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How does automation change controller's role?

Miten automaatio muuttaa controllerin roolia?

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ABSTRACT

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The aim of this research is to find out how automation effects controller's role. This study approaches controller's role from new perspectives, which are in addition to automation: modern ERP systems and software integration as part of automation and management accountant's role change.

The theoretical framework consists of both Finnish and international literature, addressing various aspects of controller's role change, its development, automation and ERP systems. The research is executed by using qualitative case study research method. The data is collected by semi-structured interviews that consisted of two controllers and two managers. All of the four interviewees work for the same company, which is offering cloud based IT solutions for businesses.

The results of the research showcase that automation supports management accountant's transformation from a traditional bean counter towards a business oriented change agent. Despite these findings, the traditional role is, by no means, obsolete in an environment where financial systems and data in general is automated. It seems that the traditional role will still be part of controllers work in the near future. Essential finding of this study is that automation does not generate any new roles that former literature would not have recognized, but rather supports the transformation towards a more analytical business oriented management accountant. Also, in an automated environment where software integrations are used, controllers did not seem to be strained by ad hoc reporting. Furthermore automation and integrations improve the quality of analysis and data modification.

TIIVISTELMÄ

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Tämän tutkimuksen tavoitteena on selvittää, miten taloushallinnon automaatio vaikuttaa controllerin rooliin. Tutkimus lähestyy controllerin roolia tuoreista näkökulmista ja automaation lisäksi aihepiiriin sisältyy toiminnanohjausjärjestelmien tarkastelu kokonaisuutena ja se, miten rajapintojen hyväksikäyttö on osana automaatiota ja roolimutosta.

Työn teoreettinen osuus kattaa laajan kirjon sekä kotimaista että ulkomaista lähdekirjallisuutta controllerin roolikehityksestä, automaatiosta ja toiminnanohjausjärjestelmistä. Tutkimuksen toteutukseen käytettiin laadullista tapaustutkimusta. Aineisto siis kerättiin haastattelemalla kahta controlleria ja kahta johdon jäsentä yhdestä organisaatiosta. Haastateltavat työskentelevät kaikki suomalaisessa teknologiayrityksessä, joka tarjoaa erilaisia ratkaisuja pilvipalveluiden muodossa aina taloushallinnosta toiminnanohjauksen kokonaisuuksiin.

Työn tutkimustulokset osoittavat, että automaatio tukee controllerin roolimutosta kohti liiketoimintaorientoituneempaa suuntaa. Vaikka tällainen vaikutus on havaittavissa, controllerin työnkuvaan kuuluu silti automatisoidussakin ympäristössä perinteiselle pöytälaskijalle tyypillisiä piirteitä. Nämä piirteet näyttävät myös pysyvän osana controllerin työtä vielä lähitulevaisuudessakin. Tutkimuksen keskeisiä löydöksiä oli, että automaatio ei itsessään luo uusia roolikuvia, vaan enemmänkin vahvistaa suuntaa mihin aikaisemmat tutkimukset ovat olettaneet controllerin roolin menevän. Lisäksi mielenkiintoinen löydös oli, miten automatisoidussa ympäristössä controllerit eivät koe ad hoc-raportoinnin olevan suuri ongelmakohta taikka aikaa vievä osa-alue. Maininnan arvoisia ovat myös ohjelmistojen integrointimahdollisuudet, mitkä helpottavat datan käsittelyä ja analyysiä controllerien työssä.

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1. Introduction

The role of a management accountant has been studied since the 80s and the research intensified in the 90s. In the last two decades the subject has gotten both international and Finnish recognition and message seems to be clear: the former bean-counter is no more an asset to an organization and more is required from a management accountant. (For example see Granlund & Lukka 1997; Järvenpää 2007) Nowadays the amount of financial data that is available for the management, is greater than ever before, and this is because of automation, which is defined by Lee & See (2004) to be data gathering, data modification and process handling. Due to financial software automation and generally automation in enterprise resource planning, this data is also gathered and formed automatically, thus giving controllers an opportunity to spend their time on other aspects of their work. (For example look Granlund & Malmi, 2002; Brands & Smith, 2016) This impact of automation has not been widely studied.

It is important to study how automation effects controller's role, because the modern financial software keeps developing in a rapid phase. Former studies have recognized IT being one of the changing forces in controller's role (For example look Verstegen, Loo, Mol, Slagter, Geerkens. 2007; Yazdifar & Tsamenyi, 2005). According to EY's research executed in the UK, 82% of financial controllers believe that their job has become more challenging over the last three years. One of the major challenges recognized by the research was the increasing requirement for IT-skills. (EY 2007) This trend is still present as the latest study of EY (2016, 10) points out that largest issue when it comes to adapting new technology, is shortage of skills within the organization.

This study will benefit organizations that are contemplating on whether to invest on automation of their ERP systems. It will also give them insight on how to organize their management accountants in a new environment that changes their functions. Also, someone who has just started as a controller can benefit from this research by understanding what is required of a management accountant in an automated environment. A controller is managements partner that supports decision making, is involved in decision making, comprehends the business and communicates actively with the organization (Vaivio & Kokko 2006).

1.1 Former studies and findings

Earlier research has discovered a variety of different roles that a management accountant can adopt into. For example, Partanen (2001) discovered 11 different roles and was able to identify how these roles are connected to each other, one role leading to another. Verstegen et al (2007) discovered 37 different roles and divided them into two different groups. (Look also Ten Rouwelaar 2006, 7; Maas & Matějka 2009) Needless to say, there is an abundance of roles that have been discovered by earlier studies.

The focus of these studies have been in controller's role change, and through interviews creating an idea, where the role is headed. One key aspect has been forgotten: the management. This can also be seen through studies that have noticed the absence of management's insight. (For example see Pierce, O'Dea, 2003, 261; Verstegen et al, 2007, 19) Communication between the decision makers and controllers plays a vital role in the success of a company and also decision making. That is why it seems quite paradoxical not to interview the management. Pierce & O'Dea (2003) pointed out that by interviewing only management accountants, there is a possibility that they overvalue their function to create an overstated image of the value they create.

The effect of ERPs (enterprise resource planning) on management accountant's role have been studied quite widely now, and most of them seem to have the same conclusion: ERPs have not had a major effect on the characteristics of controller's work. For example, Granlund and Malmi (2002) in their study focusing on the impact of ERPs in management accounting, state that the impact has not been as large as many expected. Scapens and Jazayeri (2003) argue against this because most of the studies lack to see the large changes in the nature of management accounting, which is moving towards data analyzation. Automation created by modern software takes away the routine work and creates opportunities for the role to change from a bean counter to a business partner by enabling management accountants to be more consultative (Brands & Smith, 2016).

The rather modest effect of ERPs is, indeed, true but what the study lacks to take into consideration, is that these kind of software can take long periods of time before

implemented correctly, and interestingly enough, late adaptors of ERP systems seem to get better results. (Gullkvist, 2013) Also, the characteristics of a controller and his/her approval on the new software can effect whether implementation is done successfully or not. For example, Järvenpää (2001) discovered that management accountant's personality affects the role he or she adapts into. The personality aspect has also been discovered by multiple other studies (Look for example Granlund & Lukka, 1997; Järvenpää, 2007; Feeney, 2007).

1.2 Research questions and objectives

In this research I am going to study the change of controller's role in Finland, and how automation effects their role within the organization. Hence, it is important to take into consideration how the term controller is used. When terms controller, management accountant or controller are used in this study, it covers the characteristics of a Finnish controller. In the USA, controllers typically cover the responsibilities of management accounting and financial accounting, and are often senior workers in the organization. In Finland, a controller is commonly viewed as a management's advisor. Finnish controllers are usually found spread out in the profit centers, rather than in the central management. (Granlund & Lukka 1997, 235-238: look also Ahrens & Chapman 2006, 827) It is important to understand the difference because in this research a controller is seen as part of the profit centers, supporting the decision making of the segments management. In literature, management accountant is also used as a term to describe controllers. (For example see Rieg R. 2018) In essence, a controller is someone who produces information for the management to mitigate decision making.

This study is going to be interesting because the effect of automation has not been studied widely during the past years, while the financial software have been developing. There is more time to focus on presenting the data and also to make decisions on what is actually relevant information and what is not. Modern solutions can be very effective in cost saving, and finance costs can be reduced by 30-50 percent by streamlining processes (EY, 2007, 6). The amount of data that is created through automation of financial software is greater than ever, which opens up new opportunities for a controller to be a business partner for the organization instead of a bean counter. This finding is in conflict with early 21st century research where the impact of ERPs are

found to be rather inefficient (For example look Granlund & Malmi, 2002; Granlund & Mouritsen, 2003) Scapens and Jazayeri (2003) also claimed the impact being inefficient but noted that more studies are to be made.

Automation of accounting is based on movement of work from one department or employee to another. Organizations can automate aspects, such as, payroll, working hours and invoices. Thus, improving effectiveness by connecting different software and creating cohesion within the management and management accounting. (Brands, Smith 2016, 70) This takes away controllers' routine jobs, thus giving time to produce other data for the management. This creates questions such as: What kind of data is valued when routine jobs are gone? What is the role of routine reports, ad hoc reporting, and are there limits for what we can automate? Altogether, basis for automating financial information is here, which can be seen due to the fact that Finland is, with Sweden and Norway, ranked in the top countries in electronical invoicing (Koch, 2013). This creates a need for researching the possibilities and impacts of growing presence of software automation by discovering right themes.

The main theme is financial controllers changing role in an environment where an organization has modern automated financial software that has decreased the amount of routine work, thus creating opportunities for a controller to change his/her manner of approach towards the job. By this I mean a software that automatically creates data that is easily reached by the controllers, management and auditors. The main research question is:

How has financial controller's role developed due to financial software automatization?

In addition, this research question has created sub question which is as follows:

What kind of different roles can controllers adopt in an automated environment?

The goal of this study is to find out the main changes in controller's role in this modern, automated environment, and also look what the future holds in terms of automation

and increased amount of data. This also requires us to study the history of the role's development so that we can comprehend the direction, where it has been headed and also where it is heading. I want to find out, what kind of roles can controllers take in a modern environment. Are we only going to see modern communicative controllers or can the old bean counter survive in this kind of environment?

1.3 Theoretical framework and research delimitations

Theoretical framework of this study is based on literature and articles about the development of financial controllers work and management accounting. As pictured in figure 1, Firstly I am going to go through the development of a controller in Finland and what it has been in the past and from there to the modern era where more is required and automation is effecting the direction where the role is headed. After analyzing the change that automatization has created, it is important to study what kind of change is expected in the future. Are there limits for what we can automate or do we even need human beings for data production and analysis?

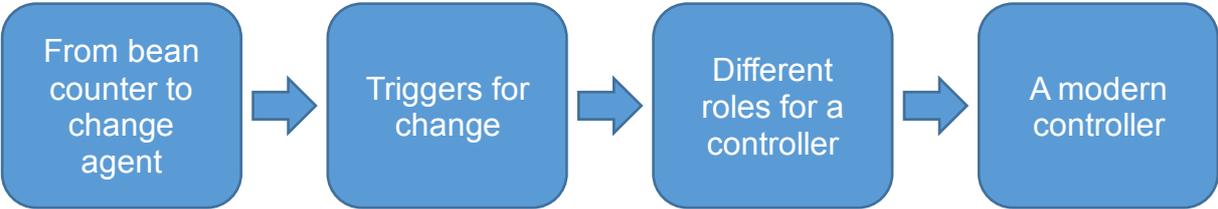


Figure 1. Theoretical framework

The cloud based financial systems effect on controller's role was selected because the change of controller's role has been studied widely, but the effects of software and automation hasn't been the main subject of conversation. Also personal interest played a large role on choosing financial software as part of the research on the controller's role. I strongly believe that we are moving towards a more active financial controller that is capable of presenting the right data at the right time. It is all about the social skills. Growing need for these kind of traits from a management accountant have been noticed earlier as well but technological development was at its infancy compared to present day (Granlund & Lukka, 1997). Therefore, it is relevant to find out how automation and software development effects different management accountant roles

discovered by former researches. To confine the research a bit more, we are geographically going to address Finland and Finnish controller's. The confining is done so that we can keep the quality of the research high and get detailed results that ultimately reveal the direction, where controllers work is headed.

In this study, I am going to focus on one Finnish SaaS (Software as a service) company, that offers wide range of solutions for its customers. The general idea is that all of the software are APIs (Application programming interface), which indicates that it is possible to integrate multiple software that create an ERP (Enterprise resource planning) systems. APIs are also called software integrations in common language and the idea is to automatically transport information from one application to another without manual work (for example look Janne Fredman, 2017; Netvisor, 2018). This enables integrations such as having logistical and financial information in a same database where it can be gathered (Dechow & Mouritsen, 2005, 692).

1.4 Research methods and material

In this research the material is collected through existing literature. In addition, to get new findings, empirical research is also done. The reason for this is, as mentioned before, the lack of attention on IT, or more precisely financial system automation and effective workflow, changes the role of a financial controller.

The effect of financial software automation on financial controller's role is researched through qualitative data collection methods. The data is collected with the help of interviews. Qualitative method was the best option for this research due to the need for individual controller's views about changes that they have witnessed during the years. Qualitative research enables a more individualistic approach and case studies have been used regularly when studying management accounting. A case study is an efficient option when studying practical topics. (Yin, 2009, 6-7) The purpose is to find out how the modern solutions effect the work of controllers, thus making the controllers and management the ones who can give the most insight. The quality of insights is best reached by interviews. Interviews will not limit their capability to answer freely on the questions at hand. An open dialog must be created to get the real opinions and insights of controllers on the research question. This way I can also be involved in the discourse. (Alasuutari, 2011)

In addition, I am going to interview the management of the same organization that the controllers are from. The role of a controller has been widely studied by interviewing management accountants themselves, but rarely the management. This has created lots of studies without the insight of management, which is quite paradoxical when taken into account the amount of co-operation between controllers and management. (Verstegen, Loo, Mol, Slagter, Geerkens. 2007) It is a great opportunity to ask the leadership's opinion on how the co-operation between controllers and management has changed due to modern software solutions. This will bring new insight on the research and also something that has been widely ignored by former studies.

In addition to the interviews, information is also collected through literature handling the role of a controller in the past and the future. This includes researches and articles about the studies and findings. By combining literature and the interviews, we are able to get more insight about the subject. It is important to compare the older studies so that we can bring fresh insight to the research. This study brings something new to the table by adding the interviews of management to the studies. It is going to be beneficial to compare how the opinions of a controller differ from management. Other interesting material that is going to be used as support are, for example, Granlund's and Lukka's research (1998) about how Finnish culture effects the work of a financial controller and how it is in constant change. Verstegen et al. study (2007) gives interesting insight to the fact, how different controllers see their role in a different way and how individual characteristics of a financial controller effects the way he/she works and sees what is required of the job. Therefore, it will be interesting on the behalf of this research to examine both controllers and managements views on the personal trait aspect and how they see its role in role adaptation.

1.5 Thesis structure

Chapter 2 will generally discuss about the findings from literature that has studied the role of controllers. I am going to address the history of the role, from where it is easy to move towards today's situation, where we live in. Chapter 2.3 will handle the triggers that have caused the role to change. This part will focus on the ideology of automation and how it changes the environment and supports the concept of a modern controller. Chapters 2.4 and 2.5 will address the changed role and how empirical studies seem to

display a modern controller and how it is seen differently from one organization to another.

Chapter 3 is going to analyze the empirical findings and open the interviews. In this part, one can also read through the background of the interviewees and the case organization. 3th will include how the interviews were executed as well. Chapter 4 is going to conclude the study and give insight towards future studies and what should be continued to research. Furthermore, it will connect the empirical findings with the former literature and findings.

2. Financial software automation's effect on controller's role

Management accounting can be, in its basic form, defined as producing information for management to mitigate decision making and supervise an organization (Burns & Scapens, 2000, 4). The subject has been studied for over thirty years and there is no shortage of studies from different eras that dig into the role of a management accountant/controller. For example, Sathe (1983) recognized that controllers can be in the business units producing vital information or higher up the ladder where the management is. But like many others, Sathe also focused on routine reports, such as budgeting and planning, which was important then but not anymore, when addressing the changing role of management accounting. In the beginning of 2000 the effect of ERP's was noticed and studies mostly showed that there is only moderate change in the roles by software development (For example see Scapens & Jazayeri, 2003; Granlund et al, 2002).

Generally, in the 21st century the development of technology and especially IT has been fast and new innovations such as EVA (Economic value added) have been changing the role of a controller (for example look Järvenpää, 2001; Burns & Vaivio, 2001). With the new set of tools, like software with integration possibilities (For example SAP), a new image of management accountant was created. The watch dog or so called bean counter turned into a business partner that was a viable asset for the management and business units to create competitive edge. Controllers role is seen as producing right information at the right time without worrying about different borders inside the organization. (Granlund & Lukka, 1998, 194-196) Granlund and Mouritsen (2003) also noticed the changing role of controllers and supported the ideology that technology will drastically change the work. The effect of technology was still mostly speculative and lots of studies were yet to be made.

The development of software in the early 21st century wasn't as drastic as it has been during the past ten years. Automation is the new changing force that drives the role of management accounting to a new era. (Brands & Smith, 2016) What automation and new financial systems also create, is new possibilities for a controller to be an asset, through the ability to manage large amounts of data. The amount of information available is greater than ever before and this creates new opportunities for controllers

(Richins, Stapleton, Stratopoulous, Wong, 2017). What Richins and Wong (2017) are after, is that automation and large amounts of data are not to be mistaken for taking away management accountants work, but rather creating new opportunities for them. The IT aspect has had a strong influence on the roles change and it still keeps effecting it.

2.1. From traditional role towards a business partner

Traditionally a stereotypical controller has been seen as bean counter for the organization that focuses on producing financial information for management. The stereotype has also been called a watch dog of the organization that only focuses on looking in the past. (For example look Granlund et al. 1997; Frideman & Lyne, 2001) One can also come across the term number cruncher when reading about management accountants role (Byrne & Pierce 2007, 470). The message is clear: the traditional role has been seen as somewhat passive and the possibilities for additional value creation close to zero. Vaivio and Kokko (2006, 50-52) point out that bean counters seem to only get negative connotations, because their job is seen as too narrow and they have no actual comprehension of the business they are dealing with.

Even though people and organizations were aware that a need for a change was present, the traditional bean counter was still much alive in Finnish businesses (Granlund et al. 1997). Friedman and Lyne (1997) discovered that the traditional role of a management accountants is also seen as socially incapable for social encounters and thus, hope for extra value creation by a controller is seen hopeless. These studies point out that even though new possibilities were seen in the theoretical front, in practice this was far away from the truth. It would take some time before automation and ERPs would widely effect the role.

The most relevant change in controller's role during the 21st century has been the change from the before mentioned bean counter to a more active management accountant that is a vital part of the management producing information that supports decision making. The passive and unsocial controller has been transformed to a professional who is aware of the business he is working in and also comprehends the larger picture. The information produced must be accurate so that it supports

management's decision making. This requires a controller to be capable of performing in front of people, showing and explaining the right data. A controller is an agent that can communicate between profit centers and create competitive edge. As seen in the figure 2, this kind of trend has also been noticed in the studies such as Granlund & Lukka (1998) and Byrne & Pierce. (2007)

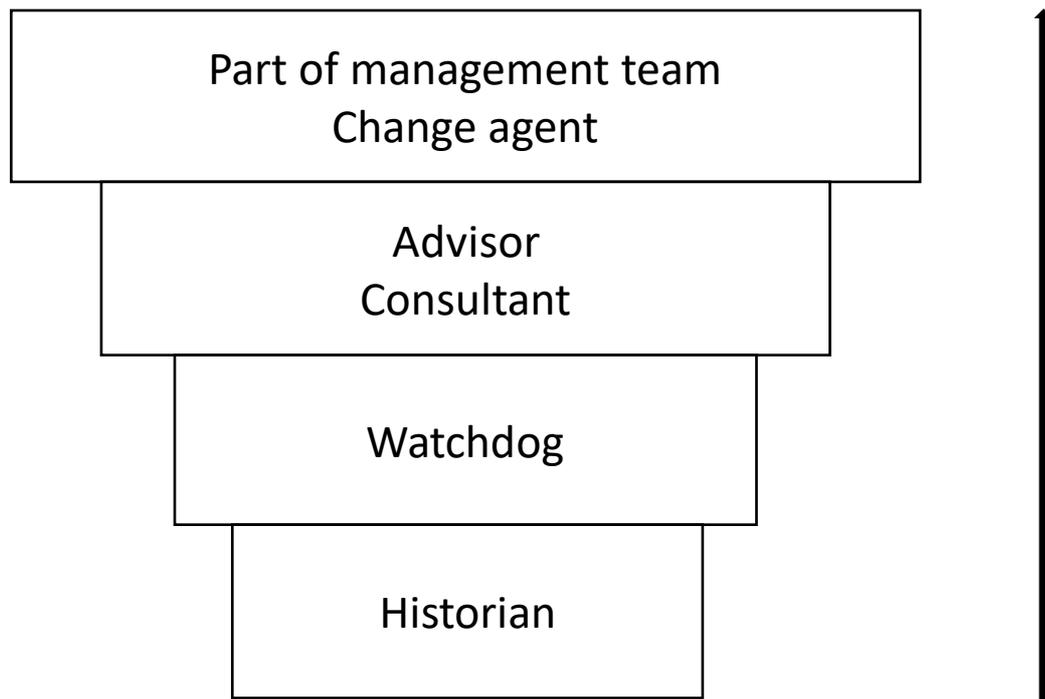


Figure 2. the development of controller's role (Granlund & Lukka 1998, 187).

Granlund and Lukka (1998) point out that it is important to keep in mind that even though the role keeps on changing towards more communicative controller, the traditional jobs do not disappear. This means that no matter how much automation and new technology change, these responsibilities do not disappear and have to be done one way or another. This was also discovered by Lambert and Sponem (2012) and they also claimed that it is rather difficult to totally separate controllers from the more traditional roles, because there are situations where a watch dog is needed, thus appreciated.

Scapens et al. (2003) discovered that the development of ERPs has played a role in this by creating a data flow larger than before, which requires a controller to be

exquisite at “storytelling”. This kind of data can be used in different ways as long as a management accountant is able to think outside of the box. For example, it is possible to change the information from reporting focused to analytics focused procedures. (Katz, 2014) This has pushed management accountants towards this new role by giving them opportunities through information flow. Automation is the changing power at hand that molds the role of a modern controller today.

2.2. Controllers in Finland

The way a controller is viewed and defined varies substantially depending on the cultural concept at hand. Unlike in Finland, for example, in the USA and Germany a controller is someone who is experienced and quite high up the ranks, so to speak. In these countries a controller is responsible of both management accounting and financial accounting. In literature a term chief financial officer (CFO) is used. (For example look Ten Rouwelaar 2006, 235-238; Zimmerman, 2005, 784)

In Finland the term controller is used to describe a management accountant, who works in profit units, producing valid information for the profit unit to perform well. Granlund and Lukka (1997, 238) have described the Finnish controller is some-one, who works in profit centers and very rarely in centralized financial units. Their most important job is to give economical insight for management decision making and see that information is actually used for benefit.

According to competitiveness analysis published by the World Economic Forum (2014) is ranked first in digital resources. Also Eurostat (2013) valued Finland as one of the top countries in organizations usage of IT. These statistics show that if automation and development of software is effecting controller’s role to any extent, it would be in Finland. The trend shows us a high amount of information being transported in digital form, which in terms indicates that they are being saved into a database. This creates opportunities for automation and digital handling of data.

2.3. Triggers for new requirements

There are multiple triggers for management accountant’s role change, but in this study we are going to focus on the technological aspect and especially to automation of financial software and ERP systems. This, for example, allows information flow such

as payroll, projects and bills to be gathered automatically, in real time, into one data bank. This is possible because of modern software being API's. Järvenpää (2007) calls these kind of solutions software packages, which is a good term because the modern solutions available tend to form from a multiple software which together create an ERP solution that enables data from all these software to be gathered into one data bank.

Järvenpää (2001) has created an onion model (Figure 3) that showcases different triggers for change. Changes can come, for example, from the environment, such as sustainability aspect, or from organizational culture. Current trends mold the controller function itself, meaning that the work adapts to the changes in the external and internal characteristics of the current business environment. This again changes the professional competence and skillset required from a management accountant. Järvenpää points out that these changes eventually mold the characteristics fitting for a controller in the environment at hand. These triggers create a chain reaction that require management accountants to adapt. The figure 3 also showcases association between the triggers that change the role.

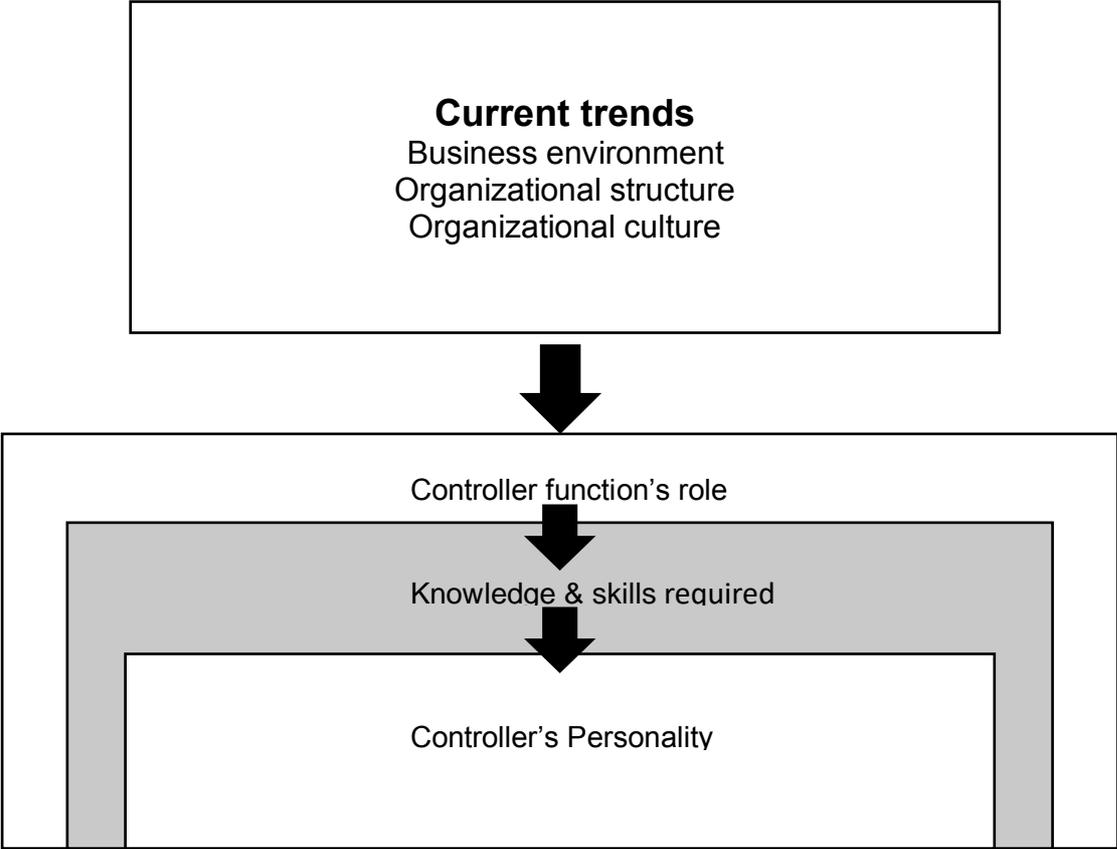


Figure 3. Controller's changing role (Järvenpää, 2001, 454)

Scapens and Jayzeri (2003) discovered that ERPs have often been the trigger for a more processed thinking and integration of profit units. This is because routine jobs are not taking as much from controller's time as before. Also, the way of presenting data mold in to a more analytical form and more interpretation of the information is needed. Looking into the back mirror is no more significant and focus turns towards future as management requires forward thinking data. The trend was clearly moving towards a situation where controllers are needed to look deeper into data, which means that analysis and reporting is going to employ them more and more (Scapens et al. 2003, 215; 223-224).

Even though this study focuses on IT technology's impact on controller's role, it is important to keep in mind that not all the researchers agree with its impact. For example, Jack and Kholeif (2008, 43) noticed in their studies that when an organization deployed a new ERP system, management accountant's role moved even more towards a classical number cruncher. Then again Zarzycka (2012) discovered that even with the implementation of ERPs, new innovative procedures were not found, but she also stated that quality of information and speed of data production increased significantly. What makes this subject even more interesting is that Gullkvist (2013) executed a study in Finland where 70 companies were involved and the focus was on ERP's effect. She discovered that implementation of recourse planning systems had a significant impact on management accountant's effectiveness and especially late adaptors of these systems seemed to get even more benefits.

2.4 Software automation's effect

The objective of financial software automation is to improve the effectiveness of financial management, by reducing routine work that is usually done by humans. Manual processes and data transporting require time which are ideal to minimize, thus making automation very important from an effectiveness viewpoint. (Lahti & Salminen 2014, 27-28) The purpose behind automation supports perfectly the changing role of a controller and especially the direction it has been seen to be heading according to, for example Granlund & Lukka (1998). Time away from routine jobs and free flow of data between software helps a management accountant to be the change agent and part of the management team.

Brands & Smith (2016) mention how automation has changed the management accountant's life by getting rid of excels and moving towards a crucial role, where a controller is close to different segments in the organization. The major advantages are mentioned to be: increased output because of decreased amount of routine jobs that are usually cause human errors and faster cycle of information, which allows controllers to focus more on data.

Automation means that more is demanded of controllers especially when it comes to knowledge in IT. This is also supported by the fact that according to EY's research executed in the UK, 82% of financial controllers believe that their job has become more challenging over the last three years. The controllers who answered the survey pointed out that technological development played a major part in this. (EY 2007) API's, even though effective in bettering information flow between different software, have created a situation where the work environment has changed due to the fact that it is possible for one controller having to use multiple software which requires more knowledge than before.

In chapter 1.2 I opened the term API. Software integrations create the possibility to transform data between different software. For example, human resource management software can be integrated to financial software, creating an ERP system from these two. Through automation one can reduce the amount of routine work and get visual reports, such as cash flow prognosis, thus giving more time for other work at hand (Visma Netvisor, 2018). This kind of automation also creates large amounts of data, which also effects controllers work. One of the major problems from a management accounting point of view is what kind of data is relevant and how to recognise the correct information. (Arnaboldi, Busco & Cuganesan, 2017, 763).

2.5 Variations in roles

Controllers roles vary depending on the organization they work for. Verstegen et al (2007) executed an inquiry in the Netherlands where 300 controllers were asked about their role. They discovered 37 different roles but were able to divide them into two different groups: one of them was watchmen and others were information adapters. As in figure 3, This study also found out a strong relationship between a controller's

characteristics and the role he or she adapts into. In addition, the inquiry found out that controller's experience was also defining factor. Ten Rouwelaar (2006, 7) has also discovered two roles but sees that one controller jumps between these roles that are supporting role and controlling role. Supporting role means that one actively takes part in financial decision making and controlling role has more of the traditional aspects such as accurate reporting and supervising the quality of reporting.

Management accountant's responsibilities can also be divided into local- and functional responsibilities. Local meaning that controller is heavily involved with profit units and producing information to increase effectiveness and decision making. Functional responsibility would be about informing the central management team. (Maas & Matějka, 2009, 1234-1235) It is also mentioned that these roles are each other's substitutes, which means that a controller can do one or the other, but not both.

Partanen (2001) went a bit further by defining 11 different roles that are divided into three different groups: Information & supervision roles, interactive- & management roles and future orientated roles. As seen in the figure 4, there are eight different roles within the information & supervision category that are, for example, interpreter and ambassador. An interpreter transforms information so that different people within the organization comprehend it well. Different people have different backgrounds and this requires skill from a controller to be able to share information in a good manner. An ambassador takes into consideration different cultures and social aspects when sharing information. (Partanen, 2001, 140-147) The figure showcases how a role can be formed through social interactions and, like Pihlanto (1998, 2000), indicates the significance of personal attributes when addressing different roles one can assimilate.

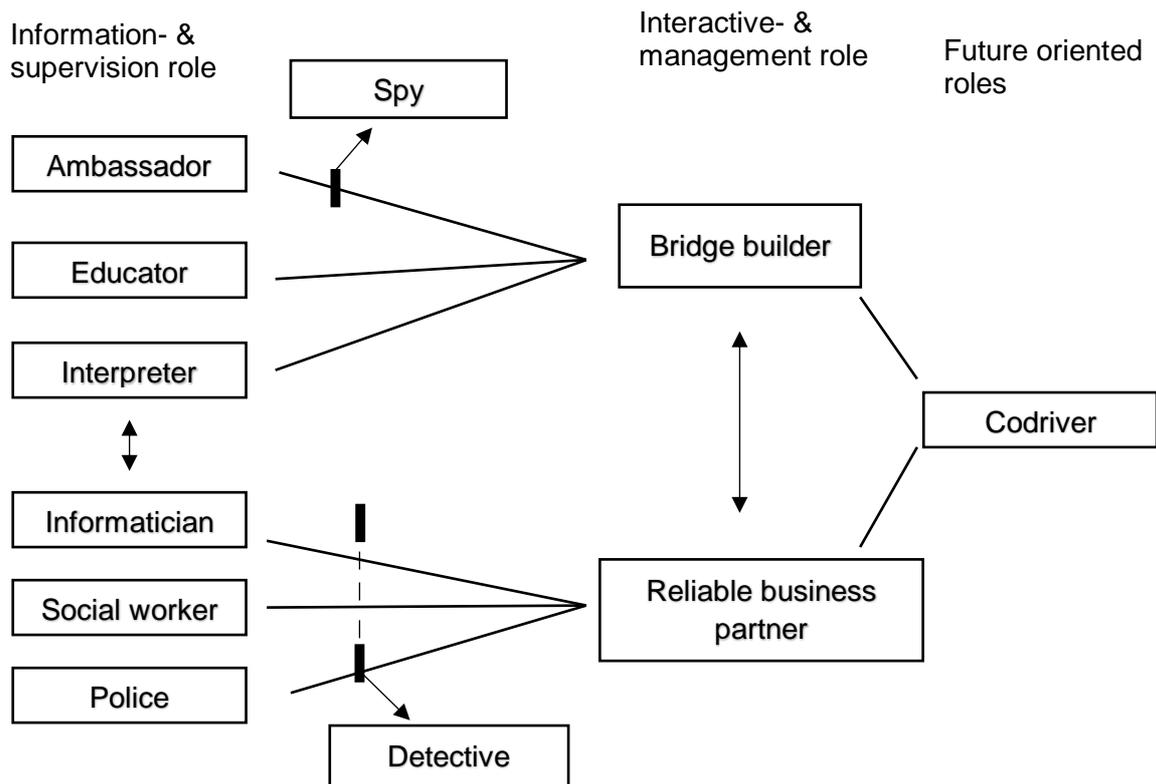


Figure 4. Disparity of roles and relations (Partanen 2001, 176)

2.5.1 The Hybrid role

It has been discovered that a controller does not necessarily reform itself to a completely new role, but can adapt to the changing environment while still completing the role of a watchdog (for example look Baldvinsdottir, Burns, Nørreklit, Scapens, 2009; Granlund & Lukka 1998). Baldvinsdottir et al. (2009) argue that new innovations are not to be adapted lightly due to the fact that they have to be comprehended by the whole organization. This is the reason why some innovations, such as balanced scorecard, is still widely in use: they work. This phenomenon itself creates an environment where the old procedures and responsibilities stay present in the work of a management accountant. Interestingly enough Holmgren Caicedo, Mårtensson, Tamm Hallström (2018) present a new point of view where a possibility of de-hybridization is also seen as a viable result due to diminishment of controllers functions.

De Ioo, Verstegen and Swagerman (2011) also portray that there is a trend towards a combination of both number cruncher and business partner. In their conclusion the fact that fully modern controller has yet to be materialized, is prominent. This kind of malleable role of a management accountant can be found frequently from various studies and conclusions (For example look Caglio, 2003; Vaivio & Kokko, 2006). Interestingly enough, the development of controller function is still quite often seen as unidirectional from watchdog towards change agent or so called business partner (El-Sayed & Youssef, 2015), which is most likely because of empirical evidence of any drastic change from the change agent role is still quite exiguous (Hyvönen, Järvinen & Pellinen, 2015). Byrne and Pierce (2018) discovered that different roles are also adapted through expectations that the leadership have towards the controller.

The hybrid role has been withstanding some criticism as well, because this double role creates conflicts due to expectations that require a management accountant to fulfill both a task of producing information for both management and profit units. Maas and Matejka (2009) find it rather paradoxical to demand a controller to adapt a bean counter role and a change agent role, without creating so called role conflicts. These kind of conflicts create difficulties in time management and responsibilities, which in terms makes controllers neglect profit units and deteriorates local decision making. Phenomenon, in which a management accountant focuses more on supporting the management than the profit units, has also been noticed in former studies. When a controller is situated close to the management rather than local units, the supporting role of a bean counter is valued more. (Granlund & Lukka, 1998)

2.5.2 Modern role of a financial controller

Because of these before mentioned triggers, that require more from a management accountant, the role has changed towards the change agent and part of management team. The change trend is towards the modern role that multiple studies have discovered (Granlund & Lukka 1998b; Järvenpää, 2001; Byrne et al. 2007). The technological development of software that brings us to the world of automation, support the ideology of how a modern controller should be.

A modern controller has to be able to look deep behind the numbers to be able to produce valuable data. Looking into the "rear mirror" is not enough because more is

demanded of him or her. A proper management accountant comprehends the business where he or she is working and is able to predict the future through numbers. This also requires good interaction capabilities so that a controller is able to communicate valuable data to management. As a professional who is a consultant and a business partner for the management, the old ideology of a "bean counter" or a "Number cruncher" has become obsolete. (For example look Granlund & Lukka 1998, Järvenpää 2001). Malmi (2001) mentions that the most important tasks of a management accountant are yearly planning, reporting and ad hoc analysis. These results were discovered by questioning over 300 workers. It will be especially interesting to discover how automation effects ad hoc analysis, if there is any effect to it.

As the table 1 showcases, Granlund and Lukka (1998, 202) have visualized the difference between a traditional controller and a modern one by showing the major differences in ideology, when it comes to working and producing information within an organization. The figure indicates how the traditional role is full of negative attributes when the modern role is viewed as positive and a role worth aspiring for.

Table 1. Comparing traditional and modern roles (Granlund & Lukka 1998, 202).

Character	Traditional role	Modern controller
Secular orientation	Emphasis on the past	Emphasis on the present and the future
Knowledge of the business in which the firm operates	Not expected	Expected
The primary aim of communication	Fulfilling of formal information requirements	Active attention attraction in order to get the message through
Felt scope of responsibility	Narrow; covers the production of correct accounting reports in time	Wide; covers both the production of relevant accounting figures and their application in business decisions
Cross-functional appreciation	Limited; based often on fear	High for an active and capable person
General operating style	Information collector and processor	A member of the management team and a change agent

This modern trend is seen in other Finnish studies too. Vaivio and Kokko (2006) interviewed eight different controllers from six different organizations. The research showed that the traditional "bean counter" role is no longer needed, but Vaivio et al. Point out that procedures required from a bean counter still need to be for filled by a controller. This ideology is also supported by Granlund and Lukka (1998) in the figure 2, where a change agent still has to be a historian, watchdog and a consultant. This also brings as to a discussion that roles vary in different organizations and depending on, especially, quality of software and procedures, some management accountants have to do more traditional work than others.

3. Empirical analysis

This part of the study will showcase the empirical findings which were discovered through interviewing controllers and management from the case organization. I am also going to address the process that I went through to reach the findings.

3.1 Research methods

Case study is a research method where a topical phenomenon is addressed in a real life situation (Eskola Suoranta, 1998). This method of research has often been used when studying management accounting and case studies suite well when questions such as “why” and “how” are to be answered. (Yin, 2003) It is essential to take into account that case studies can be used in various ways. Scapens (1990) has discovered five different ways that a case study can be used, which are descriptive, illustrative, experimental, exploratory and explanatory case studies. Without digging deeper into these different scenarios, I want to note that this research fits in well with the characteristics of descriptive case study by focusing on how automation changes the role of a controller, and the new procedures that come with it.

3.2 Research material

The research material has been gathered through semi-structured interviews. The structure of the interviews was divided into two themes, both having questions that were planned beforehand. There were two different structures that were used due to the fact that both management and controllers were interviewed, which required variations in questions. The structures can be found from the appendices (appendix 1 & 2). The interviews were held face to face in the case organizations office. The questions were sent to the interviewees one day before so that they could prepare for what was coming. All the questions were answered but because of open discourse, there were some extra themes that were covered.

Four people were interviewed for this research. Two of them were controllers and the other two were from the management team. Controllers were titled as controller and assistant controller. The management team was formed from a director of business control, who is directly the manager of the controllers, and director of finance. The

controller has worked in the organization as a controller for five years and started as an assistant controller. The present assistant controller has been working in the organization for a year. Both of them say that even though it is not seen in the title, both of them are more towards a business controller side of work rather than financial. The financial director has a long experience in financial management with experience from multiple financial software. What was also truly beneficial for this research was that she had been in an organization that had not had a modern financial software nor automation in any level. This gave insight into two different ways of organizing financial information. The director of business control has worked in the organization for ten years and is responsible for information flow within the organization when the financial director is responsible of external information flow within the corporation. He has also started in the organization as a controller, but as the business grew, more controllers were needed and he took a managerial role. Table 2 showcases the interviews and gives insight into some aspects of their work.

Table 2. Interviewees

Title	Educational background	Working experience	Job description
Director of business control	Master of Economic Science	10 years	Manager of the controllers, responsible of businesses information
Financial director	Master of Economic Science	16 years	Legal unit, acquisitions, responsible of corporation's information
Controller	Master of Economic Science	5 years	Corporation's reporting, Development of automatization, development of prognosis processes
Assistant Controller	Master of Economic Science	1 year	Purchase ledger, monthly reports, data development

The main theme in the management interviews was co-working with controllers and what kind of characteristics do they value the most. The second theme was automation and how they view it has effected management-controller relationship. Controllers were interviewed with two main themes that were effect of automation in their work and also, how they view a modern controller, or rather what kind of controller is todays controller. The answers are going to be themed into six headlines that are: controller's role change, automations effect, requirements of automation, modern role of a controller, the hybrid role and future.

3.3 Case organization

The case company that is part of this study, is a Finnish organization that is part of an international corporation. Main line of business is SaaS (software as a service), which focuses on ERPs including financial software. All software are cloud based and the goal is in high automation that offers its customers a possibility to focus on what they do best. Businesses revenue in 2017 was over 35 million euros and they have been expanding in a rapid phase, employing 200 people at the moment.

Financial director is responsible of the information flow between the organization and corporation but the controller is also heavily involved in these functions. Director of business control is more responsible of the internal information flow but it is good to take in consideration that there are no specific boundaries that each one of the interviewees has. The ideology is quite distinct in that both of the managers co-operate constantly as a unit and the controllers are supporting them. Tasks can be shared and communication is highly valued to avoid creating boundaries between management and controllers.

3.4 Results

In this part of the research I am going to cover the answers given by the interviewees. All of the themes will include both the outlooks of management and controllers. The interviewees will answer questions about automation, modern role of a controller and management-controller relationship.

3.4.1 Controllers role change

The interviews had a strong correlation with the literature covering the subject of controller's role change. It is clear that the change from a bean counter towards more of a business partner mindset is ongoing. The management mentioned that even though this kind of a trend is clearly visible, it is important to mention that the traditional version of a management accountant has not disappeared, nor is fully obsolete. Case organizations controllers are strongly involved in supporting profit units and producing data that enables a forward looking mindset. The manager 1 describes the role development as follows:

“Data-analytics has grown in a major role during these past few years. What I expect from the controller is that the reports are accurate and they are made effectively. I also value non-financial information that helps our organization to create growth. This is strongly attached to the controller's role theme, meaning that management accountants have to come out of the back office and actively think how to help a company to grow. Mind you that the back office work is still important but not the only aspect a controller should master.” (Manager 1)

The manager 2 had the same view but also added that before it was acceptable to look in the rear view mirror instead of into the future. Nowadays it is crucial to be able to forecast the future. The controllers were supporting the views of management and also hoped that they would not have the reputation of a bean counter or a watch dog in their organization. The assistant controller added that they openly communicate to management and profit units with the intention of being business partners who help the business to grow and develop. This is something that is far away from the traditional image of management accountants hiding in the back office, only to come out when they have number to complain about.

The management also mentioned something that has been brought up by the literature quite often, which is personality traits of a management accountant. They did recognize the fact that personality matters. In the case organization it is encouraged for people to be themselves and use their capabilities. That also increases the impact of

characteristics on management accountant's role. People can move towards a role they are most comfortable with personality vice. Manager 2 addressed the subject of characteristics:

“Controllers own strengths play a large part on the role one takes. Mostly it happens through management showing direction but also because of controller's own characteristics, strengths and weaknesses. It also depends of the number of employees, which defines how work load is divided between controllers.” (Manager 2)

The personality traits were also recognized by the controllers as being a when it comes to role adaptation, but when management mentioned their capability to direct into a right direction, the controllers brought up how they reinforce each other. So it is not only one's characteristics alone that effect on the role adaptation but rather the combination of own personality combined with his/her colleagues. The controller describes the relationship between her colleague:

“I do not think that there are certain characteristics that every controller should have but we communicate up, down, left and right, so social skills are definitively helpful. Me and my colleague are a little bit different in our profession. When I can be a little bit hasty and sometimes numbers can switch places, my colleague tends to be more pedantic but we reinforce each other well and by co-working create a solid team.” (Controller)

In short, there was no major differences in views when addressing controller's role change between management and controllers. Both sides agreed that the direction is towards forward looking and informing controller who still covers the necessary reporting that can be seen as traditional and manual. Everyone saw the change as a desirable direction to be headed into and thought that development is going to benefit everyone. Only slight differences came from the natural layout where management viewed their capabilities to support role changes from a managerial stand point.

3.4.2 Automation's effect

When addressing automation with both management and controllers the message was clear: automation plays a large role in the work of management accountants. It creates opportunities for controllers to be business partners and ease the working load from both management and controllers, enabling the organization to focus on other aspects of work such as analysis and decision making. Manager 1 emphasizes the significance of automation:

“Automation gives better tools for a controller to be management’s partner that creates growth. Someone who leads through knowledge. Without proper software and automation, a controller is mostly presuming things instead of actually having valid up-to-date data.” (Manager 1)

Manager 2 had the same views but also added that of course history has to be in good shape so that a proper forward looking mentality can be created. This indicates that once again the traditional tasks should not be forgotten because, rather than slowing down the controllers, it enables the role change towards a business partner. What was also brought up, was the past and how this kind of forward looking mentality and automation has been recognized quite early but no one had the right tools, which is described by the manager 2:

“Ideas have been there for a long time but there were no tools. It is because of IT development that the profession has developed to this. Actually I feel like the drastic change happened only few years ago. Nowadays the situation is totally different from what it has been before.” (Manager 2)

Controllers gave a bit more personal insight towards what kind of effect automation has in their profession. Like management, they emphasized the importance of automation with extra time created, which can be used for analyzing data in a deeper level.

“If we wouldn’t have a high level of automation, our roles would be completely different. We would not have time to analyze and see behind

the numbers so to speak. When I started working as a controller. We would actually work manually with calculators when reporting for the corporation. Nowadays we are able to close the numbers monthly within three days. Before it took us five days and the business was a lot smaller. The impact of automation is massive.” (Controller)

Assistant controller held the same views and supported the idea that automation gives more time for analytical thinking, which in terms enables sharing of high quality data for management to make decisions. This permits the controller to be more involved in the business. Still it is important to keep in mind that both of the controllers still use about 40 percent of their time doing manual routine jobs. When asked about their role in the organization if there was no automation, both of the controllers said that they wouldn't even consider themselves as management accountants but rather as back office number crunchers.

To get a better image of software automation, the most important question is: what has been automated in the organization? All of the interviewees now their organizations automated functions well and the controller opens up the processes that are automated:

“We have mostly automated reporting. By this I mean things such as monthly reporting that the corporation wants at the turn of the month. This means that there is an API created between our financial software and corporate software. Through this interface, our information flows automatically to their database. Before this, we had to manually copy paste data into excel and then manipulate them. We have also been able to automate billing for some of our products, which means that we do not have to manually go through each customer.” (Controller)

The assistant controller mentions how purchase ledger is highly automated due to the capability to create automation rules for purchase invoices, which means that they only have to supervise any anomalies. In addition, the controller tells how they have built interfaces between different software and their business information software. This

way they can automatically gather management accounting data through interfaces to a one software where the data can then be molded into a desirable form.

Both of the controllers produce ad hoc reports and what I found to be interesting is that neither of them felt like it would be the most time consuming aspect of their work. It is something that they are asked to do at least weekly, but they seemed to be quite casual about it:

“We do a lots of ad hoc reporting, but it is not time consuming because the reports asked are rather simple and easy to make. I would say that most of the time we just gather the data from our systems and that is it. Drag and drop, with some added visualization is the most common ad hoc report we make.” (Assistant controller)

“Most of the larger ad hoc reports are not as challenging as one would thing because the deadlines for them are never given to us in a “We need this today” manner. We tend to get realistic deadlines.” (Controller)

The controllers do not view ad hoc reporting as problematic because interfaces between software within the organization has created a large amount of data for the management accountants to use. Both seemed to experience this kind of reporting as secondary tasks that they do on the side of other work. This is not only because of automation but also the organization seems to be fair and do not overburden controllers by unrealistic deadlines.

3.4.3 Requirements of automation

Automation also demands more from the controllers and this was recognized by all of the participants. When asked about the portfolio of software the controllers must be able to use, they said that daily it would be about five to six software. Assistant controller explains that five to six software are used almost daily but if one counts some of the less frequently used, the number would be closer to ten. IT skills is something that is definitely an advantage nowadays and manager 2 emphasizes them:

“One thing that is nowadays brought up all the time are IT skills. There is never a situation where capability to use different software would go in vain. I hope this is something taken in consideration in educational establishments.” (Manager 2)

Manager 1 also mentions that she values technical skills a lot, and thinks that it helps the communication a lot when a controller knows how organization’s software functions. The assistant controller talks about the same aspect but adds the communicational value that it these kind of skills create:

“We have to communicate a lot with the programmers because of the integrations that we have between software. Even a small amount of IT knowledge helps in these situations so that you can communicate and, for example, express what kind of problems you have with something. As funny as it might sound, sometimes we and the programmers have a slight language barrier, which can be reduced by knowledge of software. Mind that we communicate a lot with the programmers.” (Assistant Controller)

It was a mutual view that IT skills are a major asset for a controller and this has become ever topical through the development of automation and APIs. This has created an environment where modern management accounting is able to use a large pool of data gathered from multiple software. The controllers did not see this development as a threat for their profession but felt that it is something that can be learned through communication. An open mind and curiosity were some of the traits the controllers mentioned and that helps a management accountant to learn his/her organizations programs. Like assistant controller said, one doesn’t have to know everything about IT but all knowledge helps out especially when communicating within the organization.

3.4.4 Modern role of a controller

A modern controller has been brought up multiple times during this study and literature often addresses this subject. Changes in business environment and technology create new opportunities for controller, thus making the conversation of a modern controller interesting. It wasn’t very surprising that case organizations management and

controllers held same views also on this topic. Manager 1 and manager 2 describe a modern controller as follows:

“A modern controller looks forward and understands the business he or she is working. Comprehends financial accounting and management accounting and can see trends through analysis and helps to ease management’s burden by producing accurate data. He or she also goes with the needs of the organization. Analytical and forward looking who is able to do the traditional works demanded of him but creates growth through analyzing and looking behind the numbers. A modern controller must understand the organization, business and the businesses environment. Without that one can’t be a great management accountant. Last but not least comes the IT skills, and especially capability to use data-analytics software. Without these trait’s one cannot become a great controller.” (Manager 1)

“More time towards analyzing and less time producing data. I think manual work will never fully disappear, but the percentage of it will lessen. It is not realistic that a controller would just wait for ready reports to be created and I do not think that should even be the goal. If one-day artificial intelligence would really be more intelligent than a human being, then maybe. No matter how much automation, a human being always has to validate the data.” (Manager 2)

Controllers views correlate with the managements views in terms of data analyzation and importance of future oriented mindset that enables management to make decisions based on data that forecasts future scenarios. Controller does give a bit deeper insight of the modern controller ideology:

“A modern controller understands data and where it comes from. It is also very important to comprehend how and why data flows between software. One has to have a genuine will to create new things and capability to come up with new ideas to improve the business. Also a coder type mentality is important because a modern controller co-operates with coders all the

time and one has to be able to speak their language too. To summarize all this, I would say that a modern controller is a business partner.”
(Controller)

The assistant controller explains how there can be different kinds of modern roles depending on how the management directs the work of management accounting but she thinks that controllers should not be seen as watch dogs of an organization. This is because even though they have to supervise financial data that goes in and out, they do it to improve the business:

“We sometimes have to inform profit units or management of unpleasant things or things that might at first seem like too pedantic but it is never because we want to harass someone. When a controller calls, the reaction should not be negative, but rather positive because eventually we are all part of an organization that wants to do well. We help others and are not police officers of the corporation. I wish that kind of ideology does not exist anymore.” (Assistant controller)

One thing has become rather clear: no matter how modern the systems are in an organization, manual work is still present and it is something controllers have to put focus to some extent. Both the management and the controllers mentioned frequently how one must not forget the routine work. History has to be in shape so that we can predict the future, manager 1 said. To what extent can a management accountant fulfill the role of a business partner? How often does one adapt to more of a watch dog mentality, which is clearly a necessary role to some extent in a modern organization as well? This brings us to the topic of hybrid role.

3.4.5 The hybrid role

The interviews had a clear correlation with the literature, when it comes to dividing the role of a management accountant. The hybrid role where a controller adopts both traditional role and a business partner role, is clearly visible in the case organization as well. Through interviews I discovered that, even though a very modern IT company, the case organization’s controllers still do manual work and keep an eye on the

financial status. In the literature this is tracking of financials, or so called watch dog role, is necessary but varies within organizations. The Management opened why this is the case:

“There cannot be only data production nor data analyzation. It is a mix of both. It really depends on the organization. Even within Our organization there are tens of different KPI’s, of which some can be produced automatically and some require manual work. (Manager 1)

“Manual work cannot fully disappear because one has to always be critical towards the data and check that everything is okay. Plus, changes in reporting change frequently which creates need for manual work at least occasionally. Especially when working in a corporation. Of course manual work lessens all the time but changes come every once and a while, but it does not mean that controllers wouldn’t cover the traditional role.” (Manager 2)

This kind of phenomenon was recognized by the controller and assistant controller as well, but they wanted to emphasize that there are not watch dogs or so called police officers of the organization. This subject was already covered when addressing the role of a modern controller but it came up in the conversation when talking about the hybrid role:

“I feel like we have automated most of the reporting but of course the process does not end just like that. Even with the automation we still have to look for anomalies and address them correctly. This means that sometimes we have to communicate negative things, but that is how it is. It is not something we do because we want to bother anyone. It is merely for the best of the organization.” (Controller)

“When basic things are right, we can spend more time analyzing numbers. So it kind of enables the analyzation aspect of our work.” (Assistant controller)

It is clear that in that management plays a large role when it comes to dividing the time with the traditional- and modern role. Aspects like management's ability and interest to analyze data on their own was brought up. Manager 1 addressed this subject and with a long experience has seen plenty of different synergies between management and controllers:

“Some people might have an image of a controller being a bean counter but this is really a quite out dated view. It is also often managements fault if the image is like that, because it means that they are very number oriented themselves, thus needing less help from controllers. Someone has to do it, but if a CEO wants to use his time on this work then they do not need a controller. Everyone can spend their time how they see best suites them but of course it is debatable whether the manager should do work suited for controllers or not.” (Manager 1)

The manager 1 keeps explaining how she has seen this side when she started working after graduation. If management does not use controller's capabilities at their fullest, they tend to stay in the back office fulfilling the traditional role more often. This is something that needs to be acknowledged by the management and they have to understand to use controllers, no matter how nice it would be to do their job on your own says the manager 1.

All of the interviews brought up the fact that no matter how much a controller analyzes and is part of the business, they still have to fulfill the basic duties that require more or less the traditional mentality of a management accountant. As a matter of fact, both the management and the controllers strongly felt like the history and routine work has to be done so that more analytical side of the job can even be started. It seems that the hybrid role is a splendid solution that works at least in the case organization well.

3.4.6 Future

The conversation with the management and controllers naturally drifted towards the future of software automation and controller's role in this kind of environment. One

thing is clear: it is very difficult to foresee where we are headed and especially the more experienced management had opinions about it:

“Manual work will surely decrease even more. At least that is the obvious goal that everyone is trying to move towards. But then again it is very difficult to say with this kind of technological development that we have witnessed during this past few years. I must say that major changes have happened in a very short time. We are talking about few years.” (Manager 1)

“In 10 years a lot has happened so it is very difficult to say where the future is headed. Manual work will decrease for sure but we have a privilege to work in a technology firm that always tends to go two steps ahead of everyone. So a lot of the automation is not yet used widely. Some other companies have a totally different situation when it comes to automation. Not everyone is where we are.” (Manager 2)

The development of software automation and APIs have, indeed, made predicting the future quite difficult. Also, the manager 2 has a good point about their organization perhaps moving few steps ahead of others in the profession. Manager 1 also pointed out that he does not see a replacement of humans as a viable solution, because artificial intelligence should at that point be emotionally smarter than a human being. He also mentions that artificial intelligence will play a larger role but it will not replace humans. This subject was also covered by the controllers:

“Well future is always a difficult subject but automation is even higher and we have more time to analyze results and data. Artificial intelligence will support the capability to forecast the direction where an organization is headed. Now we are producing data with and without the help of automation. In the future I don’t think this will be the case. We will be only business partners.” (Controller)

Assistant controller had the same views than rest of the interviewees. She also mentioned the relevance of big data and how it should be used effectively as possible. Everyone seemed to agree with the major trend that the future is heading towards but especially the experienced management felt that development has been so fast that one can only guess what the future has for us. Also controllers role change was seen as moving away from traditional and manual work. It seems that a bean counter is not wanted any more hereafter.

3.5 Analysis

In the theoretical part of this research, controller's roles and technological effect was depicted extensively. Literature supports the role change towards a business oriented controller that knows the business and is involved in the development of organization in general. This has been discovered by, for example, Granlund & Lukka (1998), Partanen (2001), Vaivio & Kokko (2006) and Byrne et al. (2007). The list could be continued even further but the what is important to take into account that the need for a change has been noted over 20 years ago. Still, the findings do not support the idea, which Vaivio & Kokko (2006) claim, that the traditional bean counter would be completely obsolete. There are still situations and tasks where a traditional role of a controller can be recognized. Task such as routine reporting and history based information is still present in the case organization and even with high level of automation, the traditional role is still adapted by the controllers. Thus the research findings support Verstegens et al. (2007) claims, that the traditional watch dog attributes are still needed to some extent in the work of a controller. Lambert and Sponem (2012) Granlund and Lukka (1998b) support this as well and the figure 2 foreshows how a controller must fulfill the traditional tasks before adapting the change agent role.

Still the direction towards more consultative business partner is clearly visible in practice. A controller is expected to support management in decision making, which requires a proper knowledge of the business environment. This requirement alone shows us that a more active role is needed. It is still important to keep in mind the fact that management plays a role in this and differences in role adaptation can vary

between organizations depending on how controllers are managed and what is required of them.

Automation seems to ease data production extensively, which is due to the availability of information that is gathered to BI software and financial software without the need for controllers to intervene. This is of course in theory and sometimes there are anomalies that need intervention from the management accountants. In general, basic ad hoc reports are not seen as challenging or too arduous. Still, there are procedures that are yet to be automated that require manual work in the case organization. These will most likely be automated at some point but for now there is still need for manual works, which was about 40 percent of the controller's time.

Differences between characteristics is also an influencer on the role change. A management accountant will drive towards his/her strengths when it comes to personal traits. Interestingly enough it is not only individual traits that matter, but also the traits of the team. This tells us that, like in the case organization, the controllers support each other and embrace each other's personal skills and characteristics. It was clear though that there are no detailed personal traits that the management nor the controllers absolutely require from a controller. Still characteristics do effect the role one takes.

One thing that needs to be taken into account is that this kind of role change is not a new idea nor is it due to automation. The results show that a want and need for a forward looking business partner has, indeed, been there for many years, but the tools have not been there. So it seems that automation is not the trigger for a modern way of executing management accounting, but rather an enforcer and enabler of this phenomenon and ideology. Automation and integrations between software that create ever larger amount of data that is easier and faster to mold, has a supporting role. It is easier to adapt into a change agent role when automation and modern systems enables the focus towards aspects that create this kind of a modern role of a controller.

4. Conclusions and Summary

This research was executed by interviewing the case organization's management and controllers that work in the IT sector. The goal of the interviews was to discover how automation effects controller's role and what kind of adaptations does it create, if any. The interviews were semi structured, thus open conversations were held in addition to the questions that were presented to the interviewees.

With the help of the sub question, different role adaptations were studied and what kind of different adaptations can controllers have in an automated environment. The results show us that even with APIs and automated data flow, different roles can be seen. It is more of a managerial and organizational question that effects the role adaptation. Also controller's own personality traits play a part when comparing different roles.

The findings allow organizations to mirror their controller functions and whether actions should be taken towards changing management accountant unit's structure. Especially if a conversation about updating ERP systems has been an increased topic within the management. When software automation is used to create competitive edge, it is clear that management accountants move towards more analytical role where data presentation is in a larger role than routine reporting. Managements involvement in guiding towards this role and controller' personal traits plays a part in this as well, but automation is a strong enforcer in the role change.

Demands of automation were discovered and these demands concern every controller nowadays. IT skills are highly valued and the case organization's controllers used five to six software daily and the number is even higher when looking at monthly reporting and data production. The interviewees brought up how IT skills help with the communication, especially when addressing programmers. Co-operation was seen to be swift when management accountants could understand how the software and integrations work. This requirement for IT skills is definitely going to increase in the future, especially when more countries start adapting advanced IT solutions in their resource planning and decision making.

It is clear that the traditional role, or so called bean counter, has not yet disappeared and automation does not make it obsolete. However, the routine tasks are decreasing through automation and this lessens the need for a number cruncher. It seems that automation itself does not create any new roles, but rather enables a management accountant to be a change agent in the organizations. The ideology of a modern controller has been brought up as early as 1990s but through automation this role is adaptable. All the respondents felt that automation enables looking into the future instead of focusing on the rear view mirror. The theoretical idea of a hybrid role of a management account seems to be fitting in an automated environment. Mind that even when adapting automation and integrations, routine reports must be done and inspected. Therefore, even a modern management accountant has to be a watch dog occasionally.

The findings generate several paths for further research. Firstly, future studies should focus on a larger variety of organizations. The case organization is specialized in SaaS business and produces ERP solutions with integration capabilities and high levels of automation. This inevitably creates a situation where it is rather presumable that they are a few steps ahead of the general controller profession when it comes to automating dataflow. This is why it would be vital to research a larger pool of organizations to get a better image of where we are at the moment automation vice. Deeper look into big data and non-financial data is also required. Automation creates large masses of data that can be used to create competitive edge. It would be interesting to study whether this kind of data is used to its full potential and how organizations can get more benefits from it. With non-financial data, a major focus needs to be in sustainability and how it can be measured. With ever increasing concern of global warming, ways for producing high quality data of, for example from carbon emissions, need to be researched. Automation can help with this to a great extent, because routine business activity and its sustainability could be measured in real time.

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Appendices

Appendix 1. Interview questions- management

Educational background, working experience

Job title and responsibilities

1. Theme. Working with controllers

- What kind of information do you value the most?
- What kind of characteristics do you value from a controller?
- How has the role of management accounting changed during your career?
- Where do you see the future is heading? (Future trends)
- What kind of different roles have you seen controllers take through automations effect?

2. Theme. Automation

- Through automation, most of the routine jobs are disappearing. Where do you see controllers should be focusing on with this extra time at hand?
- How do you see automation effecting management-controller relationship?

Extra

- In a nutshell explain: What does a modern controller do?

Appendix 2. Interview questions- controller

Educational background, work experience

Job title and responsibilities

1. Theme. Automation

- What kind of functions are automated in your work?

- How much of your time goes to routine work?

- What kind of software/s do you use?

- How has automation changed your role within the organization?

2. Modern controller

- What kind of characteristics do you value the most?

- Do you feel like your work has become more challenging?

- What is required from a modern controller?

- What is going to happen in the future for controllers?

- As what kind of a controller do you view yourself?

- In a nutshell explain: What does a modern controller do?