INVESTIGATING THE IMPACT OF TECHNOLOGICAL ADVANCEMENTS ON THE JOB OF A MANAGEMENT ACCOUNTANT:

IDENTIFYING CAPABILITIES REQUIRED FOR THE FUTURE

by

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Abstract

Introduction: The role of management accountants (MA) is expected to undergo significant transformations due to the rapid advancement of technology. This study delves into understanding how technological advancements influence the roles, tasks, and competencies of MAs. The research sheds light on this crucial aspect in the field of control, contributing to the knowledge base that guides professionals and educators in adapting to the changing landscape.

Goal: "Examine the future profile of a Management Accountant towards 2030, considering the influence of upcoming technological changes, and provide insights into the evolving role, underlying tasks, and required competencies for MAs within this context."

Methods: To comprehensively explore the changing role of MAs, this study employed a two-fold approach. Firstly, a Systematic Literature Review (SLR) was conducted, systematically analysing a wide range of academic articles, reports, and relevant literature to identify the current role of the MA and the changing technological environment. Secondly, focus group discussions were organized involving experienced MAs and stakeholders of MAs from diverse industries. These discussions aimed to gather qualitative insights, opinions, and real-world experiences to complement the findings of the SLR. Afterwards, two validation interviews were processed with professionals from the field.

Results: The research suggests that MAs should develop a conceptual understanding of technology and organizational dynamics, collaborate with IT departments, and transition into more holistic leadership roles. The study highlights the importance of MAs understanding data models and systems, as well as collaborating with IT specialists to bridge the gap between business and technology. It also stresses the role of controllers in driving organizational change and proposes a framework that outlines the evolving MA profile, which includes the role of accountant, financial professional, business partner, changer, and leader, while the role of information technologist has disappeared.

Conclusions: The research suggests implications for education and training, emphasizing the need for incorporating technology components and developing soft skills for managing change. Collaboration between MAs and IT professionals is crucial, with recommendations tailored to different types of companies. For large financial institutions, MAs should transition into holistic leadership roles, SMEs should focus on resource optimization and training, and FinTech startups should leverage MAs for shaping strategies. Consultancy firms should position MAs as strategic advisors in finance and tech. For RMFC, embracing tech-savvy MAs and promoting collaboration with IT is essential for success in the evolving financial landscape.

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1. Introduction

Innovation is a key element for business to stay strong against competitors. Through the digitalization of our world, businesses have started innovating by introducing new IT-systems to enhance products, people, and processes. In today's business landscape, the process of digitalization is revolutionizing the management practices employed by companies (Yaakoubi et al., 2020). The increasing amount of data makes the way of decision-making and staying in control change. The potential of the data is high, but the challenge is to convert it into valuable information to support decision-making (Yaakoubi et al., 2020). As a result, the function of a Management Accountant (MA) could transition from a primary emphasis on numbers to an increasing focus on technologies. This transformation is experiencing a substantial change, driven by the increasing prominence of technologies like robotics, data analytics, and blockchain. While the potential is high, it is important to consider the current adoption of these techniques. How extensively are they implemented in the field, and what does this mean for the future of a MA role? Are these technologies living up to their promise? These are important questions that need to be explored to better understand the changing landscape of the MA profession.

To avoid ambiguity in the remainder of this research, the term MA is used continuously within this article but may have originated from the literature that uses the term controller. These terms are used interchangeably in literature (Ahrens & Chapman, 2010; Verstegen et al., 2007). Multiple definitions encompass comparable aspects yet display slight variations, encompassing roles like financial managers, business analysts, financial advisors, CFOs, and financial business partners. Since this study concentrates on the broader role of a business controller rather than solely on the financial controller, analogous roles within the financial domain are not initially treated as synonyms or keywords. Whether these terms convey equivalent concepts relies on the specific context of their usage. At the outset, these terms are not considered interchangeable; nonetheless, if they are employed interchangeably in a particular article or study to denote similar ideas, this body of literature can be drawn upon. However, the term "MA" (Management Accountant) will be consistently utilized and duly acknowledged whenever applicable.

Recently, business environments across industries are being shaped by an ongoing IT-enabled transformation process with far-reaching consequences on organisations' structure and business processes (Lucassen & Pattiasina, 2021). The advent of digital technologies, such as big data, is expected to transform work practices in a wide range of jobs, while creating entirely novel occupations across industries, such as big data analysis, app development or software design. Consequently, skills requirements in diverse professions are being shaped, leading to a higher demand for digital skills outside the technology sector (Berger & Benedikt Frey, 2016). These new requirements comprise a wide range of new abilities and competencies including basic ICT skills such as manipulation of spreadsheets, to more advanced ICT skills, such as advanced analytics and programming (Berger & Benedikt Frey, 2016).

Within decision support, data plays an increasingly key role. Data analytics can be seen as using data to shape decisions and actions (Davenport & Harris, 2007). To enhance the optimization of data analysis, several tools are emerging. The development of information and communication technologies (ICT), Artificial Intelligence (AI) and robotics has a significant impact on the competencies of companies operating in the financial sector (Mavlutova & Volkova, 2019). The rapid evolution of automation requires a corresponding shift in existing competencies, as well as the development of new competencies that are specifically related to new technologies like ICT, and artificial intelligence (Mavlutova & Volkova, 2019). Tools like Robotic Process Automation (RPA), which are software-based

solutions and refer to configuring the software “robot” to do the work previously done by humans (Willcocks et al., 2015), aim to reduce the burden of repetitive, simple tasks on employees (Aguirre & Rodriguez, 2017).

In particular, the MA's role is expected to be significantly impacted by the growing automation of business operations, along with the emergence of new digital products and business models. According to Verstegen et al., (2007), MAs have already shifted from a scorekeeping role to a more business partnering role, where they support management in decision-making processes. The increasing use of technology and data analytics has made it necessary for MAs to have a deeper understanding of the business, as well as to have strong analytical and communication skills. The role of MAs is expected to undergo even more significant changes due to the increasing automation of business operations, as well as the emergence of new digital products and business models (Oesterreich et al., 2019).

As a result of the implementation of digital technologies, the amount of time spent on mundane tasks has decreased, allowing individuals to focus on value-added activities such as analysing and interpreting information (Oesterreich et al., 2019). This is shown in Figure 1. To be successful in managing functions, MAs must possess the appropriate education, attitude, skills, and qualities (Ntiedo B. Ekpo, PhD & Nseabasi Etukafia, 2017). Figure 1 shows that the amount of time spend on several activities is changing. This will result in other aspects demanded in terms of education, attitude, skills, and qualities.

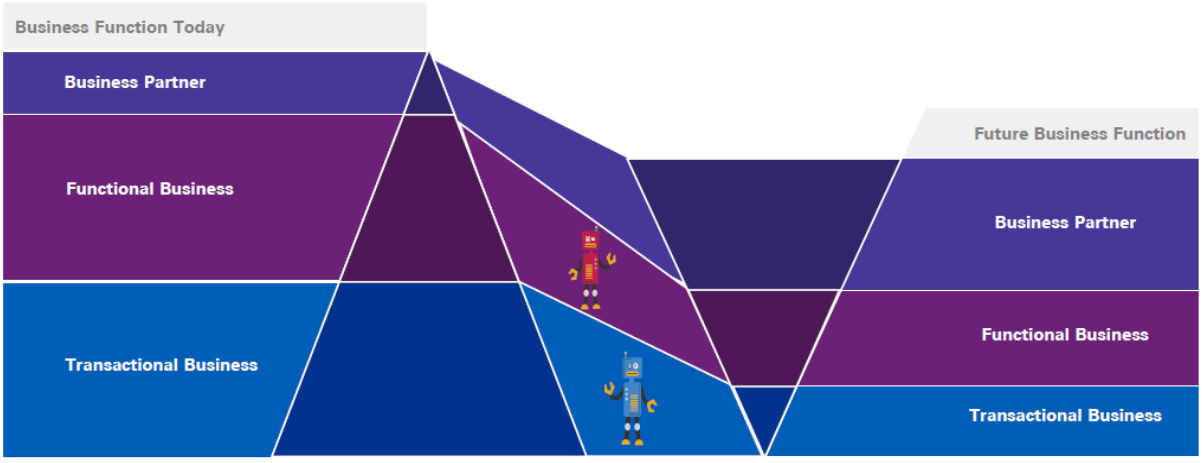


Figure 1 – Business Function (KPMG, 2023)

1.1 Problem Statement

As stated before, changes are expected within the role of the MA. Schäffer & Weber (2016) state that the full scope of the changes for MAs is still often underestimated. “The realisation that digitisation is about more than standardisation and automation of transaction-related control processes or the use of new software that promises true miracles under the buzzword "analytics" is still slow to mature” (Schäffer & Weber, 2016). This raises the concerns with regards to the extent which and how these promising techniques will then actually be integrated at a certain moment in time. Even though the new techniques might help the MA in simplifying their work and improving their results, they may also bring challenges. It might require awareness of upcoming technologies and additional skills and competencies.

As mentioned before, the development of ICT, AI and RPA has a significant impact on the competencies of companies operating in the financial sector, including banks and accountants (Mavlutova & Volkova, 2019). Their potentials are extremely high, for example

with esteemed companies like Gartner suggesting that 80% of the finance leaders have either implemented or are in the process of planning to implement RPA (Gartner, 2023).

On the other hand, advancements in finance function practices have fallen short of earlier predictions. For example, CFOs and MAs reported in 2012 that managers would have greater access to data, but this expectation was not met in 2017. In 2014, respondents predicted a widespread adoption of the "business partner" concept by 2019, but this has also proven to be unrealistic based on 2017 data. Schäffer & Weber (2019) suggest that the adaptation processes for both instances have taken longer than originally anticipated by MAs in their three studies on the future of controlling. Also according to the study (Schäffer & Weber, 2019), the findings indicate that despite widespread attention and high expectations, the process of digitalization in the finance industry remains in its early stages. In 2017, the significance of trends such as "business analytics," "digital business models," "self-service reporting," "agile management," and "digital literacy" was rated between 3.2 and 4.2 on a 7-point Likert scale. Approximately two-thirds of the survey participants noted deficiencies in data quality and accessibility, with an even higher proportion (80%) reporting issues with IT system integration. Business analytics was found to be intensively used in only a small fraction of MA functions, with only 5% of respondents reporting intensive usage.

These figures contradict the optimistic reports from major firms. Gartner (2015) expected blockchain technology for instance in the innovation trigger phase in 2015 and peaked in the peak of inflated expectations in 2018. However, it may be questioned if it has reached its predicted plateau of productivity. This might have been a bit too optimistic. This confirms the importance of having a critical look at technologies that are commonly referred to as expected emerging technologies.

Besides the need for critical thinking, there are other issues. For instance, the literature repeatedly mentions that changes are coming, but remarkably little is written within the literature about how someone can prepare for this in concrete terms.

It is important to understand why the potential and quantity of technological developments consistently appear high according to forecasting firms, yet integration often experiences delays or fails to meet expectations. Do these techniques contribute to a changing work environment? If so, what specific techniques are implemented, and how will they impact the work of MAs? Could the slower adoption process be attributed to MAs lacking the necessary competencies and knowledge of modern technologies themselves? As the work landscape for MAs continues to evolve alongside the emergence of modern technologies, it becomes crucial to determine the appropriate approach for MAs to adapt. One potential approach is a reactive response, where MAs adjust in reaction to the changing work environment. Alternatively, an initiative-taking response involves MAs actively embracing and adopting the changes. This raises an important question to address in this problem statement. Consequently, it is beneficial to examine the current role and profile of MAs.

Building on that, it is beneficial to examine the current role and profile of MAs in the context of different types of firms. This research additionally aims to shed light on how technological advancements impact MAs in various organizational settings, including but not limited to:

- Large Financial Institutions: This research is relevant to multinational banks, insurance companies, and other large financial organizations where MAs play a critical role in financial management.
- Small and Medium-sized Enterprises (SMEs): The research can provide insights into how smaller financial firms can leverage technology and the changing role of MAs to remain competitive.

- FinTech Startups: In the fast-paced world of financial technology startups, understanding how MAs evolve with technology can be vital for shaping effective business strategies.
- Consulting and Advisory Firms: MAs working in consulting and advisory firms can benefit from insights into how their services may need to adapt to assist clients in navigating technological changes.

The motivation for me as a researcher regarding this topic arose from my personal relationship with the subject. In addition to a financial studies background, I see this field as a potential field of work for my career. Therefore, it is a unique opportunity to learn about the field from the literature on the one hand, and on the other hand to speak to experts from the field to gain practical knowledge and experience as well. It can advance and prepare me, as well as many others, for the future. **This research therefore aims at identifying how the job of a MA might change towards the future because of the influence of technological developments.**

1.2 Research Goal

This research will facilitate the MA in preparing for the embracement of modern technologies that will eventually become part of their work. To adopt the technologies, the MA must have certain competencies to fulfil required tasks. The new and changing roles and underlying tasks and competencies that are required are brought into focus through this research. Through this solution, the MA will no longer just be warned about the emerging technological changes in their field of work, but also further assisted in developing his or her competencies to be well prepared.

A method to create a concrete solution that can inform MAs about their future might be the development of a future-oriented framework. This framework will consist of the changes within the MA's roles and its capabilities, consisting of competences and tasks. Because of the changes in their work field regarding technological advancements will be studied, these are also included. A framework can consequently serve as a guide to develop training programmes, identify competence gaps in both individuals and organisations providing guidance services, promote self-development in targeted ways, and ensure common reference standards (Sultana, 2009). Comparing the capabilities framework with the current capabilities will highlight the threats a MA might face. Active use of the framework should increase the preparedness for the various technologies in the future.

Oesterreich et al., (2019) state that within the controlling field, the current competencies already do not fulfil the requirements for the MA of the future. However, their research was fully focused on the current situation regarding business analytics competencies and IT skills. Also, Oesterreich et al., (2019) did research on the impact of digitisation on the MA’s job, where they state that the MA of the future should possess both the strategic thinking capabilities of a business partner and some of the skills of a data scientist. Within this study, existing information from literature, and job advertisements are used to make judgements about changing roles and competencies. This is mostly from an organisational perspective and by use of its social media platforms. This research will moreover focus on the expectations and perceptions of the experts in the work field and academic experts. This research will build on that of Oesterreich & Teuteberg (2019), but, will primarily focus on the future. For this reason, the goal of this research is:

“Examine the future profile of a Management Accountant in 2030, considering the influence of upcoming technological changes, and provide insights into the evolving role, underlying tasks, and required competencies for MAs within this context.”

To create this framework, the following research question is formulated:

"What is the future profile of a Management Accountant towards 2030, taking into account the impact of technological advancements, and what insights can be gained regarding the evolving role, the underlying tasks and essential competencies within this context?"

The research question is answered through several sub-questions. The reasons why these questions help towards answering the research question is explained subsequently.

To address the research question effectively, a crucial initial step is to provide a comprehensive and detailed overview of the current profile of the MA. Also, the technologies that will be affecting this role, must be formulated too. For that reason, the following sub-questions are formulated:

SQ1: What are the current roles, tasks, and competencies of a management accountant?

SQ2: What are the upcoming technological advancements that will affect the environment of a management accountant the most in 2030?

A Systematic Literature Review (SLR) is conducted to answer sub-question 1, which is a research method used to identify, evaluate, and interpret available research relevant to certain topics, interests, or research questions. Through the SLR we want to define the concept of MA within the research question.

After the profile of the MA is made clear, the most important technological advancements within the field of controlling in the coming years are defined. From the results of the first two sub-questions, the profile of the MA and the technological advancements are retrieved. Because the influence of the advancements needs to be measured, we need to produce a good research method and measurement methods to operationalize the concepts. For that reason, SQ3 is as follows:

SQ3: How can the influence of the technological advancements on the role of a management accountant be measured?

After answering this question, the second part of the research can be conducted. There we will investigate how the selected IT developments will influence the profession of the MA. This is done by gaining and analysing data from relevant stakeholders. This resulted in the following sub-question:

SQ4: How will the selected IT advancements change the current Management Accountants field?

To address the main research question, chapter 2 provides answers to sub-questions 1 and 2 based on the scientific literature. Chapter 3 describes the research methodology, including an explanation of the research approach. The results of the data collection are presented in Chapter 4.

Chapter 4 will evaluate the results derived from the scientific literature through focus groups. Within chapter 5, the research findings will be reflected in the framework that was derived from the literature. This will result in several conclusions about how the MA's profile might change. Chapter 5 will therefore discuss the scientific and practical implications of the research conducted. Practical implications will consist of advice on how an MA can prepare for these changes. This is divided in implication for education and training, implications for companies in general and implications for Robert Muntel Financial Consultancy (RMFC) specifically. With these implications, SQ5 can be answered.

SQ5: How can a Management Accountant proactively adapt to the changing circumstances?

Furthermore, chapter 5 appoints a validation section, the limitations of the study, and the possibilities for further research. Chapter 6 contains the conclusion of the study.

In conclusion, this chapter has outlined the research goal of preparing MAs for the adoption of modern technologies that will become integral to their work. The aim is to develop a future-oriented framework that informs MAs about changes in their field and assists in the development of competencies required for the evolving role.

To address the research goal, a research question and several sub-questions have been formulated. The main research question explores the changing tasks, roles, and competencies of MAs towards 2030 considering upcoming technological changes. Sub-question 1 focuses on understanding the current roles, tasks, and competencies of MAs through a systematic literature review. Sub-question 2 identifies the upcoming technological advancements that will have the most impact on MAs by analysing relevant literature. The influence of these technological advancements on the field of MAs needs to be measured, leading to sub-question 3, which aims to determine an appropriate research and measurement method. Sub-question 4 delves into how the selected IT advancements will change the current field of MAs, requiring data collection from stakeholders. The fifth sub-question asks for implications about how the MA and its stakeholders can prepare for the changes.

Chapter 2 will provide answers to sub-questions 1 and 2 based on scientific literature, while chapter 3 will describe the research methodology and approach and with that answer sub-question 3. After the data is collected, the results are presented in chapter 4. Chapter 5 will compare the expectations derived from scientific literature with the results of the focus groups. These findings will inform the conclusions and provide theoretical implications towards the framework and practical implications on how MA’s can prepare for the anticipated changes resulting from the research. This will also be presented in chapter 5. By addressing these research questions, this study aims to contribute to the understanding and preparedness of MAs for the future changes brought about by technological advancements.

2. Literature

Within the literature chapter, the field of management accounting will be explored, focusing on its historical development, the roles, tasks and competencies, followed by exploring the current and upcoming landscape of technological advancements. It lays the foundation for further analysis of the evolving landscape of management accounting in modern organizations.

2.1 Method

A Systematic Literature Review (SLR) is conducted to answer sub-question one. It is a research method used to identify, evaluate, and interpret available research relevant to certain topics, interests, or research questions. This method aims to identify, evaluate, and interpret available research that is relevant to certain topics, interests, or research questions, as described by Kitchenham (2004). According to Kitchenham (2004), one of the primary objectives of conducting a systematic review is to provide a summary of existing evidence related to a particular treatment or technology. SLR can help by making a more objective and evidence-based decision, rather than relying solely on subjective opinions or biases. Through the SLR we want to define the concept of being a MA. To find the right keywords that clarify all the concepts of the research question, there will be brainstorming about alternative terms and synonyms for the concepts to produce the right keywords.

In this study, a Systematic Literature Review of the current role of the MA is conducted. To see what changes in the role of the MA, first the current role of the MA needs to be identified. Therefore, we search for its roles, tasks, and competencies to create a full picture of the MA profession.

According to Kitchenham (2004), a systematic literature review (SLR) involves three stages: planning, conducting, and reporting. In the planning phase, the review's purpose is identified, and a review protocol is developed to specify the methods and criteria for conducting the review, which is important for avoiding researcher bias. Table 1 shows the steps involved in the review protocol, which are used to address the sub-questions and establish an appropriate initial design for the workshop based on evidence from the literature.

To identify all relevant literature to answer the sub-questions, a review protocol for the SLR is formulated. In the following table can the review protocol be found that are used to answer the following research question: "*What does the field of the MA look like?"*

Protocol element	Translation to this research
SQ1	What does the field of the MA look like?
Sources	Web of Science References from the Web of Science sources
Search Term/Inclusion criteria	Title: "controll*" OR "management account*" AND Abstract: "controll*" OR "management account*" AND Title: role* OR competenc* OR skill* OR abilit* OR responsibilit* OR requirement* OR task* AND Abstract: role* OR competenc* OR skill* OR abilit* OR responsibilit* OR requirement* OR task*
Exclusion criteria	Not related NOT Title: health OR medical OR hospital OR patient NOT Abstract: health OR medical OR hospital OR patient

	Papers that are not in English Papers that are not accessible
Data extraction	Literature Matrix & Mendeley
Results	Explanation of what the profession of the MA looks like

Table 1 - Review protocol SQ1

It may be prudent to provide further elaboration for certain selections made within the review protocol.

As mentioned before, the terms MA and Controller are both accepted during the SLR because they are in literature often used interchangeably (Ahrens & Chapman, 2010); (Verstegen et al., 2007). Because this research does not focus specifically on the financial Controller, but more on the general role of the controller, similar roles specific to finance are initially not used as synonyms or keywords.

We used the terms Role, Competence, and Identity during the SLR because, during the search for relevant search terms, these terms often returned when a single article was found. However, when using these terms in the search string, instead of an individual article, a collection of relevant articles emerged as opposed to before.

After SQ1 is answered through SLR, a list of technological advancements must be formulated to answer SQ2. To identify the most suitable technological advancements that influence the role of the MA most, a list of technologies was compiled by combining named technologies from several similar and relevant other studies. After taking a closer look and selecting technologies that will affect the MA the most, SQ3 can be answered.

In our quest to identify the role and competencies of the MA, we have conducted a systematic literature review to explore articles that highlight those key capabilities. By mapping these capabilities, we aim to identify common patterns that can inform the development of a comprehensive framework that outlines the current role and competencies of the MA. To facilitate the clear presentation of our findings, we have created a literature matrix.

The output of this systematic literature review is a framework that synthesizes existing literature and provides a comprehensive overview of the current profile of the MA.

The initial search based on the protocol at Web of Science still proved to be far too broad, as it returned an enormous number of results.

The title and abstract selection through the described search string resulted in 2163 articles. Because a lot of articles pertained to a completely different sector, namely healthcare, exclusion criteria were applied to exclude these articles. This narrowed down the list to 1794. Additionally, filters for Full access and English and Dutch languages were applied. As a result, a curated list of 724 articles was compiled, forming the foundation for the study. This is all shown in Table 2.

Table 2 – Preliminary steps

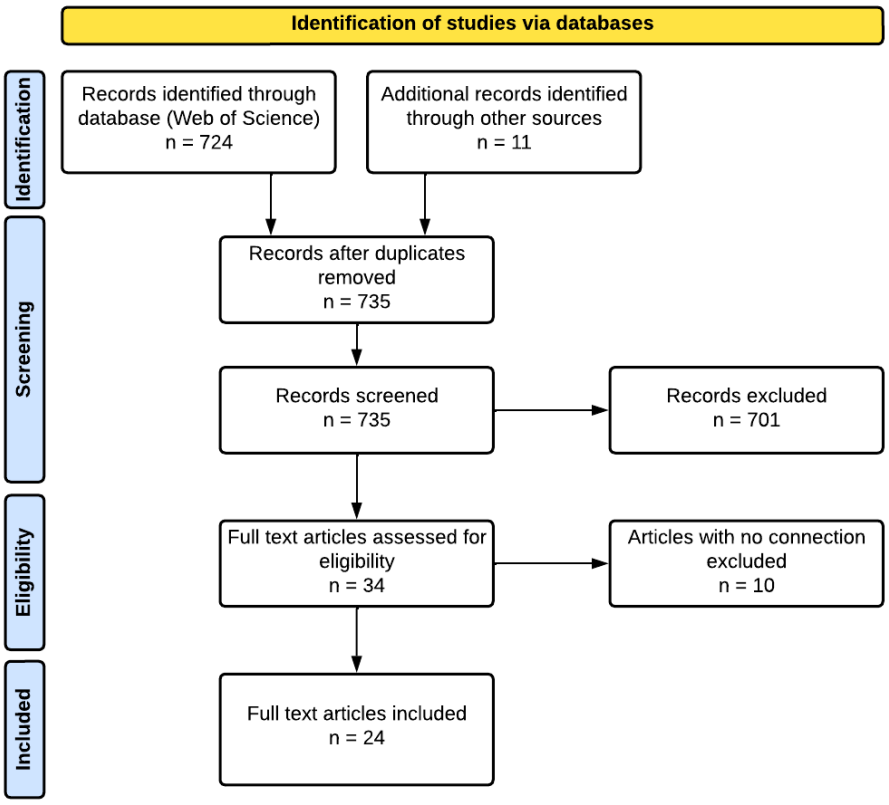
Title & Abstract selection	2163
Exclusion criteria	1794
Free access	732
English or Dutch	724

A broad search string, which this is still, can result in irrelevant articles coming out. That is why, from here the titles of these articles were screened to further narrow down the pool of potential sources. This step involved reading the titles of each article and excluding any that were clearly not relevant or did not directly address the research question. This caused many articles to have to be removed from the list; only twenty-three remained relevant.

Furthermore, during the initial exploration of topics related to this research, highly relevant articles were discovered intermittently. Because some of these articles may also be relevant for answering this sub-question, seven of these are included in the list.

This resulted in a list of thirty articles. Because the scope is somehow still a bit too broad, a good addition is some form of bibliometric analysis (Donthu et al., 2021). The articles were added to Research Rabbit, which is an advanced online tool for mapping scientific literature that uses citations as its primary basis. It is an innovative tool that allows users to visualize and analyse the relationships between different publications, authors, and research topics (The Learning Centre, 2022). The goal of doing this was to use the tool's bibliographic coupling and co-citation analysis features to identify patterns and connections within the article pool. Bibliographic coupling is a science mapping technique that works under the premise that two publications that have common references also possess similar content (Donthu et al., 2021). Donthu et al. (2021) further explain co-citation analysis as a science mapping technique that operates on the assumption that publications which are cited together with high frequency share similar thematic content.

By identifying which articles are frequently cited together or are co-cited with other key sources, articles that may have been overlooked beforehand, are showing themselves now. Also, articles with no or little connection to the rest can be excluded. The list of “Similar Work” was scanned on relevance through their abstracts and titles, and this resulted in a list of twenty articles. Because this research is future-oriented, four articles that are grey



literature were added too to provide a more comprehensive and eventually more up-to-date literature chapter. After adding these articles, the total amount of articles that was left was twenty-four. These papers were analysed through a literature matrix. During the creation of the literature matrix, the relevant literature was added to the matrix. The full process is stated following the PRISMA method in Figure 2. After that, the profile of the MA is extracted from the matrix and the roles, tasks and competencies are categorized.

Figure 2. Systematic Literature Review shown in PRISMA.

2.2 The Profile of a Management Accountant

This section aims to address the first sub-question: “What does the profile of the MA look like?” The initial part of the section will elaborate on the article selection process that underpins the literature. Subsequently, the definition of the MA and the various roles associated with the MA will be discussed, followed by the formulation of the underlying tasks and competencies of the MA.

2.2.1 Introduction to a Management Accountant

In 1996, the International Group of Controlling (IGC) established the roles and primary responsibilities of MAs. The IGC's MA Mission Statement, last revised in 2013, declares that MAs act as management partners and play a crucial role in ensuring the organization's sustainable success (Eiselmayer et al., 2016). Eiselmayer et al., (2016) explain that the MA is responsible for creating, implementing, and managing controlling systems that align with organizational goals and plans to ensure cohesion. In addition, MAs provide pertinent information to support decision-making, promote future-oriented thinking, and serve as ethical guardians, demonstrating a strong commitment to the organization's well-being.

To define the fundamental role of the MA more comprehensively, Eiselmayer et al., (2016) formulate the MA as the persons who:

- *“Design and accompany the management process of defining goals, planning and management control, so that every decision-maker can act in accordance with agreed objectives,*
- *secure the conscious preoccupation with the future and thus make it possible to take advantage of opportunities and manage risks,*
- *integrate an organisation's goals and plans into a cohesive whole,*
- *develop and maintain all controlling systems. They ensure the quality of data and provide decision-relevant information,*
- *are the moral compass of the business and thus committed to the good of the organisation.”*

The core roles of the controller are for instance described by IMA (2022) as “partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to formulate and implement an organization’s strategy.”

Literature indicates that the role of MAs is transitioning from the traditional "bean counter" model, which primarily involves routine financial analysis, transaction processing, and statutory reporting, towards a more active and strategic "business partner" model (Byrne & Pierce, 2007). A similar observation was made by Verstegen et al., (2007), who claim MAs have shifted from a scorekeeping role to a more business partnering role, where they support management in decision-making processes. The business partner model, as described by Byrne & Pierce (2007), involves supporting top management team members in analysing

broader business management issues. It involves collaborating closely with operational managers to create localized strategies (Byrne & Pierce, 2007), offering decision-making support through quantifiable data (Chang et al., 2014), and serving as a linking mechanism across management levels and functions (Cadez & Guilding, 2008). The move towards the business partner model is regarded as a favourable advancement in the realm of management accounting (Pasch, 2019).

Verstegen et al. (2007) define the MA and controller as follows: ‘A controller or MA supports and advises the management of an organization in realizing their economic, public and/or financial goals. Support is interpreted in terms of the design and maintenance of management control and accounting information systems, and the procurement and distribution of information.’

To address SQ1, it is imperative to emphasize the role of the MA beyond mere definition. The existing literature offers a vast array of articles aiming to elucidate the concept of the MA. Within these scholarly works, various terminologies have been employed to expound upon the functions and responsibilities intrinsic to the MA role. These terminologies often revolve around distinct tasks and duties that necessitate specific competencies and encompass a range of skills. The utilization of these diverse terms in the literature has led to potential confusion. To mitigate this confusion, a literature matrix is employed to systematically present an organized summary of the varied interpretations of the MA role. This matrix serves to compile different elucidations of the MA role, providing a coherent visual representation. Subsequently, articles that offer comprehensive insights into the multifaceted role of the MA can be selectively identified and chosen for a more informative portrayal. T These articles will form the foundation upon which the designed framework will be built. The selected articles are (Pasch, 2019), (IMA, 2022), (VRC, 2021) and (La Paz et al., 2020). To give additional attention to the recently changing aspects within the profile of the MA, (Oesterreich et al., 2019) have been added to the collection.

Given the structural definition of MA roles, in contrast to alternative ways of categorizing, and these are of such importance, the roles from different frameworks and models will be clustered. After that, the tasks and competencies are clustered based on two competence models.

Selecting and combining the overlapping themes leads to a good overview of the possible roles, tasks and competencies needed. However, this approach also brings some limitations. Limitations are that it is a simplified representation that can lead to loss of depth. Also, there is a risk of author bias during selecting and identifying overlapping themes and overlapping themes might exclude important tasks or competences that are not in every article. Furthermore, not all tasks and competences are relevant to every business. This depends on the business context, size, and other characteristics. Therefore, it was decided to outline a broad profile, so that for every company there are relevant roles and underlying tasks and competencies.

2.2.2 The six roles of a Management Accountant

While there are many different articles on the role of a MA, it is important to combine these articles to create a broader understanding of this role. By looking at a range of different articles, we can identify common themes and patterns that emerge across different contexts and identify areas where there may be gaps in our understanding. This can help to inform the development of best practices and guidelines for MAs in a variety of different fields.

As outlined in the introduction, six articles have been selected, focusing on the roles of the MA. These roles have been grouped to create a distinct profile. The grounded theory method

was employed to analyse the gathered data within the literature matrix. In grounded theory, data analysis has a well-defined process that begins with a basic description and moves to conceptual ordering and then on to theorizing (Patton, 2002). Data analysis is accomplished through an elaborate set of coding processes (Walker & Myrick, 2006).

Six roles are selected which recur several times in six different articles. Intensive consideration is given to the similarities between the role descriptions within and between the articles and the designed roles. The elaborations of the clustering are shown in Figure 3 and Figure 4.

Leader
Business partner for management
Accountant
Finance professional
Changer
Information technologist

Figure 3 – The Roles of a Management Accountant

Pasch, T	La Paz et al.	Oesterreich, Teuteberg	VRC	IMA	IGC
Accounting and Reporting	Business Partner	Bean counter	Paragon of Integrity	Strategy, Planning & Performance	Knowledge & Application
Management accounting and control	Coordinator	Information provider	Leader/connector	Reporting & Control	Leadership
Risk management and compliance	Operational	Financial expert	CEO's co-pilot	Business acumen & Operations	Customer focus
Strategic analysis	Information Source	Internal consultant	Change architect	Technology & Analytics	Efficiency
Funding		Business Partner	Enabler	Leadership	Designing the future
Others		Change Agent		Professional Ethics & Values	
		Data scientist			

Figure 4 – The articles used to compile the Roles of a Management Accountant

Leader

This role is mainly described as leading the company's finance function (VRC, 2021), looking at how someone collaborates and how they inspire others to achieve organisational goals together (Eiselmayer et al., 2016; IMA, 2022). The role of coordinator was also added, as this person is seen as someone who uses information and managerial tools to align resources and people proactively (La Paz et al., 2020).

Business partner for management

A business partner MA is proactive and a strategist (La Paz et al., 2020) where the emphasis is increasingly on strategic thinking, forward-looking and collaborative roles (Oesterreich et al., 2019). He or she is also jointly responsible for defining and adjusting the organisational strategy (VRC, 2021). Oesterreich et al., (2019) suggest that the goal is to envision the future, lead the strategic planning process, guide decisions, manage risk, and monitor performance (IMA, 2022).

Accountant

The accounting role can be seen as reporting about the organizational performance by measures in compliance with relevant standards and regulations (IMA, 2022), it includes financial processes and instruments according to Pasch (2019), like preparing annual reports, aggregating financial transactions in general ledgers, and keep financial control. This used to be called the role of the bean counter (Oesterreich et al., 2019).

Finance professional

The Finance professional role is in this context seen as someone who advises the decision-makers and delivers all the relevant information to make decisions. The difference with the business partner is that the Finance professional is not sitting at the table of decision-makers. This role focuses on all types of activities and deliverables that can be used to come to decisions, including for instance planning, forecasting, budgeting and management reporting (Pasch, 2019). It is therefore more an operational role rather than a strategic role. The difference between the finance professional and the accountant role is that a finance professional focuses on providing financial information and analysis to support internal decision-making, whereas the accountant focuses on day-to-day financial activities.

Changer

The change agent is an emerging role within the MA profile. In times of changing business models, organisational structures and processes, the MA has an important role to play (VRC, 2021). For the organisation to work efficiently, companies need to innovate in this regard. The changes regarding the digital transformation for instance need to be managed, the MA can play a significant role in this (Schäffer & Weber, 2016).

Information technologist

Digitalisation was briefly mentioned in the previous chapter. The role of the information technologist is therefore not surprising. This role can be seen as analysing data and managing data for organisational success. With all the technological developments, it is important to use this technology in the right way. For the MA, this includes focusing on operational and financial processes that are changing rapidly (IMA, 2022). According to (Oesterreich et al., 2019), data science and IT skills are considered very important for the MA, therefore we put them in this separate role.

2.2.3 The tasks and competencies of the Management Accountant

In this section, we delve into a fundamental aspect of the research: the tasks and competencies of the MAs in the rapidly evolving financial landscape. Understanding the specific responsibilities and skills demanded of MAs is crucial to grasping how their roles are transforming.

In the initial stages of this research, the specific tasks of MAs were not explicitly outlined within the profile. Instead, the focus was on identifying the competencies deemed necessary for MAs in the evolving landscape. However, an important question arose: Why were these selected competences considered essential? To answer this question, it became apparent that defining the tasks associated with each role of the MA was necessary to provide a holistic understanding of the competencies required.

To comprehensively describe the tasks and competencies of MAs, we synthesized information from several articles and sources. Three distinct descriptions of tasks were amalgamated to formulate the tasks corresponding to each role of the MA. Furthermore, we integrated two essential competence frameworks into our analysis: the Management Accounting Competency Framework, authored by the Institute of Management Accountants

(IMA, 2022), and the Controller Competence Model developed by the International Group of Controlling (Eiselmayer et al., 2016).

By referencing the roles outlined in the previous section and breaking down the tasks within each role, we were able to pinpoint the specific competencies that are imperative for MAs. The tasks served as a valuable bridge connecting the competencies required for successful performance within these roles. Figure 5 gives an overview.

Roles	Tasks	Competencies
Leader	Ensure communication, coordination and alignment of business units, departments, and people. Improve performance by devising mechanisms	Communication Inspiring Relationship management Decision making
Business partner for management	Design strategies and tactics, ensure organizational growth and sustainability, take part in management decisions	Strategic & Tactical Planning Decision-making Market & Business knowledge
Accountant	Financial Accounting Financial reporting Budgeting and forecasting Cost control Internal control Audit coordination Accounting policies and procedures Financial analysis	Internal Control Financial Recordkeeping Cost Accounting Financial Statement Preparation Financial Statement Analysis Tax Compliance and Planning Integrated Reporting
Management accountant	Report to management about Planning, Monitoring, Forecasts, budgets, Improve processes	Operational knowledge Quality management Performance management System-methodological approach Reliability
Changer	Initiate change processes Resolve conflicts	Change management Openness to change Creative skills Conceptual strength
Information technologist	Prepare monthly and quarterly management reports. Perform ad hoc analysis as needed. Maintain and update data systems	Information Systems Data Governance Data Analytics Data Visualization

Figure 5 – Overview of the Tasks and Competencies of a Management Accountant

Leader

To communicate, coordinate and improve performance, there are several competencies that a MA needs to possess. According to the IMA, the MA should possess effective communication skills, including effective listening and the ability to convey ideas through various mediums. They must also have emotional intelligence, accountability, and the ability to set a positive tone to influence and motivate others towards achieving organizational goals. Working collaboratively with others to build trust is also important. MAs should be skilled in evaluating decision alternatives using analytical techniques and making recommendations. The ability to make decisions is crucial for effective decision support that is accepted by management. The IGC views inspiring others and creating drive as essential competencies for financial leadership in a company.

Business partner for management

Being a business partner is not something that was required in the past, and still is not. But making important strategic and tactical decisions to ensure organizational growth requires quite a bit. The competencies required for this role include strategic and tactical planning, decision-making, and market and business knowledge. The MA leverages its financial expertise to contribute to the development of comprehensive business plans, align financial

considerations with strategic goals, provide insights for informed decision-making, optimize resource allocation, and stay informed about market dynamics and potential business opportunities. By fulfilling the role of a business partner for management, the MA adds value to the organization by integrating financial perspectives, supporting strategic decision-making, and driving overall business success.

Accountant

The tasks of the accountant are those for which the MA is trained in the basics. MAs prepare financial statements, analyse financial data, ensure tax compliance, and support integrated reporting efforts, providing accurate and meaningful financial information for decision-making and regulatory compliance. A MA plays a crucial role in assuring management and other stakeholders regarding internal controls. They are responsible for evaluating, implementing, and monitoring internal control systems within the organization. By ensuring the effectiveness of internal controls, the MA earns confidence in management and stakeholders that financial processes are reliable, risks are mitigated, and compliance with laws and regulations is maintained (IMA, 2022).

Finance professional

Within the role of the finance professional, the MA converts the results of the accountant into appropriate management information. The MA possesses essential competencies such as operational knowledge, quality management, performance management, a system-methodological approach, and reliability so that he or she can add value to management with the provided information. They leverage their operational knowledge to serve as a valuable business partner to operational units outside the accounting/finance department (IMA, 2022). Through quality management practices, the MA ensures the accuracy and reliability of financial data and reports. Performance management involves developing KPIs and analysing metrics to support decision-making. With a system-methodological approach, the MA applies frameworks and methodologies for accurate financial analysis (Eiselmayer et al., 2016). Lastly, their reliability establishes trust among stakeholders, providing dependable financial information for decision-making processes.

Changer

Setting change processes in motion requires a lot of a person. People will have to be convinced and changed, as well as processes. This of course requires an innovative outlook and some creativity, to manage the period of change appropriately. They play a crucial role in driving and managing organizational change initiatives. With their change management competence, MAs facilitate smooth transitions, assess impacts, and develop strategies to minimize resistance and maximize adoption. Their openness to change enables them to embrace new ideas and approaches, fostering an environment of innovation and continuous improvement (Eiselmayer et al., 2016). Creative skills allow MAs to be creative, generate innovative solutions, and adapt to evolving business needs. Additionally, their conceptual strength helps them grasp complex concepts, identify interrelationships, and envision future possibilities. By leveraging these competencies, MAs as changers drive successful transformations within the organization, promoting agility, adaptability, and growth.

Information technologist

Within the role of the information technologist, a lot is changing. Data preparation and analysis require technical knowledge. The MA possesses competencies in information systems, data governance, data analytics, and data visualization. It is a role that is emerging over the last years since it is only recently added to the controller competence framework. They leverage their knowledge and skills in information systems to effectively utilize technology in financial processes and reporting (IMA, 2022). With expertise in data governance, MAs establish frameworks and policies to ensure data integrity, security, and

compliance. Data analytics competencies enable MAs to analyse large datasets, identify patterns, and extract valuable insights to support decision-making and strategic planning (IMA, 2022). Additionally, MAs utilize data visualization techniques to present complex financial information clearly and concisely, facilitating understanding and effective communication. By applying these competencies, MAs as information technologists enhance the organization's data-driven decision-making capabilities, optimize financial processes, and drive digital transformation.

2.3 Technological Advancements

This part of the research aims to identify the areas of technological development that will have the biggest impact on current processes within companies and the set-up of companies. To achieve this goal, we first compiled a list of technological advancements based on the articles and reports. We started with listing IT tools based on the recent SLR by (Ulrich et al., 2022), combined with the recently listed technology trends described by Gartner (Gartner, 2023). Also, to not only look at upcoming technologies at this moment but some that should have been or are adopted now, a list of the application landscape within the accounting profession from 2018 (Accountant.nl, 2018) is used. All these advancements are brought together into one list.

This list was then validated, categorized, and prioritized through an interview with Patrick Konniger, a MA with experience in the field. He is also part of the workgroup Accounttech which is part of the NBA, the Dutch accounting association. Additionally, we reviewed an article that focused on similar research to ensure the comprehensiveness of our results (Kroon et al., 2021).

The SLR of (Ulrich et al., 2022) provides insight into relevant literature already collected in the area of technological developments and the changing role of the MA. However, it also describes that there will be new job requirements as new roles emerge. It can be inferred that as digitalization continues to advance and the utilization of information technology tools in management reporting increases, the role of the MA is progressively expanding to encompass various responsibilities. These responsibilities involve among others providing advisory support to the management, evaluating situations, initiating actions, and undertaking tasks that are reliant on information technology (Ulrich et al., 2022).

Gartner selected several hyper-automation tools. According to (Gartner, 2023), finance functions leverage hyper-automation, which involves swiftly identifying, evaluating, and automating numerous business processes by integrating various technologies, tools, or platforms. These encompass several tools, like AI, ML, RPA, iBPMS, low-code tools, and more. By 2024, organizations are projected to achieve a 30% reduction in operational costs by combining hyper-automation technologies with redesigned operational processes (Gartner, 2023).

During the interview with Mr Konniger, the roles selected within the SLR about the MA are used here. The list of technological developments is presented to Konniger and supplemented where necessary. The technological developments are contrasted with the various roles to categorize and prioritize the developments.

Because there are many overlapping themes within the list, they are categorized. This is done based on the following areas: Artificial Intelligence (AI), Data-related Technologies, Process-related Technologies, Platforms and Tools, and User Interface and Access. Table 3 gives an overview.

Table 3: Categories of technological advancements

Domain	Technologies and Applications
Artificial Intelligence (AI)	Cognitive AI, Machine Learning (ML), NLP, Explainable AI
Data-related Technologies	Big Data (Analytics), Real-time Data Mining, Data Mining, Business Intelligence (BI), Self-Service Analytics, Data Level Assurance, Semantic Web
Process-related Technologies	Robotic Process Automation (RPA), BPMS, Process Mining

Platforms and Tools	Blockchain, Cloud-native Platforms, Composable Applications, Low-Code Tools, ERP Systems, Warehousing Tools, Smart Contracts, iPaaS
User Interface and Access	Dashboards, Mobile Devices, Self-Service

The grouping categories outlined are effective in organizing the mentioned technologies and applications. The first category encompasses Artificial Intelligence (AI) and related technologies, which focus on simulating human intelligence and enhancing decision-making capabilities. The second category revolves around data-related technologies and applications, enabling organizations to collect, analyse, and derive insights from large volumes of data. The third category comprises process-related technologies that automate and optimize business processes, improving efficiency and streamlining operations. The fourth category consists of platforms and tools that support specific functions and facilitate the development of scalable and efficient systems. Finally, the fifth category encompasses technologies and applications related to user interface and accessibility, providing intuitive interfaces and convenient access to information.

The categories "Platforms & Tools" and "User Interface & Access" were not selected for this study for several reasons. The study has a specific focus on technologies, and within the given scope and time frame, it is more relevant to concentrate on the domains of Artificial Intelligence, Data-related technologies, and Process-related technologies. These domains were deemed more critical and impactful for the research objectives. Together, these groupings offer a logical and comprehensive overview for understanding and discussing the various technologies and applications in their context.

2.4 Main takeaways of the literature review

Now that both the roles, tasks, and competencies, as well as the technological advancements are clear, the results can be summarized. This is stated in *Figure 6*. This framework will function as the starting point for the second part of the research, where we want to answer the question: “How will the selected IT advancements change the current MA's field?”

The main objective of the SLR was to answer the question “*What are the roles, tasks, and competencies of a management accountant?”* All concepts within this question were eventually developed. The framework can be found in Figure 6. Within this framework, all knowledge gained from the literature is converted into a framework in which relationships are established. Relationships are established between technological developments, the MA's profession and its underlying roles, tasks, and competencies. These relationships form the basis for the second part of the study, in which they will be discussed. The next chapter will therefore describe the method by which the relationships will be discussed.

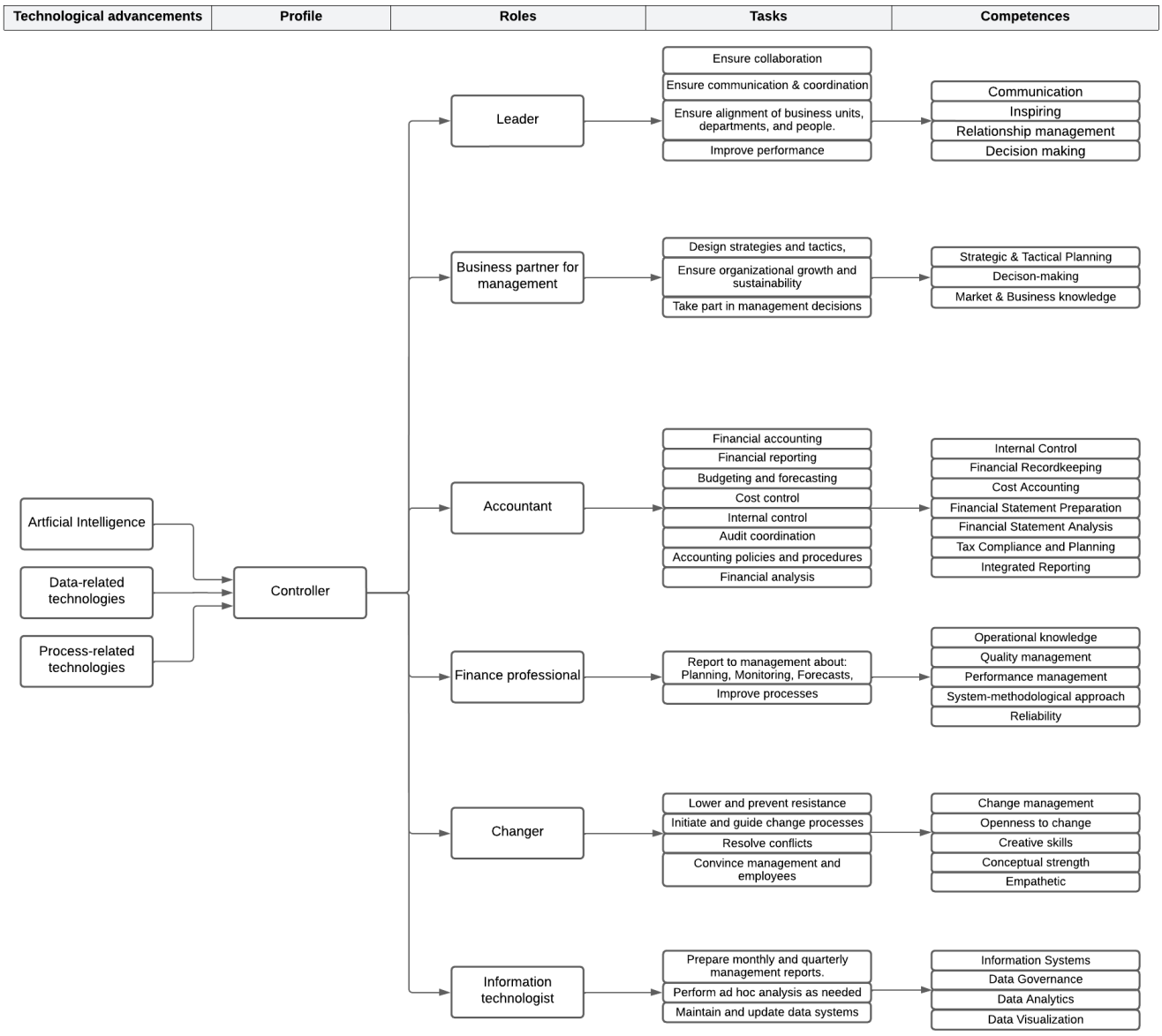


Figure 6 – Framework technological advancements in relation to the profile of the MA

3. Method

To goal of this study is to identify the influence of technological advancements on the profile of a MA. This impact can be investigated in several different methods. This chapter therefore discusses the selection of the used method and the process of applying it.

3.1 Methodology

This section presents the methodology employed for the second part of this study where a focus group method is used. With the SLR done first, followed by this approach, a comprehensive understanding of the research topic can be obtained. Where existing literature can be combined with the perspectives, experiences, and expectations of participants in the focus groups. The research aims to investigate the effects of various technological developments on the role of MAs in the Netherlands, with a focus on the expected changes towards 2030. Once the concepts are defined through literature, the right method to answer the research question must be selected.

Selecting the appropriate method and describing the process will be done within this section. This will answer sub-question four. Next, the method will need to be implemented. That will answer sub-question five. For a general overview describing the process from inception to selection and the process that follows, please refer to Figure 7.

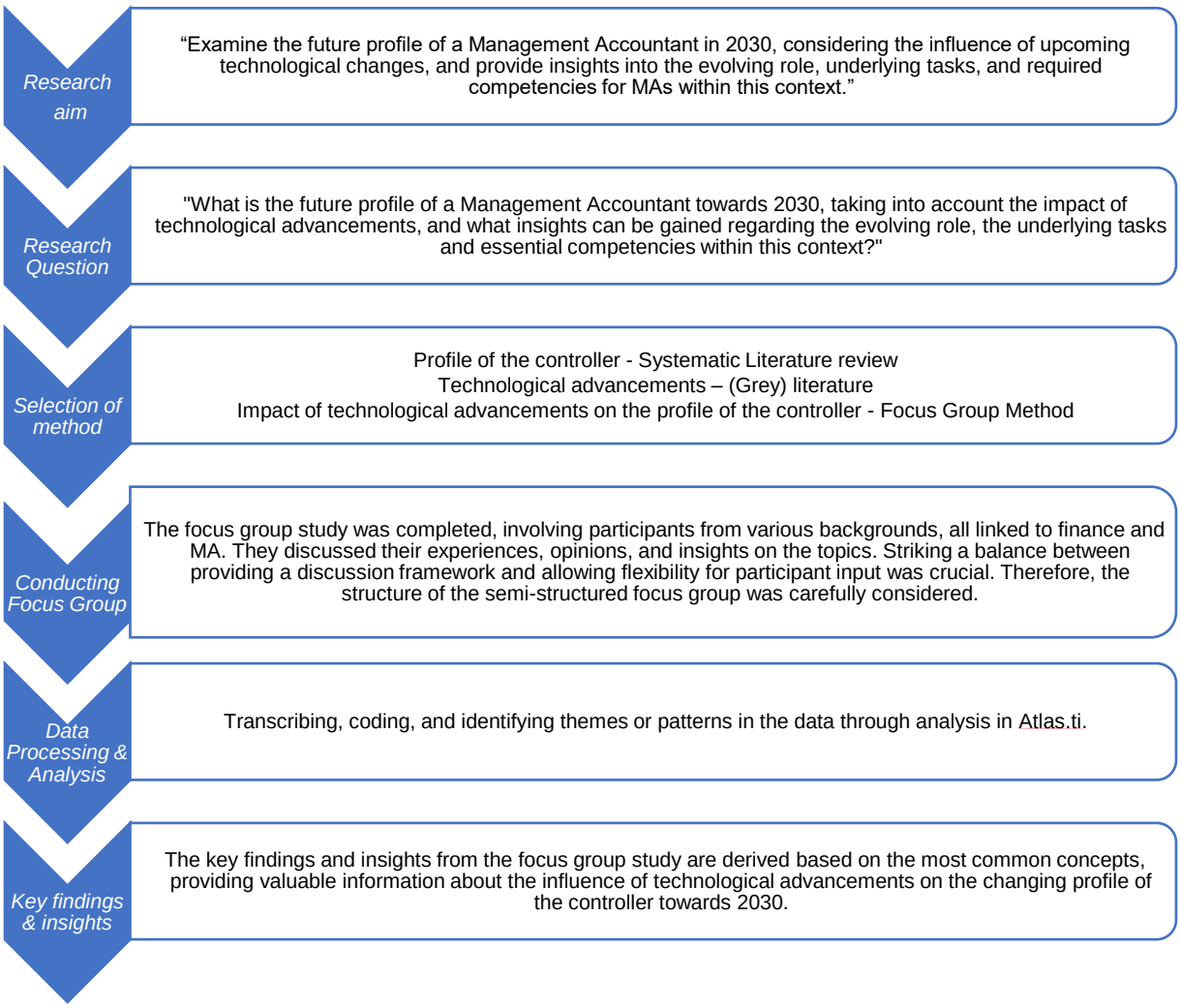


Figure 7 – The methodology process

3.2 Method

During the selection of an appropriate research method, different methods have been considered. Ultimately, physical focus groups were chosen as the research method, after comparison with online focus groups, interviews, and (e-) Delphi groups.

However, this approach also comes with its drawbacks, notably the necessity for participants to physically journey to the research facility. This factor amplifies the challenges in recruiting individuals with busy schedules, and imposes geographical constraints (Brüggen & Willems, 2009). Online focus groups, on the other hand, have their own set of limitations. They are more suitable for collecting information that offers limited depth, often serving as a means for a quick check, a brief scan, or capturing respondents' initial reactions to elements like new products, concepts, or commercials (Brüggen & Willems, 2009). According to Scholl et al. (2002), online focus groups prove extremely valuable when conducting international tests and comparing results derived from localized, traditional focus groups. Delphi groups typically require a roster of ten to twenty participants (Brown, 2018). Given the constraints of time and the challenges in sourcing appropriate participants, we have determined that focus groups present a superior alternative (Brüggen & Willems, 2009). An overview of the advantages and disadvantages of each method are given below in Table 4

Table 4 – Comparing research methods.

Qualitative research methods	Focus Groups	Online Focus Groups	Interviews	Delphi Groups
Characteristics	In-person meetings at research facility	Conducted remotely via the internet	One-on-one	Iterative process with multiple rounds of feedback.
	In-depth data collection.	Can capture initial reactions to products, concepts, or commercials.	Allows for follow-up questions	Can be effective for consensus-building.
	6-8 participants	Useful for international tests and comparisons.	Flexibility in scheduling	10-20 participants
Limitations	Physical travel	Limited In-depth data collection	Time-consuming for large-scale data collection	Challenges in sourcing appropriate participants.
	May be difficult to recruit participants with busy schedules.	Better suited for quick assessments.	No group dynamics	
	Geographical constraints may limit participant diversity.			

In this study, focus groups were utilized as the research method to investigate the potential impact of technological advancements on the profile of MA by the year 2030. The researcher acted as a moderator, following the guidelines proposed by Cameron (2005)and Wilkinson (2004), by posing questions based on a predetermined schedule and guiding the discussion. Rather than conducting individual interviews, the emphasis was on facilitating a dynamic group discussion, promoting participant interaction, and engaging in the exchange of ideas. The data collected from participants' discussions formed the core of the research method, aligning with the approach described by (Morgan & Krueger, 1998), where participants responded to each other's viewpoints, explored new perspectives, and contributed to a collective understanding of the topic. This collaborative nature of the discussions allowed for the emergence of a "synergistic" effect, as explained by Cameron (2005), generating more comprehensive information. Following a theory-building approach, the research aimed to establish connections between participants' opinions and develop a shared understanding of the topic.

The data collection focused on a future-oriented perspective. Participants engaged in discussions about an envisioned future, which remained uncertain to them. This approach aimed to raise awareness among employees and encourage initiative-taking thinking and pre-adaptation to potential forthcoming changes.

3.3 Participants

Because the data needs to reflect the opinions of the MA as well as the stakeholders, a diverse group of individuals was assembled. The group consists of a combination of stakeholders of the MA, having diverse backgrounds, but all a link to the finance field. Types of participants are MAs, (financial) directors, ICT professionals, Data consultants, and HR professionals. Also, researchers within this research field are invited. Participants are selected based on their professional expertise and experience in and with the controlling discipline. Efforts are made to ensure a balanced representation of participants from different sectors, company sizes, and levels of technological adoption. The focus group sessions did consist of 6-8 participants to encourage active participation and fruitful discussions.

Table 5 *Participants focus groups.*

Focus group	Participant	Function
1	2	Data consultant
	3	Owner - Financial Consultancy company
	4	Interim consultant for financial services & University lecturer in Finance & Control
	5	Recruitment consultant in financial consultancy
	6	Business Controller
	7	Financial- and Business Controller (interim)
	8	Financial consultant
2	2	BI Consultant
	3	Manager Finance Control
	4	Finance Manager
	5	Founder / Data consultant - A data consultancy company
	6	Financial consultant
	7	Doing research in controlling field & Junior financial consultant
	8	Finance manager
3	2	Senior Financial Consultant & Interim Manager
	3	BI Consultant
	4	Controller

5	Financial consultant
6	Business / Concern controller
7	Doctor of Engineering in Process Mining & University Lecturer Financial Management
8	Financial consultant

3.4 Focus Group Structure

Three focus groups were organized, each lasting 1.5 hours, adhering to the recommendation by Cameron (2005) that organizing three to five focus groups is typically sufficient. The sessions were conducted physically at the office of RMFC in Enschede, with video recording enabled to capture the richness of the discussions. Ethical approval was granted by the BMS Ethics Committee / Domain Humanities & Social Sciences of the University of Twente. Ethical guidelines are followed throughout the research process, ensuring participant confidentiality, informed consent, and the protection of personal data. Participants were beforehand provided with information about the research objectives, voluntary participation, and their right to withdraw at any time without consequences.

The focus groups were semi-structured, and the goal was to discuss all six roles of the MA in every focus group. These roles were discussed by keeping in mind one category of technological developments (i.e., Artificial Intelligence, Data-related developments, and Process-related developments). Thus, the focus is on the six roles and their underlying tasks and competencies rather than the specific types of technological developments. In this way, all combinations of technological advancements and roles are discussed. The focus group concluded with an overall view of the participants.

In each case, the discussion was initiated by asking open-ended questions about how the development might affect a specific role. The discussion was based on the roles, tasks, and competencies, each of which was depicted on a screen. The moderator's task was to ensure that all important and potentially changing tasks and competencies were discussed, as well as to take care of time management.

3.5 Procedure

Getting a good picture of the MA's profile can be done in several ways. By taking different perspectives, a more complete picture emerges than exclusively using the perspective of the MA. These different perspectives thus resulted in the composition of the focus groups. The aim was to achieve the predetermined diversity in the groups, each focus group as complete as possible. So, participants needed to be selected from those who fit the profile (function, relationship to finance, ability to physically attend, etc.). For this purpose, a list was compiled from RMFC's network, and a list from the researcher's network, all these people received an e-mail explaining the study, with which they could immediately indicate their availability. A call was also placed on LinkedIn. A link to fill in availability was sent along where everyone interested, could tick the dates they were available. The researcher then had the option of putting together the group composition, depending on availability, so that diversity was the highest. Final invitations were then sent out. A week before the focus group, some documents were sent to the participants that allowed them to prepare. The focus groups took place on 28 June, 29 June, and 4 July from 16:30 to 18:00. Each focus group began with a round of introductions, an introduction to the study and an explanation of the interpretation and purpose of the focus group. Each time, the focus group ended with a joint conclusion. It was also agreed to send the results of the study to the participants by e-mail after the end.

The study acknowledges certain limitations, including the potential for sample bias due to self-selection or limited generalizability of findings beyond the participants. Thus, within this

study, while finding participants, there is mainly looked in the same and limited network, which was in the Twente region, within the networks of RMFC, UT and the researcher. The focus group discussions may be influenced by social dynamics, power differentials, or dominant voices within the group. There may be limitations due to participants working in different industries, so different techniques may be relevant in diverse ways. These differences were avoided as much as possible. Opinions are gathered from people who are knowledgeable about them, to create the best possible picture of expectations toward 2030. Of course, the future is unknown, so it remains to be seen what will happen towards 2030. Efforts were made to create an inclusive and supportive environment that encourages diverse perspectives.

3.6 Data Processing & Analysis

After the data was collected, the data was prepared for data analysis. The data analysis comprises several distinct stages, where the video and audio recordings were the primary source of data. The initial step involves transcribing the interviews in their entirety. First, the video registrations of the discussions were transcribed and thereby transformed into written text format. Transcribing is the representation of audible data and is regarded as the first step in analysing data as an interpretive process (Bailey, 2008). Subsequently, the appropriate method(s) of analysis is chosen and implemented. The decision to transcribe semi-verbatim was made to prevent the loss of quality that may occur through summarization. Additionally, this approach allows for clear documentation of the sentence structure, reducing the potential for misinterpretations during the analysis process.

To choose the method of analysis, the focus is on what needs to be answered and how to address it. Firstly, the aim was to identify the **most** important concepts and themes discussed during the focus group, which could potentially alter the profile of the MA. An overview of all the concepts can be found in Appendix A. Subsequently, the analysis explores **how** these main concepts might impact the MA's profile. According to Wilkinson (1998), the first part should be done through 'systematic coding via content analysis' and the second part through 'strictly qualitative or ethnographic' analysis. In this section, therefore, we use thematic analysis to surface several key concepts (Wilkinson, 1998). All this is done in Atlas.ti, a computer-assisted qualitative data analysis software.

Within content analysis, there are distinct types of content analysis. One of them is semantic content analysis, which aims to categorize signs based on their meanings. To specify this, this type of analysis also consists of three forms, where one is designation analysis (W.Stewart et al., 2007). The method determines the frequency with which certain objects (or persons, institutions, or concepts) are mentioned.

Next, it was established that the unit of analysis is a segment of text that can stand alone and encapsulates a single idea, episode, or piece of information. In addition, the transcripts were coded. This was done through open coding by applying codes to the selected text segments as the transcripts were read. Codes were initially developed through deductive coding; this was part 1 of coding. Codes were then added inductively during coding, in the form of concepts. The deductive part was based on the theoretical framework consisting of the six roles and all underlying tasks and competencies. For example, the MA's role as a finance professional was coded "Role: Finance professional" and the underlying task "improve processes" was coded "FP Task: Improve processes". In this way, it was possible to see immediately what specifically was being discussed. Not always a specific task or competence was discussed, in such a case only the role code was added and a code "Role

in general". Of course, multiple tasks, competencies and even roles were often discussed at the same time, which is why in many cases multiple codes were added to a single quote.

Part 2 involved the inductive incorporation of discussed concepts, each carrying diverse implications. For instance, these concepts shed light on potential shifts within relevant roles, tasks, or competencies. An example of such a concept is "efficiency." Additionally, these concepts can illuminate potential challenges arising from the integration of technological advancements, offering insights into areas the MA should be cautious about. "Resistance" and "internal readiness for technology" serve as illustrative instances of this coding approach.

Subsequently, axial coding was conducted, facilitating the categorization of roles into distinct groups based on their associated tasks and competencies. The segregation of concepts was intentional, as they can be seamlessly applied in various contexts. The detailed axial coding can be found in Appendix A.

Several intriguing concepts arose from the focus groups, all of which could have been included in the results section. However, a deliberate choice was made to narrow down the selection. By employing coding techniques, the most frequently discussed and prevalent roles, tasks, competencies, and concepts were distilled. This process yields profound insights within these domains. Once the most prevalent concepts are identified, it becomes possible to examine how they intersect with roles, competencies, and tasks, thus highlighting where their influence is most pronounced. Additionally, distinctions between categories involving technologies can be elucidated.

The chosen concepts encompass "Conceptual understanding", "MA & IT", and "Initiate & guide change." These concepts dominated the discussions, as evident in the Appendix B. Due to their recurrent appearance in the coding, these concepts are deemed pivotal subjects of change in the forthcoming years. Moreover, they encompass and encapsulate a plethora of other related concepts. The topic of "Initiating & guiding change" receives greater emphasis on tasks and competencies rather than being confined to a singular concept. Despite lacking a specific definition, it is deemed highly significant and is extensively deliberated upon, leading to its manual inclusion.

By filtering these concepts, cross-sections are created to analyse which roles, tasks, and competencies these concepts are likely to have the most impact. These cross-sections can be found in Appendix C.

3.7 Validation

Validation interviews, also known as member validation, are considered a vital technique for establishing the credibility of research (Lincoln, 1985). In essence, these interviews aim to gauge the level of scrutiny applied and the comprehensibility of the researcher's work by involving participants in the research process and gathering their feedback (Bloor, 1997). The selection of a Partner and Audit and Assurance Risk Leader at a Big Four accountant firm, and a Senior Associate working in the Data & Technology team at another Big Four accounting firm, who also achieved an Executive Master of Finance and Control, for validation interviews serves a crucial purpose in enhancing the validity of the study.

While the term "member check" is commonly used in the literature, (Buchbinder, 2010) argues that the term "validation interview" more authentically communicates the essence of this interaction. The validation interview serves as a dynamic dialogue between the interviewee and the researcher, aimed at confirming, substantiating, verifying, or refining the research findings.

Engaging these two respondents in validation interviews offers several distinct advantages to the study. Firstly, their recognized expertise in the field bolsters the research's credibility, ensuring that the findings align with industry standards. Secondly, their involvement lends external validation, demonstrating that the research methodology and interpretations are sound and informed by industry professionals. Thirdly, these interviews validate and refine the analytic categories and interpretations, improving the accuracy of the study's conclusions. Lastly, the experts' real-world experiences substantiate and verify findings, enhancing the overall quality and relevance of the research within the audit and assurance domain (Buchbinder, 2010; Creswell, 1998).

4. Results and discussion

To answer sub-question 4 about how the selected IT advancements might change the current MA field, we need to discuss the main concepts that are selected as well as the implications.

4.1 Results

Important contributions among the selected concepts are shared in this section. The first subsection discusses the level of understanding of data models, systems, and organisational structures about the research topic. Subsection two gives contributions to the collaboration between the MA and IT. Subsection three then depicts initiating and guiding change. Within each subsection, a figure is added to give an overview of all the "sub-concepts" that fall under the final selected concept. These are terms, concepts, and excerpts from quotes, and were selected by running through all the quotes where the main codes were added. The next section will reflect these results on the theoretical framework.

4.1.1 Conceptual understanding

The primary topic to be addressed is the one that emerged most prominently from the discussions. A substantial number of contributions during the focus groups revolved around the concept of conceptual thinking within the role of a MA. This concept was especially recurrent in focus group 2, where conversations centred on data-related technologies. There was a significant emphasis on comprehending the internal workings of the organization and its environment – how information and financial transactions flow. As the array of technologies and systems expands, so does the volume of accompanying data. Maintaining a comprehensive overview becomes crucial, a sentiment echoed by a financial consultant who remarked, *"Emerging techniques expose you to more data, necessitating the ability to synthesize connections as MAs. At times, stepping back as an MA is essential to retain that conceptual perspective"* (FG2, P6).

Participants conveyed that rather than delving into every intricacy of a system, it is imperative to grasp the broader panorama, establishing linkages between various software and data-systems. A consensus within the group was that understanding data models will gain paramount importance. A member of focus group 2, for instance, articulated, *"Everything hinges on the model – getting it right and aligning it with your existing technologies"* (FG2, P5).

Conversely, focus group 1 zoomed in on AI technologies. In the context of AI, conceptual thinking was viewed as pivotal to framing precise queries for an AI model. The preparatory phase of engineering prompts was underscored, ensuring that *"the AI tool generates exactly what holds the utmost value for the user"* (FG1, P2).

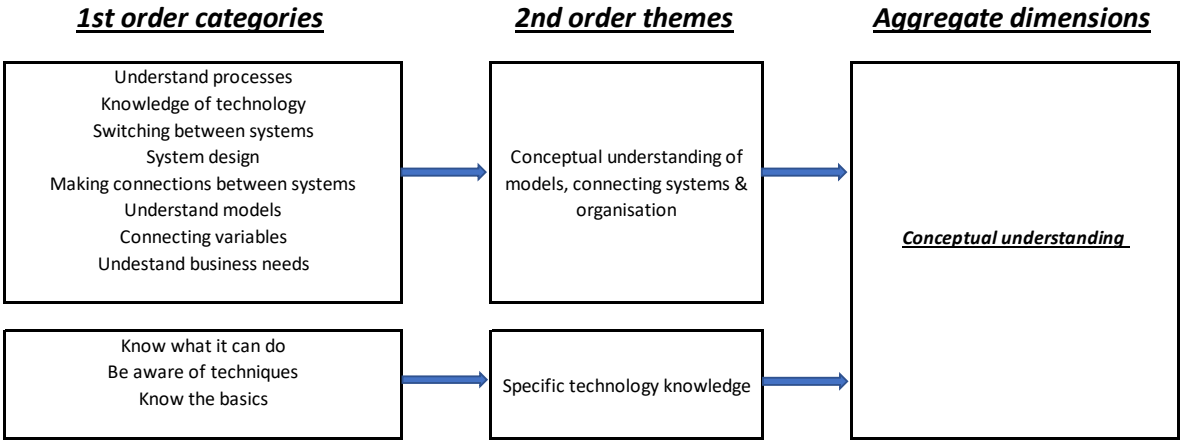


Figure 8: Overview of the concepts and quotes on conceptual understanding

"As finance professionals, for example, increasing the reliability of data is an important task. The finance professional must know where the gaps and inconsistencies are. How does it look? Where should that improvement be implemented and that you engage in joint discussion and come to a solution to improve it?" (FG 3, P3). The adept utilization of information might yield richer, data-driven insights, as articulated in this instance.

For the integration of improvements or novel technologies, the MA must possess a certain level of technological proficiency. However, participants noted that this is not always the case: *"The MA needs to be well-versed in these techniques, as I'm doubtful that all MAs are familiar with concepts like process mining or RPA. It demands familiarity with these tools, coupled with a comprehensive understanding of their underlying mechanics. Transparency is vital, considering that you need to discern which program or algorithm aligns with a given situation"*.

When an MA possesses a holistic view, coupled with market and business acumen, they can genuinely augment management's endeavours: *"Contemplate how the business can expand, operate more intelligently, and enhance efficiency"* (FG2, P5). In addition, *recognising risks and opportunities* was also a recurring topic here. Nevertheless, uncertainties emerged regarding whether strategic thinking and decision-making belong within the MA's purview: *"Being part of changing at a strategic level, is not something they are going to do or should do. I also do not want that person to be the person to produce the ideas to translate into solutions, because it remains a MA function. And it must be a creative person who thinks in solutions."* (FG2, P5).

Within Focus Group 3, which focused on process-related techniques, the efficiency gains that can be made by having a desired conceptual thinking level on data models and systems, were particularly highlighted and multiple times discussed. A good combination of conceptual thinking and using these types of technologies can result in *speeding up work,* and *more time to look ahead.*

Considerable attention was directed towards the efficiency gains achievable through a proficient conceptual understanding of data models, systems, and business processes. The synergy between conceptual thinking and the adept application of these technologies can lead to workflow acceleration and the luxury of allocating more time to forward-looking activities.

4.1.2 Management Accountant & IT

Once the MA has attained the necessary level of conceptual understanding, they gain insights into enhancing the configuration of the application landscape and data flows within the organization. By employing their conceptual thinking abilities, the MA can evaluate areas within the organization that hold potential for enhancements or avenues for integration. Throughout the focus group discussions, the consensus emerged multiple times that with the help of conceptual thinking, an optimally structured application landscape can be achieved. However, as per the participants' perspective, this responsibility does not squarely rest on the shoulders of the MA; rather, it is delegated to the IT department or dedicated IT specialists. This department assumes a pivotal role in integrating technological advancements. For the MA, the key lies in applying their conceptual knowledge and communicating this in the right way, rather than delving into the intricate specifics of the systems. *"The detailed things within systems that we just talked about with the role of the information technologist, they will sail away from the role of the MA."* (FG2, P6).

According to the majority, establishing a strong collaborative rapport with the IT department significantly aids MAs in bridging the gap between business operations and technological integration. It is imperative, that MAs communicate their aspirations and requisites. The duality of mastering both technological nuances and financial expertise raises valid questions. As articulated by one respondent, *"How can you both know this technique and be an expert in the field of finance. I have the idea that it is better to set tasks towards the IT department about what you expect from them"* (FG 1, P4).

Within Focus Group 3, where conceptual thinking was also extensively discussed, the bridge between the MA and IT is considered particularly important. They looked at process-related techniques. This often came up precisely because the MA has the knowledge of processes and IT has the knowledge of the roots of systems. Getting closer together and working well together can yield results in terms of data quality and efficiency. *"That leader is on that Chinese Wall not to get people over it but to tear it down, and thus bring Business and IT together. So that they jointly enter that journey of discovery. With that, the MA comes closer to IT and IT to the MA."* (Quote: FG 3, P3). This quote underscores the importance of leadership in dismantling the perceived barriers between business and technology. This collaborative approach fosters an environment where MAs and IT professionals collaboratively embark on a journey of *exploration*, bridging the gap between financial insights and technological expertise.

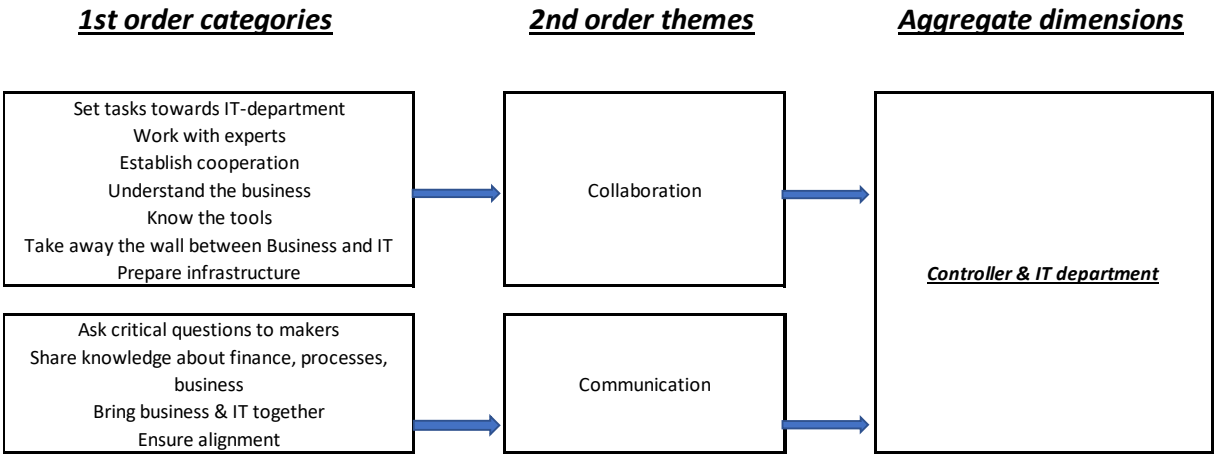


Figure 9: Overview of the concepts and quotes on the collaboration between the Controller & IT

Also in Focus Group 1, where they discussed AI technologies, they see this responsibility and integration of technologies lying more with the IT department. With input from the MA in consultation with the IT department, there is a greater chance of success*. "I think AI is still fun in the pioneering phase, but when it gets bigger, it doesn't mainly put this with the MA anymore. Then you will hire someone for that or outsource it, to the IT department, for example."* (Quote: FG 1, P4). This quote highlights the evolving nature of the MA-IT partnership as organizations embrace technologies. As AI matures, certain responsibilities may be transitioned to dedicated AI professionals or the IT department, allowing MAs to focus on functions that require human judgment and expertise.

In conclusion, the collaboration between MA and IT departments serves as a cornerstone for data-driven decision-making and strategic leadership. This collaboration empowers MAs to embrace their multifaceted roles as interpreters of financial insights, advisors, and technology integrators. As technology continues to shape the business landscape, the relationship between MAs and IT professionals remains crucial in guiding organizations towards informed decisions.

4.1.3 Initiate & Guide Change

The third concept that is discussed is initiating and guiding change. Many of the contributors expect a key role for the MA there. Many of the contributions are related to the *mindset* and *perspective* of the MA and the people around him. Having a broader perspective than most employees currently have, being open-minded to *initiate change* and being *employee-focused* and *process-focused* to *guide the changes* towards success.

Within initiating change, there are several interesting contributions. It was discussed twofold. On the one hand, the mindset of the MA himself must be right. You are a *forerunner* who "embraces" modern technologies and innovations, you must *dare to explore and dare to make mistakes*. On the other hand, investment in technology must be enforced on Management. *“I think that as a MA, you must take initiative and say: we should not be too afraid. Just leave a trial balloon on and let us see how we can make it our own.”* (FG1, P4). The latter was reaffirmed during the advice to the MA of the future by FG3, P7, who is advised to *start small*, start *convincing management* and then build further *instead of selling it as the solution to everything*. Convincing management can be made easier by *“having a good business case and collaborating with the right specialists”* (FG3, P4). Furthermore, the participants also see a role for the MA in raising awareness organisation-wide, informing about opportunities and benefits to strengthen the call to change: “*I do think that you are also there to say: “We have to change something in our organization to get that data quality up.” The awareness and the cranking of that, I think, is a key role for the MA.”* (FG2, P7).

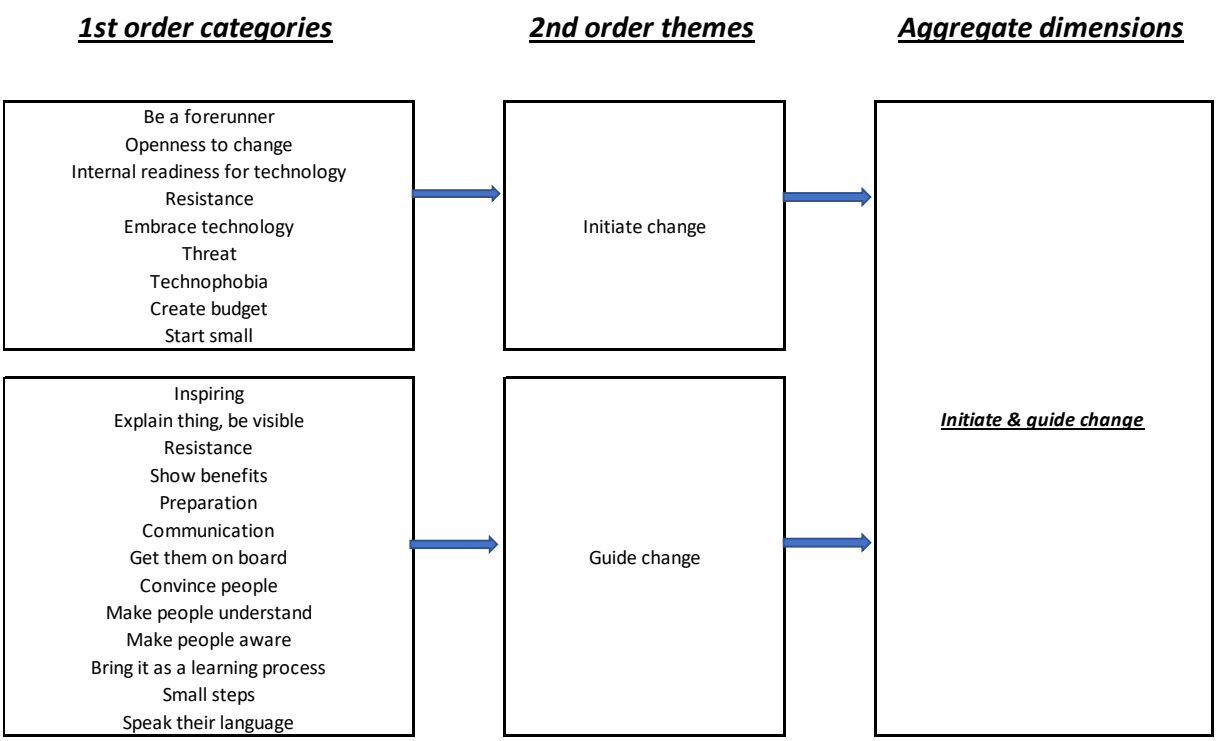


Figure 10: Overview of the concepts and quotes on Initiating and guiding change

Many of the contributors started about the process that occurs once the change is initiated, guiding the change. A variety of problems may be encountered that need to be overcome to make the change or integration of technology a success. The most recurring point of discussion was the danger of resistance from employees. People see new developments as the first reaction to a *threat* and it sounds *scary* to them. Participants see a leading role there for the MA because "*that leader must indeed make that possible. That climate, the culture change and everything before that" (FG3, P3).* The participants saw this as a *difficult* and *complicated* task because *"soft skills come to the fore here. A MA is originally perhaps a bit more on the hard skills, the numbers"* (FG3, P3).

An approach or solution is not simply found during the discussion, but participants produce advice such as being *empathetic*, being *approachable*, and *showing themselves* by *explaining* and *inspiring*, making people *aware* of the benefits, and doing all this in *small steps*.

A quotation that summarizes this perfectly is: *"The list of competencies also includes empathy, because the bigger the change, the greater the resistance. And RPA and process mining just sounds scary, new, elusive, and super high-tech. So, with those competencies, the MA together with other people needs to show management and employees empathy, and understanding of the fact that this just takes a while to make it a success and that this just needs time."* (FG3, R7).

The latter concept was discussed a lot in all three focus groups. For AI, as well as data and process-related techniques, they see a key role for the controller in initiating and guiding change.

4.2 Discussion

This section elaborates on the previously selected concepts with underlying contributions from respondents. This is expressed in several sections, namely the scientific and practical implications, followed by limitations and opportunities for future research.

4.2.1 Scientific Implications

The preceding chapters have unveiled a spectrum of scientific implications related to the roles of MAs, their symbiotic relationship with Information Technology (IT) and IT specialists, and their pivotal role in initiating and guiding transformative processes within organizations. This pivotal chapter embarks on an exploration of the broader significance inherent in these findings and delves into their profound scientific implications within the domain of MA. In this chapter, we will bridge the findings from our focus groups to the established theories and framework that was formulated during the first part of the research. Notably, this research contributes to existing literature by elucidating how the roles, responsibilities, and competencies of the contemporary MA profile are poised to evolve leading up to the year 2030. First, the three topics and their impact on roles, tasks and competences will be discussed separately. This consequently results in a proposed framework of the MA's profile.

4.2.1.1 Reflection of the results

Conceptual understanding

The observations from the research underscore the pivotal role of MAs in gaining a conceptual understanding of data models, systems, and organizational structures and its surroundings. While MA's have historically been associated with managing financial data, the evolving landscape demands that they transcend their traditional boundaries. Participants emphasized the need for MAs to adopt a holistic perspective – one that transcends individual systems and dives into the interconnectedness of data. This expanded role calls for MAs to become interpreters of insights and advisors, providing strategic direction grounded in a deep understanding of organizational dynamics. This implication reinforces the notion that MAs must evolve from being data processors to data interpreters, thereby augmenting their contribution to informed decision-making.

When we relate this to the framework of the MAs profile, it implies that as an MA needs to understand technological systems, data structures and information flows within the organisation and combine this with external information. This way a holistic view can emerge. Furthermore, they must be able to understand technological capabilities and assess how they can be used to add value to financial decision-making and strategic direction. This is not only understanding the technology and the data itself, but rather what it stands for in terms of how the organisation is structured, where is the market going, what risks are coming, what decisions lead to an increase in social relevance or profitability, etc. So, they need to know which variables are relevant to extract from the data and include in the decision-making process. By having these competencies, they will thus be better able to fulfil the roles of financial professionals and business partners for management. The controller as a financial professional and as a business partner for management must be able to analyse the financial implications of technological decisions, make forecasts and interpret financial reports to assess the impact of technological investments on the organisation. The IT role was added to the framework because Oesterreich et al. (2019) said that data science and IT skills are considered very important for the MA. Because we now conclude that a deep understanding of IT not necessarily required, which is also confirmed in the next topic, it is decided to add the required competencies to the accountant and financial professional roles. Adding these competencies within these roles will enable the tasks to be carried out successfully, taking technological developments into account. IMA (2022) added the role of Information

Technologist recently. It can be concluded from the focus groups that if technological developments continue to arise, this role will shift to the IT specialists or specialized departments. In addition, the corresponding tasks and competencies within this role are all reflected in the other roles. The role is not of great significance for the MA by 2030 and should therefore be excluded from the framework. A representation of these changes can be found in Figure 11.

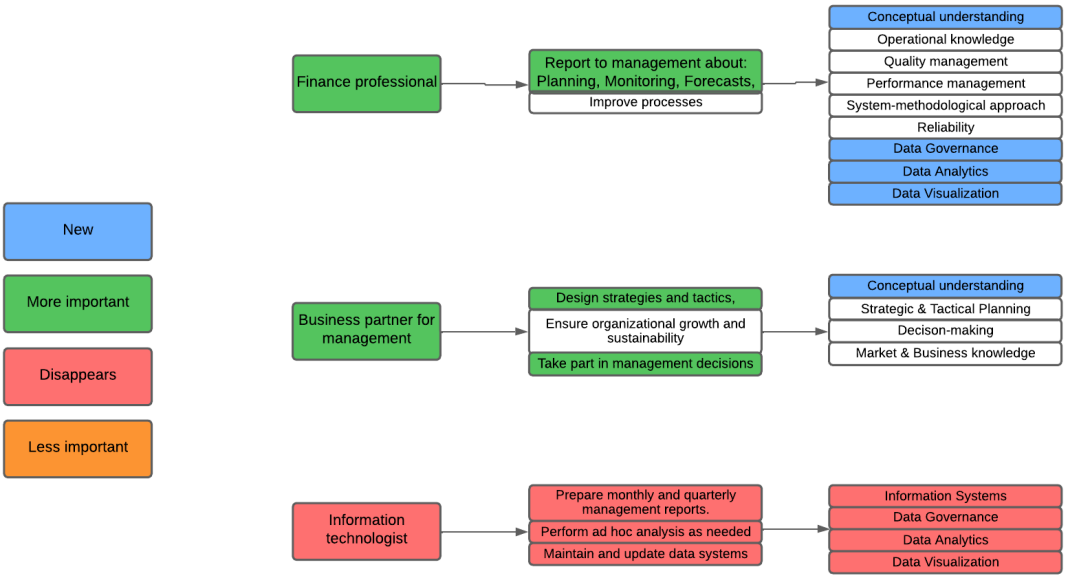


Figure 11 – Changes in roles of Finance professional, Business partner for management and Information Technologist through the concept of Conceptual Understanding.

Management Accountant & IT

The collaboration between MAs and IT specialists or departments emerges as a linchpin for realizing the potential of data-driven decision-making. The research findings emphasize that while MA's need does not delve into intricate technical specifics, they must possess a conceptual understanding of technology to effectively communicate their requirements to IT departments or to see risks and opportunities within (new) technologies. This interaction between finance professionals and IT specialists serves to bridge the gap between business operations and technological integration. The findings suggest that fostering this collaboration is essential for harnessing the power of technological advancements while leveraging the expertise of both disciplines. As organizations increasingly adopt complex technologies, the need for seamless MA-IT collaboration becomes even more pronounced.

We can establish that this development is going to affect the MA's roles as a leader and as a financial professional. In addition, the time spent within the role of information technologist is expected to decrease as it moves towards the IT department. Specifically, communication as competence and ensuring communication and coordination as a task will become increasingly important. Because these are already there, the framework will stay the same on this part. Furthermore, collaboration is a concept that emerged emphatically within this topic. Therefore, it is added to the framework as a task.

When we look at the role of a financial professional, it can be stated that a combination of conceptual thinking and collaboration with the IT department within the leadership role, will affect the results of the tasks performed within the hard skills, these will go up. By setting up

systems correctly, efficiency improvements can be achieved, and data quality can be increased. All these changes can be found in Figure 12.

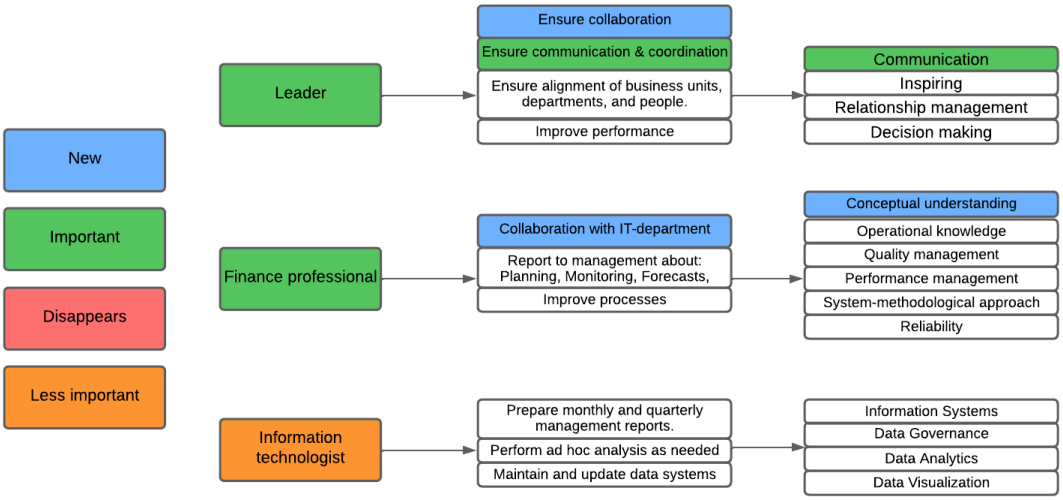


Figure 12 – Changes in roles of Leader, Finance professional and Information Technologist through collaboration between IT and the MA.

Initiate & Guide Change

The research underscores the importance of controllers in initiating and guiding change within organizations. Controllers are poised to play a pivotal role in driving technological innovations and changes that enhance efficiency and quality. To be effective in this capacity, controllers must cultivate a forward-thinking mindset, embrace modern technologies while considering the risks involved, and communicate the value of change to both peers and upper management. The findings point to the significance of controllers' soft skills, such as *empathy* and *communication*, which are essential for addressing employee resistance to change. This highlights a paradigm shift from a predominantly numbers-oriented approach to a more holistic leadership role that includes managing change dynamics.

This concept will affect the roles of being a leader and being a changer the most. An MA must also have visibility into new developments to perform these roles well. So, he or she must have an open mind and be open to new developments himself. Currently, within the changer role, the focus is still mainly on initiating change, i.e. being open to change and thus encouraging an innovative environment (Eiselmayer et al., 2016). The current MA profile lacks competencies and tasks that the research shows to be crucial. Within the changer role, dealing or collaborating with people is the overarching theme, which are dealing with resistance, convincing management and other employees and doing so using empathy or putting oneself in the other person's shoes. In the role of being a leader, collaboration was already discussed, but not added to the tasks (IMA, 2022). As a result of the Focus Group, it is added. The MA in the role of the leader should contribute to *internal technology readiness*, through excellent communication and *collaboration* with both management and employees. In this way, they can prevent and lower resistance.

The changes within the roles, competencies, and tasks that this concept brings about are depicted in Figure 13.

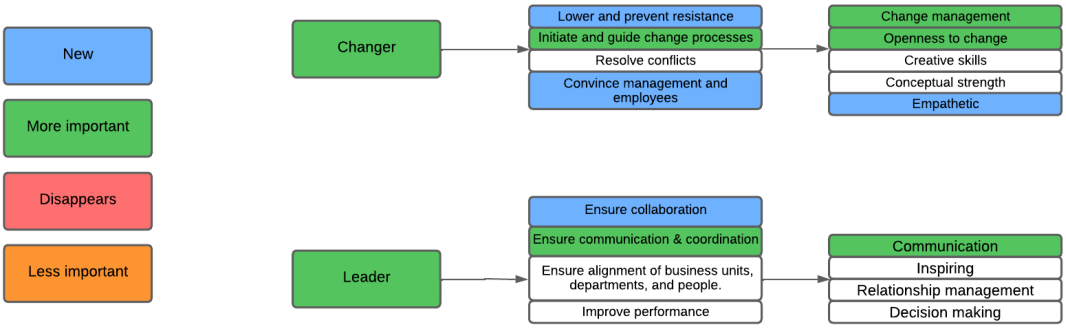


Figure 13 – Changes in roles of Changer & Leader through initiating and guiding change

4.2.1.2 A proposed changing framework of the profile of the Management Accountant

By making all the changes within the concepts, the changing profile of the controller can be shown within a proposed changing framework. This is stated in Figure 14. With this, sub-question 4, which is: "How will the selected IT advancements change the current MA's field?", is answered. Since we are thus looking specifically at the changing profile of the controller, we do not distinguish between the technology categories. These are combined into a general outcome of the influences of these technologies. What this means on a practical level for the MA will be described in the next subsection.

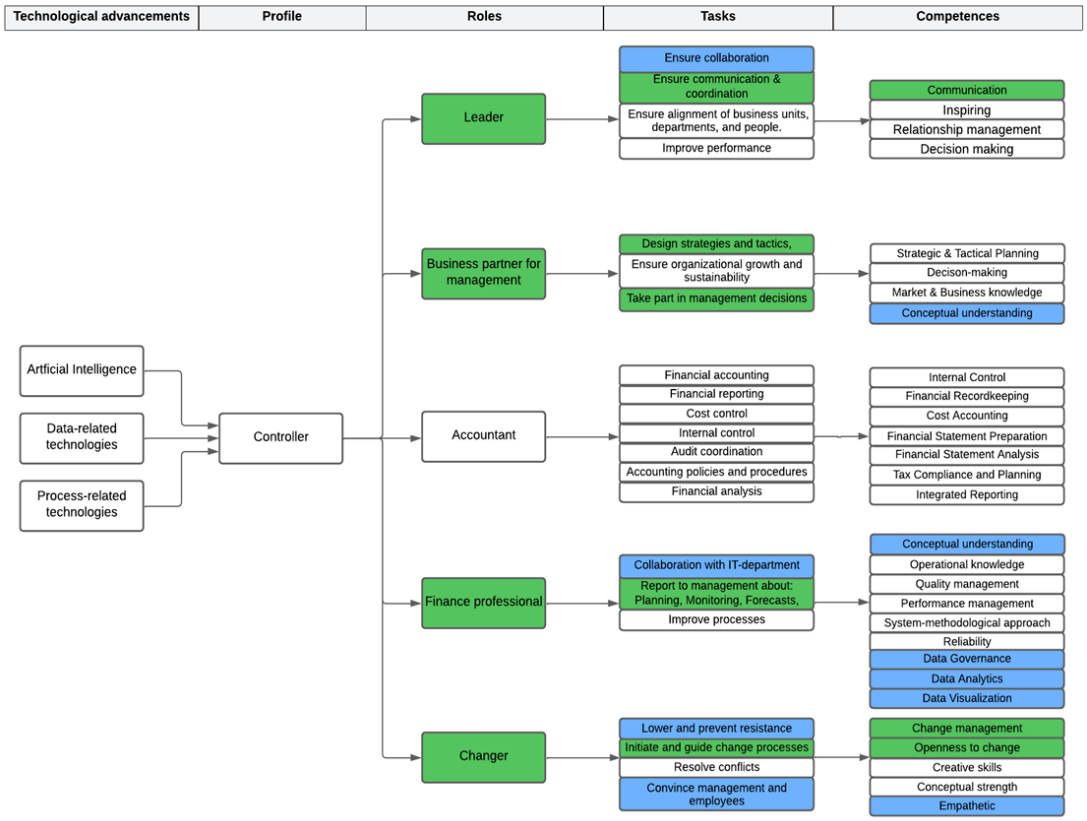


Figure 14 - A proposed changing framework of the profile of the MA

4.2.2 Practical Implications

Implications for Education and Training

The research findings also have implications for education and training in the fields of finance and management. Traditional finance education may need to evolve to include more comprehensive technology components, ensuring that future MAs possess the requisite conceptual understanding of data models and systems. Moreover, training programs could focus on developing the soft skills necessary for the successful initiation and management of change processes. The ability to communicate, empathize, and inspire becomes crucial as MAs will step into roles that involve driving transformation within organizations.

Navigating Technological Evolution

As the technological landscape continues to evolve, organizations must be adaptive in their approach to integrating new tools and techniques. The insights from this research suggest that MA's can play a significant role in assessing the suitability of technologies and guiding their integration. The collaboration between MA's and IT professionals should be viewed as an ongoing dialogue, ensuring that technological decisions are aligned with organizational goals and financial insights.

Implications for companies

When this is reflected on the different types of companies where MAs are working, it can be stated that MAs in large financial institutions should transition into holistic leadership roles, understanding both technology and organizational dynamics. Collaboration with IT is vital, and controllers should lead change initiatives. SMEs can benefit by adapting MAs to technological changes, focusing on resource optimization, cost-effective tech solutions, and investing in training. For FinTech startups MAs might play a crucial role in shaping strategies and products. Proper collaboration with IT, innovation leadership, and recruitment of technically skilled MAs are key. MAs within consultancy firms should emphasize their role as strategic advisors who understand finance and tech. They can lead clients through change and benefit from continuous learning about tech trends.

Implications for Robert Muntel Financial Consultancy

To excel within the contemporary, technology-integrated financial environment, RMFC should encourage its MAs to embrace holistic advisory roles and become strategic advisors who blend financial expertise with tech-savvy insights. Promote collaboration between MAs and IT specialists within the companies where they carry out the assignments for, to bridge the gap between financial operations and technology. Leverage MAs' evolving roles to guide clients through tech-driven financial transformations. Prioritize continuous learning to keep MAs updated on tech trends. Customize financial solutions with technology in mind, stay agile, and encourage MAs to establish thought leadership in the intersection of finance and technology. Make sure the MAs have the freedom and opportunities within their assignments to initiate technological changes. Because RMFC attracts MAs that they hire themselves, as well as part recruitment, recruitment is an important part. When recruiting, seek tech-savvy, innovative talent to ensure that they themselves, and the firms, remains competitive in this evolving landscape. By implementing these strategies, RMFC can provide forward-thinking services and maintain or increase its position in the industry.

A potential pitfall and risk is, however, that the aspects RMFC was and is good at, like financial reporting, advising, and steering, that this type might slowly disappear because of new technologies. This opens on one hand doors for new functions regarding managing these techniques and use them to strengthen your position towards management. But on the other hand, the quality on the basic work of the function (ensuring financial administration, financial reporting, and advice) is increasingly coming into question. The new functions that

emerge should be seen as complementary rather than replacements. The traditional strengths should remain at the core of what RMFC does, with new functions enhancing and expanding the service offerings. Therefore, the basic knowledge about conceptual understanding becomes even more important towards 2030. When techniques start complement and partly replace financial tasks, there might be a higher level of completeness through the automatic checking of technologies, but less manual control. To ensure that an MA can rely on these controls, a MA should use his/her conceptual knowledge to know where pain points are to maintain control over the quality of his/her reports.

Also, a key question is to what extent a company like RMFC needs to have the technological knowledge in-house to reflect it in its assignments. The decision to employ individuals with in-depth technology knowledge or focus on those who oversee and manage technology should align with RMFC's strategic goals and client needs. Hiring technology experts can be beneficial for specialized tech-related consulting and innovation. On the other hand, a focus on oversight and management allows RMFC to maintain financial expertise, remain adaptable, and potentially reduce costs by collaborating with external tech specialists when necessary. A balanced approach could involve a core team with technology understanding and access to external experts, offering comprehensive financial solutions while remaining adaptable to technology trends.

4.2.3 Limitations and future research

While this research has provided valuable insights, it is important to recognize its inherent limitations. The study's focus on a specific context and a particular set of participants may restrict the generalizability of the findings. To enhance the applicability of these insights, future research could investigate these concepts across diverse industries and organizational contexts to ascertain the universality of the implications identified herein.

Regarding the literature chapter, selecting and combining overlapping themes provides a useful overview of potential roles, tasks, and competencies, but it also has limitations. This method simplifies the representation, which might be leading to a loss of depth. There's a risk of author bias in selecting and identifying these themes, and important tasks or competencies might be excluded if they're not mentioned in every source. Additionally, not all tasks and competencies apply universally; they depend on factors like business context and size. Hence, a broad profile was chosen to ensure that for every type of company there are relevant roles, tasks, and competencies in the framework.

Another limitation of this research lies in the potential for bias among the participants, specifically in their discussions about the impact of technological advancements on their roles. Since the focus groups involve individuals who are experts in their field and have an interest in maintaining the importance of their profession, there is a risk that participants may inadvertently overestimate their own relevance and downplay the potential for automation or technological displacement in their jobs. This bias can lead to an overly optimistic assessment of the future of their roles and may inhibit open and objective discussions about the realistic threats and challenges posed by technological advancements, including the possibility of automation or the integration of AI-driven tools into their work. This is partly mitigated by the addition of data professionals to the group of participants.

In addition, it's important to acknowledge that the framework utilized in this research may not have been thoroughly tested due to the qualitative nature of the study. Qualitative research prioritized gaining a deeper understanding of participants' perspectives over quantitatively testing the entire framework. This limitation means that while the framework served as a

valuable guide for data collection and analysis, it may not have been rigorously validated or refined through extensive quantitative testing. Researchers should be cautious about generalizing the findings beyond the specific context of this qualitative study, and further quantitative research may be necessary to validate the framework's broader applicability and reliability.

Moreover, given the ever-evolving nature of technology, the roles, and responsibilities of MAs are likely to undergo further transformations in the future. Therefore, longitudinal studies that track these changes over time could provide more profound insights into the dynamic interplay between MAs, IT departments, and organizational change, thus enriching our understanding of this evolving landscape.

Furthermore, an intriguing avenue for future research lies in exploring the potential benefits that optimizing the recommendations presented in this study can offer to MAs. Concepts that often recurred during the data analysis included efficiency gains and improving data quality.

While controllers often look at the past, it is anticipated that a shift toward more predictive analytics is on the horizon. The idea of capturing data in mathematical models to enable more informed and forward-looking decision-making could be a compelling area of investigation, shedding light on how such practices can empower MAs and their organizations.

Additionally, the aspect of resistance to technological integration presents an interesting opportunity for further exploration. Investigating whether resistance acts as a barrier to the seamless integration of technological developments within organizations could offer valuable insights into the challenges organizations face when implementing change initiatives. This research could pave the way for strategies to mitigate resistance and facilitate smoother transitions in the realm of technological innovation within the domain of Management Accounting.

5. Validation of the research

In two interviews conducted on respectively August 18th and August 31, 2023, with professionals from two distinct Big Four accounting firms, several key points were discussed regarding the research study. Both interviewees acknowledged the logical progression of the study, the suitability of qualitative methods for exploring competencies, and the effective validation of the research methodology through focus groups and multiple individuals. They emphasized the importance of participant selection, recognized the study's results within its scope, and discussed potential areas for future research, including subjects like risk management, continuous reporting, and themes like ESG. They also suggested adjustments, such as excluding the gender column and considering the inclusion of additional themes. All aspects discussed are systematically listed in Table 6. This info will be discussed in subsections 5.1 and 5.2.

5.1 Validation part 1

A semi structured validation interview was conducted on August 18, 2023, with a partner and Audit and Assurance Risk Leader at a Big Four accounting firm. During the interview several key takeaways emerged that validate the research process undertaken for this thesis. The respondent affirmed the logical progression from the initial literature review to the utilization of focus groups, emphasizing that the efficacy of the latter largely depends on their composition. He stressed the importance of including key stakeholders and individuals to whom the controller reports in these focus groups, highlighting their critical roles in shaping the outcomes. Whereas initially the gender of the participants was included in the table, Mr Moonen felt this did not add value. Because the researcher agreed on this, the column is removed.

Furthermore, the discussion revealed critical considerations for future research directions. Questions arose regarding the role of risk management in the controller's domain and the increasing significance of continuous reporting. The interviewee could well identify with the results of this survey, painting them as "recognisable". When talking about the adaptability and alignment with evolving factors, such as data and IT, as well as change management, he underscored the importance of them.

The interviewee agreed on the approach taken in the research, acknowledging the clear plan of action and scoping. He emphasized the importance of focused research when time constraints exist and noted that the research maintained a strong alignment with its original question throughout the process. The inclusion of focus groups and validation through multiple individuals was deemed adequate, reinforcing the soundness of the approach. Ultimately, the validation interview confirmed that the research methodology employed was well-considered and effectively executed.

5.2 Validation part 2

To validate and enrich the research findings further, an interview was conducted with another respondent, an accomplished professional with extensive experience in the domain of Management Accounting and a keen insight into the impact of technology on this field. The interview was held on 31-08-2023. In this section, we present the insights gained from the interview, highlighting key points of discussion and the expert opinions.

The expert acknowledged the choice of qualitative research as appropriate for this study, emphasizing the complexities associated with assessing competencies. She also recognized the potential of quantitative research but emphasized the importance of qualitative methods in exploring personal experiences and nuanced insights. The discussion highlighted the advantages and disadvantages of using focus groups and interviews as research

methodologies, emphasizing their respective strengths in capturing a comprehensive view of the changing landscape for MAs.

The respondent inquired about the rationale behind the specific focus on technological developments and questioned whether other themes, such as Environmental, Social, and Governance (ESG) factors, should also be considered. Her perspective underscored the need to address multiple dimensions of change within the MA profession.

The respondent disputed the notion that individuals in the field fail to perceive changes, emphasizing the potential role of MAs in enhancing workplace efficiency and innovation. She emphasized the significance of the "Initiate & Guide Change" concept and its relevance in driving transformative efforts within organizations. The respondents' insights indicated that a proactive mindset and willingness to seek better ways of doing things are crucial drivers of change. The interview touched upon the concept of conceptual understanding and its alignment with the goal of initiating and guiding change. The respondent stressed that while specific technical knowledge is valuable, the ultimate focus should be on the goals pursued. Collaboration was identified as an essential factor in effectively navigating the evolving landscape.

The expert raised the issue of diversity among respondents and highlighted the disparities between large financial institutions, government agencies, and SMEs. This conversation shed light on how varying organizational contexts can lead to different challenges and rates of adaptation.

During the interview, the expert offered suggestions for potential additions to focus groups, including IT professionals, product owners of technological advancements, specialists in automation, and external accountants. These recommendations highlighted the interdisciplinary nature of the changes affecting MAs.

The expert emphasized the challenges organizations face in motivating and mobilizing their workforce, particularly when dealing with resistance to change. She distinguished between younger individuals with a background in data and those less receptive to technological advancements. Additionally, she underscored the importance of IT departments embracing change and the role of specific IT professionals in facilitating this process.

Finally, the respondent advised incorporating nuance into the research, acknowledging that various factors influence the changing role of MAs besides technological advancements. She emphasized the dynamic nature of the profession and the need to consider multiple facets of change.

Table 6: Take aways validation interviews.

Subject	**Interview 1**	**Interview 2**
Validation Interview Date	August 18, 2023	August 31, 2023
Interviewee	Partner and Audit and Assurance Risk Leader at a Big Four company.	Senior Associate Data Analytics at a Big Four company and Executive Master of Finance and Control.
Structure of the study in general	Logical progression from the initial literature review to the utilization of focus groups.	Saw FG as an appropriate method to further explore SLR outcomes.
Research approach	Agrees on the approach taken in the research, acknowledging the clear plan of action and scoping. He emphasized the importance of focused research	The interviewee acknowledged the choice of qualitative research as appropriate for this study, emphasizing the complexities associated with

	when time constraints exist and noted that the research maintained a strong alignment with its original question throughout the process.	assessing competencies. She also recognized the potential of quantitative research but emphasized the importance of qualitative methods in exploring personal experiences and nuanced insights
Validation of Research	The inclusion of focus groups and validation through multiple individuals was deemed adequate, reinforcing the soundness of the approach. Ultimately, the validation interview confirmed that the research methodology employed was well-considered and effectively executed.	The interviewee said there were two obvious research methods within this study. These were Interviews and focus groups (or something similar). She stressed that one-on-one interviews might make it easier to ask further questions but understood the choice of focus groups to initiate group interaction.
Participant selection	The respondent stressed the importance of including key stakeholders and individuals to whom the controller reports in these focus groups, highlighting their critical roles in shaping the outcomes.	The interviewee raised the issue of diversity among respondents and highlighted the disparities between large financial institutions, government agencies, and SMEs. This conversation shed light on how varying organizational contexts can lead to different challenges and rates of adaptation. This could also have been a component in participant selection. Other profile that could have been added: IT professionals, product owners of technological advancements, specialists in automation, and external accountants.
Results - General	The interviewee could well identify with the results of the FG, painting them as "recognizable". He further confirmed that the selection for the three concepts is a logical one because it fits within the scope of the research question.	Recognizes the most in “Initiate & Guide change”. This must be the attitude. Even if the technical knowledge level is low. IT can play a role in that, which also makes that concept relevant. Conceptual understanding is already present to some extent in the profile.
Results and discussion – conceptual understanding	The interviewee doubts whether this concept is not already at this point in today’s business. He added that it lacks the optimal use of data in most businesses.	The interviewee discussed the concept of conceptual understanding and its alignment with the goal of initiating and guiding change. The respondent stressed that while specific technical knowledge is valuable, the ultimate focus should be on the goals pursued. However, this interviewee also questions whether this concept is not already there.
Results and discussion – MA and IT	The interviewee questioned whether IT is becoming more and therefore shifting to IT departments or specialists, or whether IT is changing. For example, that with AI data is accessed in a different way. and that this change triggers the displacement.	Collaboration was identified as an essential factor in effectively navigating the evolving landscape.
Results and discussion – Initiate and guide change	When talking about the adaptability and alignment with evolving factors, such as data and IT, as well as change management, he underscored the importance of them.	The interviewee emphasized the significance of this concept and its relevance in driving transformative efforts within organizations. The respondent indicated that a proactive mindset and willingness to seek better ways of doing things are crucial drivers of change and when the MA does not

		take initiative in this, things will not change quickly.
Limitations & Future Research	The role of risk management in the controller's domain. The increasing significance of continuous reporting.	Other subjects that influence the role of the controller, like CSRD. Her perspective underscored the need to address multiple dimensions of change within the MA profession. Further exploring how to get people to change within your existing workforce. This is perhaps more difficult than acquiring people with the right profile.
Suggestions Exclusion / Inclusion	Exclusion: Gender column in respondent's table. Confirmed and deleted.	Inclusion: Other themes, such as ESG, should also be considered.

6. Conclusion

This research has provided valuable insights into the evolving role of MAs in the context of technological advancements. The implications of these findings are substantial and shed light on several key aspects of the MA field. The motivation for this research arose because it may be relevant to identify changes within the field in which I, as a researcher, as well as many others, see a future. It can advance and prepare me and others for the future.

This scientific journey started with formulating the exact research goal. Which was to examine the future profile of the MA towards 2030, considering the influence of technological changes, and provide insights into the evolving roles, tasks, and required competencies for MAs within this context. The research question formulated was:

"What is the future profile of a Management Accountant towards 2030, taking into account the impact of technological advancements, and what insights can be gained regarding the evolving role and essential competencies within this context?"

To answer this research question, 5 sub questions were formulated. The first 2 sub-questions were formulated to gather all the necessary literature so that the concepts in the research question were clear. On the one hand, this was the profile of the controller, which resulted in the first sub-question:

SQ1: What are the roles, tasks, and competencies of a management accountant?

On the other hand, possible technological developments had to be scrutinised, which resulted in sub-question two:

SQ2: What are the upcoming technological advancements that will affect the MA the most towards 2030?

This literature research journey began with a literature review that aimed to define the concept of MA and identify their roles, tasks, and competencies. To increase validity, a Systematic Literature Review was conducted, a transparent and objective approach. The six roles that were selected are being a leader, a business partner for management, an accountant, a finance professional, a changer, and an information technologist. These were selected based on several articles, an overview can be found in Figure 4 (Eiselmayer et al., 2016; IMA, 2022; La Paz et al., 2020; Oesterreich & Teuteberg, 2019; Pasch, 2019; VRC, 2021). The competences were based on the IMA competence framework and the Controller Competence Model of the IGC (Eiselmayer et al., 2016; IMA, 2022). The tasks are formulated based on three articles (La Paz et al., 2020; Laval, 2015; Pasch, 2019). This resulted in a framework (figure 6) where a total of 28 competences and 24 tasks are divided over six roles of the MA. Subsequently, the study delved into an analysis of grey literature about the most impactful technological advancements expected to influence the MA role by 2030. The technological developments research ended in three main categories of technological development, which were Artificial Intelligence, Data-related technologies, and Process-related technologies. To measure the impact of these developments on the MAs profile, the most appropriate research methodology had to be selected, as outlined in SQ3:

SQ3: How can the influence of the advancements on the field of the MA be measured?

To make an informed choice between different research methods, several methods were reviewed and compared. Focus groups was selected as the core methodology to investigate how technological advancements may impact the profiles of MAs in the Netherlands by 2030. During the post-study validation interviews that were conducted, the choice of this method was acknowledged. Interviews, for example, were also seen as an interesting option.

However, the motivation for achieving group interaction was understood. These focus groups, comprising a diverse array of participants including MAs, financial directors, ICT professionals, data consultants, HR professionals, and researchers, allowed for dynamic discussions and the synthesis of collective insights. We meticulously designed our research procedure, ensured ethical compliance, and conducted three structured focus group sessions. Our data analysis involved systematic coding and thematic analysis, revealing key concepts like "Conceptual understanding", "MA & IT", and "Initiate & guide change." As we move to our conclusion chapter, this methodology forms the foundation upon which we will draw to provide a comprehensive understanding of the future landscape for MAs in the context of evolving technology. These three concepts were then further explored to answer sub-question 4, which was:

SQ4: How will the selected IT advancements change the current MA field?

This part of the research was answered by identifying that MAs must develop a conceptual understanding of technology and organizational dynamics, collaborate with IT departments, and transition into more holistic leadership roles in response to technological advancements and organizational change. It also proposes a framework for the evolving MA profile and suggests implications for education and training in finance and management.

The three concepts emerging from the study deserve further explanation. Firstly, the research highlights the necessity for MAs to develop a conceptual understanding of data models, systems, and organizational structures. This shift from traditional data processing to data interpretation positions MAs as strategic advisors, capable of providing insights grounded in a deep understanding of the organization's dynamics. This conceptual understanding is crucial for both financial decision-making and strategic direction.

Furthermore, the collaboration between MAs and IT departments is identified as a crucial factor. While MAs do not need to delve into technical specifics, they must possess a conceptual understanding of technology to effectively communicate their needs to IT specialists. This collaboration bridges the gap between business operations and technological integration, becoming increasingly important as organizations adopt complex technologies.

The research also emphasizes the role of controllers in initiating and guiding change within organizations. Controllers must cultivate a forward-thinking mindset, embrace modern technologies, and communicate the value of change. This shift from a numbers-oriented approach to a more holistic leadership role emphasizes the importance of soft skills such as empathy and communication in addressing resistance to change.

To visualize these changes, a proposed framework (figure 14 in chapter 5.1.1.) of the evolving MA profile is presented, encompassing the roles of accountant, financial professional, business partner for management, changer, and leader. The role of information technologist, as proposed by (IMA, 2022), has disappeared from the profile. The competences and tasks that are still essential from this role have been transferred to other roles. The changes in tasks and competences indicated by the three main concepts have also been incorporated into the framework. This framework provides a comprehensive view of how MAs must adapt to technological advancements and changing organizational needs. To make this theoretical framework more practical for MAs, employers, training providers and others who might be interested, sub-question five was drafted:

SQ5: How can a Management Accountant proactively adapt to the changing circumstances?

In practical terms, these findings have implications for education and training in the fields of finance and management. Traditional finance education may need to incorporate more technology components, and training programs should focus on developing the soft skills necessary for managing change. Moreover, organizations should view the collaboration between MAs and IT professionals as an ongoing dialogue to align technological decisions with organizational goals.

When this is reflected on the different types of companies where MAs are working, it can be stated that MAs in large financial institutions should transition into holistic leadership roles, understanding both technology and organizational dynamics. Collaboration with IT is vital, and controllers should lead change initiatives. SMEs can benefit by adapting MAs to technological changes, focusing on resource optimization, cost-effective tech solutions, and investing in training. For FinTech startups MAs might play a crucial role in shaping strategies and products. Proper collaboration with IT, innovation leadership, and recruitment of technically skilled MAs are key. MAs within consultancy firms should emphasize their role as strategic advisors who understand finance and tech. They can lead clients through change and benefit from continuous learning about tech trends.

For RMFC, embracing MAs as tech-savvy strategic advisors, fostering collaboration with IT, and promoting thought leadership in finance and technology are key strategies to thrive in the evolving financial landscape and remain competitive.

The research I conducted both enlightening and challenging. It all began with a well-defined research goal and a set of sub-questions that acted as guiding stars throughout the process. Conducting a systematic literature review not only broadened my understanding of the diverse roles, tasks, and competencies of MAs but also underscored the importance of a strong foundation in research. As I delved into the world of technological advancements and assessing their potential impact, the complexity of the MA profession in the face of rapid change became increasingly evident. The decision to use focus groups as the core research methodology was validated through post-study interviews, reassuring me of its effectiveness. In the end, this research strengthened my own perspective as a researcher, but also provides practical guidance for MAs and organizations navigating this dynamic landscape. It has not only enriched my knowledge but has also equipped me with valuable insights to embrace the future of Management Accounting with confidence.

The final section of chapter five discusses the limitations of the current research and suggests potential avenues for future study. During the research, as well as through the validation interviews, several limitations emerged. The study's limitations include its specificity to a particular context and participant group, potentially limiting the generalizability of its findings. The method of selecting and combining overlapping themes in the literature review is noted for simplifying representations and introducing the risk of author bias, potentially omitting important tasks or competencies. Derived from the validation interviews, it is important to place a nuance about the scoping of the research, which doesn't encompass all the themes influencing the role of MAs in the context of 2030.

The dynamic nature of technology and its impact on the roles of MAs is recognized, calling for longitudinal studies to better understand these changes. Future research is also encouraged to explore the benefits of optimizing the study’s recommendations, particularly in terms of efficiency gains and predictive analytics. Investigating resistance to technological integration is proposed as a valuable area of study to inform strategies for smoother transitions in technological innovation within Management Accounting.

In summary, this research contributes to a deeper understanding of the evolving role of MAs in the face of technological advancements and organizational change, offering valuable insights for academics, practitioners, and educators in the field. As technology continues to advance, the role of MAs will undoubtedly continue to evolve, making ongoing research in this area both relevant and necessary.

Reference list

Aguirre, S., & Rodriguez, A. (2017). *Automation of a Business Process Using Robotic Process Automation (RPA): A Case Study*. 1–8. https://doi.org/10.1007/978-3-319-66963-2

Ahrens, T., & Chapman, C. S. (2010). *European Accounting Review Occupational identity of management accountants in Britain and Germany*. https://doi.org/10.1080/09638180020024070

Bailey, J. (2008). First steps in qualitative data analysis: Transcribing. *Family Practice*, *25*(2), 127–131. https://doi.org/10.1093/fampra/cmn003

Berger, T., & Benedikt Frey, C. (2016). Digitalization, jobs, and convergence in Europe: strategies for closing the skills gap. Prepared for the European Commission DG Internal Market, Industry, [1] Berger T, Benedikt Frey C. Digitalization, jobs, and convergence in Europe: strategies for closi. *Oxford Martin School*, *January*. http://www.oxfordmartin.ox.ac.uk/downloads/reports/SCALE_Digitalisation_Final.pdf

Brüggen, E., & Willems, P. (2009). A critical comparison of offline focus groups, online focus groups and e-Delphi. *Source: Int. Journal of Market Research*, *15*(3), 15.

Buchbinder, E. (2010). Beyond Checking - Experiences of the Validation Interview. *JournalsPermissions.Nav*, *10*, 106–122. https://doi.org/10.1177/1473325010370189

Byrne, S., & Pierce, B. (2007). Towards a more comprehensive understanding of the roles of management accountants. *European Accounting Review*, *16*(3), 469–498. https://doi.org/10.1080/09638180701507114

Cadez, S., & Guilding, C. (2008). An exploratory investigation of an integrated contingency model of strategic management accounting. *Accounting, Organizations and Society*, *33*(7–8), 836–863. https://doi.org/10.1016/j.aos.2008.01.003

Cameron, J. (2005). *Focussing on the Focus Group*. *2*.

Chang, H., Ittner, C., & Paz, M. (2014). *The Multiple Roles of the Finance Organization: Determinants, Effectiveness...: EBSCOhost*. https://web-p-ebscohost-com.ezproxy2.utwente.nl/ehost/pdfviewer/pdfviewer?vid=0&sid=502e4f10-dd08-4821-ae1d-3101603b3a55%40redis

Davenport, T. H., & Harris. (2007). Competing on analytics. *Harvard Business Review*, *84*(1).

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285–296. https://doi.org/10.1016/J.JBUSRES.2021.04.070

Eiselmayer, K., Gleich, R., Losbichler, H., Niedermayr-Kruse, R., Rieder, L., Schulze, M., Seefried, J., Wickel-Kirsch, S., & Thiele, P. (2016). *Controller Competence Model: A Guideline For Moden Controller Development with Model Competence Profiles*.

Gartner. (2015). *Gartner's 2015 Hype Cycle for Emerging Technologies Identifies the Computing Innovations That Organizations Should Monitor*. https://www.gartner.com/en/newsroom/press-releases/2015-08-18-gartners-2015-hype-cycle-for-emerging-technologies-identifies-the-computing-innovations-that-organizations-should-monitor

IMA. (2022). IMA Management Accounting Competency Framework. *IMA Management Accounting Competency Framework*, *25*(March), 29–44. http://dx.doi.org/10.1016/j.accinf.2017.03.003

Kitchenham, B. (2004). Procedures for Performing Systematic Reviews. *Keele University*

Technical Report, *33*(2004), 1–26.

KPMG. (2023). *Robotics Process Automation Services*. https://kpmg.com/nl/nl/home/services/advisory/finance-and-business-services/digital-process-excellence/robotics-process-automation-services.html

Kroon, N., Do Céu Alves, M., & Martins, I. (2021). The impacts of emerging technologies on accountants' role and skills: Connecting to open innovation-a systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3). https://doi.org/10.3390/joitmc7030163

La Paz, A., Gracia, D., & Vásquez, J. (2020). Matching the controller role: Individuals vs companies. *Journal of Business Economics and Management*, *21*(5), 1411–1431. https://doi.org/10.3846/jbem.2020.13187

Laval, V. (2015). Impact of Recent Megatrends on the Controlling Role Model. *Procedia Economics and Finance*, *27*(15), 54–63. https://doi.org/10.1016/s2212-5671(15)00971-5

Lucassen, A., & Pattiasina, M. (2021). *De kracht van data in het mkb nieuwe perspectieven BDO ADVISORY*.

Mavlutova, I., & Volkova, T. (2019). *Digital Transformation of Financial Sector and Challengies for Competencies Development*. *99*(Mdsmes), 161–166. https://doi.org/10.2991/mdsmes-19.2019.31

Morgan, D. L., & Krueger, R. (1998). *The Focus Group Guidebook* -. Google Books. https://books.google.nl/books?hl=nl&lr=&id=YzjzGJd-OtoC&oi=fnd&pg=PR9&dq=Morgan,+D.+L.,+%26+Krueger,+R.+A.+(1998).+The+focus+group+guidebook&ots=CZTKg2HHna&sig=lvNRD2rDetflnKNPW4yU5XuWW4s#v=onepage&q&f=false

Ntiedo B. Ekpo, PhD, F., & Nseabasi Etukafia, P. (2017). *Finance Manager and the Finance Function in Business Sustainability*.

Oesterreich, T. D., & Teuteberg, F. (2019). The role of business analytics in the controllers and management accountants' competence profiles: An exploratory study on individual-level data. *Journal of Accounting and Organizational Change*, *15*(2), 330–356. https://doi.org/10.1108/JAOC-10-2018-0097

Oesterreich, T. D., Teuteberg, F., Bensberg, F., & Buscher, G. (2019). The controlling profession in the digital age: Understanding the impact of digitisation on the controller's job roles, skills and competences. *International Journal of Accounting Information Systems*, *35*, 100432. https://doi.org/10.1016/j.accinf.2019.100432

Pasch, T. (2019). Strategy and innovation: the mediating role of management accountants and management accounting systems' use. *Journal of Management Control*, *30*(2), 213–246. https://doi.org/10.1007/s00187-019-00283-y

Schäffer, U., & Weber, J. (2016). Die Digitalisierung wird das Controlling radikal verändern. *Controlling & Management Review*, *60*(6), 6–17. https://doi.org/10.1007/s12176-016-0093-9

Schäffer, U., & Weber, J. (2019). Digitalization ante portas The transformation of controlling as reflected in the third WHU study on the Future of Controlling. *Behavioral Controlling: Anniversary Volume in Honor of Jürgen Weber*, 179–190. https://doi.org/10.1007/978-3-658-25983-9_12/COVER

Sultana, R. G. (2009). Competence and competence frameworks in career guidance: Complex and contested concepts. *International Journal for Educational and Vocational Guidance*, *9*(1), 15–30. https://doi.org/10.1007/s10775-008-9148-6

The Learning Centre. (2022). *What is ResearchRabbit?* https://medium.com/a-academic-librarians-thoughts-on-open-access/researchrabbit-is-out-

Ulrich, P., Frank, V., Buettner, R., & Becker, W. (2022). A Literature Review on the Impact of Modern Technologies on Management Reporting. *Procedia Computer Science*, *207*, 907–915. https://doi.org/10.1016/j.procs.2022.09.146

Verstegen, B., Loo, I. De, & Mol, P. (2007). Classifying Controllers by Activities: An Exploratory Study. *Journal of Applied Accounting Research*, *5*(2), 9–32. http://www.cmawebline.org/joomla4/images/stories/JAMAR 2007 Summer/3 - JAMARv5-2-Classifying Controllers-Edited2.pdf

VRC. (2021). CFO of the Future. *Nucl. Phys.*, *13*(1), 104–116.

W.Stewart, D., N.Shamdasani, P., & W.Rook, D. (2007). *Focus Groups*. https://doi.org/10.4135/9781412991841

Walker, D., & Myrick, F. (2006). Grounded theory: An exploration of process and procedure. *Qualitative Health Research*, *16*(4), 547–559. https://doi.org/10.1177/1049732305285972

Wilkinson, S. (1998). Focus group methodology: A review. *International Journal of Social Research Methodology*, *1*(3), 181–203. https://doi.org/10.1080/13645579.1998.10846874

Willcocks, L., Lacity, M., & Craig, A. (2015). The IT Function and Robotic Process Automation. *Project Management, Planning and Control*, *October 2015*, 372–380. https://doi.org/10.1016/b978-075066956-6/50051-4

Yaakoubi, M., Ravesteijn, P., Prinsen, A., & Hooimeijer, H. (2020). *Data Driven Decision Support : The Role of the Controller in Decision-Making Processes*. *October*. https://doi.org/10.34190/ELG.20.026

Appendix

Appendix A. Axial coding

Category: Accountant
Role: The accountant

Tasks	Competences
ACC Task: Financial reporting	Acc Comp: Financial statement preparation
Acc Task: Budgeting and Forecasting	Acc Comp: Financial recordkeeping
Acc Task: Financial Analysis	Acc Comp: Internal control
Acc Task: Audit coordination	Acc Comp: Integrated reporting
Acc Task: Cost control	
Acc Task: Financial accounting	
Acc Task: Accounting policies and procedures	
Acc Task: Internal Control	

Category: Finance professional
Role: Financial Professional

Tasks	Competences
FP Task: Report to management about Planning, Monitoring, Forecasts	FP Comp: Operational knowledge
FP Task: Improve processes	FP Comp: Quality management
	FP Comp: Assess reliability
	FP Comp: Performance management
	FP Comp: System-methodological approach

Category: Business partner for management
Role: Business partner for Management

Tasks	Competences
BPFM Task: Take part in management decisions	BPFM Comp: Decision-making
BPFM Task: Design strategies and tactics	BPFM Comp: Market & Business knowledge
BPFM Task: Ensure organizational growth and sustainability	BPFM Comp: Strategic & tactical planning

Category: Leader
Role: Leader

Tasks	Competences
Leader Task: Ensure alignment	Leader Comp: Communication
Leader Task: Improve performance	Leader Comp: Inspiring
Leader Task: Ensure communication & coordinatic	Leader Comp: Decision making
	Leader Comp: Relationship management

Category: Changer
Role: Changer

Tasks	Competences
Changer Task: Resolve Conflicts	Changer Comp: Change management
Changer Task: Inititate and guide change processe	Changer Comp: Openness to change
	Changer Comp: Creative skills
	Changer Comp: Conceptual strength

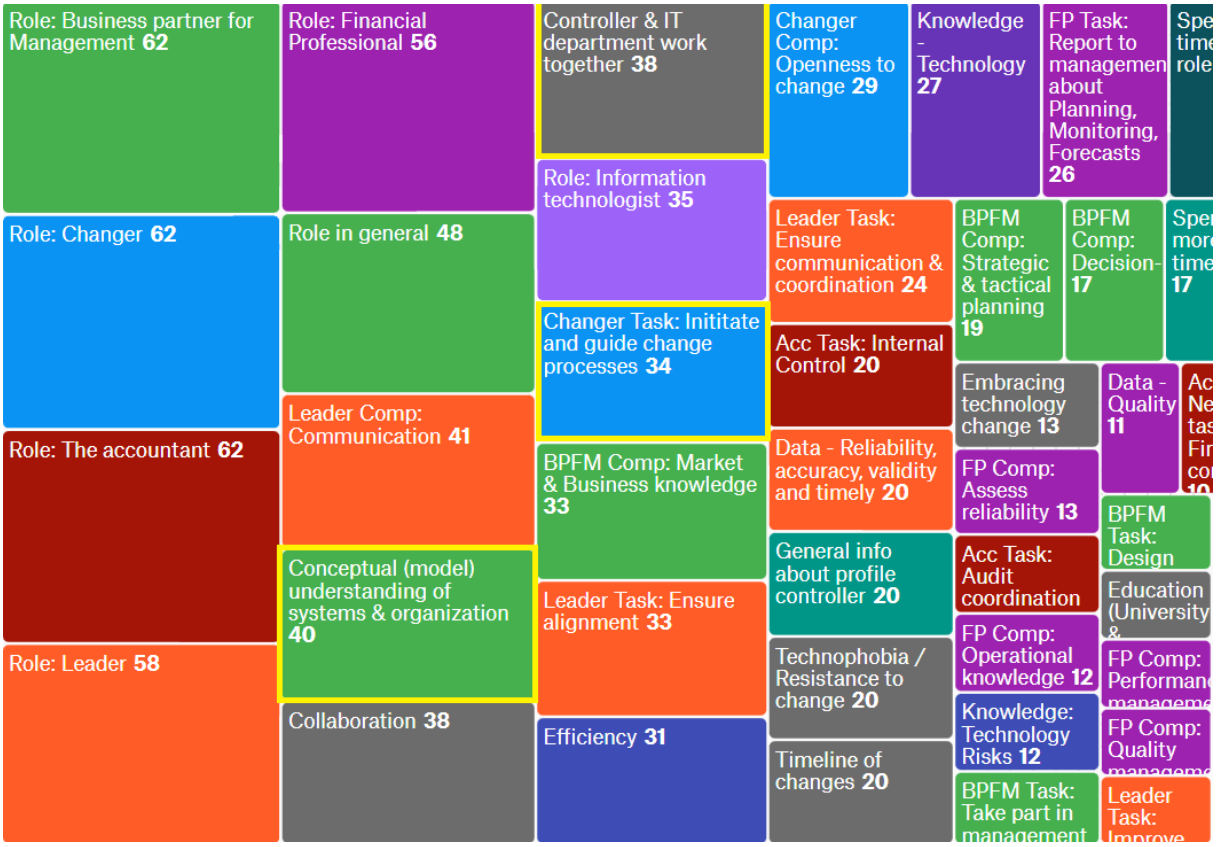
Category: Information technologist
Role: Information technologist

Tasks	Competences
IT Task: Maintain and update data systems	IT Comp: Information systems
	IT Comp: Data governance

Concepts

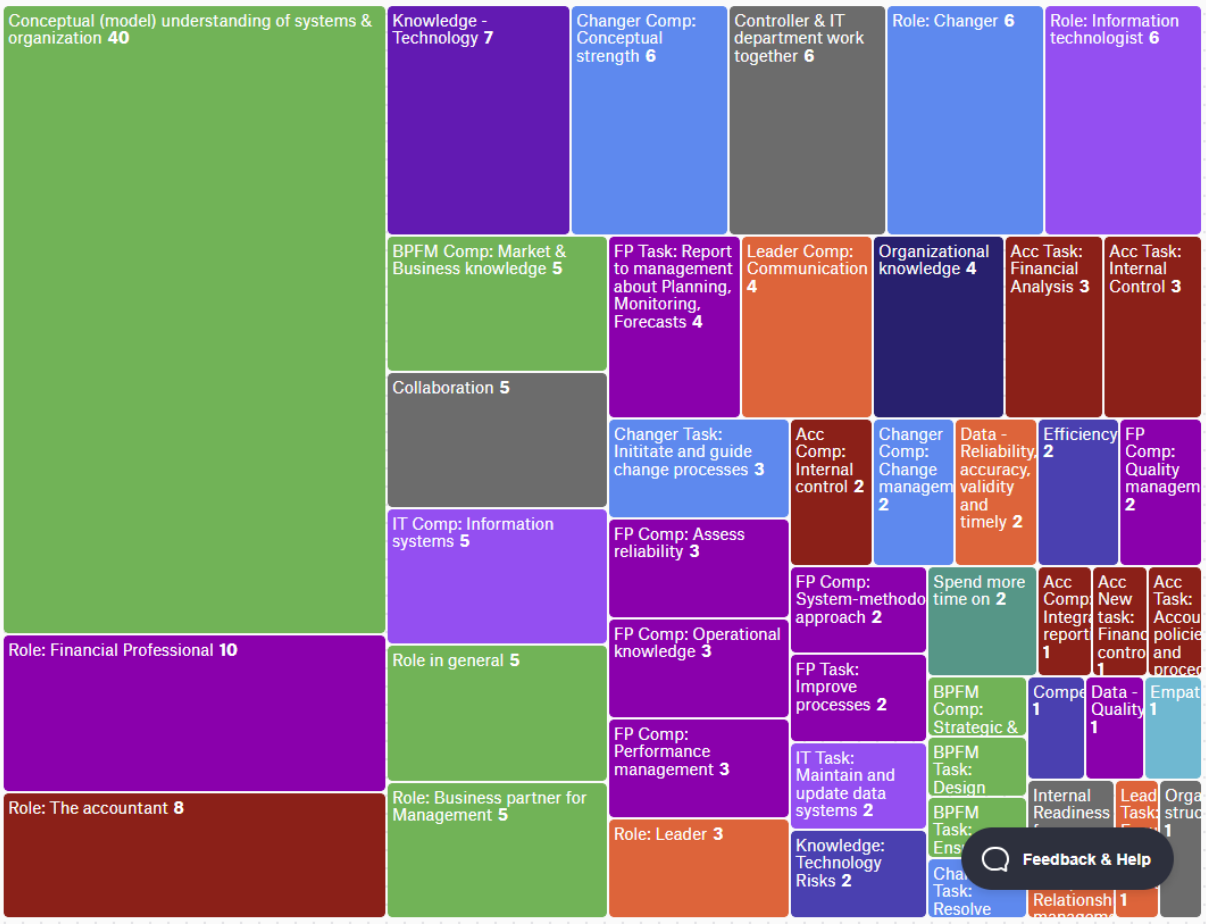
Collaboration
Efficiency
Technophobia / Resistance to change
Competence
Knowledge - Technology
Data - Reliability, accuracy, validity and timely
Embracing technology change
Organizational structure
Knowledge: Technology restrictions
Role in general
Government regulation
Data - Quality
Conceptual (model) understanding of systems & organization
Empathy
Knowledge: Technology Risks
Internal Readiness for technology
Spend more time on
Organizational knowledge
Controller & IT department work together
Spend less time in this role
General info about profile controller
Timeline of changes
Size of the company
External factor readiness
Education (University & Companies)

Appendix B. Selecting concepts.

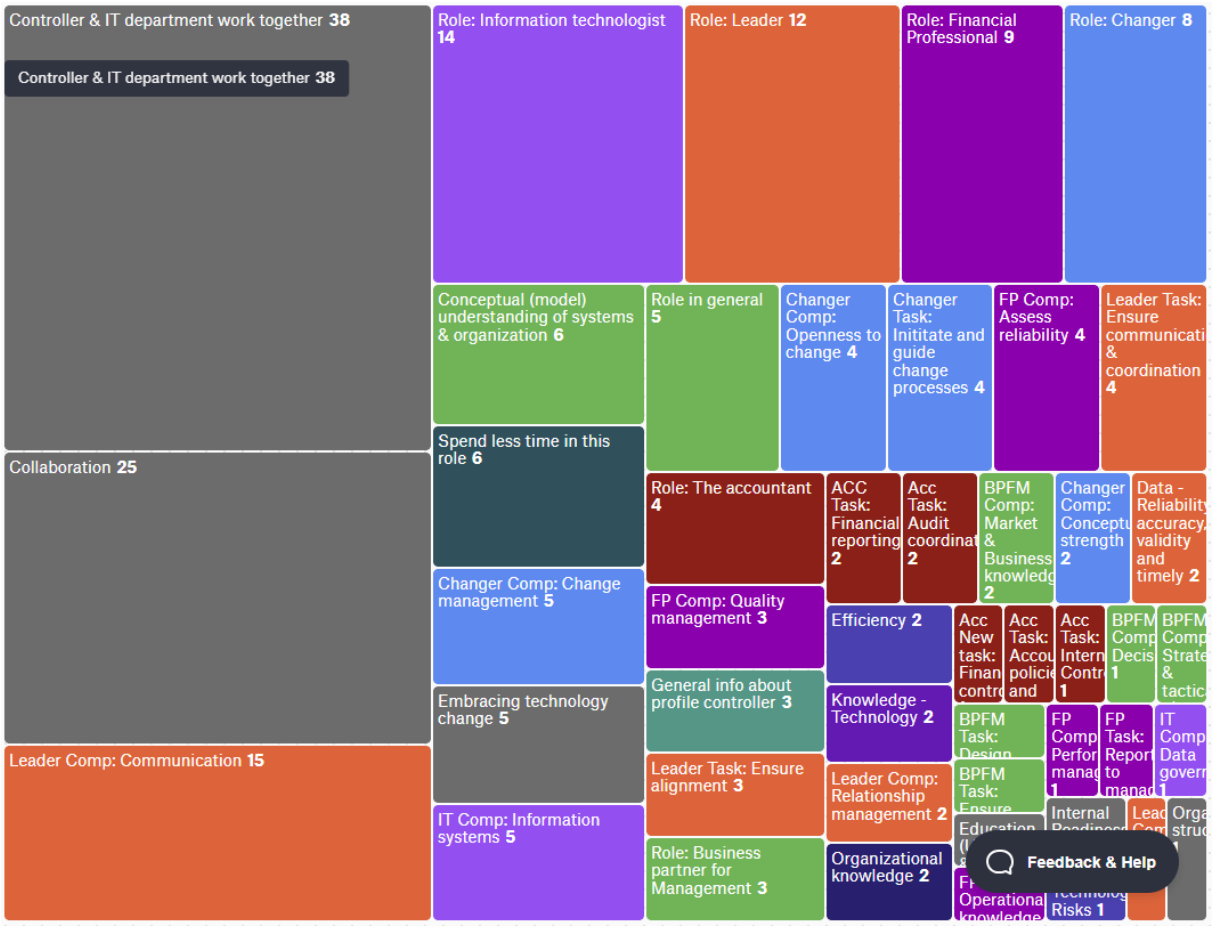
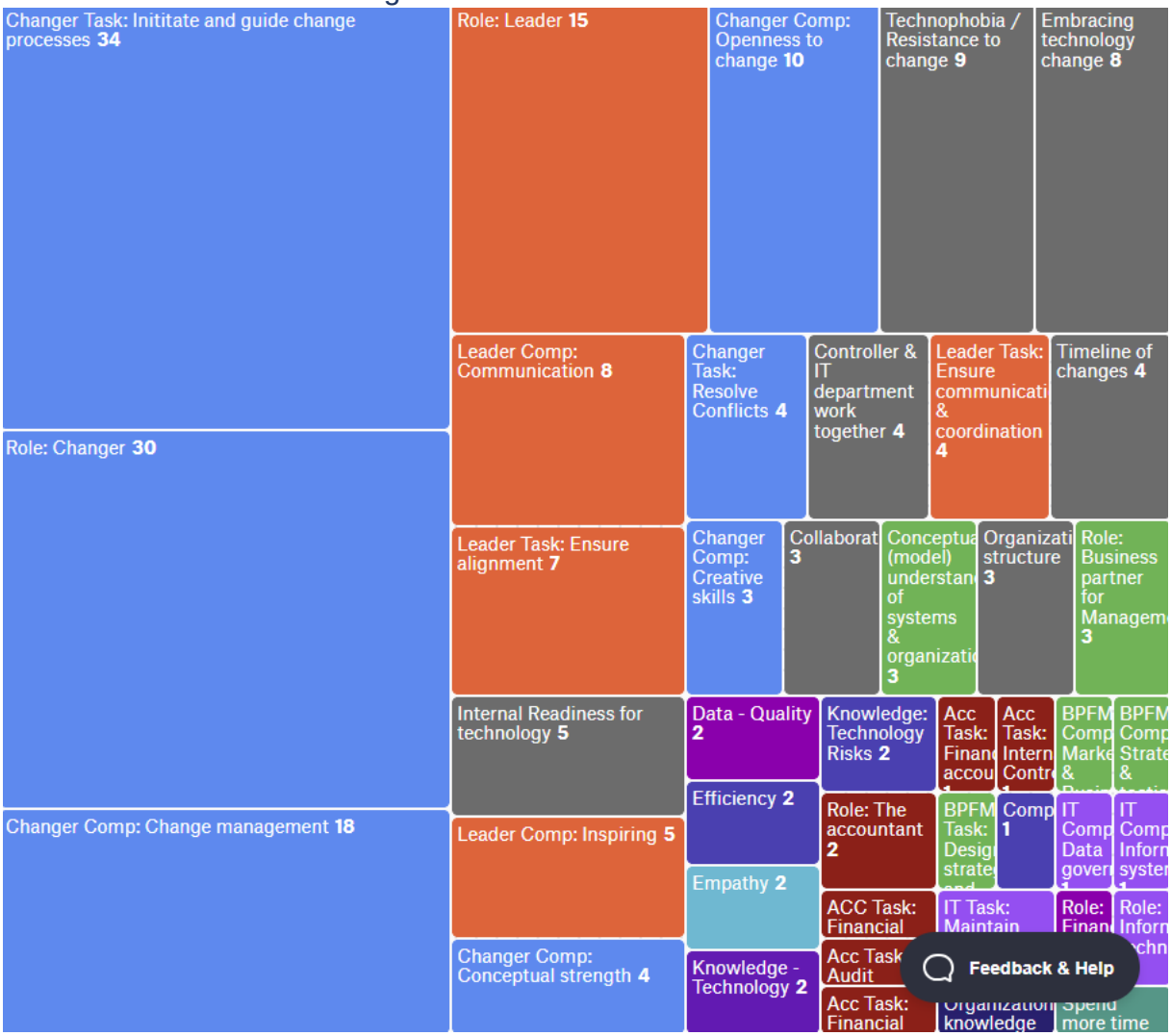


Appendix C. Cross sections

C1. Conceptual understanding



C2. Management Accountant & IT



C3. Initiate and Guide Change