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van Slooten, Alexander; Dirks, Paula; Firk, Sebastian

Published in:
British Accounting Review

DOI:
[10.1016/j.bar.2024.101460](https://doi.org/10.1016/j.bar.2024.101460)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Version created as part of publication process; publisher's layout; not normally made publicly available

Publication date:
2024

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
van Slooten, A., Dirks, P., & Firk, S. (2024). Digitalization and management accountants' role conflict and ambiguity: a double-edged sword for the profession. *British Accounting Review*, Article 101460. Advance online publication. <https://doi.org/10.1016/j.bar.2024.101460>

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The British Accounting Review

journal homepage: www.elsevier.com/locate/bar

Digitalization and management accountants' role conflict and ambiguity: A double-edged sword for the profession

Alexander C.A. van Slooten^{*}, Paula M.G. Dirks, Sebastian Firk*Department of Accounting and Auditing, University of Groningen, the Netherlands*

ARTICLE INFO

Keywords:

Digitalization
Management accountants
Role conflict
Role ambiguity

ABSTRACT

This study investigates the relationship between the anticipated digitalization of the finance and control function and management accountants' (MAs') role conflict and ambiguity. Drawing on role theory, we argue that digitalization is associated with increases in MAs' role conflict and ambiguity because digitalization leads to adaptations in the established role templates of MAs and also introduces new templates for the digital age. We further argue that digitalization is associated with a stronger (weaker) increase in role conflict and ambiguity the more MAs have a watchdog (business partner) orientation. The reason is that the role templates for the digital age are less coherent and clear for watchdog-oriented MAs than for their business partner counterparts. We test our predictions using survey data from 242 MAs in Dutch for-profit firms. While we do not find that digitalization is associated with MAs' role conflict and ambiguity per se, it is associated with more (less) role ambiguity and conflict for MAs with a relatively stronger watchdog (business partner) orientation. Digitalization may thus act as a double-edged sword for the management accounting profession. MAs focusing on the watchdog role may struggle in the digital age, while their business partner counterparts are set to benefit from digitalization.

1. Introduction

The accounting landscape is ever-changing, with one of the latest developments being the diffusion of highly impactful digital technologies, such as robotic process automation (RPA), predictive analytics, and artificial intelligence (AI). These digital technologies can deeply affect the creation and dissemination of information and thus the key responsibilities of management accountants (MAs) (Bhimani, 2021; Moll & Yigitbasioglu, 2019; Quattrone, 2016). Researchers and practitioners consistently highlight that MAs need to adapt to the use of digital technologies (e.g., Brands & Holtzblatt, 2015; Pickard & Cokins, 2015; Stransky et al., 2019). They also caution that failing to adapt could cause MAs to lose relevance within their organizations (Arnaboldi et al., 2017; Möller et al., 2020; Quattrone, 2016), which is reminiscent of the warnings expressed by Johnson and Kaplan (1987) regarding MAs' position. Digitalization may change the balance between MAs and other professional groups when they compete over the application of their knowledge to specific old and new tasks, potentially leading to a diminished influence of the management accounting profession.

Despite such "doomsday" scenarios, empirical research on MAs in the digital age is surprisingly scarce (Möller et al., 2020). Most prior research is conceptual and broadly considers the influence of digital technologies on (management) accountants in general (Appelbaum et al., 2017; Bhimani & Willcocks, 2014; Moll & Yigitbasioglu, 2019; Richins et al., 2017; Rikhardsson & Yigitbasioglu, 2018). Whereas this conceptual literature is largely ambivalent about the influence of digitalization on the relevance of MAs, the scarce

^{*} Corresponding author.

E-mail addresses: a.c.a.van.slooten@rug.nl (A.C.A. van Slooten), p.m.g.dirks@rug.nl (P.M.G. Dirks), s.firk@rug.nl (S. Firk).

<https://doi.org/10.1016/j.bar.2024.101460>

Received 27 July 2023; Received in revised form 13 July 2024; Accepted 6 August 2024

Available online 8 August 2024

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Please cite this article as: Alexander C.A. van Slooten et al., *The British Accounting Review*, <https://doi.org/10.1016/j.bar.2024.101460>

empirical literature that exists indicates that MAs struggle with digitalization. For example, [Firk et al. \(2024\)](#) find that employees in the finance and control function can experience digital anxiety, which relates to fears that employees experience when considering the diffusion of digital technologies, such as RPA, predictive analytics, and AI. [Goretzki and Pfister \(2023\)](#) further point out how MAs struggle with strong automation pressures enabled by digital technologies. The potential influence of digitalization on management accounting is thus likely to be substantial, but our understanding of this influence remains limited.

To fill this void, we study the way in which MAs react to the advent of digital technologies, with a particular focus on MAs' role conflict and ambiguity, which are two subdimensions of role stress that act as so-called role stressors ([Örtqvist & Wincent, 2006](#)). We focus on the role conflict and ambiguity of MAs because MAs are likely to receive new role expectations from managers who want their MAs to leverage digital technologies ([Rautiainen et al., 2024](#); [Yigitbasioğlu et al., 2023](#)). From prior research, we know that MAs who have a strong orientation toward a particular role can experience role conflict and ambiguity when confronted with role expectations that undermine or challenge their extant roles ([Byrne & Pierce, 2007, 2018](#); [Morales & Lambert, 2013](#)). Prior research further shows that role conflict and ambiguity are associated with dysfunctional behaviors, such as reduced personal accomplishment and job performance ([Örtqvist & Wincent, 2006](#)), which may prevent MAs from adapting to digitalization challenges. This, in turn, could leave MAs at a disadvantage when competing for influence in the digital age against perhaps better-prepared colleagues from other business functions within their organizations. In light of these potential negative consequences of role conflict and ambiguity, we are interested in the relationship between the digitalization of the finance and control function and the role conflict and ambiguity that MAs experience.

To study this relationship, we draw on role theory, which states that a role is shaped by the expectations of role senders and the way in which the role occupant interprets these expectations ([Kahn et al., 1964](#); [Katz & Kahn, 1978](#)). In line with prior research studying the roles of MAs (e.g., [Goretzki et al., 2013](#)), we theorize that the role expectations of MAs and their role senders are influenced by role templates—(normative) sets of role expectations that together provide an often aspirational role. Digitalization may adapt MAs' established role templates and even introduce new ones (e.g., [Kokina et al., 2021](#); [Schäffer & Brueckner, 2019](#)). Faced with these adapted or new role templates for the digital age, MAs and their role senders may derive role expectations that are incoherent with each other or with MAs' extant roles, which may give rise to role conflict. Additionally, the derived role expectations may give rise to role ambiguity, as the role templates for the digital age are still emerging and are likely to be uncertain. Consequently, we hypothesize that the more digitalization is anticipated for the finance and control function, the more likely MAs are to experience stronger role conflict and ambiguity.

We further expect that the strength of this relationship depends on the MAs' extant role (i.e., the role that the MAs enact when confronted with new role expectations). MAs and their role senders are likely to take the MAs' extant role as a starting point while searching for role templates for the digital age. Depending on the MA's extant role, they may thus have access to different templates for the digital age that vary in coherence and clarity. We conceptualize the MAs' extant role as consisting of tasks and responsibilities derived from two overarching role templates—namely, the business partner and the watchdog ([Hartmann & Maas, 2011](#); [Maas & Matějka, 2009](#)). Business partners are primarily responsible for facilitating decision-making by providing managers with relevant information, whereas watchdogs focus on keeping control, monitoring performance, and ensuring compliance. While prior research describes that especially MAs who primarily focus on the business partner role struggle with role conflict and ambiguity relative to their watchdog counterparts (e.g., [Tillema et al., 2022](#); [Zoni & Merchant, 2007](#)), we describe how this may be different in the context of digitalization.

We argue that watchdog-oriented MAs face a relatively more disruptive outlook for the digital age. The digitalization of the finance and control function is anticipated to increasingly automate their extant tasks ([Cooper et al., 2019](#); [Frey & Osborne, 2017](#); [Petkov, 2019](#)) and introduce new tasks eclectically derived from a multitude of emerging role templates for the digital age. Due to their emerging nature, these role templates are relatively uncertain and incoherent—both in themselves and with the extant watchdog role template. In contrast, business partner-oriented MAs face a relatively less disruptive outlook, as digitalization is expected to mostly augment their tasks in a way that is coherent with the business partner role template in the status quo and relatively clear (e.g., [Oesterreich et al., 2019](#); [Richins et al., 2017](#)). As a consequence of the relative differences in these outlooks for MAs, their extant role may influence the association between the anticipated digitalization of the finance and control function and MAs' role conflict and ambiguity. Specifically, we hypothesize that this association is more positive the more MAs focus on the watchdog role relative to the business partner role. Our research framework is presented in [Fig. 1](#).

We test our hypotheses by applying ordinary least squares (OLS) regressions to survey data collected from 242 MAs in Dutch for-profit firms. We do not find evidence in support of our first hypothesis, where we expected an overall positive association between the anticipated digitalization of the finance and control function and the role conflict and ambiguity of MAs. We do, however, find evidence supporting our second hypothesis that the influence of anticipated digitalization on role conflict and ambiguity is moderated by the MA's extant role. Specifically, we find that the more MAs focus on the watchdog role relative to the business partner role, the more role conflict and ambiguity they experience due to the digitalization of the finance and control function. Interestingly, we even find that business partner-oriented MAs experience less role conflict and ambiguity in the face of digitalization, whereas watchdog-oriented MAs experience greater role conflict and ambiguity due to digitalization. These findings indicate that the results for the two groups may cancel each other out, which explains the lack of support for our first hypothesis. Collectively, our results indicate that MAs focusing on the business partner role are set to benefit from digitalization, while their watchdog counterparts may struggle in the

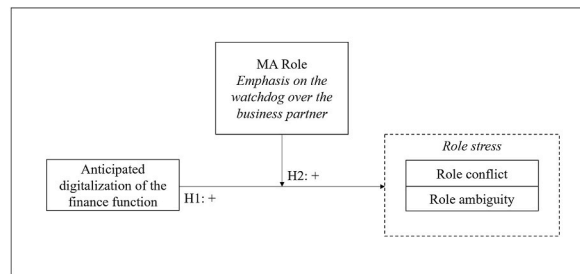


Fig. 1. Research framework.

digital age. In robustness tests, we show that our results hold when using separate constructs for the watchdog and business partner roles instead of a continuum, as well as when employing structural equation modeling (SEM).

In additional analyses, we show that the association between anticipated digitalization and role stress¹ is stronger for MAs who are exposed to multiple role senders, indicating that coherent and clear role templates can align and clarify the role expectations of multiple role senders. Moreover, we find that the associations between the individual digital technologies (e.g., automation, AI) underlying our digitalization construct and MAs' role stress are all similar, suggesting that the association between anticipated digitalization and role stress is not driven by any particular technology, but by the overall advent of digital technologies.

Our study contributes to theory and practice in several ways. First, while prior literature has mainly conceptually considered the way in which MAs and management accounting in general are affected by digital technologies (e.g., [Arnaboldi et al., 2017](#); [Moll & Yigitbasioglu, 2019](#); [Möller et al., 2020](#)), our study adds a finer-grained perspective, revealing that digitalization may act as a double-edged sword for the management accounting profession. Specifically, our study suggests that business partner-oriented MAs are well positioned to take advantage of digital technologies, whereas watchdog-oriented MAs face conflicting and ambiguous role expectations for the digital age arising from much less coherent and clear role templates for watchdogs in the digital age. Second, we contribute to the literature that has studied how managers attempt to change the roles of MAs and how MAs struggle with such changes (e.g., [Goretzki et al., 2013](#); [Tillema et al., 2022](#); [Van der Steen, 2022](#)). Focusing on the context of digitalization, we find empirical evidence consistent with our theory that access to a coherent and clear role template can help MAs overcome role conflict and ambiguity, which we suggest may enable MAs to enact a new role. Finally, our finding that digitalization acts as a double-edged sword for the management accounting profession suggests that in their attempts to advance the business partner role (e.g., [Thomson, 2015](#); [Yigitbasioglu et al., 2023](#)), prior literature and practice have overlooked watchdog-oriented MAs. These MAs are left without a coherent and clear role template for the digital age, fostering role ambiguity and conflict. However, their role will likely remain important for organizations in preventing value-destroying behaviors and ensuring compliance in the digital age (e.g., designing internal controls for digital use, monitoring data quality, and auditing AI systems). Therefore, we call on practitioners and future researchers to develop a clear and positive vision for watchdogs in the digital age.

The remainder of this paper is structured as follows. Section 2 outlines our theoretical background and develops our hypotheses. Section 3 describes our methods. Section 4 presents our main empirical results, and section 5 contains robustness tests and additional analyses. Finally, we discuss our findings and conclude in section 6.

2. Theoretical background and hypothesis development

2.1. Theoretical background

To understand the way in which MAs react to the advent of digital technologies, we begin this section by outlining the roles of MAs. Based on the discussion of MAs' roles, we elaborate on the consequences of digitalization for MAs. Finally, we draw on role theory to provide a foundation for our theorizing about the influence of the progressing digitalization of the finance and control function on the role conflict and ambiguity of MAs.

2.1.1. The roles of management accountants

MAs can broadly be described as suppliers of relevant information to managers and employees for making decisions, allocating resources, and monitoring, evaluating, and rewarding performance ([Atkinson et al., 2012](#), p. 26). In this capacity, MAs have a wide-ranging set of tasks and responsibilities that broadly fall under two overarching role templates: the watchdog and the business partner (e.g., [Hartmann & Maas, 2011](#); [Maas & Matějka, 2009](#)).²

¹ For the purpose of brevity, we use role stress rather than role conflict and ambiguity as our dependent variable in the additional analyses. In untabulated analyses, the results hold for role conflict and ambiguity as well.

² Prior research has often attempted to describe these sets of tasks and responsibilities in terms of roles (e.g., [Fourné et al., 2023](#); [Lambert & Sponem, 2012](#); [Mouritsen, 1996](#)). We focus on the watchdog and the business partner, which is in line with prior literature that considers the roles of Dutch MAs ([Hartmann & Maas, 2011](#); [Maas & Matějka, 2009](#)). We discuss management accounting and MAs in the Dutch context in section 3.2.

The watchdog's main responsibilities are to ensure that managers achieve their financial performance targets, make efficient use of corporate resources, and adhere to internal control policies and external regulations (Hartmann & Maas, 2011; Indjejikian & Matějka, 2006; Lambert & Sponem, 2012). The watchdog thus adds value to the organization by acting as a custodian of organizational resources that prevents its members from engaging in value-destroying behaviors. The business partner's responsibility is to facilitate operational and strategic decision-making by providing (operating) management with relevant (non-)financial information (Järvenpää, 2007; Lambert & Sponem, 2012; Maas & Matějka, 2009). Thus, the business partner adds value by informing and thereby improving decision-making processes.

In practice, MAs almost never enact a role that fully resembles one of these two templates; instead, they have a *hybrid* role in which they perform tasks that correspond to both role templates (Burns & Balvinsdottir, 2005; Caglio, 2003; Rieg, 2018). The roles of MAs can therefore be seen as being on a continuum, ranging from a pure focus as a watchdog to a pure focus as a business partner. On this continuum, however, MAs often have a stronger orientation toward one of these templates (e.g., Byrne & Pierce, 2007; Morales & Lambert, 2013).

2.1.2. Management accountants and the digitalization of the finance and control function

The progressing digitalization of the finance and control function is expected to heavily influence the work and role templates of MAs (e.g., Möller et al., 2020). Digitalization here refers to the sociotechnical process by which digital technologies become integrated into the daily work of the finance and control function.³ One of the key characteristics of digitalization, conceptually distinguishing it from IT implementations (e.g., an enterprise resource planning [ERP] system implementation), is that digitalization introduces new affordances (i.e., what MAs can do or have the potential to do in a given setting) and promotes change (Baiyere et al., 2023; Firk et al., 2024). Digitalization provides its users with an array of digital technologies that can be easily combined and reapplied, thereby offering a range of (often unknown) opportunities (Lyytinen et al., 2017). In this way, it not only changes material presentations of information using digital encoding, but also changes social settings by, for example, disrupting existing ways of working and introducing new organizational goals (Adhikari et al., 2023; Baiyere et al., 2023).⁴ Specifically, we conceptualize three ways in which digitalization can simultaneously influence MAs' work and role templates.

First, digital technologies can be used to automate existing management accounting tasks associated with the watchdog and business partner roles. MAs, for instance, record transactions, reconcile accounts, and generate standardized financial and non-financial reports. Lindebaum et al. (2020) describe such tasks, which are based on explicit knowledge and regulated by formal procedures and rules, as "formal-rational." These formal-rational tasks are highly programmable (Korhonen et al., 2021) and thus suitable for automation (Frey & Osborne, 2017; Lindebaum et al., 2020; Petkov, 2019). Given the advantages of using digital technologies to perform formal-rational tasks, routine-based accounting and controlling operations can be increasingly automated.

Second, digital technologies may augment the tasks and responsibilities associated with the watchdog and business partner roles (Richins et al., 2017). Whereas MAs are replaced by digital technologies in the case of automation, MAs collaborate with digital technologies in the case of augmentation and use the technology to expand their capacity to perform a given task (Raisch & Krakowski, 2021). Tasks that are "substantive-rational" in nature are especially suited for augmentation (Lindebaum et al., 2020). These tasks are based on tacit knowledge, are future-oriented, and involve interpretation. Because of their nature, substantive-rational tasks cannot be easily automated. However, digital technologies can help MAs perform these tasks more effectively. For example, the use of machine learning in combination with large amounts of structured and unstructured data may allow business partner-oriented MAs to find ways to improve processes, identify more accurate cost drivers, and develop more effective key performance indicators (Arnaboldi et al., 2017; Ding et al., 2020; Nielsen, 2022; Richins et al., 2017). Similarly, MAs in a more watchdog-oriented role may use digital technologies, such as AI, to more effectively monitor performance and compliance (Bhimani, 2021).

In addition to augmenting and automating MAs' current tasks, the increasing integration of digital technologies into the work of MAs may introduce new tasks. For instance, digital dashboards and self-servicing increase the accessibility of data and information for a broad range of managers (Rikhardsson & Yigitbasioglu, 2018).⁵ MAs may design internal controls for and monitor the use of digital technologies to ensure compliance with regulations and prevent value-destroying behaviors by managers, such as the uncaredful handling and analysis of sensitive proprietary data (Schäffer & Brueckner, 2019; Stouthuysen, 2023). More generally, many of the tasks introduced by digitalization may require MAs to collaborate with digital technologies, such that augmentation and the introduction of new tasks occur simultaneously.

Overall, the anticipated digitalization of the finance and control function presents MAs with opportunities to increase the value they add to their organizations, but also challenges them. As digital technologies become progressively more discussed and used in organizations, advice-seeking managers may increasingly demand valuable services enabled by digital technologies from MAs (Yigitbasioglu et al., 2023). Additionally, there is likely to be greater demand for the governance of these technologies (Schäffer & Brueckner, 2019). If MAs are unable to effectively integrate these services into their roles, they may lose relevance within their organizations relative to their colleagues from other functional departments (Möller et al., 2020). It is thus crucial for MAs to adapt their roles to meet the challenges imposed by digitalization (Möller et al., 2020; Quattrone, 2016). However, prior research shows that MAs

³ This definition of digitalization is inferred from Tilson et al.'s (2010) definition that is established in information systems research.

⁴ In contrast, IT implementations promote stability, as they capture and support existing processes in a digitized form, mostly aimed at improving operational efficiency and realizing other productivity gains (Baiyere et al., 2023).

⁵ For an example of the implementation of digital dashboards and self-servicing, see Bayer's "CFO app" (<https://customers.microsoft.com/EN-GB/story/1404533828014895899-bayer-creates-cfo-app-for-one-stop-shop-by-steering-relevant-data-using-power-bi>, accessed on 19 July 2023).

may struggle with adapting their roles in a variety of settings (e.g., Goretzki & Pfister, 2023; Tillema et al., 2022; Van der Steen, 2022), which may also apply when they are confronted with the opportunities and challenges imposed by digitalization. For this reason, it is important to investigate how MAs experience the progressing digitalization of the finance and control function.

2.1.3. Role theory and the role ambiguity and conflict of management accountants

To understand how MAs respond to changes in their role as a result of the progressing digitalization of the finance and control function, we turn to role theory. Prior literature has often drawn on role theory to study the roles of MAs, the changes in these roles, and how MAs respond to these changes (e.g., Byrne & Pierce, 2007, 2018). Role theory explains that roles are shaped by the expectations of role senders and by the way in which role occupants interpret and enact these expectations (Kahn et al., 1964; Katz & Kahn, 1978; Van Sell et al., 1981). Here, role expectations refer to the tasks and responsibilities that MAs are expected to perform (Hartmann & Maas, 2011; Maas & Matějka, 2009), while the managers to whom MAs are accountable are typically viewed as the most influential role senders (Byrne & Pierce, 2018; Maas & Matějka, 2009).

MAs and their role senders draw on role templates in shaping the roles of MAs (Goretzki & Messner, 2019; Järvenpää, 2007; Lambert & Pezet, 2011; Morales & Lambert, 2013). Role templates, such as the business partner and watchdog, are influential in shaping the roles of MAs. They can inspire MAs' role senders, who derive role expectations for MAs from these templates and use them to communicate role expectations to MAs (Goretzki et al., 2013).⁶ In addition, they function as a frame of reference through which MAs interpret role expectations. Specifically, MAs use their extant roles as internalized role templates that serve as their frame of reference when interpreting new role expectations (Goretzki & Pfister, 2023; Morales & Lambert, 2013; Tillema et al., 2022).

Here, some tension can arise. While new role templates (e.g., introduced by digitalization) may inspire MAs and their role senders, the role expectations derived from these role templates may conflict with MAs' extant roles and can be relatively unclear. As a result, role conflict and ambiguity can emerge. *Role conflict* is defined as the "incongruity of the expectations associated with a role" (Van Sell et al., 1981, p. 44), while *role ambiguity* refers to the uncertainty experienced by the role occupant about the role sender's expectations of the role occupant (Kahn et al., 1964). Prior research suggests that MAs struggle with the enactment of new role expectations when they increase their role conflict and ambiguity (e.g., Byrne & Pierce, 2007; Goretzki & Pfister, 2023; Tillema et al., 2022). MAs often have an irreconcilable orientation toward a specific set of tasks and responsibilities (Byrne & Pierce, 2007) and can feel deeply distressed when they are expected to enact role expectations that are ambiguous or undermine their extant roles (Morales & Lambert, 2013). The role conflict and ambiguity of MAs may thus be a crucial factor in determining whether MAs are willing and able to adapt their roles in a way that enables them to continue adding value to their organizations (and to remain relevant) in the digital age. Thus, we focus on the relationship between the anticipated digitalization of the finance and control function and MAs' role conflict and ambiguity.

2.2. Development of hypotheses

Drawing on this theoretical background, we first develop hypotheses on the relationship between the digitalization of the finance and control function and MAs' role conflict and ambiguity. We then continue by developing hypotheses on how this relationship is moderated by the MAs' extant roles.

2.2.1. Digitalization of the finance and control function and management accountants' role conflict and ambiguity

As organizations explore opportunities to apply digital technologies in the finance and control function, MAs and their role senders are likely to reformulate their role expectations for MAs. In this process, they may draw inspiration from role templates designed specifically for the digital age. Such role templates for the digital age are shaped in the professional field as the digitalization of the finance and control function progresses. For instance, Kokina et al. (2021) describe multiple potential role templates for MAs in the context of increasing automation. Schäffer and Brueckner (2019) even outline nine different role templates for MAs in the digital age. However, these templates are still developing, and the boundaries between the different templates are not yet clearly defined. When MAs and their role senders derive role expectations from this array of emerging templates, there may be incoherencies between the resulting role expectations of MAs and their role senders, and between the role expectations for the digital age and MAs' extant roles. Moreover, the developing nature of these templates, as well as their indistinct boundaries, may result in less clarity. We expect that, in this way, digitalization increases the role conflict and role ambiguity of MAs.

Regarding role conflict, we argue that in the face of digitalization, MAs are confronted with various emerging role templates for the digital age that are incoherent with each other or with the MAs' extant roles, which increases their role conflict. For example, some tasks and responsibilities that are core to the established role templates of MAs are formal-rational in nature and are thus anticipated to be automated in the role templates for MAs in the digital age. Role expectations derived from these role templates undermine MAs' extant roles and may thus increase their role conflict. In a similar way, tasks that are substantive-rational in nature are anticipated to be augmented using digital technologies, which uproots established ways of working. Finally, role templates for MAs in the digital age introduce various new tasks and responsibilities that can be mutually incompatible or incompatible with MAs' extant tasks and responsibilities. Overall, as MAs and their role senders revise their role expectations in the face of digitalization, they may draw role expectations from role templates for the digital age that are mutually incompatible or incoherent with MAs' extant roles. MAs may thus

⁶ For example, MAs' role senders, rather than specifying individual tasks, may simply refer to a role template (e.g., business partner or watchdog) and, given that the MA and the role sender have a common understanding of what the role template entails, the MA knows what is expected of them.

be confronted with conflicting role expectations. For this reason, we hypothesize the following.

H1a. The anticipated digitalization of the finance and control function is positively related to MAs' role conflict.

Regarding role ambiguity, we argue that the role templates for MAs in the digital age are still developing and thus are more likely to be uncertain and incomplete. For instance, the extent to which automation will influence extant tasks and responsibilities is uncertain because managers and MAs have great difficulty in judging ex ante to what degree a set of tasks is automatable (Korhonen et al., 2021; Sutton et al., 2018). This also increases the uncertainty around the new tasks and responsibilities that role templates for the digital age introduce because these templates are based on the assumption that many of the extant tasks of MAs will be automated and MAs will thus have time to perform new tasks. Just as it is uncertain as to how much of MAs' time will be freed up by automation, it is also uncertain whether MAs will have the opportunity to perform and meet these new expectations derived from the role templates for the digital age. Furthermore, when role senders are inspired by a role template for the digital age in their communication of role expectations to MAs, it may be unclear which tasks and responsibilities that a particular role template includes, which can create confusion and does not help to establish greater role clarity. The digitalization of the finance and control function may thus confront MAs and their role senders with a number of different role templates for MAs in the digital age, from which they eclectically draw new role expectations that are relatively more uncertain than their extant roles, thus increasing MAs' role ambiguity. Therefore, we hypothesize the following.

H1b. The anticipated digitalization of the finance and control function is positively related to MAs' role ambiguity.

2.2.2. The influence of management accountants' extant roles on role conflict and ambiguity

We further theorize that MAs and their role senders are likely to take the MAs' extant roles as their point of departure when looking for role templates for MAs in the digital age. Depending on MAs' extant roles, MAs and their role senders may thus draw on different role templates for the digital age that vary in coherence and clarity. For this reason, the digitalization of the finance and control function may differently affect MAs' role conflict and ambiguity, depending on their extant roles. To explain this, we now more closely consider the different impacts of the digitalization of the finance and control function on watchdog-oriented MAs versus business partner-oriented MAs.

We argue that the anticipated digitalization of the finance and control function creates a relatively more disruptive outlook for watchdog-oriented MAs than for business partner-oriented MAs. Relative to the business partner, the watchdog is more burdened with formal-rational tasks, such as performance measurement and reporting, which are suited for automation (Frey & Osborne, 2017; Lindebaum et al., 2020; Petkov, 2019). RPA, for example, can perform manual steps in the reporting and data collection process (e.g., account reconciliation) and can make reports in real time (Cooper et al., 2019). Nonetheless, we do not suggest that the watchdog role will disappear entirely. Despite automation, the watchdog will remain an important role in organizations, as watchdogs prevent managers and other employees from engaging in value-destroying behaviors. For instance, they design and enforce the organization's internal controls. These activities cannot be automated because successfully performing them requires elaborate communication and information strategies (e.g., Goretzki et al., 2018; Puyou, 2018). Rather, digital technologies, such as AI and machine-learning technologies, may augment such existing watchdog responsibilities to enable better monitoring and governance (Bhimani, 2021).

Digitalization may further introduce several new tasks and responsibilities that could be performed by watchdog-oriented MAs. For example, the watchdog role may come to include the responsibility for designing internal controls for digital technology use (Schäffer & Brueckner, 2019). Watchdogs may also act as "custodians of information," monitoring managers' handling of sensitive data and assuring data quality. Social media and "data exhausts" from customers visiting the firm's website can potentially provide managers with a wealth of attractive data about the behaviors of actual and potential customers, but such data require careful cleaning, storage and protection, and collecting these data is heavily regulated (Arnaboldi et al., 2017; Rikhardsson & Yigitbasioglu, 2018; Yigitbasioglu, 2015). In addition, digitalization may expand the watchdog role to include auditing AI or bots to ensure compliance with regulations (Kokina et al., 2021; Petkov, 2019) and may include the role of a "data engineer," which comprises the tasks of maintaining and protecting digital technologies and avoiding data breaches or other external attacks (Schäffer & Brueckner, 2019). However, these new activities are not part of a single coherent and clear role template for the digital age. This is reflected in the many different potential role templates for watchdog-oriented MAs, such as the roles of data engineer (Schäffer & Brueckner, 2019) and internal consultant for employees implementing digital technologies (Kokina et al., 2021; Rikhardsson & Yigitbasioglu, 2018). Overall, digitalization creates a relatively disruptive outlook for watchdog-oriented MAs, dominated by the automation and augmentation of their extant tasks, combined with the introduction of new tasks derived from a multitude of uncertain role templates for the digital age that are mutually incompatible and partly incoherent with their extant role.

In contrast, business partners and their role senders are likely to be confronted with a less severely disruptive outlook. The tasks associated with business partners can be regarded as relatively more substantive-rational and are thus more difficult to automate than those associated with watchdogs (Korhonen et al., 2021; Lindebaum et al., 2020; Sutton et al., 2018). In addition, digital technologies may provide relatively more opportunities to "augment" the business partner role (Raisch & Krakowski, 2021) by providing MAs focusing on this role with tools to better fulfill their core responsibility of informing operational and strategic decision-making (Ding et al., 2020; Richins et al., 2017). For example, using business analytics, MAs can proactively investigate the economic feasibility of new business models, propose them to management, and be actively involved in their development (Schäffer & Brueckner, 2019). Using data visualization tools, such as dynamic balanced scorecards and dashboards, MAs can present the results of their analyses to managers more intuitively and hence more strongly impact decisions and strategy implementations in their organizations (Reinking et al., 2020; Wiraeus & Creelman, 2019). Therefore, while perhaps still uprooting their established ways of working, digitalization may

augment the tasks of business partner-oriented MAs in a way that is coherent with the business partner role template in the status quo and relatively clear. Accordingly, relative to watchdog-oriented MAs, business partner-oriented MAs have a role template for the digital age that is relatively coherent and clear. The expected changes in the role templates of MAs in the digital age are summarized in Table 1.

To summarize, we argue that business partner-oriented MAs have a relatively more coherent and clearer role template for the digital age, whereas watchdog-oriented MAs have a less coherent and less clear role template for the digital age and are instead exposed to multiple potential role templates that vary in coherence and clarity. Building on our theorizing that the difficulty in having access to a coherent and clear role template is associated with more role conflict and ambiguity, we formulate the following hypotheses.

H2a. The MAs' extant role moderates the relationship between the anticipated digitalization of the finance and control function and their role conflict, such that the relationship becomes more positive the more MAs emphasize the watchdog role relative to the business partner role.

H2b. The MAs' extant role moderates the relationship between the anticipated digitalization of the finance and control function and their role ambiguity, such that the relationship becomes more positive the more MAs emphasize the watchdog role relative to the business partner role.

3. Methods

3.1. Data

We collected our data via a questionnaire survey of MAs in Dutch for-profit firms that earned at least €50 million in turnover during 2019 and had at least one branch in the Netherlands.⁷ Using these criteria, we searched Bureau van Dijk's Orbis database, which yielded a list of 479 firms.⁸ We then searched the "people" section of these firms' LinkedIn pages for MAs using the terms "management accountant," "managerial accountant," and "controller." As for concerns regarding a potential selection bias due to our use of LinkedIn for selecting respondents, we emphasize that the use of LinkedIn in the Netherlands is ubiquitous.⁹ In total, we collected the profiles of 1465 people and approached them by sending an invitation to connect on LinkedIn that specified our intention of administering a survey. Upon acceptance of the invitation, the respondents were sent a personal link that redirected them to the online survey in Qualtrics. While this approach allowed us to match survey responses to demographic data from the respondents' personal LinkedIn pages (i.e., job title, prior work experience, education, and number of LinkedIn connections), we always ensured the confidentiality of the responses. Specifically, we stored the survey responses and the data collected from LinkedIn in separate files with an identifier but without their names.

The data were collected between March 2021 and April 2022. During this period, we received a total of 300 responses, which yielded a response rate of 20.5%. While this response rate lies within the range of response rates achieved in similar surveys (Hiebl & Richter, 2018), we tested for the presence of non-response bias. We compared the responses of early and late respondents,¹⁰ assuming that late survey respondents are similar to non-respondents (Oppenheim, 1992). Our comparisons of the main variables (the MA's role, role conflict, role ambiguity, digitalization) of early and late respondents did not reveal significant differences.

Our survey consists of self-reported measures. Therefore, we took several measures to reduce concerns about potential satisficing behaviors of respondents influencing the results (Krosnick, 1991). We excluded four observations where the total duration of the response was lower than 75% of the estimated survey duration from Qualtrics. Furthermore, we considered the presence of straightliners in our data (Kim et al., 2018; Zhang et al., 2014), in line with prior studies that relied on self-reported measures in their surveys (e.g., Bastini et al., 2022). To measure straightlining, we used the two methods recommended by Kim et al. (2018)—namely, the mean root of pairs (MRP) and scale point variation (SPV) methods. We excluded 11 observations where the MRP exceeded 0.65 and

⁷ We wanted to only include midsize and large firms, similar to Maas and Matějka (2009) and Hartmann and Maas (2011). We added the criterion that firms should consist of at least one branch and a headquarters to increase the likelihood that respondents were working in diversified companies with relatively autonomous units.

⁸ We arrived at this sample by searching the Orbis database using the following criteria: (1) We selected only firms located in the Netherlands, which yielded 3,726,270 firms. (2) We only selected consolidated entities, which reduced the list to 12,282 firms. (3) We selected only firms with at least €50 million in turnover in 2019, which further reduced the list to 2630 firms. (4) We selected only firms with at least one branch in the Netherlands, which yielded the final list of 479 firms.

⁹ Specifically, LinkedIn had more than 8 million members in the Netherlands in 2023 (Statistics Netherlands, 2023a) from a Dutch working population of 10.1 million in 2023 (Statistics Netherlands, 2023b).

¹⁰ We defined early respondents as those who responded within three weeks of receiving the survey, and late respondents as those who responded after three weeks of receiving the survey.

Table 1

An overview of the expected changes in the role templates of MAs in the digital age.

Watchdog	Business partner
Expected Change: Automation of many transactional tasks and self-service by managers. Need for MAs in the watchdog role to occupy new tasks.	Expected Change: Augmentation of existing tasks. Major tasks remain similar.
Resulting Role Template: A combination of the existing watchdog role and other new roles that vary in coherence and clarity such as <i>custodian of information</i> , <i>data engineer</i> or <i>auditor of digital technologies</i> .	Resulting Role Template: Close to the current role template and narrowing down to an <i>augmented business partner</i> .

Table 2

Sample description.

Education (degree)	N	%	Experience	N	%
Secondary or vocational	7	3%	0–10 years	129	53%
Bachelor's	81	33%	10–20 years	64	26%
Master's	83	34%	>20 years	49	20%
Post-graduate	71	29%	Total	242	100%
Total	242	100%			
Gender	N	%	Management responsibility	N	%
Male	186	77%	No	145	60%
Female	56	23%	Yes	97	40%
Total	242	100%	Total	242	100%

Notes: This table presents sample characteristics (N = 242). Percentages indicate the proportion of participants that belong to the specific group.

the SPV was lower than 0.35.¹¹ Another 43 observations could not be included in the analysis because one or more items relating to the variables included in our models were missing.¹² Accordingly, for our analysis, we retained a total of 242 responses. Table 2 shows sample characteristics.

To mitigate potential common method bias (CMB), we used ex-ante procedural remedies. These include providing examples of digital technologies, using well-developed scales where possible, and separating independent and dependent variables (Podsakoff et al., 2012). Additionally, we used Harman's (1967) single-factor post-hoc test and find that the first unrotated factor explains 14.4% of the variance, which indicates an absence of severe CMB. Finally, hypotheses 2a and 2b include interaction effects. As CMB only deflates interaction effects, finding significant interaction effects despite potential CMB provides strong evidence that an interaction effect exists (Siemsen et al., 2010). Therefore, if the results of testing our hypotheses provide statistically significant interaction effects, CMB is unlikely to be severe.

3.2. Management accounting and management accountants in the Netherlands

In the Netherlands, similar to Germanic countries, MAs are referred to as “controllers” and are considered to be distinct from “accountants” (Hartmann & Maas, 2011; Maas & Matějka, 2009; Van der Steen, 2022). However, similar to the United Kingdom, this distinction is not as pronounced in the Netherlands as it is in Germanic countries (Ahrens & Chapman, 2000; Messner et al., 2008). Dutch universities, for instance, generally combine accounting and controlling in a single program (e.g., “Accounting & Control”). Similarly, while there are distinct professional certificates for MAs (“registercontroller”) and public accountants (“registeraccountant”), many MAs are certified public accountants rather than certified MAs and have prior work experience as public accountants. Dutch MAs typically have a combination of various rather general management accounting responsibilities, such as bookkeeping and budgeting, as well as a focus on either internal control and compliance or internal consulting and process improvement. To indicate this focus, job titles are often further specified, although the job title of “controller” is also commonplace. The most common specifications of the controller job title are “financial controller,” which denotes MAs whose role leans more toward internal control and compliance, and “business controller,” which denotes MAs who are responsible for internal consulting and process improvement.

¹¹ As a robustness test, we include the 15 observations that were excluded from the main analysis due to satisficing behaviors (i.e., 4 observations due to speeding and 11 observations due to straightlining) and find that the results from the main analysis still hold. We present the results in Table OA.1.

¹² Of the 43 observations with missing items, 26 observations had less than 5% of the items relating to the variables included in our models as missing. As a robustness test, we impute the missing items for these 26 observations using the MICE package in R and find that the results from our main analysis also hold when we include these imputed observations. The results are presented in Table OA.2.

Table 3
Construct validity of main variables.

Factor analysis: factor loadings and variance extracted per factor	Factor
Dependent variables	
<i>ROLCON</i>	0.843
To what extent do you agree or disagree with the following statements:	(0.561)
I have to deal with competing demands at work.	0.728
The tasks I am assigned at work rarely come into conflict with each other. (R)	0.704
The things I am told to do at work do not conflict with each other. (R)	0.736
In my job, I often feel like different people are “pulling me in different directions”.	0.808
My superiors often tell me to do two different things that can't both be done.	0.780
In my job, I'm seldom placed in a situation where one job duty conflicts with other job duties. (R)	0.734
<i>ROLAMB</i>	0.858
To what extent do you agree or disagree with the following statements:	(0.591)
I am not sure what is expected of me at work.	0.805
The requirements of my job aren't always clear.	0.837
I often don't know what is expected of me at work.	0.832
I know everything that I am expected to do at work with certainty. (R)	0.796
My job duties are clearly defined. (R)	0.603
I know what I am required to do for every aspect of my job. (R)	0.714
Independent variables	
<i>DIG</i>	0.799
For the daily work in the future (next 5 years), I expect that our F&C function will regularly make use of:	(0.558)
automation of business processes (e.g., Robotic Process Automation (RPA)).	0.727
digital platforms to source content and/or capabilities (e.g., APIs or crowdsourcing).	0.786
tools for the visualization of data (e.g., business intelligence dashboards such as Tableau).	0.589
approaches related to predictive analytics (e.g., employing regressions in a tool such as Alteryx).	0.795
approaches related to artificial intelligence or machine learning.	0.817
<i>Decision-making support</i>	0.819
Please indicate how frequently you engage into the following activities within your current position:	(0.581)
Analyzing product and customer profitability	0.713
Developing and evaluating investment opportunities	0.696
Developing new strategies for the business	0.814
Finding new ways to meet the targets of the business	0.776
Developing cost saving and revenue increasing plans for the business	0.805
<i>Watchdog</i>	0.723
Please indicate how frequently you engage into the following activities within your current position:	(0.479)
Ensuring that managers do not spend more than strictly necessary from a corporate perspective	0.605
Ensuring that managers observe all financial reporting requirements	0.802
Developing internal controls and procedures	0.591
Assessing whether managers observe agreements with corporate headquarters and adhere to company regulations	0.728
Developing performance reports for higher-level managers	0.712

Notes: The table reports the results of confirmatory factor analyses by construct for our dependent and explanatory variables. The Cronbach's alpha of each factor is indicated in italics. Factor loadings of the items are indicated in bold. The variance extracted for each factor analysis is indicated in parentheses. *ROLCON* refers to role conflict, *ROLAMB* refers to role ambiguity, and *DIG* refers to the anticipated digitalization of the finance and control function. N = 242.

3.3. Measures

Table 3 presents the results of factor analyses by construct for our dependent and independent variables. The results of factor analyses by construct for our control variables are presented in the Appendix. We apply the principal-component factoring estimation method and use the Kaiser (1958) criterion of retaining factors with an eigenvalue that exceeds 1. As the factor loadings of all items with their respective constructs exceed 0.4, we did not exclude items from the variables.¹³ We aggregate our variables by averaging the scores of the items for each construct.¹⁴ All survey constructs are measured using 7-point Likert scales.

¹³ We also performed an exploratory factor analysis (see Table OA.3). The items generally load strongly onto their respective factors with low cross-loadings. However, the items used in constructing our variables for the anticipated digitalization of the finance and control function (*DIG*) and the use of digital technologies in the finance function (*DIGUSE*) yield a three-factor rather than a two-factor solution. Specifically, the items measuring the use and the anticipated use of data visualization technologies load poorly onto *DIG* and *DIGUSE* and instead load strongly onto a third factor. In our main analysis, we do not exclude these items, because we seek to keep a broad scope of digital technologies in our analysis and control for the current use of digital technologies. In a robustness check, we performed our analyses while excluding *DIGUSE* as well as the item measuring the anticipated use of data visualization technologies. In this case, the exploratory factor analysis yields single-factor solutions for all the included constructs (see Table OA.4).

¹⁴ As a robustness test, we rerun our analyses while constructing our variables using the factor loadings of the construct items obtained from the factor analyses by construct (see Table OA.5). We find that the results from our hypothesis tests still hold.

3.3.1. Role conflict, ambiguity, and stress

We use the scales developed by Bowling et al. (2017) to measure role conflict (*ROLCON*) and role ambiguity (*ROLAMB*). The measures each load onto one factor and show satisfactory internal consistency. The Cronbach's alpha ($C\alpha$) is 0.84 for *ROLCON*, and 0.86 for *ROLAMB*. We further create a variable for role stress (*ROLSTR*), reflecting a composite measure of role conflict and role ambiguity equal to the average of the scores of *ROLCON* and *ROLAMB*.

3.3.2. The anticipated digitalization of the finance and control function

We use a self-developed variable to operationalize the digitalization of the finance and control function, as an established way of measuring digitalization does not currently exist in the literature (Möller et al., 2020). We focus on anticipated digitalization because the diffusion of digital technologies is still in its infancy and the anticipation of this diffusion is likely to already influence the role expectations of MAs and their role senders (Firk et al., 2024). As we focus here on anticipated digitalization, we operationalize the anticipated digitalization of the finance and control function (*DIG*) by measuring the expectations regarding the extent to which the finance and control function of an MA's organization will use digital technologies in the next 5 years. We specifically consider five different digital technologies: automation of business processes, digital platforms to source content and/or capabilities, data visualization tools, predictive analytics, and AI. We consider these digital technologies because of their relevance and potential impact on management accounting. MAs may use digital platforms and AI to source large quantities of data (Arnaboldi et al., 2017; Nielsen, 2022; Warren et al., 2015). They can use predictive analytics and machine-learning techniques to analyze these data (Appelbaum et al., 2017; Brands & Holtzblatt, 2015; Ding et al., 2020; Richins et al., 2017) and report them using visualization techniques, such as digital dashboards (Reinking et al., 2020). Finally, some tasks currently performed by MAs may be automated using techniques such as RPA (Cooper et al., 2019; Kokina et al., 2021). The $C\alpha$ for *DIG* is 0.80.

3.3.3. Relative emphasis on the watchdog role over the business partner role

We conceptualize the MA's role as a hybrid role in which an MA performs tasks and responsibilities corresponding to both the watchdog and business partner templates, but often with a stronger emphasis on either of these templates. In line with this concept, we operationalize the MA's role as the MA's relative emphasis on the watchdog role over the business partner role.¹⁵ To measure the extent to which MAs perform business partner duties, we use the variable for decision-making support developed by Matějka and Maas (2009) (5 items; $C\alpha = 0.82$). We use the watchdog variable developed by Hartmann and Maas (2011) to measure the extent to which MAs perform watchdog duties (5 items; $C\alpha = 0.72$). We obtain our variable of interest, *WDtoBP*, by subtracting the mean of the items corresponding to the decision-making support measure from that of the items corresponding to the watchdog measure. *WDtoBP* equals 0 if an MA equally emphasizes each role, -6 if the MA fully focuses on the business partner role, and 6 if the MA fully focuses on the watchdog role. *WDtoBP* thus measures the relative emphasis of the MA on the watchdog over the business partner role.

3.3.4. Control variables

We include several control variables in the analysis. First, we include the level of digital technology use in the finance and control function of the MA's organization (*DIGUSE*) (5 items; $C\alpha = 0.70$) to account for increased levels of role conflict and ambiguity as a result of recent digital technology implementations.¹⁶ Second, we control for the presence of a digital strategy (*DIGSTRAT*) using an indicator variable, as it may be related to digitalization within the organization and reduce role conflict and ambiguity. Furthermore, we control for technological savviness (*TECHSAVVY*) (4 items; $C\alpha = 0.83$), based on Geissler and Edison (2005) and Wixom and Todd (2005), because an MA's affinity with digital technologies is likely to be correlated with digitalization, and an MA who is high in technological savviness is likely to be able to more clearly disentangle and interpret their role expectations for the digital age. To control for the degree to which MAs can influence the digitalization of their roles, we include digital authority (*DIGAUTH*) (4 items; $C\alpha = 0.87$) (adapted from Tiwana & Konsynski, 2010). We also include a measure of digital outcome expectations (*DIGOUTCEXP*) (6 items; $C\alpha = 0.83$), adapted from Venkatesh et al. (2003), to control for the degree to which MAs believe their work could benefit from digitalization. In addition, we control for the degree to which the MA's functional superior engages in transformational leadership (*TRANSFLEAD*) (7 items; $C\alpha = 0.91$) (Carless et al., 2000), whether the MA has management responsibility (*MGMTRES*), and for the size of the finance and control function (*F&CSIZE*). Transformational leadership may affect the role conflict and ambiguity experienced by MAs, an MA with management responsibility may have more authority in using digital technologies, and functional size proxies for the amount of resources available to the organization for investing in digitalization and supporting MAs. We further control for the respondents' gender (*GENDER*), which equals 1 if the respondent is female and 0 if they are male. Finally, we control for respondents' experience in finance and control using two indicator variables. *EXP(10–20)* equals 1 if the respondent has between 10 and 20 years of experience, and 0 otherwise. *EXP(>20)* is a dummy that equals 1 if the respondent has more than 20 years of experience, and

¹⁵ Prior literature on the roles of MAs describes a third role template in addition to the watchdog and business partner roles, namely the "scorekeeper" (Fourné et al., 2023). As we were unsure whether this third role exists in the Dutch context of our study, we explored this possibility, using the "scorekeeper" survey measure from Bechtoldt et al. (2016). Because the results of a factor analysis of the items corresponding to the three roles did not reveal a unique factor for the scorekeeper in our sample, we excluded the items for the scorekeeper from our analysis.

¹⁶ As a robustness test, we check whether our results are driven by organizations that are at a particular stage of digitalization. To do so, we perform a subgroup analysis by splitting our sample at the median of *DIGUSE* (see Table OA.6). If our results are driven by MAs in organizations that are at a particular stage of digitalization, we should find significant differences in the size of the coefficients of the interaction term *WDtoBP* * *DIG*. A Chow test indicates that the magnitude of the interaction is not significantly different between the two subgroups ($\chi^2 = 0.08$; $p = 0.782$).

0 otherwise.

3.4. Models

To test our hypotheses, we employ OLS regressions. For all the models in the main analysis, we calculate P-values using firm-clustered standard errors, as we have multiple observations per firm in 51 out of the 153 firms in our sample, with up to 6 observations per firm.¹⁷ All variables that are part of an interaction effect are mean-centered. Below, we present the OLS regression model specifications used to test our hypotheses. To test the association between digitalization and role conflict and ambiguity (H1), we estimate the following model:

$$ROLVAR = \beta_0 + \beta_1 DIG + \beta_2 WDtoBP + \beta_3 CONTROLS + \epsilon \quad [1]$$

To investigate how the MA's relative emphasis on the watchdog over the business partner role moderates the association between digitalization and role conflict and ambiguity (H2), we add the interaction term $WDtoBP * DIG$ to [1]:

$$ROLVAR = \beta_0 + \beta_1 WDtoBP + \beta_2 DIG + \beta_3 WDtoBP * DIG + \beta_4 CONTROLS + \epsilon \quad [2]$$

ROLVAR denotes the dependent variable, which is either role conflict or role ambiguity. We additionally estimate the models using role stress as the dependent variable. *CONTROLS* is a vector of control variables that comprises *DIGUSE*, *DIGSTRAT*, *TECHSAVVY*, *DIGAUTH*, *DIGOUTCEXP*, *TRANSFLEAD*, *MGMTRES*, *F&CSIZE*, *GENDER*, *EXP(10–20)*, and *EXP(>20)*.

4. Results

4.1. Descriptive and correlation statistics

Table 4 presents descriptive statistics. A few observations stand out. On average, the MAs in our sample seem to have a role in which they emphasize the watchdog and business partner roles in roughly equal amounts, which is in line with prior research (e.g., Hartmann & Maas, 2011). Furthermore, MAs are relatively high in technological savviness and expect their work to benefit from digitalization. Correlation statistics are reported in Table 5 and indicate that multicollinearity does not pose a serious issue.

4.2. Main analysis

Table 6 reports the results of our hypothesis tests. For H1a and H1b, we predicted a positive association between the anticipated digitalization of the finance and control function and MAs' role conflict and ambiguity, respectively. To test these hypotheses, we estimate the model specified in equation [1]. The results of these tests are presented in Table 6. Model 1a tests H1a using role conflict as the dependent variable, and Model 1b tests H1b using role ambiguity as the dependent variable. We additionally estimate Model 1c using role stress as the dependent variable. The coefficient of digitalization is statistically non-significant in Model 1a (–0.034; $p > 0.10$), Model 1b (–0.058; $p > 0.10$), and Model 1c (–0.093; $p > 0.10$), which means that we do not find evidence in support of H1a and H1b.

For H2a and H2b, we predicted a positive interaction effect of the MA's relative emphasis on the watchdog role over the business partner role and digitalization on role conflict and ambiguity, such that the relationships between digitalization and role conflict and ambiguity become more positive the more the MA emphasizes the watchdog role over the business partner role. We estimate the model specified in equation [2] to test these hypotheses. The results of these tests are presented in the last three columns of Table 6. Model 2a tests H2a using role conflict as the dependent variable, and Model 2b tests H2b using role ambiguity as the dependent variable. We also estimate Model 2c using role stress as the dependent variable.

The results provide statistical support in favor of our hypotheses. We find statistically significant positive coefficients for the interaction effects in Model 2a (0.107; $p < 0.01$), Model 2b (0.068; $p < 0.05$), and Model 2c (0.088; $p < 0.01$). We thus find that the association between the anticipated digitalization of the finance and control function and the role conflict and ambiguity of MAs is stronger for MAs who focus on the watchdog role than for MAs who focus on the business partner role. Therefore, we find statistical evidence supporting H2a and H2b.

We further perform a simple slope analysis (see Table OA.7) and find that the marginal effects of digitalization on role stress are significantly negative for MAs with a strong focus on the business partner role (–0.277; $p < 0.01$), but significantly positive for MAs with a strong focus on the watchdog role (0.174; $p < 0.05$). Fig. 2 plots these results, which are particularly interesting in light of our hypotheses. Whereas we expected digitalization to be positively associated with role conflict and ambiguity, the results indicate that digitalization acts as a double-edged sword for the management accounting profession. In the face of increasing digitalization, MAs who focus on the watchdog role experience an increase in role stress, whereas MAs who focus on the business partner role experience a decrease in role stress.

¹⁷ In untabulated analyses, we estimate our models using heteroskedasticity-robust standard errors and find that our results also hold.

Table 4
Descriptive statistics.

Variable	N	Mean	S.D.	Min.	Median	Max.
<i>ROLCON</i>	242	3.54	1.14	1.17	3.50	6.67
<i>ROLAMB</i>	242	2.91	1.04	1.00	2.67	6.00
<i>ROLSTR</i>	242	3.23	0.93	1.25	3.08	6.00
<i>DIG</i>	242	5.27	1.09	1.00	5.40	7.00
<i>WDtoBP</i>	242	0.08	1.29	-3.40	0.00	3.80
<i>DIGUSE</i>	242	3.78	1.13	1.00	3.80	6.40
<i>DIGSTRAT</i>	242	0.51	0.50	0.00	1.00	1.00
<i>TECHSAVVY</i>	242	4.77	1.14	1.00	5.00	7.00
<i>DIGAUTH</i>	242	3.22	1.38	1.00	3.00	7.00
<i>DIGOUTCEXP</i>	242	5.81	0.70	4.00	5.83	7.00
<i>TRANSFLEAD</i>	242	5.24	1.02	1.71	5.43	7.00
<i>MGMTRES</i>	242	0.40	0.49	0.00	0.00	1.00
<i>F&CSIZE</i>	242	0.30	0.46	0.00	0.00	1.00
<i>GENDER</i>	242	0.23	0.42	0.00	0.00	1.00
<i>EXP(10–20)</i>	242	0.26	0.50	0.00	0.00	1.00
<i>EXP(>20)</i>	242	0.21	0.41	0.00	0.00	1.00

Notes: This table presents the descriptive statistics of our variables. *ROLCON* refers to role conflict, *ROLAMB* refers to role ambiguity, *ROLSTR* refers to role stress, *WDtoBP* refers to the MA's relative emphasis on the watchdog role over the business partner role, and *DIG* refers to the anticipated digitalization of the finance and control function. See the Appendix for the descriptions of our control variables.

Table 5
Correlation statistics.

Panel A: 1–8									
Variables	N	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) <i>ROLCON</i>	242	1.00							
(2) <i>ROLAMB</i>	242	0.44***	1.00						
(3) <i>ROLSTR</i>	242	0.86***	0.83***	1.00					
(4) <i>DIG</i>	242	-0.01	-0.10	-0.07	1.00				
(5) <i>WDtoBP</i>	242	0.06	0.06	0.07	-0.06	1.00			
(6) <i>DIGUSE</i>	242	-0.07	-0.15**	-0.13**	0.56***	-0.09	1.00		
(7) <i>DIGSTRAT</i>	242	0.10	-0.09	0.01	0.15***	-0.08	0.24***	1.00	
(8) <i>TECHSAVVY</i>	242	-0.01	-0.13**	-0.08	0.32***	0.00	0.26***	0.12*	1.00
(9) <i>DIGAUTH</i>	242	0.05	-0.11*	-0.03	0.11*	-0.08	0.08	0.01	0.34***
(10) <i>DIGOUTCEXP</i>	242	0.16**	0.07	0.14**	0.41***	0.06	0.20***	-0.03	0.42***
(11) <i>TRANSFLEAD</i>	242	-0.24***	-0.36***	-0.35***	0.30***	-0.02	0.40***	0.15**	0.14**
(12) <i>MGMTRES</i>	242	0.01	-0.10	-0.05	0.09	-0.08	0.03	-0.04	0.10
(13) <i>F&CSIZE</i>	242	0.11*	-0.03	0.05	0.11*	0.05	0.20***	0.17***	0.20***
(14) <i>GENDER</i>	242	-0.02	-0.01	-0.02	0.08	0.13**	0.01	0.05	-0.13**
(15) <i>EXP(10–20)</i>	242	0.07	-0.05	0.02	0.00	-0.01	0.07	-0.01	-0.13**
(16) <i>EXP(>20)</i>	242	-0.14**	-0.23***	-0.22***	-0.06	-0.03	0.07	-0.04	0.10

Panel B: 9–16									
Variables	N	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(9) <i>DIGAUTH</i>	242	1.00							
(10) <i>DIGOUTCEXP</i>	242	0.15**	1.00						
(11) <i>TRANSFLEAD</i>	242	0.09	0.14**	1.00					
(12) <i>MGMTRES</i>	242	0.39***	-0.06	-0.10	1.00				
(13) <i>F&CSIZE</i>	242	-0.01	0.05	0.12*	-0.03	1.00			
(14) <i>GENDER</i>	242	-0.15**	0.05	0.02	-0.11*	0.01	1.00		
(15) <i>EXP(10–20)</i>	242	0.11*	-0.08	0.04	0.18***	0.02	0.00	1.00	
(16) <i>EXP(>20)</i>	242	0.04	-0.01	-0.04	0.30***	-0.01	-0.08	-0.30***	1.00

Notes: This table reports the correlation statistics of our variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5. Robustness tests and additional analyses

We conduct several robustness tests and additional analyses. First, we test our hypotheses using an alternative method—namely, partial least squares SEM (PLS-SEM). Second, we test whether our results are robust to alternative specifications of our variable for the MA's role. We further perform additional explorative analyses. We first test two corollaries of our theorizing by considering the influence of multiple role senders on the role conflict and ambiguity of MAs in the context of digitalization. Finally, we test whether a specific digital technology (e.g., AI) drives the association between the anticipated digitalization of the finance and control function and role stress. In the following, we describe the tests in more detail.

Table 6
OLS regression results for the models testing H1 & H2.

DV	Pred.	Model 1a	Model 1b	Model 1c	Model 2a	Model 2b	Model 2c
		ROLCON	ROLAMB	ROLSTR	ROLCON	ROLAMB	ROLSTR
<i>DIG</i>	+	-0.034 (0.345)	-0.058 (0.169)	-0.046 (0.212)	-0.041 (0.318)	-0.062 (0.150)	-0.052 (0.185)
<i>WDtoBP</i>		0.046 (0.415)	0.030 (0.520)	0.038 (0.364)	0.038 (0.485)	0.025 (0.578)	0.031 (0.423)
<i>WDtoBP * DIG</i>	+				0.107*** (0.008)	0.068** (0.013)	0.088*** (0.003)
<i>DIGUSE</i>		-0.020 (0.786)	0.074 (0.279)	0.027 (0.636)	-0.020 (0.794)	0.074 (0.274)	0.027 (0.626)
<i>DIGSTRAT</i>		0.347** (0.011)	-0.074 (0.547)	0.136 (0.186)	0.306** (0.022)	-0.100 (0.417)	0.103 (0.311)
<i>TECHSAVVY</i>		-0.119 (0.160)	-0.127* (0.096)	-0.123* (0.063)	-0.128 (0.133)	-0.133* (0.085)	-0.130* (0.051)
<i>DIGAUTH</i>		0.060 (0.340)	-0.031 (0.594)	0.014 (0.780)	0.068 (0.277)	-0.027 (0.650)	0.020 (0.687)
<i>DIGOUTCEXP</i>		0.416*** (0.001)	0.270*** (0.004)	0.343*** (0.000)	0.440*** (0.001)	0.285*** (0.003)	0.363*** (0.000)
<i>TRANSLEAD</i>		-0.320*** (0.000)	-0.389*** (0.000)	-0.355*** (0.000)	-0.324*** (0.000)	-0.392*** (0.000)	-0.358*** (0.000)
<i>MGMTRES</i>		0.069 (0.670)	0.015 (0.919)	0.042 (0.741)	0.055 (0.735)	0.006 (0.969)	0.030 (0.811)
<i>F&CSIZE</i>		0.337** (0.045)	0.076 (0.625)	0.206 (0.125)	0.397** (0.016)	0.115 (0.457)	0.256* (0.052)
<i>GENDER</i>		-0.137 (0.455)	-0.150 (0.356)	-0.144 (0.300)	-0.096 (0.603)	-0.124 (0.450)	-0.109 (0.431)
<i>EXP(10-20)</i>		0.090 (0.605)	-0.294* (0.080)	-0.102 (0.470)	0.085 (0.618)	-0.297* (0.069)	-0.106 (0.430)
<i>EXP(>20)</i>		-0.379** (0.033)	-0.731*** (0.000)	-0.555*** (0.000)	-0.392** (0.024)	-0.740*** (0.000)	-0.566*** (0.000)
<i>CONS</i>		3.207*** (0.000)	4.390*** (0.000)	3.799*** (0.000)	2.939*** (0.001)	4.029*** (0.000)	3.484*** (0.000)
N		242	242	242	242	242	242
R ²		0.172	0.245	0.245	0.190	0.254	0.264

Notes: ***p < 0.01, **p < 0.05, *p < 0.1.

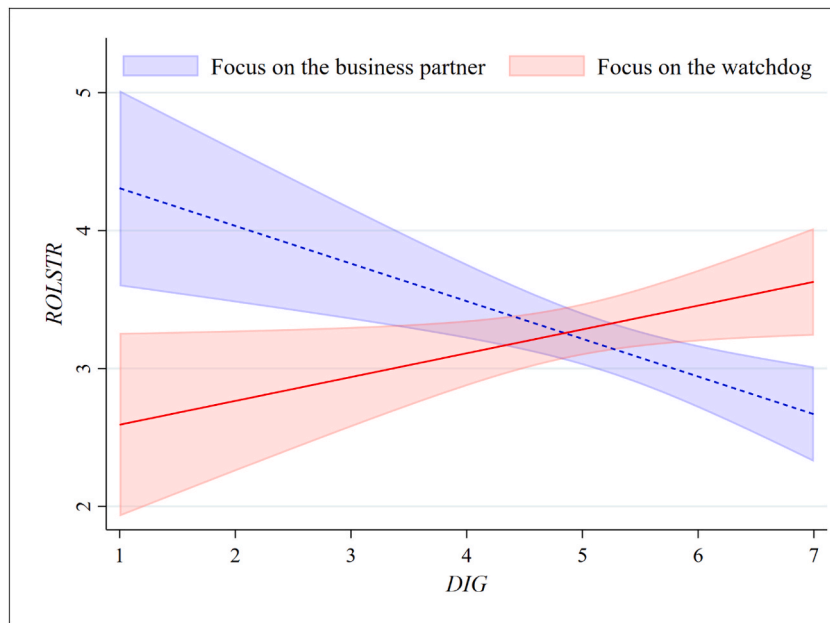
This table presents the results of OLS regressions related to tests of our hypotheses. P-values are shown in parentheses below their corresponding coefficients. All models include firm-clustered standard errors. All variables that are part of an interaction effect are mean-centered. The models use one-tailed significance tests for the hypothesized coefficients and two-tailed significance tests for the remaining coefficients. *ROLCON* refers to role conflict, *ROLAMB* refers to role ambiguity, *ROLSTR* refers to role stress, *DIG* refers to the anticipated digitalization of the finance and control function, and *WDtoBP* refers to the MA's relative emphasis on the watchdog role over the business partner role. See the Appendix for the descriptions of our control variables.

5.1. Robustness test using partial least squares structural equation modeling

As a first robustness check, we test our hypotheses using PLS-SEM,¹⁸ which allows us to test the measurement model and simultaneously estimate both role conflict and role ambiguity in a single structural model, while also including role stress as a second-order construct of role conflict and role ambiguity. Tests of the measurement model suggest an overall good model fit.¹⁹ We present estimates of the structural model using PLS-SEM in Table 7. While we do not find a significant path from the anticipated digitalization of the finance and control function to the role conflict, role ambiguity, and role stress of MAs in Model 3a, we find significantly positive paths from the interaction term between *DIG* and *WDtoBP* to role conflict, role ambiguity, and role stress in Model 3b. The results obtained using PLS-SEM are therefore highly consistent with the results obtained using OLS in the main analysis.

¹⁸ We also test our hypotheses using covariance-based SEM in Table OA.8. Estimating both the full model from our main analysis as well as a trimmed model, we again find significantly positive paths from the interaction term between *DIG* and *WDtoBP* to role conflict, role ambiguity, and role stress.

¹⁹ We assess the measurement model in Table OA.9. We calculate the average variance extracted (AVE), composite reliability (CR), α , and heterotrait-monotrait (HTMT) ratios for the constructs in the full measurement model. We adopt the following thresholds from prior literature (Hair et al., 2019; Henseler et al., 2015): AVE > 0.50, 0.70 < CR < 0.95, α > 0.70, and HTMT < 0.85. We find that all constructs satisfy recommended thresholds, except for *DIGUSE*. Specifically, we find that the AVE for *DIGUSE* is 0.454. We further find that the indicator for data visualization loads poorly onto *DIG*. Therefore, in an untabulated analysis, we estimate the same models while dropping the latent control variable *DIGUSE* and excluding the indicator for data visualization from *DIG*. We find that our results still hold.



Notes: This graph presents a margins plot of the association between the anticipated digitalization of the finance and control function (*DIG*) and MAs' role stress (*ROLSTR*) for MAs that focus on the business partner role (*WDtoBP*, -2 SD) and MAs that focus on the watchdog role (*WDtoBP*, +2 SD). *ROLSTR* is a composite measure consisting of the average scores of role conflict and role ambiguity. For purposes of readability, *DIG* is not mean-centered.

Fig. 2. A margins plot of the moderating influence of the MA's role.

Table 7
Results of tests using PLS-SEM.

DV	Pred.	Model 3a			Model 3b		
		<i>ROLCON</i>	<i>ROLAMB</i>	<i>ROLSTR</i>	<i>ROLCON</i>	<i>ROLAMB</i>	<i>ROLSTR</i>
<i>DIG</i>	+	-0.027 (0.381)	-0.087 (0.148)	-0.068 (0.204)	-0.028 (0.377)	-0.087 (0.144)	-0.069 (0.198)
<i>WDtoBP</i>		0.030 (0.641)	0.024 (0.707)	0.032 (0.287)	0.027 (0.688)	0.023 (0.650)	0.029 (0.600)
<i>WDtoBP</i> * <i>DIG</i>	+				0.113** (0.044)	0.077* (0.072)	0.111** (0.031)
Controls included			yes			yes	
N			242			242	
Bootstraps			5000			5000	
R ²		0.206	0.279	1.000	0.218	0.285	1.000

Notes: ***p < 0.01, **p < 0.05, *p < 0.1.

This table reports the results of hypothesis tests using PLS-SEM. In this table, we only report the estimates of the structural model. We assess the measurement model in Table OA.8. P-values are reported in parentheses below their corresponding coefficients. We report one-sided p-values for coefficients with a prediction and two-sided p-values for the other coefficients. *ROLCON* refers to role conflict, *ROLAMB* refers to role ambiguity, *ROLSTR* refers to role stress, *DIG* refers to the anticipated digitalization of the finance and control function, and *WDtoBP* refers to the MA's relative emphasis on the watchdog role over the business partner role. See the Appendix for the descriptions of our control variables.

5.2. Robustness test using alternative specifications for the management accountant's role

We further test whether our results are driven by our specification of the MA's role. In our main analysis, we construct a single continuous variable measuring MAs' relative emphasis on the watchdog role over the business partner role. Now, we construct alternative, separate measures for these roles, which we name *Svy_WD* and *Svy_BP*. Using these variables, we re-estimate the full model from the main analysis. The results displayed in Panel A of Table 8 show a positive and significant coefficient of the interaction term between *Svy_WD* and *DIG* in Model 4a (0.085; p < 0.05) and a negative and marginally significant coefficient of the interaction term between *Svy_BP* and *DIG* in Model 4b (-0.053; p < 0.10). Moreover, when both role variables are included as moderators in Model 4c, the interaction terms between *Svy_WD* and *DIG* (0.105; p < 0.05) and *Svy_BP* and *DIG* (-0.076; p < 0.05) again show the expected signs and are statistically significant.

Table 8
Robustness tests of alternative measures for the MA's role.

Panel A: Separate survey constructs for the business partner and watchdog roles				
DV	Pred.	Model 4a	Model 4b	Model 4c
		ROLSTR	ROLSTR	ROLSTR
<i>DIG</i>	+	-0.060 (0.294)	-0.045 (0.408)	-0.056 (0.322)
<i>Svy_WD</i>		0.083 (0.135)		0.080 (0.155)
<i>Svy_WD * DIG</i>	+	0.085** (0.028)		0.105** (0.011)
<i>Svy_BP</i>			0.036 (0.425)	0.010 (0.816)
<i>Svy_BP * DIG</i>	-		-0.053* (0.095)	-0.076** (0.027)
Controls included		yes	yes	yes
N		242	242	242
R ²		0.263	0.249	0.272
Panel B: Indicator variables for the business partner and watchdog roles using LinkedIn data				
DV	Pred.	Model 5a	Model 5b	Model 5c
		ROLSTR	ROLSTR	ROLSTR
<i>DIG</i>	+	-0.172 (0.143)	-0.070 (0.545)	-0.141 (0.246)
<i>LI_WD</i>		-0.508 (0.149)		-0.487 (0.175)
<i>LI_WD * DIG</i>	+	0.390* (0.060)		0.355* (0.081)
<i>LI_BP</i>			0.243 (0.364)	0.178 (0.516)
<i>LI_BP * DIG</i>	-		-0.698*** (0.009)	-0.626** (0.015)
Controls included		yes	yes	yes
N		242	242	242
R ²		0.258	0.252	0.265

Notes: ***p < 0.01, **p < 0.05, *p < 0.1.

The table presents OLS regression results of estimating models that include alternative measures for the MA's role. In panel A, we separately use the survey scales we used to construct our continuum-based measure in the main analysis. In panel B, we use indicator variables for the business partner and watchdog roles based on LinkedIn data. P-values are shown in parentheses below their corresponding coefficients. All models include firm-clustered standard errors. All variables that are part of an interaction effect are mean-centered. The models use one-tailed significance tests for the hypothesized coefficients and two-tailed significance tests for the remaining coefficients. *ROLSTR* refers to role stress, *DIG* refers to the anticipated digitalization of the finance and control function, *Svy_WD* refers to the degree to which the MA performs watchdog tasks, *Svy_BP* refers to the degree to which the MA performs decision-making support tasks, *LI_WD* refers to a variable based on LinkedIn data measuring whether the MA is a watchdog, and *LI_BP* refers to a variable based on LinkedIn data measuring whether the MA is a business partner.

Second, we construct two indicator variables, namely *LI_WD* and *LI_BP*, based on the MA's educational background, prior work experience, and job title, which we collected from their LinkedIn profile, similar to Fang and Hope (2021). By using LinkedIn data, we can validate our model using data from a different source than our survey. *LI_WD* equals 1 if the MA's job title contains "financial controller" or "group controller,"²⁰ and they have an educational or professional background in compliance or auditing, and 0 otherwise. *LI_BP* equals 1 if the MA's job title contains "business controller" or "business partner," and they have an educational background in finance and control,²¹ and 0 otherwise. We tested the correlation between the indicator variables and *WDtoBP*. We find a positive correlation (0.35; p < 0.05) between *WDtoBP* and *LI_WD*, and a negative correlation (-0.12; p < 0.10) between *WDtoBP* and *LI_BP*. Of the 242 MAs in our sample, based on the LinkedIn data, we classify 27 (11.2%) MAs as watchdogs and 22 (9.1%) as business partners. Using these variables, we re-estimate the full model from the main analysis and present the results in Panel B of Table 8. We find a positive and marginally significant interaction between *LI_WD* and *DIG* in Model 5a (0.390; p < 0.10) and Model 5c (0.355; p < 0.10), and a significantly negative interaction between *LI_BP* and *DIG* in Model 5b (-0.698; p < 0.01) and Model 5c (-0.626; p < 0.05). These findings are in line with the results of the main analysis. Notably, we again find digitalization to be a double-edged sword. While

²⁰ A group controller is often located at a head office of a business group, which is a group of firms operating as one entity. In this capacity, they have financial oversight and ensure control, which aligns well with the watchdog role.

²¹ We classified an MA as having an educational background in finance and control if they are a certified controller ("registercontroller"), qualified controller (QC), registered project controller, certified management accountant (CMA), or they completed a degree with a title that contains "control" and does not contain "accounting" or "auditing."

digitalization is associated with increased role stress for watchdog-oriented MAs, it is associated with reduced role stress for MAs focused on the business partner role.

5.3. Additional analysis exploring the influence of multiple role senders

Thus far, we have theorized that the access of MAs and their role senders to a coherent and clear role template for the digital age influences the role stress of MAs when facing the digitalization of the finance and control function. Based on our theorizing, we expect this influence to be more pronounced for MAs who are exposed to a greater number of role senders. We focus on two contexts in which this is presumably the case: MAs with dual accountability and MAs with strong embeddedness in a professional network.

5.3.1. Dual accountability

MAs can provide services to business-unit managers, corporate managers, or both (Maas & Matějka, 2009). If an MA provides services to both types of managers, they have dual accountability and also receive role expectations from both types of managers. Triggered by digitalization, business-unit and corporate managers may both revise their role expectations for MAs in the digital age. If the expectations of the MA, business-unit manager, and corporate manager regarding the MA's role in the digital age are all grounded in a shared role template, they are more likely to be aligned. In this case, the MA's role senders may even complement each other in the way in which they communicate coherent role expectations. Access to a coherent and clear role template may therefore strongly reduce the role stress of an MA if they have dual accountability. However, the inverse is also likely to be the case, such that an MA who lacks access to a coherent and clear role template may receive more heterogeneous and potentially conflicting role expectations if they have dual accountability. For these reasons, we expect that when digitalization increases, MAs focusing on the watchdog (business partner) role experience even greater (less) role stress when they have dual accountability to business-unit and corporate managers.

To operationalize dual accountability (*DUALACC*), we use a dummy variable that equals 1 if the MA provides services to both business-unit and corporate managers, and 0 otherwise. Using this variable, we perform a subgroup analysis to test the interaction effect between *WDtoBP* and *DIG* on role stress for MAs with and without dual accountability. The results of this analysis are presented in Models 6a and 6b in Table 9. The coefficient for the interaction term *WDtoBP * DIG* in Model 6a is positive and non-significant (0.043; $p > 0.10$), while it is significantly positive in Model 6b (0.311; $p < 0.01$). Using a Chow test to compare the coefficients from the two models, we further find that the coefficient in Model 6b is statistically significantly higher than the coefficient in Model 6a ($\chi^2 = 11.96$; $p < 0.01$).²² These findings indicate that access to a coherent and clear role template can align and clarify the role expectations of multiple role senders in the context of digitalization.

5.3.2. Professional network

MAs also have role senders outside of the organization, such as other MAs and management accounting institutions, in their professional networks (Goretzki et al., 2013). Individuals generally use social networks to obtain information and career development opportunities (Garg & Telang, 2018; Granovetter, 1973). MAs may, when faced with the digitalization of the finance and control function, particularly compare the role templates circulating in their professional networks to their extant role when reflecting on their potential role in the digital age. These MAs may be especially exposed to signals and templates that fit their extant role. Therefore, MAs who focus on the watchdog role are, if they are strongly embedded in a professional network, more likely to be heavily exposed to the multitude of potential role templates for watchdogs in the digital age. In contrast, MAs who focus on the business partner role are, when strongly embedded in a professional network, more likely to observe the continued relevance and relative clarity of the business partner role as a role template for the digital age. For these reasons, we expect that MAs focusing on the watchdog (business partner) role, who are well embedded in a professional network, particularly experience greater (less) role stress when faced with digitalization than the less embedded MAs in similar roles.

We operationalize an MA's embeddedness in a professional network based on Garg and Telang (2018) by using the number of connections the MA has on LinkedIn. We create the variable professional network (*PROFNET*), which is an indicator variable that equals 1 if the MA had more than 800 connections (top quartile), and 0 otherwise.²³ Using this variable, we perform a subgroup analysis to test the interaction effect between *WDtoBP* and *DIG* on role stress for MAs who are well embedded in a professional network and for MAs who are less embedded in a professional network. The results of this analysis are presented in Models 7a and 7b in Table 9. The coefficient for the interaction term *WDtoBP * DIG* is positive and non-significant in Model 7a (0.021; $p > 0.10$) but significantly positive in Model 7b (0.190; $p < 0.01$). Using a Chow test to compare the coefficients from the two models, we further find that the coefficient in Model 7b is significantly higher than the coefficient in Model 7a ($\chi^2 = 10.01$; $p < 0.01$).²⁴ These findings indicate that embeddedness in a professional network — and thereby being more exposed to role templates — further strengthens the positive (negative) association between digitalization and role stress for MAs in the watchdog (business partner) role.

²² In an untabulated analysis, we also estimate a model in which we include a three-way interaction between *DUALACC*, *WDtoBP*, and *DIG*, and find that the coefficient of the three-way interaction term is positive and statistically significant.

²³ We also created variables classifying MAs as being well embedded in a professional network if the MA had more than 689 connections (top tertile) and 870 connections (top quintile) on LinkedIn (see Table OA.10). Our results remain unchanged.

²⁴ In an untabulated analysis, we also estimate a model in which we include a three-way interaction between *PROFNET*, *WDtoBP*, and *DIG*, and find that the coefficient of the three-way interaction term is positive and statistically significant.

Table 9
Cross-sectional tests for dual accountability and professional network.

DV	Pred.	Model 6a	Model 6b	Model 7a	Model 7b
		<i>ROLSTR</i>	<i>ROLSTR</i>	<i>ROLSTR</i>	<i>ROLSTR</i>
Subgroup		<i>DUALACC</i>		<i>PROFNET</i>	
		No	Yes	Low	High
<i>DIG</i>		-0.061 (0.386)	0.098 (0.474)	-0.032 (0.701)	-0.099 (0.320)
<i>WDtoBP</i>		0.019 (0.665)	0.065 (0.503)	-0.008 (0.876)	0.114 (0.128)
<i>WDtoBP * DIG</i>	+	0.043 (0.238)	0.311*** (0.000)	0.021 (0.646)	0.190*** (0.000)
Controls included		yes	yes	yes	yes
Chow test		11.96 (p = 0.001)		10.01 (p = 0.002)	
N		197	45	163	57
R ²		0.304	0.402	0.233	0.442

Notes: ***p < 0.01, **p < 0.05, *p < 0.1.

This table presents the results of OLS regressions and Chow tests. Models 5a and 5b show the results of a subgroup analysis for *DUALACC*. *DUALACC* measures whether the MA provides services to both corporate and business-unit managers, or not. Model 5a includes the MAs without a dual accountability, while Model 5b includes the MAs with a dual accountability. Models 6a and 6b show the results of a subgroup analysis for *PROFNET*. *PROFNET* measures whether the MA is in the top quartile of MAs in terms of their number of LinkedIn connections. The observations in the bottom three quartiles are included in Model 6a, while Model 6b includes the observations that are in the top quartile for *PROFNET*. We test the significance of the difference in *WDtoBP * DIG* between Model 5a and Model 5b, and between Model 6a and Model 6b using a Chow test. P-values are shown in parentheses below their corresponding coefficients. All models include firm-clustered standard errors. All variables that are part of an interaction effect are mean-centered. The models use one-tailed significance tests for the hypothesized coefficients and two-tailed significance tests for the remaining coefficients. *ROLSTR* refers to role stress, *DIG* refers to the anticipated digitalization of the finance and control function, and *WDtoBP* refers to the MA's relative emphasis on the watchdog role over the business partner role.

5.4. Additional analysis considering individual digital technologies

One of the defining differences between digitalization and IT implementations is that digitalization concerns an array of digital technologies that can be combined and reapplied, whereas IT implementations revolve around a single technology (e.g., an ERP system) that cannot be combined and reapplied (Baiyere et al., 2023). Therefore, we test whether the results of our main analysis are driven by the overall advent of digital technologies or by a single digital technology. To do so, we explore how the MA's role interacts with each individual digital technology underlying the digitalization construct to affect the MA's role stress—namely, automation, data platforms, data visualization, predictive analytics, and AI. The results are presented in Table 10. Models 8a to 8e all yield positive and similarly sized coefficients for the interaction effects. We interpret these results as an indication that the association between digitalization and MAs' role stress is not driven by any particular technology, but rather by the overall advent of digital technologies. For example, it is likely that multiple individual digital technologies are implemented simultaneously and in combination as part of a single digitalization initiative.²⁵

6. Discussion and conclusion

This study set out to investigate the association between the digitalization of the finance and control function and MAs' role conflict and ambiguity. Drawing on role theory, we argued that digitalization positively relates to MAs' role conflict and ambiguity and that their extant role moderates these relationships. Using survey data collected from 242 MAs in Dutch firms, we find that the influence of digitalization on role conflict and ambiguity depends on the relative emphasis of an MA on the watchdog role over the business partner role. Digitalization is associated with more role ambiguity and conflict for MAs with a strong watchdog orientation, but with less role ambiguity and conflict for MAs with a strong business partner orientation. In additional tests, we show that this relationship is stronger in the context of multiple role senders, substantiating that a coherent and clear role template can align and clarify the role expectations of multiple role senders, but also that the lack of such a role template can give rise to further role stress. We further show that the influence of digitalization is not driven by any individual digital technology, but is related to the overall advent of digital technologies.

Our study contributes to the literature on the roles of MAs in several ways. First, prior literature has mainly conceptually considered

²⁵ In Table OA.11, we explore whether technologies related to augmentation or automation differently influence the role stress of watchdog-oriented MAs and business partner-oriented MAs. We create a cluster of digital automation technologies and a cluster of digital augmentation technologies and interact these digital technology clusters with the watchdog and business partner survey constructs (*Svy_WD* and *Svy_BP*). We find positive interaction coefficients between each cluster and the watchdog survey construct, and negative interaction coefficients between each cluster and the business partner survey construct. We interpret these findings as further evidence that MAs' role stress is driven by the overall advent of digital technologies rather than individual digital technologies.

Table 10
Additional tests using individual digital technologies.

DV	Pred.	Model 8a	Model 8b	Model 8c	Model 8d	Model 8e
		ROLSTR	ROLSTR	ROLSTR	ROLSTR	ROLSTR
		Automation	Digital platforms	Data visualization	Predictive analytics	AI
<i>DT</i>		−0.039 (0.315)	−0.002 (0.959)	0.013 (0.799)	−0.041 (0.209)	−0.017 (0.682)
<i>WDtoBP</i>		0.036 (0.375)	0.040 (0.323)	0.041 (0.316)	0.024 (0.537)	0.031 (0.429)
<i>WDtoBP * DT</i>	+	0.037* (0.099)	0.055** (0.019)	0.058** (0.040)	0.059*** (0.006)	0.052*** (0.007)
Controls included		yes	yes	yes	yes	yes
N		242	242	242	242	242
R ²		0.252	0.256	0.252	0.262	0.259

Notes: ***p < 0.01, **p < 0.05, *p < 0.1.

This table presents the results of OLS regressions related to tests using the individual digital technologies underlying our digitalization construct from the main analysis. P-values are shown in parentheses below their corresponding coefficients. All models include firm-clustered standard errors. All variables that are part of an interaction effect are mean-centered. The models use one-tailed significance tests for the hypothesized coefficients and two-tailed significance tests for the remaining coefficients. *ROLSTR* refers to role stress, *DT* refers to individual digital technologies, and *WDtoBP* refers to the MA's relative emphasis on the watchdog role over the business partner role.

the way in which MAs and management accounting in general are affected by digital technologies (Appelbaum et al., 2017; Bhimani & Willcocks, 2014; Moll & Yigitbasioglu, 2019; Richins et al., 2017; Rikhardsson & Yigitbasioglu, 2018). Our empirical study provides a finer-grained perspective, revealing that digitalization acts as a double-edged sword for the management accounting profession. On the one hand, watchdog-oriented MAs are confronted with role conflict and ambiguity due to digitalization and may struggle to take advantage of digital technologies. On the other hand, our study suggests that business partner-oriented MAs are well positioned to benefit from digitalization. Given that we know from previous literature that MAs struggle with role conflict and ambiguity when trying to enact the business partner role (e.g., Byrne & Pierce, 2007, 2018; Tillema et al., 2022), the reduced role conflict and ambiguity arising from digitalization may enable MAs aspiring to this role to enact it more fully.

Second, our paper contributes to research on the ways in which organizations attempt to adapt the roles of MAs (e.g., Goretzki et al., 2013; Tillema et al., 2022; Van der Steen, 2022). We theorize that role templates can help to align and elucidate the role expectations of multiple role senders, both within and outside the organization. In particular, we argue that a lack of access to a coherent and clear role template can cause MAs to experience role conflict and ambiguity when faced with digitalization. Our results, including those related to dual accountability and embeddedness in professional networks, are consistent with this theory. As such, we highlight the importance of role templates in supporting MAs when they are confronted with a development that requires them to reconsider their roles.

Finally, our study also has broader implications for the management accounting profession and research. Prior literature and practice have mainly focused on advancing the business partner role (e.g., Brands & Holtzblatt, 2015; Järvenpää, 2007) and have emphasized a greater focus on the business partner role as a way for MAs to retain their relevance in the digital age (e.g., Appelbaum et al., 2017; Pickard & Cokins, 2015; Thomson, 2015; Wolf et al., 2015; Yigitbasioglu et al., 2023). Our study paints a positive picture for business partner-oriented MAs, suggesting that digitalization may help them overcome some of the obstacles—role conflict and ambiguity—that have hindered them when trying to enact their aspired role (Byrne & Pierce, 2007; Morales & Lambert, 2013; Tillema et al., 2022). However, our study also suggests that in their attempts to advance the business partner role, prior literature and practice may have neglected watchdog-oriented MAs. These MAs lack a coherent and clear role template for the digital age and consequently experience greater role conflict and ambiguity when faced with digitalization. This, we suggest, is problematic. Watchdogs add value to their organizations by preventing managers from engaging in value-destroying behaviors and keeping the organization in control (Burns et al., 2014). These responsibilities are core to the management accounting profession and will, albeit in new forms, remain important to organizations in the digital age to ensure effective control over digitalization processes, such as investments in and applications of digital technologies. Without a coherent and clear role template for the digital age, watchdog-oriented MAs may not be able to take advantage of digital technologies. This may not only culminate in risks for organizations, but may also pose a threat to the relevance of MAs and, eventually, management accounting as a profession. Therefore, we call on practitioners and academics doing research in the MA domain to develop a clear and positive vision for watchdogs in the digital age.

Our results should be interpreted in light of the study's limitations. First, similar to other studies based on cross-sectional surveys, this study cannot make strong inferences about causality due to the potential for reverse causality and other sources of endogeneity. However, we believe the validity of our findings is not threatened by CMB (Podsakoff et al., 2003), as CMB only deflates interaction effects (Siemsen et al., 2010), and we find significant interaction effects. Second, it is not possible to fully rule out the possibility that our results may be driven by an omitted variable. We aimed to address this concern by including a broad set of control variables and firm-clustered standard errors. Third, our findings may be biased by our reliance on self-reported constructs to measure the role that MAs enact, because business partners are regarded as more prestigious than watchdogs (e.g., Morales & Lambert, 2013), and MAs can have a self-serving bias (Rieg, 2018). To combat this concern, we used scales that consist of task-based items (Hartmann & Maas, 2011;

Maas & Matějka, 2009). Moreover, in a robustness check, we show that our results hold using an alternative measure for the MA's role based on external data about descriptions of each respondent's job title, educational background, and prior work experience. Finally, the generalizability of our findings may be limited to the Dutch business context because our sample consists of MAs employed by Dutch for-profit firms, and MAs in different countries may be faced with considerably different technological and institutional contexts (e.g., Ahrens & Chapman, 2000). Nonetheless, prior research shows that the two major roles of MAs are prevalent across different national contexts (Byrne & Pierce, 2018; Goretzki et al., 2013; Granlund & Lukka, 1998; Morales & Lambert, 2013).

Overall, the results of this study provide a nuanced view of the ways in which digital technologies may impact MAs. While our findings indicate that business partner-oriented MAs are well situated for the digital age, we also bring to light how watchdog-oriented MAs lack a sufficiently coherent and clear role template for the digital age. An interesting avenue for future research would therefore be to study the development of such a role template for watchdogs in the digital age and the attributes that make the template supportive for MAs. In doing so, future studies could lead the way so that MAs focusing on this role receive the guidance and support needed to thrive in the digital age.

Data availability

The data that has been used is confidential.

Acknowledgements

We thank the special issue editors, Alnoor Bhimani, Lino Cinquini, and Teemu Malmi as well as two reviewers for their helpful comments and guidance. We also appreciate the helpful and constructive comments from Lukas Goretzki, Utz Schäffer, Matthias Mahlendorf, Sally Widener, Michal Matějka, Rouven Trapp, and Aleksandra Klein as well as participants of the 20th Annual Conference for Management Accounting Research (ACMAR), the 45th Annual Congress of the European Accounting Association, and the 2023 BAR conference in Dubai on earlier versions of this paper. We finally also gratefully acknowledge the management accountants participating in our survey. The last two authors contributed equally, and their authorship is listed alphabetically based on their surnames.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bar.2024.101460>.

Table A.1

Construct validity of control variables

Factor analysis: factor loadings and variance extracted per factor	Factor
Control variables	
<i>DIGUSE</i>	0.697
Within our daily work, our finance and control function regularly makes use of ...	(0.468)
automation of business processes (e.g., Robotic Process Automation (RPA)).	0.715
digital platforms to source content and/or capabilities (e.g., APIs or crowdsourcing).	0.606
tools for the visualization of data (e.g., business intelligence dashboards such as Tableau).	0.425
approaches related to predictive analytics (e.g., employing regressions in a tool such as Alteryx).	0.797
approaches related to artificial intelligence or machine learning.	0.803
<i>TECHSAVVY</i>	0.826
To what extent do you agree or disagree with the following statements:	(0.663)
I frequently inform myself about trends and developments related to digital technologies.	0.876
I regularly look for opportunities to develop knowledge and skills in the field of digital technologies.	0.898
I am well informed about the range of trainings/seminars on digital technologies offered by the company.	0.672
I enjoy dealing with new technologies and innovations.	0.792
<i>DIGAUTH</i>	0.874
How much say or influence do you have in the following decisions:	(0.728)
Identifying investment opportunities for digital technologies	0.887
Defining priorities and objectives for the selection of digital technologies	0.908
Choosing programming languages or tools	0.797
Defining budgets and schedules for implementation of digital technologies	0.816
<i>DIGOUTCEXP</i>	0.831
To what extent do you agree or disagree that making greater use of digital technologies would enable me to ...	(0.540)
execute my working procedures more efficiently.	0.704
coordinate work across processes, units and levels more easily.	0.731
recognize changes that are relevant for our business much earlier.	0.691
understand influences on and interdependencies of our business more deeply.	0.766
contribute to our firm's business development more effectively.	0.780
focus more on value-creating activities.	0.732
<i>TRANSFLEAD</i>	0.907

(continued on next page)

Table A.1 (continued)

Factor analysis: factor loadings and variance extracted per factor	Factor
My direct superior in the financial line (e.g. CFO, Head of Controlling) ...	(0.644)
communicates a clear and positive vision of the future.	0.695
treats staff as individuals, supports and encourages their development.	0.843
gives encouragement and recognition to staff.	0.869
fosters trust, involvement and cooperation among team members.	0.856
encourages thinking about problems in new ways and questions assumptions.	0.744
is clear about his/her values and practices what he/she preaches.	0.770
instills pride and respect in others and inspires me by being highly competent.	0.825

Notes: The table reports the results of confirmatory factor analyses by construct for our control variables. The Cronbach's alpha of each factor is indicated in italics. Factor loadings are indicated in bold. The variance extracted for each factor is indicated in parentheses. N = 242.

Table A.2

Variable descriptions

Variable label	Variable description
<i>ROLCON</i>	Role conflict – The degree of role conflict experienced by the MA
<i>ROLAMB</i>	Role ambiguity – The degree of role ambiguity experienced by the MA
<i>ROLSTR</i>	Role stress – The degree of role stress experienced by the MA, equal to the average scores of <i>ROLCON</i> and <i>ROLAMB</i>
<i>DIG</i>	The anticipated digitalization of the finance and control function – The degree to which the MA expects the finance and control function of their organization to use digital technologies (automation, data platforms, data visualization, predictive analytics and AI/ML) in the next 5 years
<i>WDtoBP</i>	Relative emphasis on the watchdog role over the business partner role – The degree to which MA's role emphasizes the watchdog role over the business partner role, equal to the score for the watchdog less the score for the business partner
<i>DIGUSE</i>	Use of digital technologies – The degree to which the finance and control function of the organization that the MA works for uses digital technologies (automation, data platforms, data visualization, predictive analytics and AI/ML)
<i>DIGSTRAT</i>	Digital strategy – An indicator variable for the presence of a digital strategy for the organization
<i>TECHSAVVY</i>	Technological savviness – The degree to which the MA is open to using digital technologies in general
<i>DIGAUTH</i>	Digital authority – The degree to which the MA has authority in choosing and implementing digital technologies
<i>DIGOUTCEXP</i>	Digital outcome expectations – The degree to which the MA believes their work could benefit from digitalization
<i>TRANSLEAD</i>	Transformational leadership – The degree to which the MA's direct superior in the finance and control function engages in transformational leadership
<i>MGMTRES</i>	Management responsibility – An indicator variable that measures whether the MA has management responsibility
<i>F&CSIZE</i>	Size of the finance & control function – An indicator variable for the size of the finance and control function of the MA's organization, where a value of 1 indicates a size of at least 20 people
<i>GENDER</i>	Gender – An indicator variable for the MA's gender, where a value of 1 indicates a female and 0 indicates a male
<i>EXP(10–20)</i>	Work experience in finance and control (10–20 years) – An indicator variable for the MA's work experience in finance and control, where a value of 1 indicates 10–20 years of experience
<i>EXP(>20)</i>	Work experience in finance and control (>20 years) – An indicator variable for the MA's work experience in finance and control, where a value of 1 indicates more than 20 years of experience

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