when compared to the actual captured service revenues, guides behaviour towards a higher number of chargeable hours.

The other six hybrid measurement systems relate to the Monthly Recurring Revenue (MRR). It is always more profitable for the Company to keep existing customers rather than get new ones. As a reminder, the IEBM customers are also

members of the Community, so most marketing efforts are towards the Community. The MRR measures indicate how much of the sales come from existing customers as they renew or extend their subscriptions. An example report of MRR out of total revenue is presented in Figure 12:

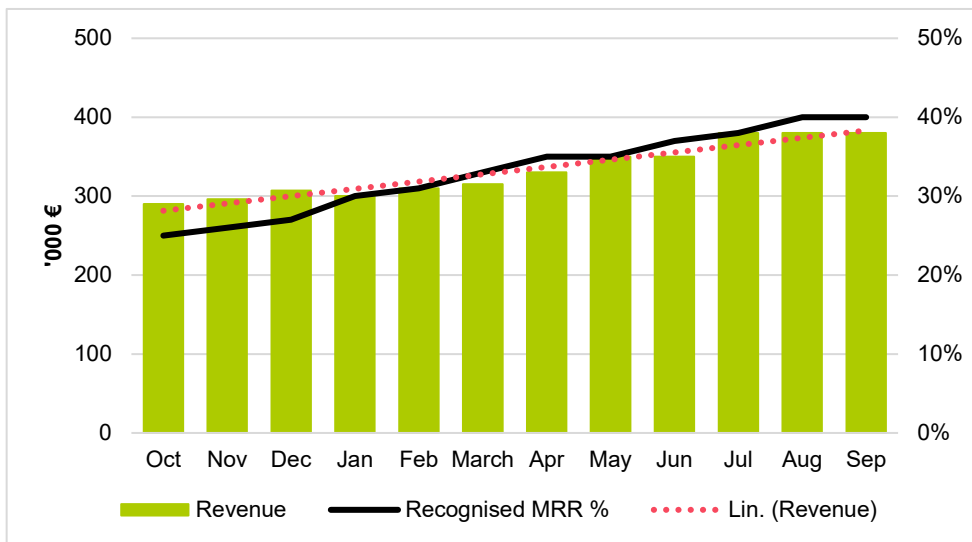


Figure 12. Modified example of MRR out of total revenue.

The example report above shows that while the Company has increased its total revenue, it has also increased the share from renewing or expanding the subscriptions of existing customers. The MRR has become the focus of surveillance in the management team, and came up in several interviews:

“The most interesting are subscription products, especially amounts, and adjourned by-products.”

(CEO, 2017)

Also the VP of Sales recognises the importance of customer numbers, and gives an example of a team, which concentrates on MRR development:

”We are about to build a ‘customer success’ team which only concentrates on subscription renewals and on existing customers... they will not hunt new customers at all..”

(VP of Sales, 2017)

During the years the MRR figures have grown in importance:

“That recurring revenue, which we report separately, has not been on the required level, not on the target track... it has been a driver for immediate actions, so these measures do have an effect.”

(CFO, 2019)

The following examples give a good idea on how the measure is utilised in the organisation.

“We follow very carefully our [product names] packages whether the subscription numbers go up or down, and when we add more attractive features on [product name] does it get more subscribers, as that reflects directly our value-add in the product development.”

(VP of Engineering, 2022)

“... probably the most important is MRR, which we should improve, and that we can affect in the Product Management, although slowly.”

(VP of Products, 2022)

The MRR has become a very central measure in the Company. In addition to the basic percentage trend view in Figure 12, six other perspectives of the MRR appear in the monthly management reporting, four of them in the modified examples below:

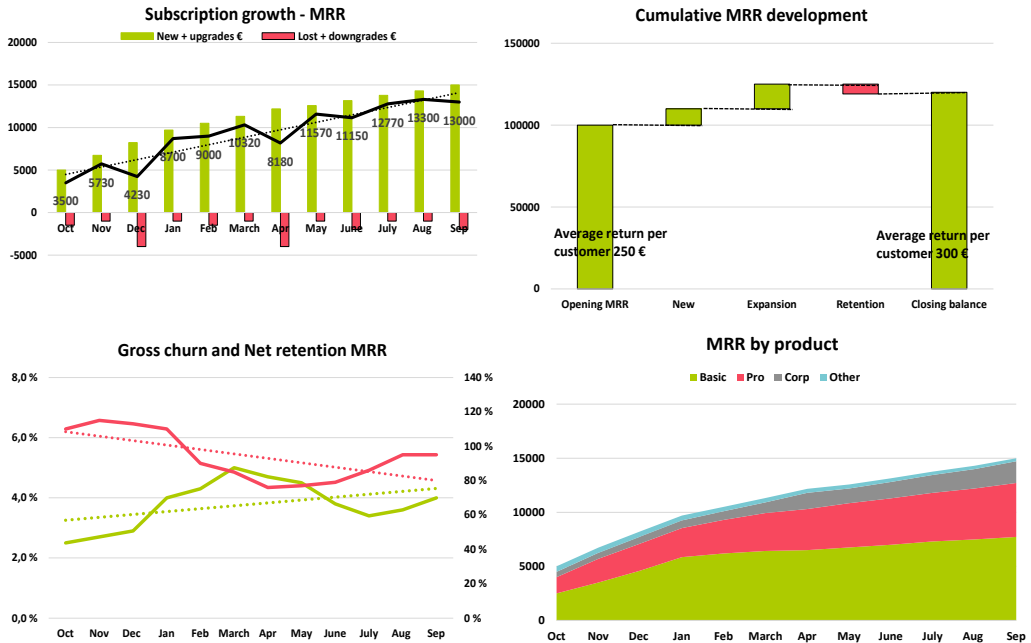


Figure 13. Modified MRR perspectives of the monthly report.

In the upper left corner of Figure 13 is a rolling 12-month graphic presentation of new and lost subscriptions and their net value in euros. The trend in the net value shows that there have been more new, renewed or extended subscriptions than cancelled ones. This report shows completely new and extended subscriptions together. In the upper right corner, the measure of the cumulative MRR development shows cumulative changes in the last twelve months in euros. The first column was the starting situation of the MRR twelve months ago (i.e., the preceding 12 months). The following two green columns itemise the value of completely new and extended subscriptions. This adds to the first perspective on subscription growth. In addition, they calculate the average return per customer, i.e., divide the net value by the number of customers at the corresponding time. The red column is the value of retention, and the last column on the right is the ending balance of MRR. Below the cumulative MRR development, in the lower right corner, is the MRR twelve-month trend by product. This report itemises the value of new and extended subscriptions into products, which is a valuable addition to the previous perspectives. The lower left corner is a relative presentation of gross MRR possibilities (the right y-axis) and how much of those have been gained (the left y-axis). This report utilises data from several sources, including statistics on web visitors. In addition to these four, there is one more MRR measure, similar to Figure 12, but with cumulative twelve-month figures. Although these MRR measures do not have a detailed plan attached to the

graphs, the trend curves are implicitly supposed to grow. “The best customer is an existing customer” came up in some of the discussions. They invest in taking good care of their existing customers:

“... for that, we have an ‘account executive’ named for each customer because we want to show long-term commitment from our side... we gave free support for five years to all our framework users, and even after that [high-end and corporation product] users can buy ten more support years, just to avoid the situation where customers are forced to re-code their application with some other solution.”

(Product Marketing Manager, 2022)

In addition to the highest possible number of recurring customers, the MRR measures are used to capture the highest possible value from the products. In combination with the subscription numbers by product, they analyse the development of revenues. If the subscription numbers and the development of revenues do not go in line with each other, changes in the pricing or product content are needed:

“After the change in the product package, by which we pursued more volume, we noticed that although we had more customers, we did not see the corresponding revenue increase. That didn’t warm much..., and then we took the added part away from the product package as a separate add-on product, and now we can also see the revenue flow from that.”

(CFO, acting VP of Sales, 2022)

The MRR measures appear to be essential in managing the Company. Two issues related to the core of the IEBM are highlighted: value creation and capture. The increase in the number of subscriptions indicates that customers recognise added value from the products. The parallel increase in revenue means that this added value can also be captured as sales. I will return to this finding when discussing the IEBM’s MCS package later. I list the described seven hybrid measures in Appendix 1 as part of the MCS package and continue following the typology of Malmi and Brown (2008) to the next type of control systems.

4.5 Rewarding and compensation in the Case

I briefly presented, in chapter 3.4.4., suggestions from the earlier literature regarding connections between rewarding and planning. Here, I also refer to a connection to the Company planning process. Just as I have described the business planning in the Company, it also continues at the lower levels of the organisation. Team plans are translated into tasks and goals of each employee. In contrast to the quarterly business plan time span, the goal-setting and evaluation process is half-yearly. This means that the business targets of two quarters are turned into half-year objectives of personnel.

“... every six-month period, we set the objectives and have a performance appraisal with each of our employees... just check how things have gone, and how everyone has advanced.”

(CEO of the Company)

The evaluation is quite a subjective view of the team leader. It is carried out in an interactive development discussion, the results of which do not lead to rewards for most employees. That is because only the sales personnel, less than 15% of the total, have an incentive scheme as part of their salary. For them, the evaluation is grounded on formal, system-based measures and on a detailed individual scorecard. Usually, sales growth, number of customers and MRR affect the salary of sales personnel.

“The management team first sets objectives for itself. Then each department does the same... and downwards to each team and person. For those who have result-based incentives, we build score cards for each quarter.”

(CEO of the Company)

Rewarding and compensation did not get much relevance in discussions. They seemed to be a secondary issue in all interviews. It came up only by asking directly and did not arouse great passion. The Company pays rewards occasionally, but the payment is linked to the good result of the team or the Company as a whole. The current way of rewarding could be seen as an enhancement of organisational values more than affecting people's behaviour through incentives.

“... we do try to some extent motivate with bonuses if it has gone very well [with the Company]. But I would not see that in any central role.”

(CEO, 2019)

As described by the HR Manager, the result-based salary is akin to a method of attracting Sales personnel:

“In Sales everyone has this kind of salary scheme [result-based salary] but not anywhere else. I think there have been some team-based models in Marketing and bonuses related to that... but very few.”

(HR Manager, 2022)

Sales personnel have a result-based portion in their salaries. Regardless of the business sector or model, it is common to hire sales personnel by tying part of their salary to the result. It motivates the sales organisation without a doubt, therefore affects their behaviour and helps towards the strategic targets. However, it is not particularly special to IEBMs, nor is it considered important. Because the criteria of MCS are fulfilled, I added rewarding and compensation in Appendix 1.

4.6 Administrative controls in the Case

The administrative control systems can be a very diverse group of practices, processes, and ways of doing things. Basically, this could include anything, but in the following chapter, I describe those picked up from the discussions that fulfil the criteria of managed and systematic use for reaching the pre-set targets.

4.6.1 Governance structure

The owners, financiers, and the internal organisation require a governance system to exist. The highest governing body is the Board, of which the CEO is also a member. The Board takes care of the overall operational capacity of the company and ensures operations comply with the regulations and laws in all respects. The general tool in the governance process is the so-called year-clock, which schedules the major events of leadership and decision-making on a calendar. The year-clock schedules the budgeting, closing of accounts and Board meetings. It affects the timing of the management team meetings and all regular meetings in the lower organisation. Regular monthly or weekly meetings seem to be a very common way of general governance and daily management in the Company. That, of course, leads to a situation that all calendars are full.

In 2017, the role of the CEO was quite interesting. He had ‘the last word’ on quite a large number of issues, like ‘the Governor’ in the old days. He tried to participate and manage on a rather detailed level, even though he lived in the US,

with ten hours' time difference from Finland. Here are some of his activities, stated by himself:

“Lately, I have participated in the creation of our product strategy... I spend quite a lot of time on that... I probably spend less time with our customers than any average CEO.”

“I just came from a product demo meeting just to get the picture of what they are doing in that team currently.”

“...we followed some discussions [on coming technology] ... debated that issue within the management and decided... well... I made the decision that we are going to change to that.”

“The fact that I live in the US has brought a bunch of challenges. In an organisation of this size, the presence and management evolving from that are still very, very important... when I have been only one week here within two months, a good deal of personnel-related issues have arisen here.”

(CEO of the Company, 2017)

As the CEO made the final choice of every employee recruited into the Company, as explained in chapter 4.2., he was a powerful person. He had a desire to keep all the threads in his own hands. He even wished to be more approachable, so that any employee could call him at any hour, despite the ten hours' time difference between Finland and the US. He seemed to be somewhat frustrated when that practice was not leveraged further in the organisation. He also criticised the Finnish work culture, which separates work and leisure time too strictly. He would have liked to blur the borders of work hours and the organisation hierarchy:

“...our customers in Middle-Europe or in the US don't understand how on earth there can be such a company that everyone is off for a whole month in July. And if it is eleven o'clock on Saturday night, that is a huge barrier to calling the CEO for guidance, even though I emphasise that it is completely okay to call.”

(CEO, 2017)

In autumn 2021, the CEO changed, and of course, a different personality brings changes to the methods and practices in use. Although this is not special to the IEBM as such, I bring up the ways of the previous CEO because even just one strong

personality in an organisation can have a broad impact on others' behaviour, especially if they are in a high position. In addition to the CEO's formal governance duties, he had a great deal of informal influence overall in the Company.

I will add the governance structure with the year-clock process in Appendix 1 as part of the MCS package. The impact of the superfluous governing CEO does not fulfil the criteria of MCS and therefore is left out of the package listing.

4.6.2 Organisation structure

In the contemporary world of new business models, organisation designers have created quite ambitious structures for organisations. However, in the case company there is a very traditional, functional organisation in place. They have six functional units: Product Development and Product Management, forming a function called Engineering, and then Marketing, Sales, Services and Operational administration. Figure 14 is a high-level presentation of the organisation chart:

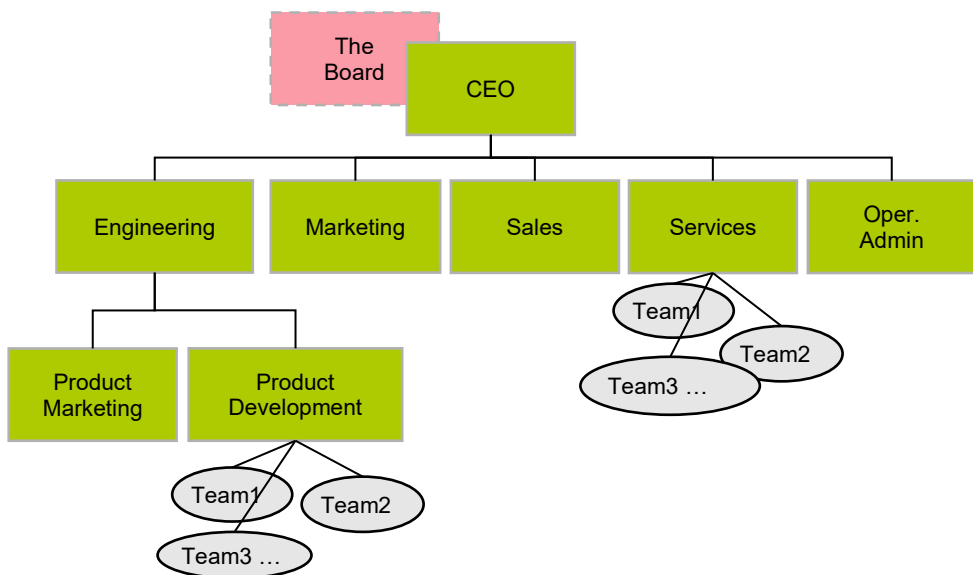


Figure 14. Organisation chart of the Company.

The Company has around 130 employees, which indicates the need for a formal, official organisation structure. The grey ovals in the picture above illustrate teams, which report to the function heads and the head of each function reports to the CEO. The function heads and the CEO form the management team of the Company. The CEO is also a member of the Board. So, the Company has a three-

step, traditional organisation and responsibilities aligned with the governance explained earlier. They have a strong CEO personality who is involved in both the operational activities and the Board. The management is a hierarchical structure, except for project work. That includes some matrix reporting to a project manager. Teams are skill-based and managed by a team leader, who has authority over all resources on their team. Team leaders report to functional heads (either ‘Vice President’ or ‘Senior Vice President’), who have full authority over all resources in the function. Business decisions and any larger changes in the organisation or practices are decided by the management team, which includes the function heads and the CEO.

“Yes, this is a traditional, hierarchic organisation with six departments [functions]... we operate as one business unit, with real business responsibility only on the CEO.”

(COO in the Key Informant Interview)

In 2017, the biggest function in terms of headcount, Services, owned customer projects. Projects were conducted with matrix reporting responsibilities, but everyone had a home base in the line organisation. Those who worked on projects reported to a project manager on project-related issues. The organisation tied tasks to functions, and it seems that the ownership of tasks was quite definite and organisational borders strict:

“Product Management owns the products. We only ensure the timing and quality.”

(SVP of Product Development)

The VP of Product Management indicates almost indifference towards other parts of the organisation:

“No, I have nothing to do with the sales planning. I only plan my own [department] expenses.”

(VP of Product Management)

The VP of Sales brings up the co-operation spirit between the organisational units:

“Well... there are quite good benefits and value of our products present in sales situations... those who sell are quite technical persons themselves and can discuss with customers... but occasionally we need some technical support from the Product Management.”

(VP of Sales)

The last reference of the VP of Sales also reflects well the spirit of all the interviews on organisational questions: persons are recruited based on their skills to a certain position and function. They know what they do and are proud of doing it within the team. On the other hand, they all operate as only one business unit with a very strong influence of the CEO. It seems like a balance between ‘a small team family’ and ‘a big company family’. An organisation is the creation of all the people in it. It is hard to decide whether the clan and its values form a certain type of organisation or whether the organisation creates a clan and its values gradually. I wonder which comes first.

4.6.3 Procedures and practices

It was quite clear during the very first interviews that there are plenty of procedures which are ‘the company way’ of doing things. In all the conversations, the procedures of recruiting, communication and work time measuring came up:

“... we have values in writing, which HR goes through [with the candidate] in the recruiting process...”

(VP of Sales)

“... recruiting process is under change, and we are trying to improve the evaluation of candidate fit much better in the new process.”

(SVP of Product Development)

As in a technology company, it is quite natural to find them trusting strongly in IT systems. There are several systems in use and even some variations of systems between functions and teams. Almost in every interview, some tool was mentioned, saving evidence in systems and gathering data.

“We do have many systems: hour-tracking system, subscription management systems, database of all sales invoices, CRM and marketing system... then we

have Hub-planner for resourcing in Services... the accumulation of data is not a problem, analysing is.”

(COO in Key Informant Interview)

“Yes, every minute is recorded... we have hour-tracking at 15-minute precision... people are quite free to choose their working time, but everything is recorded accurately.”

(VP of Services)

Many IT systems are not independent control systems but are used as a part of the other controls. The above-mentioned CRM and hour-tracking in services meet the criteria of managed, full processes with an impact on reaching targets, so they are added to Appendix 1.

Although it is not a priority subject for this study, it is noticeable that analysing the ever-accumulating flow of data across multiple operating systems also appears to be a challenge for the Company. Un-utilised possibilities of data came up in several interviews.

The communication within the organisation seems systemised and performed in a controlled way, utilising modern devices:

“The most important communication channel is all-hands breakfasts on Monday mornings, where we have all employees in and a broadcast to the German office. The US office watches the recording afterwards. Our official electric communication tool is the G+ channel. There we have all kinds of postings and open discussion on a wide range of subjects... goals, follow-up, development statuses, team situations...”

(CEO of the Company)

Communication comes up also in the later interviews like here in the HR Manager’s interview 2022:

“Open information sharing and communication is important to us. It becomes very clear the moment someone comes to our house.”

(HR Manager, 2022)

In addition to the online communication channels, communication takes place in regular weekly team meetings. Again, with a contribution to the company values, team-level meeting agendas include all company-level subjects from business targets to financials. Somehow, these procedures leave a feeling of unidirectional top-down communication. When asked about how the management gets feedback from teams upward, the answers were around:

“Yes and no... well, we have certain challenges... heterogeneity in systems and practices.”

(CEO of the Company)

The management communication evidently covers the whole organisation, but it may not have yet developed to be an open, two-way discussion. Anyway, communication is handled in a systematic and controlled way, so that all other policies and procedures found in the Company are listed as MCS in Appendix 1.

As in all manufacturing companies, also in the case of software products, all changes, corrections and updates related to the product code must be accurately documented. The release policies related to the products are strict instructions guiding the employees, like in the two following quotations of the CFO and the VP of Engineering says:

“The idea is to commit [the product software] as small pieces, but often.”

(CFO, 2017)

“We have moved to a six-week project model. Every development is a project of six weeks... later corrections are done on a warranty ticket basis.”

(VP of Engineering, 2022)

Probably the most interesting practice relates to communicating with the open-source community. Although there are teams and positions where close monitoring of the Community’s movements is part of the job description, this practice affects the entire development personnel and also involves the very core of all activities in the Company.

“Last autumn, we invested in Community work quite much... there is now a new development releases team, DevRel, who markets the value-add directly to those developers and coders [in the Community]... this community team started

immediately discussing [on a vulnerability issue] about the consequences to the customers, to users, to the Community, and how it shows in their daily life.”

(VP of Engineering, 2022)

All employees are encouraged to familiarise themselves with the Community and participate in the discussions if possible. Work time can also be used for this, and Friday afternoons are named Community Fridays.

“It’s more like users ask questions and usually another user answers, but quite a lot of our team also answers. Anyone from the company [can answer], and they are tracked.”

(VP of Products, 2022)

The Product Manager continues the same line, and gives an idea what that community co-operation means in the organisation:

“Well, of course, we do participate. Many of the things we need are run on StackOverflow, and we now have this ‘Community focus’ thing, that is, ten per cent of the working time can be used for any project, so many of us use it to go to Stack Overflow and help those users.”

(Product Manager, 2022)

Basically, the Community decides what features are developed next. The prioritisation comes from different sources, all of which the Community is present:

“... they suggest features, what will be done... or if there is something that is important, then you can also put the thumbs up there, and then we look from time to time, what have accumulated the most of them [thumbs]. Then we think... not automatically [to execution], of course, but so that, if it is like the number one priority everywhere [all sources], it will be taken into account.”

(VP of Products, 2022)

Discussions are kept on a person-to-person level, without the Company being a party. Those discussions are more like sharing from one expert to another. Discussants try to solve problems before they turn into big trouble for the Company:

“... if noticed there that someone has this kind of problem.... can you tell me more... and pretty quickly, when there’s another person online who’s listening, the tone might change very quickly... now this person is giving me time, let’s tell him the problem [in the product]. That is where we are trying to help if we can and if there is even a solution.”

(Product Manager, 2022)

The practice of voluntarily spending time with the most important stakeholder, the Community, labels how things are done in the Company. It reflects the spirit and deeply internalised values. It also describes the motivation, which evolves from problem-solving, new solutions and innovation. This is the very essence of the IEBM practice, added in Appendix 1 as the last but definitely not the least.

Summarising the research interviews and the material provided by the company, I can say them telling a coherent story about the functioning of the Company. The interviewees of the first round of interviews were all members of the management team. All repeated the basic message of quarterly planning, massive measurement, and highly trained, carefully selected experts in the organisation. The strong role of the founder-CEO was visible everywhere in the company. In the second round of interviews, there was a story of clarified measurement systems and a focus on a few, most relevant measures of MRR. The development of the software product had risen in importance over the production of services. Most of the Sales comes from the product sales now. Probably, because of the change in emphases, the open-source community was invested more in 2022 than before. The crucial meaning of the Community is really taken seriously. Also, the teamwork was emphasised more in 2022 than a couple of years before. It is significant that changes had taken place in the control systems as the operation changed. It was clear that the change of CEO had affected to operations of the Company. The stabilisation of operations because of the change had not yet been completed by the beginning of 2022. However, I got an understanding that the MCS package develops along with the company, whether the changes were big or small.

The full list of my findings for the MCS package is presented in Appendix 1. I added to the list information on control mechanisms, my interpretation of the level of importance, and information on how MCS connects to the operations of a business model. I continue to open of the content of the Appendix 1 and discuss further the findings in the following chapter 5.

5 Management control in the IEBM

5.1 The package design of the IEBM

This study examines the details of the MCS package in the IEBM context and explains how the package differs from a traditional business model's MCS package. In Chapter [1.2, Purpose of the Study](#), I posed a two-part question: how is the IEBM's MCS package designed and why? In this chapter, I answer on how MCS package is designed. Based on the evidence gathered in the case material and explained in chapter 4, I open up the MCS into its details.

The structure of the MCS package and a full list of the control systems are presented in Appendix 1. The listing of control systems follows the typology of Malmi and Brown (2008), which divides control systems into cultural controls, planning controls, budgeting, cybernetic controls, rewarding and compensating, and administrative controls. In [the introduction](#), I defined an MCS to be listed in the rows of Appendix 1 when it is continuously used and has become an established practice, including a complete process with an obvious purpose of promoting reaching the strategic target. In addition, I considered certain information for each MCS that fills the criteria. In the columns of Appendix 1, a control mechanism describes the way the control system works to change behaviour in the organisation. Next is the column 'Control directs to', which describes the part of the organisation or activity whose employees are directed by the control. The next column has a value of high, moderate, or low, depending on how important the control system is for the operations of the case company. I interpreted the importance based on how central the control system and its use were described in the interviews and other research materials. The next column connects the MCS to the attributes of IEBMs described in chapter [2.2. Characteristics of IEBMs](#). In other words, this column indicates what kind of business-model-level decision the MCS relates to. In the next column, 'Reason for being within the package', there is a short description of the detailed control question this MCS answers.

To the first group of cultural controls, I added the recruiting process, high education or high skill requirement, all-hands breakfast meetings and team-building days. They are activities that reveal the building of a clan. Other informal systems may exist to enforce the clan spirit. The strict selection and socialisation processes

are indicators of the clan, as the perfect fit unifies the team and increases the possibility of reaching targets (Clark, 1971; Ouchi, 1979). These systems direct their impact to all employees but from a very long time perspective. Building the clan is a slow process. I put the relevancy in the package as the base of MCS because strong cultural unity within an organisation is necessary for the IEBM to succeed. The requirement of high education or skills connects to the functioning of expert organisations, a typical characteristic of IEBMs. The role of the strict clan building is to ensure similarities in people's backgrounds, like, for example, a university level education. A well-built clan diminishes risks, which might raise from different values, interpretation of targets, or even interpretations of the strategy. The socialisation process inseparably belongs to clan-building.

Next on the list of Appendix 1 are the values. Their control mechanism is very similar to clan-building and separating the two is quite difficult. Unified and shared values are the basis on which the clan is formulated. The values are also a very long-term control system, and similarly to clan-building, the values are the core of the package. They also relate to the choice of being an innovative technology company, i.e., the connection to the IEBM is the same as the clan-building MCS. They diminish risks as behavioural predictability increases.

Symbols, in this case, were the logo, the colourfulness of the interior of the office, and the off-site management meetings. The control mechanism works through differentiation. With symbols, the Company stands out from all other companies, which enforces team spirit even more. Symbols affect all employees and also all candidates who may become employees later. Although there are symbols visible on the premises, I interpret the logo and bright colours to have only a moderate impact on the MCS package. However, the off-site management meetings received so much room within the discussions that their impact is high. The symbols relate to the IEBM similarly to the clan and the values, and their role is mainly to enforce those two other types of controls.

The significance of building an organisational culture in the case company corresponds to my previous assumption and previous research findings. High reliance on socio-ideological controls (Bedford & Malmi, 2015), cultural controls in prospector strategies (Bedford et al., 2016) and an emphasis on employee selection (Abernethy et al., 2015) in a context like the case IEBM have been proved several times in research. Therefore, I consider the strong organisational culture given in circumstances such as the IEBM. I have covered those circumstances more in chapter [2.2. Characteristics of IEBMs](#).

The planning controls are listed next in Appendix 1. Both long-range planning and action planning work through the same mechanism of unifying and sharing targets, which improves the possibility of reach. All planning, whether on a strategic level or lower, directs the behaviour of all employees, ex-ante. The only difference

is the time span. I interpreted the relevancy of the MCS as high because planning is the basis for all activities within the Company. It also connects to the core of the business model by planning the methods for value creation capture. The role of both planning controls is to diminish risk by increasing the predictability of behaviour. In a similar context to the IEBM, interactivity in the planning of targets has been discovered to be important in many recent MCS studies, which I agree with in this study.

Moving on to the cybernetic MCSs, budgeting is next in Appendix 1. The control mechanism follows what I said above on the planning controls; the target-setting is only in monetary terms for the coming calendar year. The budget derived from the action planning makes yearly monetary targets explicit and unifies the understanding of targets in the short term. It affects the behaviour of the whole organisation, but I estimate it as having moderate relevancy because the updated business plans replace the budget during the year. Budgeting relates to the IEBM-level decisions via value creation and capture, as it does plan that in monetary terms. As a cybernetic control system, the interactivity between the management and the employees applies to budgeting. Also, as an ex-ante control, the role of budgeting lies in risk-mitigating, but the interactive method of target-setting also motivates the employees.

In the group of financial measures, I have listed in Appendix 1 twelve such profit and loss, revenue, and gross profit measures, which are reported directly in euros with no relation to the non-monetary drivers, like hours or pieces. As ex-post controls, the control mechanism of the financial measures works through the deviation from the target. If the measures show a negative gap compared to the targets, it indicates the need to change some aspects of organisational behaviour. The measures direct their control over the corresponding organisational team they are measuring or over all employees. The relevance of each system differs according to the amount of money they measure. Therefore, I have considered the full profit and loss, gross profit measure and EBITDAC for the whole company as highly relevant MCS in the package. Basically, all those financial measures that reflect the total ability to create or capture value are either moderately or highly important for the IEBM. The management has selected each of the financial measures to meet a specific information need, and therefore, the particular role in the last column of Appendix 1 varies accordingly.

There are only two clearly non-financial measures in the MCS package of the case: the number of subscriptions by product and the monthly demand for service hours. The first is the number of payable product users, and the latter is the number of hours invoiced in the Services business. The control mechanism is the same as in the financial measures. First, the impact is directed to Marketing and Product Management for the first measure and Sales and the Service personnel for the second, although indirectly, they concern all employees via the value offer. I have

interpreted the relevance as moderate because the information on these two can be gained from the hybrid measures below. Non-financial metrics are a measure of the interest the products and services generate, which in turn is a consequence of the ability to package value, for example, saving of customers' time, into them. Value is reflected in the hybrid measures I explain in the following.

The rows of the hybrid measuring systems in Appendix 1 contain five measures, four of which are different perspectives on the MRR. The control mechanism is again the same as in the other types of measures explained above. All four MRR measures direct the behaviour of all employees in the Company, the first one primarily Sales and Marketing activities only. The interviewed persons considered MRRs the most important, and based on all the research materials, my interpretation confirms the high relevancy of the MCS package. The IEBM attributes to which these measures relate are value creation and capture. The last column of roles in Appendix 1 varies depending on the exact question these measures are answering.

Generally, the findings on financial, non-financial and hybrid measuring systems align with earlier MCS package studies in a similar context (Bedford, 2015; Henri, 2006; Henri & Wouters, 2020). However, I would like to remind here that value creation and capture are the core characteristics of IEBMs (Zott et al., 2011), so the MCSs directed to that part are necessary for appropriate business model control. The use of MRR hybrid measures supports the idea of Malmi & Bedford (2015) that the answer to the extensive information need lies in a wide range of hybrid control systems. In the case of IEBM, all information on how successful the business-model level decisions are required and have a major impact on behaviour. Value creation and capture – the only reasons for the existence of an IEBM – combined with non-financial drivers label the measuring of the case.

In Appendix 1, rewarding and compensation is next after the measures systems. The control mechanism works through the cognitive process of motivation. In the Company, rewarding and compensation control only the sales personnel directly. Based on the research interviews, it has low relevancy for the MCS package. I interpret the role as a normal way of hiring employees to a sales organisation rather than any role to control behaviour. The rewarding of salespeople has an impact on the level of value capture but as part of the whole package with minor consequences. Following the findings of Abernethy et al. (2015), the Company also trusts employee selection rather than incentives (Abernethy et al., 2015).

The typology of Malmi & Brown (2008) divides the group of administrative controls into governance structure, organisation structure, and policy and procedure MCSs. In the governance structure, I have added the Board, the CEO and the direct reports of the CEO as an MCS in Appendix 1. They all follow the year-clock timings in

leading of operations. The governance structure acts through a clear and unified understanding of authority, decision-making and command order. The governance affects all employees, ex-ante. It connects to the IEBM through the innovation characteristic, as the governors of the company provide and sustain resources, circumstances and structures that enable development and innovation activities. The hierarchical organisation structure, listed next in Appendix 1, works similarly. Also that controls all employees but works on a shorter term than the governance. Some organisation theorists have feared that the organisation structure of the 1950s or before will not succeed in IEBMs' time (Stanford, 2007), but at least the case proves otherwise. The number of employees in the Company also supports what Davila (2005a) calls "a reasonable size of organisation". Therefore, the governance and organisation structure are an expected part of the MCS package.

The MCS categorised as 'Policies and procedures' in Appendix 1 are the Customer Relationship Management (CRM) system and process, resource planning and hour-tracking of the service business, product documentation and release procedures, communication practices and practices of interaction with the Community. The control mechanism is the same for all five: instructed ways of working decrease the number of errors and ensure the desired outcome towards the targets. I have considered the relevancy high for all of these, because they all connect to the essential characteristics of the IEBM, the most important being the last. I have interpreted the role as being 'the core of all' for the practice of interaction with the Community. The roles of the other four are enablers or creators of favourable circumstances for utilising resources in the most innovative and best way. Bedford et al. (2016) noted trust in administrative controls and structures in companies following prospector strategies (Bedford et al., 2016). This study is in line with the findings, in both the strong existence of administrative controls and the way of using them interactively or in an organic way, as they put it. Administrative structures and procedures as enablers of innovation have also been found beneficial (Pfister, 2014), which verifies their presumed existence in the MCS package.

I have now revealed the content of the MCS package used in the case company. In summary, all the control types of Malmi & Brown's (2008) typology exist in the Company. Although there are some variations (even quite significant) between single control systems within the types, I would roughly characterise the content as aligning with my assumptions and earlier studies of similar contexts. The basis for all the MCS is the building of organisational culture, which shows a strong formulation of the clan with deeply internalised values. The planning, measuring, and administrative controls are all considered highly important, with tight connections directly to the IEBM-level decisions on value creation and capture logic or supporting innovative circumstances. Those two I consider the most relevant to be tackled or covered with the MCS. Budgeting, together with rewarding and

compensation, is less important, and the latter might also be considered meaningless for the outcome. Table 2 below summarises the contents of the MCS package.

Table 2. Summary of the case MCS package.

	Cultural controls	Long-term planning	Action planning	Budgeting	Measuring	Rewarding and compensation	Admin controls
Mechanism	coherent team with unified, shared values supports target reach	unified and shared, interactively set long-term targets	unified and shared, interactively set short-term targets	interactively agreed monetary targets	comparison to agreed targets > deviation > actions	acts through motivation for achieving the targets	a common understanding of responsibilities, ways of working, and a clear chain of command promote reaching targets
Time span	ex-ante, very long term	ex-ante, long term	ex-ante, short term	ex-ante, short term	ex-post, short term	ex-ante, short term	ex-ante, long term
Relevancy	High	High	High	Moderate	High	Low	High
Reason for MCS in the package	Technology, innovation and ecosystem control, clan behaviour reduces risks – the base of the MCS package	Planning of value creation and the earning logic promotes their realisation and reduces risks	Planning of value creation and the earning logic promotes their realisation and reduces risks	Planning of value capture promotes its realisation and reduces risks	Measuring value creation and capture from the ecosystem	Connects to value creation and capture through sales personnel only – way of hiring	Enabler and necessity for innovation and realisation of value through the ecosystem – includes an anchor practice

In Table 2 above, in the row ‘Reason for MCS in the package’, I have summarised the columns of IEBM attributes and the role of MCS within the package in Appendix 1. There, building a strong organisational culture aims to reduce risks arising from high technology, innovation and the ecosystem. In this context, I would assume it is necessary to trust a strong, unified team with shared values. I will return to this discussion later in chapter 5.3. The reasoning behind the planning controls and budgeting are quite similar: planning all activities for value creation and earning logic commits the organisation to those plans, which promotes the target reach. Planning activities reduces the risk of possible strategic contradictions or confusion in the organisation (Cunningham, 1993). Interactivity in using formal control systems, such as planning and budgeting, in combination with strong socio-ideological controls has been proved beneficial (Bedford et al., 2016; Bedford & Malmi, 2015). Also, interrelations between these two types of control systems may create circumstances of reaching even the stretched level of targets (Pfister & Lukka,

2019). All measuring systems presented in Table 2 above are then for evaluating and comparing the value creation plans to what has been realised. Of course, all this is common for most organisations and all kinds of business models. The difference comes in the link to the ecosystem. In the IEBM context, the connection to the ecosystem is emphasised because all revenues are earned through ecosystem co-operation. I will return to this dimension later in this discussion. Also, rewarding and compensation as a control system enhances the value creation and capture, although in the case of this study, its importance was minor.

The reasoning behind the administrative controls varies a little by MCSs, but they could be drawn together as enablers and necessities for creating innovative circumstances and realising the value proposal through the ecosystem. In the case of this study, some practices are relevant and decisive for other MCSs, with the ecosystem dimension again. I will discuss this more in chapter 5.3.

When I sorted the data in Appendix 1 according to the IEBM attributes and generated a summary in Table 2 above, my attention was drawn to the fact that only a few IEBM-level items dominated a large part of the individual control systems: value creation and capture, enabling of innovation, and the technology-related ecosystem. Those are the questions, among others, that the management of an IEBM needs to answer to create a functioning business model (Hedman & Kalling, 2003; Huelsbeck et al., 2011). Value creation and capture, innovation and the ecosystem are also all sources of risks in IEBMs (Schneckenberg et al., 2017). It seems that these also generate the main control questions they need to cover with the MCS package. The management needs to focus on ensuring the constant flow of earnings as part of the ecosystem, ensure favourable circumstances for innovation and diminish risks emerging from all these. Of the three main areas for management control, value creation and its continuous accumulation into the Company is undoubtedly the most relevant. It has created an efficient way of measuring that and also directing the value creation through the measures. I discuss this major contributor to the MCS package further in the following chapter 5,2.

Above, I have used the logic of IEBM-level attributes, or decisions, which create the control questions to be answered with the package. Gerdin (2020), in his study of the complementary logic of MCS, found that control forms can be underpinned by two or more logics, i.e., they can complement each other as different types of controls, social and technical, depending on the underlying logic they embed (Gerdin, 2020). Another logic for the examination is the complementing/substituting logic. In Figure 15, I propose that the high-relevancy systems complement each other in the balanced package. Systems inside the same grey circle can be substitutes. Systems answering the same control question but with moderate relevancy give supplementary control at most.

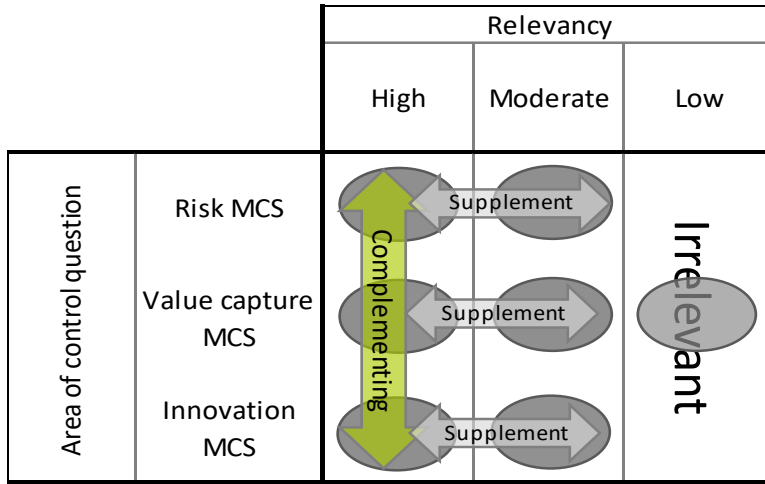


Figure 15. Complementing control systems within the IEBM's MCS package.

In the picture above, the vertical arrow stands for complementing, and the horizontal arrows for providing supplementary control. Systems with low relevancy are considered meaningless for the control impact and outcome. As an example of the complementing/substituting MCS presented in Appendix 1, planning controls and product release procedures are all risk-diminishing, so they may substitute each other. With high relevancy, they complement the value capture control systems of the MRR. With moderate relevancy, the cash flow financial measure supplements the MRR measures. Design changes are possible within the package, as the earlier equifinality findings suggested (Abernethy & Chua, 1996; Bedford, 2015; Bedford et al., 2016; Sandelin, 2008). However, I suggest that there always needs to be at least one MCS for each main control question, which in the IEBM context are risk diminishing, control of value creation and capture and innovation enabling. On removing one of these areas, the package balance will be disturbed. Consequently, some crucial development for the business may go unnoticed in the organisation and complicate or even prevent the realising of the strategy.

Here, in chapter 5.1. I have described the case company's MCS package structure from two perspectives: through IEBM attributes and from the complementing/substituting perspective. This chapter has provided a detailed answer regarding the design of the package, which emphasises value creation, collecting that value through the ecosystem, as well as enabling innovative circumstances and risk management. The MCSs of these three areas complement each other. I now continue to analyse the package further and answer to the question why the structure is as presented above. I first approach the control of value creation and capture in the package, as it appeared so relevant when analysed by the IEBM attributes.

5.2 MCSs for control of value creation and capture

In my narrative, I described extensively financial, non-financial and hybrid measures, which are regularly used in the management decision-making of the case. With these control systems, the management directs behaviour towards development projects and services that meet customers' expectations and valuation. All measurement systems are used for gathering information on how highly customers value the development work of the Company and whether the performance of the Company saves their time as expected. MRR measures, which I have listed as hybrid measures in Appendix 1, came up as the most important topic of discussion regarding measuring. I have described the MRR concept and the use of the measures in chapter 4.4.5, and now I explain their role in the package. My first research question comprised two parts: the design question and the question regarding the reason behind the design. The rationale for the current structure of the package emerges from chapters 5.2, 5.3, and 5.4.

The business model literature suggests that the most important management decisions that form the core of the business model are those that determine 1) how value is created and 2) how it is captured from the market to the company's result (Amit & Zott, 2001). Especially for the latter, capturing value, the case company actively uses metrics that show the possible fading of constant value creation and deficiency of the added value reflected in the sales. As I described in chapter [4.4.5 Hybrid measurement systems](#), in the case, the MRR (Monthly Recurring Revenue) systems are the focus of management discussion. It is regularly communicated to all employees, and I claim, like the CFO of the Company in 2019, that this considerable importance links directly to the IEBM value creation and capture: "... together with subscriptions, that MRR has grown strongly... it is the same thing that determines this company's value quite strongly" (CFO, 2019).

The MRR measures are simple but clever, as they combine non-financial drivers and value. When the number of new customers (subscriptions) exceeds the number of leavers, the business model succeeds in value creation. The corresponding revenue should increase proportionally to the new customers, but if it does not, it means a deficiency in the value capture. That leads to actions in the pricing or changes to the product content, i.e., what services are included in the subscription price. If there are more leavers than new customers, the firm needs to wrap more value into their offering. They could develop new features in the product or add support services. The whole process of MRR use has been cleverly implemented in the Company, and the results have led to changes in product content quite recently: "We have been aiming at value-based pricing. On the one hand, what is the value that the customer gets, and on the other hand, efforts have been made to package our services onto the products?" (CFO, acting VP of Sales). The management team noticed a steady increase in the subscribers to one product package, but the revenues did not respond

similarly. They decided to remove part of the support service from the package as a separate service subscription, and they managed to grab the additional value. The acting VP of Sales continued: “In my opinion, the packaging is a more relevant question than how we are priced. The pricing is value-based, and in packaging, we should succeed in creating packages that meet the needs of customer groups.” The MRR indicates that more (or less) value is needed from the service side on the product package.

At the beginning of the dissertation, I defined an MCS as a systematic, management-driven process that often includes a technical solution. In the case of MRR reporting, the CRM system, together with the accounting system, serves as the technical information source. The process includes planning the numbers, following up through the systems and reporting the five different MRR combinations for the monthly management meetings. There they discuss the MRR and make necessary decisions, to sustain existing customers and cut all actions leading to a negative effect on recurring revenues. The process is systematic, thoroughly planned and actively managed.

In innovative circumstances, the earlier literature notified the need for cybernetic controls and measures as information providers and enablers, as well as support for all other systems in the package (Bedford, 2015; Henri, 2006; Henri & Wouters, 2020). I suggest that in the context of IEBM, the value proposition, its creation and monetisation are emphasised because they can only succeed with the help of the ecosystem. The community, i.e., part of the ecosystem, decides how valuable the value proposition of the business model is and strongly influences, for example, the prioritisation of development work. Earlier studies have not recognised that direct prioritisation role of development. Bedford et al. (2019) emphasised the balance of performance measures, particularly the use of hybrid measures, whose results are used as a vivid discussion tool for senior management. They considered the measures as promoters of discussion, which finding relates the design of MCS to the use and connects performance measures to other MCS of a firm (Bedford et al., 2019). The case of this study strengthens this understanding. The MRRs are a discussion base for the management, but also between the management and other organisational levels. They are part of transparent communication when changes in product packages are needed and also communication on why those changes are necessary.

Ylinen & Gullkvist (2014) also emphasised the organic way of communication together with rather mechanistic control systems like measuring. They explained the use of mechanistic controls with information needs in projects, which need was then answered with performance measures. Mechanistic controls combined with the MCS of organisational culture create cognitive tension, which enhances performance (Ylinen & Gullkvist, 2014). I suggest that the cognitive tension amplifies when the business model’s functioning is at stake, as in the IEBMs. The development of

anything new needs an agile link to what is worth developing. Well-designed hybrid measures link innovation and product development seamlessly to the value creation process, as discovered in the case of this study. The MRR measures ensure that the sales revenues from the products are in proportion to the added value they produce.

At an IEBM, creating and capturing value requires strong integration into an operational context to be successful. The Company used hybrid measures of MRR for that integration and a discussion tool for the entire organisation.

5.3 MCSs for reducing risks

Earlier in this chapter 5, I suggested three main control questions, formed around business model-level decisions, that the management tries to answer in IEBM settings. Those are ensuring continuous value creation and flow of income, reducing risks, and ensuring favourable conditions for innovation. In chapter 5.2., I discussed the control of value creation and capture with measurement control systems, especially with MRR measures. Here, in the following, I will shed more light on how the MCS package responds to the question of diminishing risks.

In the previous MCS literature, a strong corporate culture with informal behavioural controls has usually been combined with development strategies (Abernethy & Brownell, 1997; Bedford et al., 2016; Bedford & Malmi, 2015). Those strategies associated with innovation activity involve high risks because innovations are not always born or successful (Chenhall & Moers, 2015). That strategic context, of course, applies to most technology-driven business models as well, but in the IEBM environment, the risks are not only related to the strategic-level decisions. Uncertainty arises from innovation that concerns the business model itself, independent of the strategy, regarding all three main attributes of the business model separately: value proposal, value creation and value capture (Schneckenberg et al., 2017). The MCSs in the package for reducing the risks are very common, like planning, budgeting, and policies or instructions, which are widely used in any business model. However, the difference comes in ecosystem risks. In addition to all other risk sources, the management needs to answer the question of ecosystem risks.

At the level of business-model decisions, the choice of technology is very decisive in many aspects, especially because it leads to part of the technology ecosystem, allowing a company to realise its value proposition (Adner, 2017). Risks related to the ecosystem decision may arise from contradictions between the different actors and their targets in the ecosystem (Adner, 2017) and product competitiveness within the ecosystem, especially in open-source technology solutions, as they are widely available (Seppänen & Helander, 2014). Special risks relate to the integration of a business model into the ecosystem. Horneber (2022) discusses several perspectives of integration, the technical, customer perspective, structural and also

cultural integration, which may increase the possibility of value creation and capture but involves risks of diverse aims and directions of actors, especially in cultural integration (Horneber, 2022). The last point of cultural fit into the ecosystem is interesting. As I have described above, to diminish risks arising from the strategic environment, the Company uses MCSs which are common in all business models. Obviously, those MCSs function at the business-model level as well, but the difference lies in building the organisational culture. Unified and shared values, together with a strong team spirit, increases the commitment to targets but also the predictability, which reduces risks related to contradictions in personal vs organisational targets and their interpretation. Cultural MCSs are often connected to the strategic decision of pursuing new product development, but at the business model level, especially in IEBMs, the organisational culture is for settling down risks from several sources: diverse actors and strategies within the ecosystem, business model development, i.e., innovation to the business model itself, product competitiveness brought by open-source technologies and product competitiveness among the other ecosystem actors. In addition, as Horneber (2022) suggests, in realising value creation, the organisational culture needs to fit into the culture of the chosen ecosystem, which increases pressure for the management responsible for building such a fitting team. That is also one of the risks in the ecosystem context. I return to this subject in my discussion of the ecosystem dimension of the MCS package. At this point, I only note that in exploring the MCSs on the IEBM level, there are other explanations to discover than what has been found in the strategic-level analyses.

5.4 MCSs for providing innovative circumstances

I have described above how the management of the IEBM has answered the control questions of value creation and capture and risk diminishing. The third main question relates to innovation, and especially how to ensure such circumstances for the business model that innovations in the product, as well as the business model, are likely to be born.

As explained above, in the discussion on risk diminishing, innovation is an inseparable activity in pursuing development strategies. In addition to innovative products and services, IEBMs must constantly innovate the business model itself to keep the value proposal competitive within the ecosystem (Achtenhagen et al., 2013; Chesbrough, 2010; Rasche et al., 2016). Innovation is a decisive attribute and crucial for the existence of an IEBM (Amit & Zott, 2012); the management needs to ensure that the circumstances are as favourable as possible for both product-level and business model-level innovation. This appears to be one big area of control questions the management answers with the MCS package design. For that purpose, I

discovered several MCSs, many in a group which Malmi & Brown's (2008) typology determines as administrative controls, for example, organisation and governance structures, communication procedures and discussion practices.

The most important contributor to the innovative environment is, however, the organisational culture in the Company. Relaxed working conditions are evident, but certain procedures give character and assertiveness for concentrating on important activities: "... people are quite free to choose their working time, but everything is recorded accurately" (VP of Services). Because innovation is a strategic level choice, MCSs have also been explored from the strategic points of view. Several authors have studied how innovative companies have combined quite strict but interactive use of formal control systems with informal, even complex, behavioural controls and managed to create organisational circumstances which promote innovation (Bedford, 2015; Chenhall & Moers, 2015; Henri, 2006). Those findings on MCS and innovative strategies apply, of course, to IEBMs as well. However, when concentrating on the business model-level of decisions, some more explanations may be revealed, and understanding increases of why this is a special area of control in IEBMs.

Structures inside a company, and governance structures overall, are usually considered to be reflective for and aligned with the strategy (Chenhall, 2003). However, the management decisions that define the organisation and other structures are part of the formation of the business model (Osterwalder, 2004). There are different views on the mutual impact between organisation and strategy, but it would seem that the organisational structure affects the implementation of the operating strategy, rather than vice versa (Ferreira & Otley, 2009). The operating strategy strongly refers to business model-level decisions, i.e., the creation of a business model, which only confirms that the agreed strategy affects the building of the business model structures.

Although the structures are also formal boundary systems (Simons, 1995), and as such are sometimes considered restrictive to innovation, they provide form and discipline for activities which, in interrelation to behavioural systems, like organisational culture, are beneficial for performance in an innovative context (Bedford, 2015). The organisation structure defines the responsibilities of each employee but also, inversely, what activities are outside one's responsibility (Chenhall, 2003). As such, it leaves room and creates opportunities for exactly those activities, for example, innovation, that are required in a specific organisation. Ferreira & Otley (2009) highlight organisations' connections to value chains and their linkages to surrounding networks or alliances which need to be addressed in organisation structures and properly linked to key success factors of an organisation (Ferreira & Otley, 2009). In the case of this study, the organisation clearly reflects the operational environment of the business model, as well as ensuring enough room

for the innovation process: “Last autumn, we invested in Community work quite much ... there is now a new development releases team” (VP of Engineering), “... we now have this ‘Community focus’ thing, that is, ten per cent of the working time can be used for any project” (Product Manager). Of course, it would be naïve to think that by appointing individuals or teams responsible for innovations, those would start to emerge. However, when an opportunity is given and favourable conditions are built with a motivating team, enough time, in relaxed culture, and with some inspiration from the Community, the appearance of innovations is more likely. I suggest that the governance and organisation structures, together with established and implemented practices in the organisation, are enabling and ensuring such working conditions which promote both product and business model innovation. This enabling power of an organisation is amplified when looking at activities at the operating level of an organisation, i.e., on the business model level. What Ferreira & Otley (2009) refer to as surrounding networks are realised in ecosystems, and that context is reflected in the teams of the organisation. In the case of open-source technologies, innovation is co-operative with the Community. Therefore, the importance of agreed structures and practices involving that specific part of the ecosystem increases. Also, the structures and practices connect tightly to the ecosystem in the IEBM context.

To stay innovative and maintain the competitiveness of the business model in the technology ecosystem from which the company tries to gain value, vivid interaction between other ecosystem actors and the organisation is needed. Akroyd et al. (2016) and later Ahrens (2018) explored organisational practices as control systems. They identified central and marginal practices which formed a hierarchy where an MCS appeared to guide all other practices. The central MCS characterises, i.e., anchors, how the organisation acts and makes it a constitutive rule in the organisation. While they control the behaviour, they are so deeply part of the organisation’s functioning that they even define its character (Ahrens, 2018; Akroyd et al., 2016). Community discussions are at the top of the hierarchy of practices in the case of the study. Anyone from the organisation can participate in the activity, it is encouraged, and it is also obviously popular among technology-minded people. Every Friday afternoon is reserved for ‘free’ work time when everyone can choose which project or activity they want to promote at work. Many use that time to solve problems that have arisen in the Community or come up with new solutions in co-operation with other community members. This practice of discussions is, therefore, tightly connected to the process of innovation, and especially, enables collaborative innovation within the Community. This action has very significant and even far-reaching consequences in the sense that it allows the management of the Company to know in which direction the technology is likely to develop and how well the Company’s product framework fulfils the requirements in that specific ecosystem. The discussions may reveal problems that require new development work or

prioritisation of an existing project. In a good way, discussions may lead to such development ideas that can lead to significant added value in the company's products. Particular seriousness relates to concerns that appear, for example, towards the capability of solving issues in customer system integration with the product framework. If the solutions produced by other actors emerge strongly in the Community discussions, it leads to actions in product development. If the Community members do not experience enough value-add from the Company's products, the value creation process has failed. And that, of course, is crucial for the existence of any IEBM. The practice of Community discussions anchors all activities to value creation. It directs the development work in the right direction already before any other measures such as MRRs, show negative signs. Of course, those MCSs are needed there to measure the proper level of income and profit, but the Community discussions have already acted first.

The practice of the Community discussions is strongly controlling behaviour within the company, "... they [the Community members] suggest features, what will be done... if it is like the number one priority everywhere [all sources], it will be taken into account" (VP of Products), but there is also a certain aspiration to direct those conversations in a way which is favourable to the Company's targets. As the Product Manager of the Company indicated: "... if someone wants to make such a big application for their Web shop, for example, then maybe we will try to guide that person, that if you have the resources, you can do this with [product framework]. But maybe we can also mention at that point that we can do it for you." The discussant may also eliminate negative comments about the product or recommend a solution that takes the development of the product framework in the desired direction. That means also directing control towards the Community, i.e., ecosystem actors outside the Company, which is a specific feature of IEBM management control. Primarily, of course, all control systems are for aligning behaviour only inside the Company. Considering that these MCS influence and ensure favourable conditions for innovation, the MCSs are mainly similar to any other type of business model. The difference comes in implementing them properly at lower levels of the organisation. Another difference is connections to the ecosystem, which need to be noted in the implementation. I will discuss that further within chapter 5.5.

Now, I have discussed the MCS package structure and how it reflects the three main areas of control questions: ensuring constant value creation and capture, reducing risks, and enabling circumstances where innovative development can take place. These main control questions are very much the same as in any business model when looking at them from the strategic point of view. Also, the means for answering them, MCSs as such, are very similar to those in use for controlling non-technology-driven business models. The presented MCSs are not exclusively for any of the control

questions, even though I have presented them in answering only one on the business model level. On the strategic level, for example, the structures may have other roles than enabling innovation. However, when examining the MCS package at a lower level of the business, in connection to the business model functioning, differences compared to other types of business models and different roles for MCSs appear. The management of an IEBM takes some stance on the main areas of control questions to make sure that organisational behaviour is aligned with those areas which directly connect to the typical IEBM features of high risks arising from several sources, pursuing innovation in products and the business model, and most importantly, the value proposal realised through the chosen ecosystem. That last one is important for the package. IEBMs function in a network of lateral actors, in an ecosystem which differs from the functioning of non-technology-driven business models. I have noted several times in my analyses above that the business model functionality connects tightly to the ecosystem, and so do many MCSs in the end. The role of the ecosystem in the MCS package design definitely needs more attention. Namely, the ecosystem as a reason for some MCS being in the package leads to the situation where some facets, external to the Company, are control objects of MCS. That makes even a common MCS different when it is put in the role of ecosystem control.

5.5 Ecosystem as an object of control

As I have explained above, the MCS package of an IEBM is designed around three main subjects, i.e., control questions. By definition, MCS can influence the behaviour only inside an organisational unit whose management has implemented the MCS. The ecosystem, however, is completely external to the organisation, structured around the technology and comprises lateral, independent actors with no one having official power over others (Adner, 2017). Still, when I examined the package from the business model point of view, I noticed for each main control question how MCSs related to and reached for control of the Community, i.e., the part of the technology ecosystem. In this chapter 5.5., I discuss some methods of governance that I discovered from the case of this study, and which methods are for answering the control questions raised by the ecosystem. At the beginning of my research, I posed the research question, "How is the IEBM reflected in management control practices and vice versa?" This chapter, along with chapters 5.6 and 5.7, specifically address this question.

First, I described above how the management systematically measures and monitors the value creation and capture process with financial and hybrid measures. That interest, of course, is by no means exclusive to IEBMs, but common to all types of business models. Still I claim that the monitoring of the value creation process is

amplified when it is realised with the customers and within the ecosystem, but especially in open-source business model, where the creation process is a collaborative process with other developers in the ecosystem. The value creation process is tightly connected to other actors of the ecosystem, whose decisions and actions are not under the direct control of any MCSs in the package.

Second, I discussed earlier MCSs for reducing risks. Planning, budgeting and instructing may reduce risks inside the Company, but do not have any impact on the behaviour of other ecosystem actors. Schnekenberg et al. (2017) found a complex ecosystem structure to increase risks in business model innovation due to the unpredictability of other lateral actors. They suggested five coping mechanisms for reducing that un-predictability: customer-centricity, which means a value proposition that is closely aligned to customer needs, value co-creation in which intense communication and feedback activates customers in the value definition, capability evolution, which is a response to customer-centricity and co-creation by acquiring missing capabilities and adapting to evolved work processes, ecosystem growth, meaning the search for business support from a larger amount of ecosystem actors, and adaptive pricing in the value capture, especially in a new business model or in the case of a new product (Schneckenberg et al., 2017). These coping mechanisms talk about the challenges that the management of an IEBM encounters in developing and operating the business model. They also talk about the different sources of risks in the ecosystem environment. However, even though the mechanisms may help in adapting to the uncertainty, they do not reduce it or govern other actors in any way. To really reduce risks in an ecosystem environment, I suggest profound means of building the organisation's culture, which I will discuss more in the following chapter.

Third, I discussed earlier how the management of the Company has concentrated on making all the value creation possible by enforcing such structures, policies and practices that make the organisational environment opportune for innovations. Several studies have indicated the need for control systems to promote innovative circumstances in organisations implementing innovative strategies (Bedford, 2015; Henri, 2006; Henri & Wouters, 2020; Pfister, 2014; Pfister & Lukka, 2019). The need is not restricted to IEBMs, but is common to all organisations with a significant R&D function. Earlier MCS literature concentrated on the strategic level of innovative companies, mostly ignoring the ecosystem's perspective. A chosen technology limits product innovation in the chosen technological solution and, especially, limits business model innovation, the value proposal, within that chosen ecosystem. Innovation in an ecosystem environment has greatly interested researchers lately, since there may occur tensions, even contradictions, between the parties on what kind of innovations are 'acceptable' for an individual actor within the structure, as they can disturb the equilibrium and transform the whole ecosystem

structure (Palmié et al., 2020; Wareham et al., 2014). Other actors in the ecosystem may have a say in what kind of business model may be developed for value creation so that the value proposition of others remains competitive (Thomson et al., 2022). The open-source technology choice makes product innovations, as well as business model innovations particularly dependent on others within the same ecosystem due to the shared development principle of open-source (<https://opensource.org/>, n.d.).

In the initial business literature, the concept of an ecosystem focused on the idea of mutual prosperity. This viewpoint is reflected in Moore (1996) definition, which describes an economic community that produces valuable goods and services for customers who are also part of the ecosystem. Subsequently, Adner (2017) highlighted the importance of aligned and interdependent structures but with independent partners in value creation, which is a more suitable definition for technology-driven ecosystems. Both definitions, however, acknowledge the presence of lateral business entities that cannot be controlled using the same methods as internal employees. Yet, the control questions remain, like ensuring constant value creation and capture. This ecosystem dimension makes the management control environment of IEBMs different from other types of business models. When I analysed the MCS package from the internal organisation point of view, I came across this ecosystem context for each control question. In light of the earlier ecosystem governance literature, it also seems that governing others, directing even the closest parts of the network without being a technology owner, is rather difficult for a single business model (Wareham et al., 2014). On the contrary, reciprocal control from the ecosystem towards a business model is powerful.

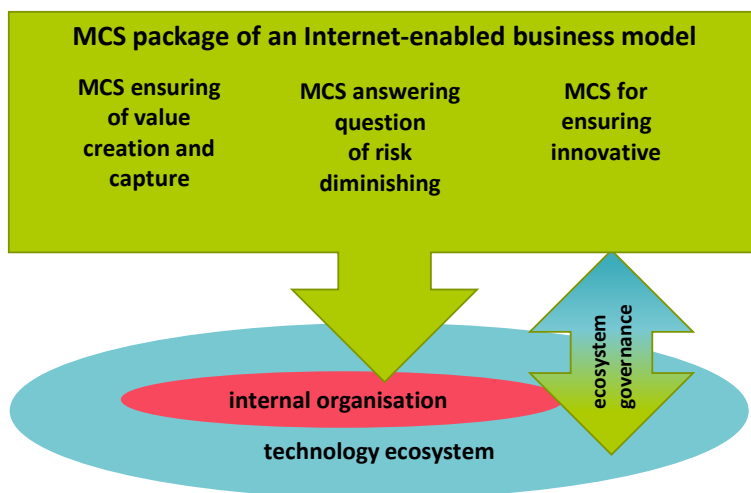


Figure 16. MCS of an IEBM, control questions and connection to the ecosystem.

Figure 16 above shows the main dimensions of the MCS package in the IEBM context. MCSs are mostly designed around risk diminishing, value creation and ensuring favourable circumstances for innovation, which are depicted on a green background. The main control questions are the same for internal aligning of behaviour as for affecting the conduct of the external ecosystem. Although an organisation is within a technology ecosystem, as shown in Figure 16, there are only a few MCSs that can affect both objects of control. Based on this case study, I propose the construction of cultural controls and, to a lesser extent, anchor practice as systems that can control both objects. The double arrow on the right, in gradient colour, shows a reciprocal effect, as the ecosystem also shapes and influences the MCS. That governance should by no means be underestimated. In the following, I bring forward two means of control which give some possibility for a single business model to govern inside the ecosystem towards others.

5.6 Organisational culture as a device for ecosystem control

I have described earlier in [chapter 4.2](#) how building a strong organisational culture and living that through shows in the Company. I gave an example of fully implemented values in the story of un-sent invitations to interviews, and how well I was treated as a complete outsider for all their business activities. In [chapter 5.1](#), I described all those MCSs that I found in the Company and considered them as a grounding pillar for the whole package, as well as a necessity for IEBM circumstances. So far, I have explored the informal control systems of clan-building, values, and symbols only from aligning the internal organisation's point of view. In the analyses of the MCS package in the IEBM context, I repeatedly noted, however, that the united and shared value base between employees is not enough for a business model operating in an ecosystem environment. Previous studies have found that a strong organisational culture benefits development environments executing new product strategies (Abernethy & Brownell, 1997; Bedford et al., 2016; Bedford & Malmi, 2015; Davila et al., 2006). Krupskyi & Kuzmytska (2020) described organisational culture in those as flexible, open to new ideas and favouring the ability to take risks, but especially, it forms an attitude towards innovation. In companies in an ecosystem environment, however, the features of organisational culture slightly differed from those of development strategies without an ecosystem network. In the ecosystem environment, the adhocracy was even higher compared to non-ecosystem companies, but also, features of rational and result-oriented behaviours were meaningful in those. A culture of command, or clan, which they describe as a co-operative, interchangeable exchange of knowledge and experience, and readiness to assist, was found relevant in the ecosystem environment (Krupskyi & Kuzmytska,

2020). These findings mean that building a culture suitable for an ecosystem environment requires combining both flexibility and rationality and adaptation to the ecosystem, but prioritising competitiveness and business results at the same. This can lead to tensions that are usually addressed within the organisation through careful clan-building but require more attention if recognised between the ecosystem and the organisation. In chapter [5.6.1](#), I briefly discuss the concept of organisational ambidexterity, by means of which firms attempt to solve the problem of multiple and diverse objectives.

In the IEBM context, innovation strategy covers also the development of the business model itself (Schneckenberg et al., 2017). In that development, in addition to the company's own value proposition, it needs to take account how the proposition fits into the value propositions of others in the same ecosystem (Cennamo & Santaló, 2019; Palmié et al., 2020; Thomson et al., 2022; Wareham et al., 2014). As I mentioned in connection with the discussion on risk reduction, cultural controls settle risks arising from diverse interpretations of the strategy, individual values or contradictory personal objectives. In the ecosystem, the mechanism is, of course, the same but now on a different level. In realising value creation, the organisational culture needs to fit into the culture of the chosen ecosystem, which increases pressure for the management responsible for building such a fitting team (Horneber, 2022). This means aligning the collective "behaviour" of the business model with the ecosystem's structures, values and collective value offer. That alignment may include a major challenge to managing a business model; however, it is a mandatory condition, for example, in responding to the cultural requirements presented by Krupskyi & Kuzmyska (2020).

Aligning the organisational culture with the ecosystem culture means quite a profound consideration of clan-building. Earlier control literature emphasised the similarities and reduction of differences in clan members' backgrounds when functioning within the same organisation (Birnberg & Snodgrass, 1988; Ouchi, 1979). Now, similarities must be tied to the principles of the ecosystem, which requirement differs from clan-building in a non-technology business model. An example of such a principle could be the basic idea of open-source technology of free sharing of source code. Everyone who works with open-source must accept the idea that anyone can obtain and modify open-source code and that these modifications are returned to the community without compensation. Even later, no one can claim any part of the open-source code as their own. If a person cannot commit to these ideas but would like their own development work to be recognised in that code, their personal values are in conflict with the open-source ecosystem. Working in the ecosystem of payable technology licences suits that person better. Although only a single example of similarities in values of the ecosystem, it

enlightens how profoundly the alignment of behaviour affects the ecosystem environment.

In addition to reducing ecosystem risk, aligned principles, values and a compatible value proposition also enable, not only limit, the business model's opportunities to manage the direction of the ecosystem. Similarities in principles contribute to understanding the peculiarities of that particular ecosystem and its patterns of thinking, but above all, they contribute to how a single business model can affect the thinking and behaviour of the ecosystem. It requires some other MCS practices that would only work within a strong cultural unity. Such practices include, for example, the community discussions in open-source discussion forums, which practice I discovered from the Company and listed as a final MCS in Appendix 1. As an internal company practice, I called it an anchor practice according to Ahrens (2018), but from a broader ecosystem management point of view, it is related to the organisational culture, because, in a different organisational environment, the practice would not be possible, or would not work. The company actively aims to influence the community in such a way that more and more people start using the framework, and that ongoing product development projects receive broad support from the community. In the interview, to my question about whether the company's discussant on the open-source forum tries to positively influence thoughts about the use of products and services, the Product Marketing Manager answered: "Of course, we participate... maybe we will try to guide you on that point, you can do this with the required amount of time, and if there are enough resources you can do it, but here maybe it can be mentioned that we can do it for you too," Product Marketing Manager (2022). Tight co-operation with the Community gives direction to the development work and the value creation, which may appear limiting, but it reduces the risk level at the same time, and being an active member of the Community is a way of influencing others in the ecosystem.

By creating an organisational culture with a strong and unified value base among employees, but one which is also in line with the ecosystem's values and principles, the business model's value proposition can be realised. Building such a culture in an organisation starts from the perspective of the external technology ecosystem and its principles. When an IEBM's 'behaviour' and value proposition align with other ecosystem actors, the organisational culture reduces the risks arising from multiple strategies and targets. Moreover, an organisational culture suitable for the ecosystem enables MCSs that can extend their influence on other actors in the ecosystem as well. In the case of this research, such an MCS is the Community discussions. The people who discuss within the Community forums influence the direction of the conversation and thus also influence the Community. What is more significant is that this discussion forms a minimal social structure (Kamoche & Cunha, 2001), common

in co-operative arrangements between independent organisations, which situation I discuss further in the following.

5.6.1 Introduction to inter-organisational control

The MCS can directly affect only the behaviour of employees in a certain organisational unit or legal entity. Only rarely can the same MCS act as a control outside the organisation. The above-mentioned cultural MCSs and, to a small extent, also Community discussions are those exceptions with an external influence. Research on the design and use of MCS in companies that jointly pursue multiple strategic objectives is quite recent (Bedford, 2015). Below, I briefly introduce some earlier research on control in horizontal business situations, i.e., between independent lateral organisations.

Bormann (2020) studied firms' organisational designs in multiple strategic situations and when incentives are needed for balancing different, partially opposing objectives. In multiple-strategy firms, the use of subjective performance measurement evaluation and incentive intensity together has led to good results. (Bormann, 2020). The study was concluded in manufacturing companies with R&D as a relevant part of the strategy. The results assume full authority over all incentivised parties, which is obviously not the situation in the ecosystem environment. However, the result gives a seed of thought for what could be motivating like an incentive, but between the actors of the ecosystem.

Related to the diverse strategy issue, Gibson and Birkinshaw (2004) studied organisational ambidexterity, which means the capability to align to an organisation's task environment and adapt to the business demands at the same time. Their study explored business unit-level ambidexterity in companies operating in different businesses with some degree of conflict in their operations, like a trade-off decision about 'current versus future projects'. Gibson and Birkinshaw (2004) launched the concept of contextual ambidexterity arising from the organisational context, and they saw it as individuals' capacity to align their behaviour across an entire business unit towards the same goals and adapt to changing activities in the business unit to meet the demands of the environment. They found that successful business units aligned themselves around adaptability, and did it with simple, informal systems, with the support of an organisational context which encourages individuals to make their own choices of time division between alignment- and adaptability-oriented activities. (Gibson & Birkinshaw, 2004). Simsek (2009) continued the discussion on contextual ambidexterity with its definition "... as the state of attaining exploitation and exploration with dexterity". He considered the inter-firm level as a context factor of ambidexterity. Also, he found that the complexity of

the inter-firm network affects the organisation's ambidexterity, especially the fact of how central the organisational player is within the network (Simsek, 2009).

Strategic diversity and the ability to simultaneously cope with multiple operational plans apply to business models in ecosystems. The above findings need to be taken into account in interpreting the MCS package design. However, looking at minimal structures is the most interesting path for reasoning on the MCS practices. Kamoche & Cunha (2001) studied contemporary development environments, especially how to provide some structures and formality but also flexibility for improvisation, i.e., innovation. They ended up with two types of structures – social and technical – that can control behaviour but leave enough room for innovation. Social structures include behavioural norms, communication networking, partnering, mutual trust, etc. Technical structures include critical features of the product concept, quality standards, requirements for skills, training, technology knowledge, modelling and testing specifications, etc. The social structures resemble organisational culture but are not restricted to any organisational unit. To Kamoche & Cunha (2001), social and technical structures represent flexibility and improvisation, upon which product development can happen (Kamoche & Cunha, 2001).

Van der Meer-Kooistra and Scapens (2008) continued looking at minimal structures in lateral relationships. Instead of controlling, they preferred to use the term governance for discussing arrangements between organisations that are not hierarchical but equal. They described these relationships as “substantial interdependence between the parties, considerable complexities in both the relationships and the environment, and a context of continuous change,” but considered them more normal than exceptional in contemporary business. Lateral relations arise when there is a need for an exchange of knowledge between all the parties, a need to secure co-operation, and, at the same time, a need for flexibility and standardisation of action. In Kamoche & Cunha (2001), the social structure governed the behavioural level of the product development process, and the technical structure defined the quality and performance standards of the products to be developed. Van der Meer-Kooistra & Scapens (2008) added minimal institutional and economic structures. Institutional structure is the regulations and rules established by any regulatory facet and the organisations themselves in the form of contracts, employment conditions, etc. Economic structure covers the economic transactions between the parties, their economic character and the context where they take place. As examples of economic arrangements, they specifically mentioned performance measures, efficiency norms, length of relationship, frequency and volume of transactions, time schedules and quality requirements (of transactions), and understanding of market positioning. The institutional structure defines how transactions (mentioned above), and relationships should be structured from the

external legal point of view, but also the internal point of view determined by the parties themselves. Van der Meer-Kooistra & Scapens (2008) did not suggest that a more traditional MCS package would not work in lateral relations at all, or would somehow be replaced by lateral governance. MCS is needed for parties to control themselves. The study emphasised that lateral governance answers the demand of the specific circumstances by helping trust-building and knowledge-sharing (van der Meer-Kooistra & Scapens, 2008).

Van der Meer-Kooistra & Scapens (2015) continued studying minimal structures in practice within product 'co-development', in which environment the parties contribute to the development for accomplishing a project or for a fixed time and form a temporary inter-organisational organisation. Their study concentrated on co-development in a complex network, which well describes a large number of contemporary development environments. In this set-up, the minimal (but not loose) structures provide guidance for the independent parties. They found that the social structure provides most of the day-to-day governance, and the tightness of the social structure even increased over time. A particularly efficient social structure was a broad exchange of knowledge, which enabled interpersonal trust. Later also, the anticipation of possible future co-operation was an important social structure. Concentrating also on day-to-day activities, the importance of the technical structures increased during the project. The economic and institutional structures provided a context for a temporary project, and the institutional structure especially facilitated the flexibility of technical and economic structures. The role of management accounting was found to be quite minimal, but the budget and reviewing of basic financials, i.e., money consumption, were found to be economic structures and boundary settings for the temporary organisation (van der Meer-Kooistra & Scapens, 2015).

The minimal structures presented in the papers of Kamoche & Cunha and van der Meer-Kooistra & Scapens build on at least some mutual agreement between the parties about the existence of lateral relations, even some contracts or written agreements on parts of the collaboration. I will discuss them in a complex network environment, in the ecosystem, where lateral relations are not necessarily recognised in all respects and not specifically agreed upon. However, in what follows, I discuss especially the existence of minimal structures in the ecosystem environment and how they provide reciprocal control between the case IEBM and the Community.

5.6.2 Inter-organisation control in the Company

First, I briefly discuss balancing the diverse organisational objectives of different actors within the ecosystem. Secondly, I examine minimal structures that I found providing governance for the Company of this study and look at the possibilities for all companies operating as a part of an ecosystem.

As I described in connection with the characteristics of IEBMs, the technological choice of the company management is decisive for the ecosystem structures the company belongs to. The case company management opted for Google's open-source technology and, at the same time, entered into a comprehensive, global ecosystem. The open-source community members who have made the same technological choice permit the profitable business opportunity, the value-added, for the Company. The technology owner and the Community members are independent actors, making the business model context into an inter-organisational set-up. An ecosystem is a complex network structure where a colourful group of Community members drives different strategies, but whose success benefits all parties – the loss of any part does not benefit anyone. Looking at the MCS package of one company inside this network requires understanding the management control in a multi-actor environment.

Bormann (2020) studied a multiple strategic situation where incentives balanced different, partially opposing objectives. In the ecosystem environment, there are multiple strategies involved. For example, within the customers of the Company (i.e., the Community and ecosystem parties at the same time), there are insurance companies and big technology companies, which must differ in strategic objectives. However, in the ecosystem, there is no clear party which could incentivise all others' positive actions and, via that, promote all strategies to be realised. I started to consider what could be motivating like an incentive, but between the actors of the Community. I assume there might be some similar mechanisms within the Community. For example, the Company gives a trophy label for those who are the best contributors to their product framework in the Community. That practice may be too small a gesture to incentivise any professional coder, but as a thought, some way might exist to promote the whole ecosystem in the same direction. Of course, the idea of the ecosystem is to realise the value propositions of the actors together, which is a benefit for all, and therefore might act as an incentive as such.

Gibson and Birkinshaw (2004) studied contextual ambidexterity and found the answer in individuals' capacity to align their behaviour towards the goals and adapt to changing activities to meet the demands of the environment. I see a link there to the careful selection of individuals and clan-building. I assume the issue of ambidexterity in the ecosystem context depends on the right individuals, which, in the case of IEBM, is profound for control in all perspectives. That emphasises the strong cultural unity even more in the ecosystem context. Simsek (2009) found that

the complexity of the inter-firm network affects the organisation's ambidexterity, especially the fact of how central the organisational player is within the network. In the case of the Google ecosystem, there are numerous small actors 'on the edge of the network', which individually do not have almost any other possibility than playing along. In such case, the ability to go forward with their own strategic agenda but responding to changes caused by others at the same time, must require flexibility and stiffness together. That describes the Company of this study well.

In the case description, I indicated how the Company constantly but sensitively monitors everything that goes on in the ecosystem. The most important movements are, of course, those inside the Community, because of the direct impact on all activities in the Company and the sales revenues. The VP of Engineering said: "we can then dig out from the Community why we are not selling something... we really, really need to listen [with a sensitive ear]". In the VP of Products interview, "the hobby" also came up: "Me, CTO, and one guy on the Marketing side are following social media and podcasts, just out of interest towards what is going on...". Real commitment and the common practice of Community Fridays drew my attention with almost wonder.

Although participation in community discussions and technological forums is an official task for some positions in the organisation, the management encourages all employees to participate in discussions as private persons, making it a unique and labelling activity. It is particularly noteworthy that the discussants log in as private persons, not with the company username. They try to help the Community the best they can before any big problem arises and any negative comments start to pop up towards the company. Many employees follow discussions even in their free time, which would not work in all companies, but requires a solid, shared value base. The technical discussion platform enables the discussions, but building on this, the management has designed a process which particularly involves certain functions but touches all others. If necessary, there is a systematic way for discussions to generate issues in the organisation up to the management group level. The practice certainly affects behaviour in the company, for example, in the prioritisation of development efforts or on what to pay special attention to in sales and marketing. However, it also benefits the Community with free advice, which calms many storms even before they negatively impact the company's product or reputation. The employee discussants may even steer the debate in the desired direction, which indirectly controls the Community through the employee discussants' behaviour.

Based on the above, I suggest that this is a social structure established to govern the relationship between the case company and the open-source community members. I also claim that even though there is no official understanding of the collaboration towards the common benefits between parties, the social structures seem tight and govern well. Answering questions from the Community members,

and discussing their solutions, i.e., sharing knowledge in both directions, forms a vivid social structure and builds trust in the Community. The Community members also ‘play along’ as they recognise the possible future needs for the Company’s products. The minimal structures are a sort of continuation for MCSs targeted inside the Company. As an example of the functioning of the two-fold MCS package, I give here the social structure and the Community discussion: the social structure created by discussants governs lateral relations towards the Community and the community discussion practice as an anchor to the context controls the behaviour inside the Company. These are like two ends of the same practice.

Technical structures for ecosystem control include all technological solutions enabling collaboration within the ecosystem, especially with the Community. When the management selected the Google open-source technology, it created a strong technical structure for the Company and all who use its free or payable products. Notably, the structure similarly controls the paying customers and those who use the free product framework. Other technical structures relate to the technical side of the open-source discussion forum, such as common server space, tags, etc. The Product Manager describes those in his interview: “... nowadays we have Discord here, which is active and is followed, and then the biggest forum is Stack Overflow. We then code tags there to be followed. The tags then become a feed from which we can all see if someone mentions [Company] or one of our products.” It is good to remember that these technical structures, like all minimal structures, are for managing lateral relations. They do not mean those technical solutions (IT systems, documentation, etc.) used internally by the company and possibly as part of MCS processes. Here too, as in social structures, there is hardly any multilateral understanding between the parties that the technical arrangements are used for governance towards common benefits. Still, the control/governance impact is quite tight.

Economic structures relate to the value proposal for the Community and the value-add the members receive from the Company’s offering. The fact that customers subscribe to the company’s products or buy services becomes a very common economic structure. The company depends on customer sales, and customers, i.e., Community members, need products and services to save time on their own projects. A more interesting economic structure is between the users of the free, open-source product and the Company. There the economic structure is created through the experienced value-add of the Community member and the possible future sales expectation of the Company. The money is not transferred at that moment, but the Community member is dependent on the Company’s free product to meet the time goal of their project. Accordingly, the Company financially depends on the Community members and their future purchases. Although Google’s adoption of open-source technology brings the Company into that technological ecosystem

and, at the same time, brings with it a minimal technical structure, the same must also be seen as an economic structure. The idea of the ecosystem is to provide financial benefits to the entire network. Of course, the individual IEBM is financially completely dependent on that technology. The Google ecosystem is huge, and no single business model can be seen in its benefits, but as a whole, it is a network, and the tighter the network, the better for the ecosystem. There are more agreement-based arrangements in the minimal economic structures than within the social or technical minimal structures.

In the open-source IEBM, the most important minimal institutional structure is the open-source principles, which I described in chapter [2.3 Operation of open-source business model](#). The choice of any open-source technology obliges the user to follow the principles in all licensing, use and sharing of the source code. The principles create a minimal structure that actively governs the mutual relations of all parties. Of course, all local legislation and international regulations bind the Company, as well as all ecosystem parties, but those minimal structures are not unique to the IEBM in the same way that the open-source principles are. With the minimal institutional structures, their governance role in lateral relations is probably the highest compared to other minimal structures. However, for the most part, the IEBM does not have the power to change or choose any position within those structures. They are mostly ‘given’ and the only option if the IEBM wants to continue in the business.

5.7 The package of internal and external together

In this chapter, I summarise my observations about the differences in the structure and use of the MCS package in the IEBM compared with other business models. I have identified and now discussed two intertwined layers of the package: the internal organisation layer and the external ecosystem layer. Both layers strive to answer the same main control questions about constant value creation, reducing risks and ensuring innovative conditions, which control questions connect directly to features characterising any technology-driven business model. The features of value creation and capture, multiple sources of risks and innovative environment for both product and business model innovations are the architectural levels which characterise what the business model actually is about and how it functions. The management of any business model needs to take a stance on each of them, as well as to implement suitable MCSs accordingly. Those decisions are behind the differences in the use and designs of the IEBM MCS package compared with non-technology-driven business models.

The internal layer comprises MCSs, which, as such, are typical of all companies. However, when I analysed their use at the business model level, I noted differences

in the roles that MCSs had. For example, in connection with innovative strategies, organisation and administrative structures have not been very relevant, but at the level of business model operations, they create a position, space and time for innovations with the support of the Community. The MCSs are also intertwined. A thorough planning process, repeated several times a year and taking into account the movements of the ecosystem, meets the management's desire to manage ecosystem risks, although the planning controls are also connected to value creation. The biggest difference, however, compared with other types of business models is the connection to the ecosystem: the desire to understand and control other actors in the ecosystem. MCSs for internal organisation control are connected to ecosystem control, because the control questions remain the same even if the means need to be different for the external party.

In the control of the value creation process, the connection shows in the selection of hybrid measures. The measures combine the level of perceived value in the ecosystem with booked earnings. In the ecosystem context, this also indicates how the value proposition of the business model fits into the ecosystem and whether other actors allow the realisation (Cennamo & Santaló, 2019). In diminishing risks, the ecosystem needs attention as a high-risk environment. Careful business planning on the business model level helps to identify and prepare for risks and thus reduces their occurrence. In the IEBM, business risks relate, of course, to value creation through the ecosystem, which intertwines MCSs in both layers of the package. The strongest link, however, between the internal and external layers is the anchor practice of the Community discussions.

Ahrens (2018) describes the concept of an anchor practice as a practice that structures organisations by defining their nature and outlining the ways in which its members can assume different identities within the organisation. This characteristic of the anchor practice is evident in the operations of the case company. In community discussions, individuals participate as their private selves, but they steer the conversation in a direction that benefits their work role. As a result, the discussion may also impact other tasks and job roles within the company if the content of the conversation is implemented in product development. Ahrens (2018) highlights hierarchies of practices, but in a way where the subsidiary practices not only follow or execute the scripts of the anchor practices but also also play a role in shaping the emotional and affective aspects associated with them. It is a dynamic interplay where subsidiary practices flesh out and contribute to the overall impact and character of the anchor practices. In my view, such a dynamic hierarchy can be observed, for example, between Community discussions and the subsidiary practice of MRR measures within the MCS package. Both are highly important MCS's, but since the content of MRR can be traced back to Community activities, I consider MRR to be a subsidiary practice. Specifically, the emotional impact of the MRR measures also

shapes, to some extent, the dynamics of the Community discussions. In Ahrens (2018), he also mentions (originally Swidler's (2001) idea) anchor practices as manifesting the organisation's constitutive rules in ways that involve antagonistic relationships that can even lead to conflicts or tensions between different groups or individuals within the organisation. Such a notion does not seem to manifest in the anchor practice of the case company. It is possible that any confrontations are mitigated due to the influence of a particularly strong organisational culture. On a contrary, the anchor practice seems to unify organisation even further in a positive way.

The practice strongly guides the development of products, thereby the creation of value, and, eventually, all practices, measures and policies in the Company, as in the business model, everything connects to value creation and capture. In addition, the practice of Community discussions has a possibility, to some extent, to guide the behaviour of external parties. That MCS really ties the two layers together. Although the interactions with the open-source Community are a matter of open-source business models only, I presume that generally in IEBMs, there is a similar practice, an MCS, that connects the business model functioning tightly to its ecosystem, and which is placed at the top of the hierarchy of MCSs, as described in Ahrens (2018) on anchor practices.

Organisational culture is intertwined with all other MCSs. It influences both layers of the package and provides conditions for, for example, the Community discussions to succeed. When aligned with the ecosystem values and principles, the organisational culture also governs external ecosystem actors to a certain extent. However, the stronger governance for the external ecosystem comes from minimal structures formulated between the IEBM and the other ecosystem players. Minimal structures are mutual guiding instruments that influence both layers of the package. For example, the social structure formed by the Community discussions guides, at least to some extent, all parties of the discussion. The Community participates in problem-solving and developing work, even innovation, which social structure guides the activities on the business model side. The two layers of the package work together seamlessly so that some MCSs extend to both the internal and external levels.

There is also some intertwining between different minimal structures. Van der Meer-Kooistra & Scapens (2008, 2015) do not particularly emphasise their correct grouping. It is not necessarily evident what the minimum structure in question governs between the organisations. On the contrary, they suggest there is always interpretation involved in whether an activity creates a technical or, for example, an economic structure. However, their studies assumed that the parties of a lateral set-up are at least aware of, but often also officially agree on, the co-operation for pursuing the outcome that benefits all parties. In the ecosystem context, the creation

of minimal structures has been unintentional. The structures are a consequence of business model decisions, which have led to a certain ecosystem, which again has brought along a complex network structure with minimal structures. They answer to the need to direct control across the Company's borders towards the ecosystem. Unlike in the studies of van der Meer-Kooistra & Scapens (2008, 2015), I claim that in the IEBM context, the minimal structures appear and function without any particular collaboration agreement between the ecosystem parties. They intertwine the internal and external together.

Above, I have highlighted the aspects that exemplify the response to my second research question, 'How is the IEBM reflected in management control practices and vice versa?' The distinctive characteristics of the IEBM are particularly evident in the implementation of organisational culture and the specific operational practice, known as the anchor practice, within the MCS package. The MCS, in turn, is reflected in the business model as minimal structures, enabling a two-way control facilitated by the IEBM environment itself.

5.8 Practical implications

In this chapter, I consider the possible practical effects of the study at hand. In interpretive research, empirical material gathered from practice leads to new knowledge through an abductive process. I regard the opposite direction as equally important: utilising new knowledge in practice. Merchant & Otley (2020) also emphasise the importance of practice and real-life connections in comprehending how to cultivate effective MCS design. Drawing from the successes and failures of others proves advantageous when implementing gradual modifications that consider both the internal factors and the surrounding environment (Merchant & Otley, 2020). Research innovations in technical, bio-technical and medical sciences often lead to practical applications; some are even utilised commercially. That seldom happens in the field of social science. Even rarer are such solutions in business administration. In the following, I present a few possibilities for how the results of this study could be beneficial for companies.

As I revealed through the analyses above, IEBM's control package has a two-fold design. Systems that align employees' behaviour inside an organisation concentrate mostly on ensuring constant value creation, reducing the level of risk brought by technology, the ecosystem and the business model, and on favourable circumstances for innovation. In addition to control of internal behaviour, there are MCSs governing lateral relations of ecosystem actors. These findings might act as a starting point for managers and controllers who are creating a new or renewing an

old MCS package in an IEBM. This reveals the questions that might be worth focusing on when it comes to the package design.

In technology-oriented companies, the MCSs core is a strong corporate culture with unified and shared values. The earlier literature suggests that in the ecosystem context, these values also need to comply with the values and principles of the corresponding ecosystem. Often, IEBMs are created precisely by people with a unified and strong vision of what the company's operating culture should be and how it fits into the surrounding ecosystem structures. Nourishing and building that further when the number of employees continues to grow is a central task for the management in all changes along the way. Based on this research case and my previous experience with a technology corporation, it is difficult to see how the implementation of the technology strategy would be successful without a strong and unified value base aligned with the ecosystem. The informal system of a shared value base also promotes the functioning of formal MCSs.

Most relevant formal MCSs concentrate on planning and follow-up of constant value creation and revenue development based on that. Therefore, implementing such measurement systems that reflect the drivers contributing to sales might benefit companies the most. In the case of this study, the management had designed several measures that combined subscription amounts and corresponding sales euros. Naturally, those are not an answer for all other IEBM, but I am confident that each business model could find its own drivers and concentrating to those drivers, is able to implement efficient reporting with information beneficial for the decision-making. The essence, however, is on value and how that can be contributed. Interactive planning of activities affects the driver of numbers, commits the organisation throughout to the plans, promotes realising the plans, and reduces risks by helping to notice the possible contradictions in plans. Frequent follow-up and communication of the realised values of the drivers, including sales, are an inseparable part of the process. Implementing value creation and capture measurement systems ensures that the right things are produced in terms of the customer value.

In the case of open-source technology, customers are actors in the open-source community and part of the ecosystem. Of course, that is not the case in all IEBMs. However, I claim that in technology-driven business models, there is always a network structure of outsider actors, an ecosystem, that needs governance at least to some extent. Inside the organisation, the case company of this study had promoted the discussion practice with their co-developers and potential future customers to ensure that all the development activities are for the benefit of value creation. It might be beneficial to search for a similar practice in all IEBMs for gluing all the activities of an organisation to customer value. That does not mean inventing completely new tasks, but selecting and probably promoting further a routine that

crystallises what the organisation is about. Such a practice also expresses the organisational culture, which I considered as a take-off for all other MCSs.

For managers and controllers of IEBMs, I would like to notify the role of minimal structures as formulators of governance towards the ecosystem. In addition to the ecosystem-aligned culture, strict value creation control and a core/anchor practice, the minimal structures are another difference of management control compared to non-technology business models. Even though the minimal structures appear automatically after entering a certain technological ecosystem, that does not mean they can be left unmanaged. I would like to encourage all who manage and control an IEBM to pay attention to the social, technical, economic and institutional structures they are involved in. The structures might be identified, and by the identification the management can acknowledge that those structures do influence the behaviour in the organisation, even without any formal co-operation agreement between the parties. The control impact will appear regardless of anyone's desires or intentions.

The enabling of innovative circumstances as a key control question also needs the management's attention and proper MCSs. The MCSs related to these are largely the same as in the non-technology-driven business model: thorough planning for the long and short term, established formal organisational structures and practices, and an adhocracy culture. Based on my findings on complementing and substituting control systems in chapter 5.1, it could be beneficial to find at least one control method for each main control question mentioned above. Only by having the three main areas of the value creation and capture, risks, and innovative circumstances covered, the package is in balance. As I discussed in [chapter 5.1](#), the MCSs of those three different areas compensate each other, but are also intertwined and influence more widely than only a single control question. However, the means of control as such do not differ in this respect from the means of control in a non-technology-driven business model. The difference lies in the specific structure of also having MCSs for governing the ecosystem. Unfortunately, it is impossible to give any detailed example of an MCS package for the IEBM, because the design always starts with the strategy, continues on the business model structures and those all are company-specific decisions. Of course, the list in Appendix 1 of this study may give some inspiration for those who struggle with MCS design, but the list can only be indicative for others than the case of the study.

Besides what to include in the package, it might be good to cut control systems that no longer serve the IEBM. Too often in companies, the management implements new control systems, but does not cut any existing ones. When new MCSs are implemented, it might be necessary to re-evaluate the whole MCS package and its functioning. The evaluation ensures that the organisational efficiency does not suffer

from unnecessary control systems, but the package still answers the control questions in a balanced way.

6 Conclusions

The motivation for this research work originated from noticing the rapid development of network connections and Internet technology, reaching a point where companies have been able to anchor their value creation on it and devise entirely novel earning logics. This study focuses on the control systems of business models enabled by the Internet (IEBM). The purpose is to emphasise how management control in this context differs from a non-Internet-driven business model, and especially how the difference shows in their package of management control systems (MCS). The majority of earlier management control literature explored MCS on strategic premises. Here, I have considered the business model as a separate level of management decision-making, which concentrates on the ways of creating value and the earning logic and affecting the MCS package separately from the strategy.

My approach has been a context-driven set of controls, in which I have included those management controls that were implemented by the management, have become an established practice, and involve a complete process with an obvious purpose of promoting the strategic target reach. I have explained in this study why the design of MCSs has evolved differently in the IEBM compared with non-technology-driven business models. In that development, the biggest single explanatory factor is acting as part of the technology ecosystem. As a significant feature, IEBM's MCS package has a two-fold structure: MCSs for directing the behaviour inside the organisation and systems for governing external actors of the ecosystem. This two-layer structure is because of IEBMs' way of creating value as part of the ecosystem, in which the value creation of the ecosystem strongly influences the operation of the business model. The design of the MCS package reflects this structure.

After deciding on the strategic direction, the management of any business model needs to take a stance and decide on the logic of the value creation and capture, technological choice, and other business architectural decisions (Amit & Zott, 2001; Osterwalder, 2004). Instead of strategic decisions, I followed these business architectural decisions, the business model level, and noticed their decisive effect on the design of the MCS package. I recognised three main control questions to which

the selected control systems provide answers and align the behaviour: value creation and capture, risk diminishing, and enabling circumstances favourable to innovation. The questions are the same for both layers of the MCS package, but with differences in means of control. Several earlier MCS studies from strategic premises have found that informal cultural controls are often in use when a company pursues a development strategy (Abernethy & Brownell, 1997; Bedford et al., 2016; Bedford & Malmi, 2015; Davila et al., 2006). In IEBMs, the strategic context applies, but in building the organisational culture, there is a difference. Because of pursuing its strategic targets as a member of the ecosystem, an IEBM needs to align the values and beliefs of the organisation to comply with the ecosystem (Horneber, 2022).

The main MCSs for ensuring constant value creation and capture are measures, particularly hybrid measuring systems, which combine sales figures with drivers that generate the sales. The case Company put planning controls into the role of diminishing risks. Unlike in many strategic studies before, I found the organisational and governance structures supporting circumstances favourable to innovations. The found MCSs are not special as such, but common to all types of business models. However, the difference comes in the connection to the ecosystem. The value proposal of the IEBM can only be realised within the ecosystem, with its favourable collaboration. In addition to fitting the organisational culture, the value proposal needs to fit the ecosystem (Cennamo & Santaló, 2019; Palmié et al., 2020; Thomson et al., 2022; Wareham et al., 2014). The ecosystem is also a source of severe risks for both product and business model innovations, and those ecosystem connections need to be covered in the MCS package design. That requires some means of governance which can reach and act on parties external to the organisation.

I found the practice of Community discussions extremely relevant in the MCS package of the case. The practice is based on frequent, voluntary interactions between the external open-source community and employees in the organisation. This custom of frequent discussions on the open-source forums affects the development of the product framework via value creation and, ultimately, all the activities of the Company. It glues the activities into the business context and labels the whole organisation. This kind of anchor practice at the top of the hierarchy of MCSs has been studied by Ahrens (2018), and later also Carlsson-Wall et al. (2021) as an adjustment between development and strategy. I also found the core practice reaching its governance to the ecosystem to a small extent. The employees of the Company who are involved in discussions in open-source forums affect other members of the Community, and, therefore, may control the direction of the conversations in a direction favourable to the Company's product framework or services. As users of open-source technologies share the solutions back to the Community, this situation is comparable to co-operative product development projects and governance of collaboration work. I suggest that in the IEBM context,

there is, and needs to be, something similar in the MCS package: a practice for connecting the business context and organisational development activities tightly together with mutual governance between the MCS package and business context.

The open-source community is part of a larger technological ecosystem. An ecosystem is the alignment structure of multilateral actors who interact to realise their value proposition and whose interactions are equal within this structure (Adner, 2017). The management's technological choice leads automatically to certain ecosystem structures, which results in a situation with a need to control the lateral relations of interdependent actors, i.e., results in the other layer of the MCS package. In addition to building the ecosystem-compliant organisational culture and implementing the anchor practice, I found minimal structures, originally launched by Kamoche & Cunha (2001) and complemented by the studies of van der Meer-Kooistra & Scapens (2008, 2015), providing governance for the lateral relations of the ecosystem. Minimal structures provide governance but allow considerable independence at the same time. Unlike in van der Meer-Kooistra & Scapens (2008, 2015), the findings of this study indicate that in the IEBM context, the social, technical, economic and institutional structures appear and function without any officially established relations. Where the earlier studies explored mutually agreed collaboration situations, I found similar structures between the ecosystem actors even without any official contracts of agreement as a grounding of the co-operation. Minimal structures are a smooth continuation to those MCSs which align the behaviour inside the organisation. However, entering into the ecosystem automatically formulates these structures, the reciprocal impact of which on the behaviour inside the organisation is quite considerable. That, in addition to the value proposition's fit and the cultural alignment with the ecosystem, leaves us wondering how 'independent' the ecosystem actors are, after all.

The thought of rather strong dependency on the ecosystem leads to interesting new research paths that other researchers could consider in the future. The mutual control power between actors still needs more research to understand all the mechanisms of ecosystem control. This study concentrated on the case of open-source technologies, but it might be interesting to see whether payable technologies are any different in that respect? If a significant amount of reciprocal control comes from the business context, there might be interesting research questions such as what other solutions, in addition to minimal structures, there might be for the ecosystem governance? How the role of the management and controller changes in ecosystem environment? It would also be interesting to discover what is sufficient interaction level for parties for creating a minimal structure. Those questions might interest researchers in the future.

This study addresses the calls for further MCS studies in collaborative technology settings (Moll, 2015), business model innovation environments (Lill,

Wald, & Munck, 2020) and controls in the business model organisation (Globocnik et al., 2020). However, one study can only answer a limited part of the big questions. Limitations of the study relate to business model context. The MCS package structure revealed in this study especially benefits IEBMs with similar conditions. Other types of business model are limited out. However, similar dependencies may appear in business models of payable technologies, so the results might apply there as well. In business models outside of technology ecosystems, the results may not apply.

The Internet-enabled business model needs a two-fold MCS package for its own organisational alignment, but also for the ecosystem. The difference compared to non-technology-driven business models lies in the ecosystem connections. Each of the three above-explained main control questions needs to be answered both in the internal organisation and also in the external ecosystem. By understanding this and recognising the similarities discussed above, the management of any IEBM can design an effective management control package. The two-layer package is a clever and powerful MCS design. With these considerations, it is good to finish this marvellous journey as a researcher. It has been a curvy and sometimes bumpy road, but far more interesting than the destination itself.

Abbreviations

ABC	Activity-based Costing
AC	Accounting Control
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COO	Chief Operating Officer
CRP	Capacity/Customer Requirements Planning
BM	Business Model
BSC	Balanced Score Card
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
ERP	Enterprise Resource Planning
EVA	Economic Value-add
FSF	Free Software Foundation
HR	Human Resources
IEBM	Internet-enabled Business Model
IT	Information Technology
MC	Management Control
MCS	Management Controls System
MRR	Monthly Recurring Revenue
OSI	Open-source Initiative
OSS	Open-source Software
R&D	Research and Development
ROI	Return on Investment
ROA	Return on Asset
SAAS	Software as a Service
VP	Vice President

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Appendices

Appendix 1. The content of the MCS package in the Case.

Cultural controls	Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Clan controls	thorough recruiting process	future acts of the employees, <i>ex ante</i> , very long perspective	base of the MCS	technology, innovation, ecosystem	<i>ex ante</i> controls diminish the technological, innovation, and ecosystem-based uncertainty
	requirement of high education or high skills				
	all-hands breakfast meetings				
	Team-building days				
Values	six values, delivered through communication channels, also showed externally in the web	current and future acts of the employees, <i>ex ante</i>	base of the MCS	technology, innovation	<i>ex ante</i> controls diminish the risks, unified & shared values base for the organisational culture
	logo	current and future acts of the employees, <i>ex ante</i>	moderate	technology, innovation	enforces the clan controls
bright colours	moderate		enforces the clan controls		
Symbols	management team off-site planning meetings		high		enforces the clan controls

Planning controls		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Long Range Planning (LRP)	process of decisions, which affect beyond one year	unified and shared targets promote the reaching	direction of the employees' actions, long term, <i>ex ante</i>	high	Value creation and value capture	<i>ex ante</i> controls diminish the risks, involvement in the target-setting promotes realisation
	planning process of actions for the next year		detailed level actions of the employees in short term, <i>ex ante</i>	high		<i>ex ante</i> controls diminish the risks, involvement in the target-setting promotes realisation
Action Planning						
Cybernetic controls		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Budgeting	budgeting process for a calendar year	unified and shared monetary targets promote the reaching	spending in the organisation, short term, <i>ex ante</i>	moderate	Value capture	<i>ex ante</i> controls diminish the risks in uncertainty, Involvement in monetary target-setting motivates
	Fiscal year Profit & Loss divided in months (actual + forecast), revenue by segments, COGS, expenses, compared to the full-year plan	<i>ex post</i> measures indicate the deviation from the plan and the need for change in organisational behaviour	all employees, <i>ex post</i>	high		Measures the total value capture
Financial measurement systems	Service revenue in euros, months and cumulative (actual + forecast), deviation from plan			Service personnel, <i>ex post</i>	moderate	Value creation
	Subscription revenue €, months and cumulative (actual + forecast), plan deviation	Sales- and Product Management personnel, <i>ex post</i>		moderate	Measures the value creation of the Products	

Cybernetic controls	Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Financial measurement systems	Gross profit, COGS and Gross Margin in euros and %, by business segment by months (actual), deviation from plan	all employees, <i>ex post</i>	high	Value creation and value capture	Measures the total value capture
	Total expenses €, monthly and cumulative (actual + plan), plan deviation	Administrative activities, <i>ex post</i>	low	The efficiency of the IEBM	Measures the total expenses of the IEBM, affordability serves cost consciousness
	Expenses by functions €, monthly and cumulative (actual + plan), plan dev	Administrative activities, <i>ex post</i>	low		
	Balance Sheet KPIs in € monthly (actual)	Top management of the Company, <i>ex post</i>	low	Financing	Measures the wealth captured from operation of the IEBM
	Monthly cash flow (actual + forecast), compared to the plan and to the prev year		moderate		
	Revenue and EBITDAC - trends with the budget, the plan and the prev year comparisons	Top management of the Company, <i>ex post</i>	moderate	Value capture	Measures the total value creation and value capture
	Revenue and EBITDAC euros, last twelve months cumulative, presented by month (actual)		high		
	One month and cumulative revenue and EBITDAC figures compared to the budget and to the prev year	All employees, <i>ex post</i>	moderate	Value capture	Measures cumulative last twelve months value creation and -capture
	One month and cumulative revenue by business segment compared to the budget and to the prev year		high		Measures the total value capture of a month
		All employees, <i>ex post</i>			Measures the total value capture as cumulative

Cybernetic controls		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Non-financial measurement systems	Number of subscriptions by product (actual)	<i>ex post</i> measure indicates the deviation from the targets and the need for change in organisational behaviour	Marketing- and Product Management activities, <i>ex post</i>	moderate	Value creation	Measures the value potential the company has been able to wrap into by each product
	Service hours monthly demand (actual + forecast)		Sales and Service personnel activities, <i>ex post</i>	moderate		Measures the value creation opportunity and capacity of Service -business segment
Hybrid measurement systems	Service bookings in euros, months and cumulative (actual + forecast), deviation from plan	<i>ex post</i> measure indicates the deviation from the targets and the need for change in organisational behaviour	Sales & Marketing personnel, <i>ex post</i>	moderate	Value creation and capture	Estimates the opportunity of Services value creation
	MRR recognised from total revenue in euros and %, actual trend		All employees, <i>ex post</i>	high		Measures the total added value the Company has been able to create to the existing customers, as a monthly trend
	MRR recognised from the total revenue in euros and %, last twelve months cumulative presented by month (actual)		All employees, <i>ex post</i>	high		Measures the total value the Company has been able to create to the existing customers, as a last twelve months trend
	MRR cumulative changes: new, expansion and retire, in euros and in numbers of customers, with KPI Average Revenue per Account		All employees, <i>ex post</i>	high		Measures the net value-add the Company has been able to create and capture
	MRR Gross churn and Net retention % -trend (actual)		All employees, <i>ex post</i>	high		Measures the potential of value capture as a trend

Cybernetic controls		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Hybrid measurement systems	MRR by product in euros (actual)	ex post measure indicates the deviation from the targets and the need for change in organisational behaviour	All employees, <i>ex post</i>	high	Value creation and capture	Measures the value creation which the company has been able to wrap into each product Measures the added value of Products monthly
	MRR Subscription growth - Growth in product subscriptions € (actual + forecast), comers and leavers + net change					
Rewarding and compensation		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Rewarding and compensation	Sales personnel have result-related portion on their salary, some moderate bonuses are paid for a good performance	a meaningful reward on achieved individual and/or team targets motivates employees to strive for them	Sales employees, <i>ex ante</i>	low	Value creation and value capture	The normal way of hiring Sales personnel is result based salary, for others this control system has no meaning in the Company
Administrative controls		Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Governance structure	the Board of directors, the CEO, the function heads, and the team leaders are governing with guidance from the year-clock	clear and unified understanding about the authority and the order of command increases the possibility of reaching strategic targets	All employees, <i>ex ante</i>	high	Innovation	Creates circumstances that benefit the innovation of product, services, and the business model in long term
Organisation structure	traditional hierarchical organisation structure		All employees, <i>ex ante</i>	moderate	Innovation	Creates circumstances that benefit the innovation of product, services, and the business model in daily operations

Administrative controls	Control mechanism	Control directs to:	Relevancy in the package	The related IEBM attribute	The role in the package
Customer Relationship Management (CRM) system and process	unified, instructed ways of working diminish errors and strengthens the desired outcome towards targets	Sales & Marketing activities, ex ante	high	Value creation and capture	Enables and serves the full customer care
Service resource planning and hour-tracking		Service personnel, ex ante	high	Value creation and capture	Enables full resource utilisation in Services business
Product documentation and release procedures		Engineering functions of the Company, ex ante	high	Technology, innovation and R&D, value proposal	Enables circumstances for the development work, ensures fulfilment of the promise
Communication practices		All employees, ex post	high	Value creation and capture, Innovation	Creates relaxed circumstances for value creation
Community Fridays, interaction with the Community		All employees, ex post	high	Value proposal and creation, Innovation	Core of all - the whole development is based on listening of the community
Policies and procedures					

Appendix 2: Details of the interviews.

Title of interviewee	Date of interview	Duration
Chief Operating Officer, Key Informant Interview	28.04.2017	00:45
Chief Operating Officer	03.05.2017	00:37
Vice President of Services	09.06.2017	00:46
Vice President of Product Management	16.06.2017	00:35
Chief Executive Officer	03.08.2017	00:50
Vice President of Sales	09.08.2017	00:47
Vice President of Marketing	09.08.2017	00:28
Vice President of Product Development	09.08.2017	00:44
Chief Operating Officer, acting CFO	11.09.2019	00:35
Chief Financial Officer	28.01.2022	e-mail interview
CFO, acting as VP of Sales	28.01.2022	00:26
Vice President of Products	28.01.2022	00:25
Vice President of Engineering	28.01.2022	00:17
HR Manager	28.01.2022	00:23
Product Marketing Manager	28.01.2022	00:26
VP of Services	03.02.2022	00:23

Themes/questions of the first-round interviews:

1. Describe briefly, what is “The Company’s” business? What it does? To whom? How does it operate generally?
2. What is your role in “The Company”? What activities or tasks are under your responsibility?
3. When thinking back about one year time in “The Company”, which processes and actions are repeating during that time? How often they repeat and why? Who initiates those actions and how they are communicated?
4. Describe briefly the process of your own organisation/responsibility area: what does it do? Whom? How? Which communication tools you are using with different stakeholders?
5. What kind of problems there have been lately on your responsibility area? How they have been fixed?
6. How is your own process/organisation being measured? What kind of metrics do you have? How do you follow them? How do the results affect to your actions? Are those results somehow connected to rewarding?

7. Let's say, your organisation/team needs a new person on board, how would you start the recruiting process? What kind of a person you would start to look for? Which elements or features would be decisive in selection?

Discussion themes of the second-round interviews by function:

Marketing:

What are the current KPIs? Targeting only to sales leads? Are there other things to pursue? How is the overall discussion and visibility related to the company's products monitored? How do you monitor the progress of competing products / solutions? In which forums?

Sales:

The most important KPIs at the moment? Relative sales shares: products / services? The sales process: what are the steps from marketing to sales? How are existing customers maintained? Is the duration of the customer relationship measured? Is part of the seller's salary still tied to the sales euro? Pricing: Who / How to Decide on the "Right" Price Level - Value Capture?

Products / product management:

The most important KPIs at the moment? How is the customer value of products measured? How / who follows the discussion in the community? How are community suggestions taken into account in products? How / who monitors developments in the technology you use? How do you participate in the technology debate? Connections to the technology supplier? Is there an agreed forum here? How do you monitor the progress of competing products / solutions?

Product development:

The most important KPIs at the moment? How is the generated customer value measured? How does the development work benefit the whole community? How will the Community's proposals be prioritised? How do you take technological developments into account in product development? Do you participate in technology vendor discussions? In which forum?

HR:

How is HR measured? How much of HR's working time is spent on current employment, how much on recruitment? What kind of reward system does the company currently have? What are the main criteria for recruiting currently in place? How do the values appear in recruitment now?



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