

**Essays on Systems of Accountability and Transparency –
Attributes, Developments and Consequences for Decision-Making**

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Abstract

Organizations rely on accountability systems and transparency for decision-making and strategy implementation. Despite the importance of awareness of others and purposeful distribution of responsibilities, these control and organizational design choices are characterized by divergent objectives of decision facilitation (i.e., support) and influence (i.e., control), ambiguous situations for focusing attention, and dynamic changes in the internal and external organizational environment. Thus, supporting business strategies with effective accountability and transparency mechanisms is this dissertation's emerging theme. Based on three complementary studies, this cumulative thesis addresses how the finance organization applies, initiates changes to, and enacts accountability and transparency systems for improving managerial decision-making and organizational performance.

This thesis contributes to prior studies in accounting and management by illustrating managerial principles. First, *Article I* clarifies the theoretical attributes and dimensions of transparency. Based on a multilevel case study of twelve accounting routines in four organizations, this study further identifies specific configurations to manage accounting-based information transparency. Second, in *Article II*, the empirical analysis, based on a longitudinal case study of ten analytics initiatives (for predictive forecasts and automated planning), provides support for the proposition of a dynamic process perspective on how an emergent accountability practice allows managers to reconcile seemingly contrasting control targets of efficiency and flexibility in response to executives' unconstrained transparency demands. Finally, *Article III* tests the decision-making effectiveness of dual accountabilities and transparency of communication using survey data on 82 CEO-CFO relationships. The empirical results show that depending on the linkages between a CFO's dual accountabilities and communication channels, support and control and their combined effects (i.e., duality) lead to more transparent communication, therefore improving strategic decision-making effectiveness. Together, this makes transparency and accountability a relevant lever for facilitating the ability to effectively implement business strategies.

Keywords: management control; accountability systems; transparency; accounting information; attention; decision-making; business analytics; strategy implementation

Zusammenfassung

Organisationen sind bei der Entscheidungsfindung und Strategieumsetzung auf Verantwortlichkeitssysteme und Transparenz angewiesen. Trotz ihrer Relevanz sind diese organisatorischen Gestaltungs- und Kontrollentscheidungen durch divergierende Ziele in der Entscheidungsfindung (Unterstützung) und -beeinflussung (Kontrolle), eine unterschiedliche Fokussierung der Aufmerksamkeit, und dynamische Veränderungen im internen und externen Organisationsumfeld, gekennzeichnet. Die vorliegende kumulative Dissertation erklärt daher deren Zusammenhänge und testet empirisch Prinzipien wie die Finanzorganisation Verantwortlichkeitssysteme und Transparenz zur Verbesserung der Entscheidungsfindung des Managements und zur effektiven Unterstützung bei der Strategieumsetzung anwendet, sowie Änderungen ebendieser initiiert, und durchführt.

In *Beitrag I* werden die theoretischen Eigenschaften und Dimensionen von Transparenz geklärt. Darüber hinaus identifiziert diese vergleichende Fallstudie von zwölf Accountingpraktiken in vier Organisationen, spezifische Konfigurationsmöglichkeiten, um die Transparenz von rechnungslegungsbasierten Informationen effektiv zu steuern. In *Beitrag II* bestätigt die empirische Analyse, welche auf einer Langzeitfallstudie von zehn Business Analytics Initiativen (zur Einführung prädiktiver Modelle für die finanzielle Prognose und Planung) basiert, die These einer dynamischen Prozessperspektive als Reaktion auf die uneingeschränkte Transparenzanforderung der Führungskräfte, die es Managern ermöglicht, vermeintlich konträre Kontrollziele von Effizienz und Flexibilität in Einklang zu bringen. Schliesslich testet *Beitrag III* die Entscheidungseffektivität von dualer Verantwortlichkeit (für interne Kontrolle und Business Partnering) und Kommunikationstransparenz anhand von Umfragedaten in 82 CEO-CFO-Beziehungen zur Entscheidungsfindung. Die Resultate zeigen, dass in Abhängigkeit von der entsprechenden Kopplung zwischen den dualen Verantwortlichkeiten eines CFOs und den Kommunikationskanälen des Managements, Business Partnering, interne Kontrolle, und deren kombinierter Effekt (d.h. Dualität), zu unterschiedlich transparenter Kommunikation führen, und daher die strategische Entscheidungseffektivität beeinflussen. Insgesamt macht dies Transparenz und Verantwortlichkeit zu relevanten Steuerungsgrössen für die effektive Umsetzung von Unternehmensstrategien.

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1 Introduction

Systems of accountability (Roberts and Scapens 1985) are built on observation (Bernstein 2017). Since you can only measure what you can observe, there is even a natural curiosity that attempts to observe something or someone to gain information (Turilli and Floridi 2009). To coordinate and govern these tendencies, the formal system of accountability defines an organization's key positions and legitimatizes the rights to set targets, receive and distribute accounting information, and influence others' work (Simons 2005).

While the management accounting literature is replete with studies investigating accounting information, many studies have applied the contingency framework to examine how systems of accountability govern information that improves individuals' abilities to make organizationally desirable decisions (decision-facilitating) or information that helps align the interests of agents with principals by directing effort and attention to activities benefitting the organization (decision-influencing) (Merchant and Otley 2006, Demski and Feltham 1979). These studies have found relationships between contextual variables (such as environmental uncertainty, span of control, task interdependence, and decentralization) and their use for strategy implementation and performance improvements (Mia and Chenhall 1994, Gul and Chia 1994, Chenhall and Morris 1986). Another body of literature on accounting information use is based on exploratory case studies (e.g., Mouritsen and Bekke 1999, Ahrens 1997).¹ However, it is well-recognized that the management control systems (MCS) is comprised of multiple accountability systems that work together with the organization structure in which these systems exist (e.g., Demartini and Otley 2020, Bedford 2015, Grabner and Moers 2013, Widener 2007).

This thesis is further motivated by the disparate emergence of advanced business analytics and traditional finance (Brock and von Wangenheim 2019), which requires some "rethinking about the expected usefulness of accounting information on the

¹ At the outset of this thesis, I clarify the used notation and perspective. The typology initially propose by Ouchi (1979) and refined by Merchant (1985, 1998) and Merchant and Van der Stede (2017), is used because it can be applied to a subset of management control system (MCS) and, in particular, to distinct control targets. Specifically, I use the notion "accountability system", and "system of accountability" interchangeably (cf. Roberts and Scapens 1985), which defines key positions in an organization, legitimate rights and obligations to set targets, and receive and distribute information (Simons 2005).

analytical level" (Jönsson and Grönlund 1988). The kind of new machine learning and AI technologies that have been installed in the digital transformation of the finance function at an increasing rate over the last few years sets a new stage for the development of management accounting. Flexibility makes it possible to have extreme adaptation of accounting-based reporting to meet managerial demands. Standardization and harmonization of accounting systems make individualized accounting information and analytics solutions problematic. Ownership of accounting data must be centralized, while the design of accounting information systems must be decentralized. Therefore, the function and use of a traditional management accounting system should be questioned. What are the important issues that prompt accounting to introduce new technologies in the first place? Is it flexibility for new routines or rationalization for productivity gains that is the prime mover? Is it both? Or might it be efficiency? Whatever the case may be, it is necessary to clarify the trade-offs between aspects of new technologies' advanced information-processing capabilities. Causal links between the decision-facilitating and the decision-influencing role of accounting must be reestablished. The simple relationships between the benefits of accounting routines and costs are no longer valid. This thesis deals with these issues against a background of current research on transparency demands in and on organizations (Bernstein 2017) and a solution for coupling control systems and organizational structures in situations for organizational learning (Widener 2007), and for efficient use of management attention (Simons 2000) is proposed.

In this dissertation, I address these questions by analyzing the attributes, developments, and consequences of systems of accountability and transparency and their use in multinational enterprises (MNEs) headquartered in Central Europe. Three complementary studies form this dissertation's basis. Each study addresses one specific topic; jointly, the studies cover the dissertation's overall theme.

In the first qualitative study (Article I), I examine the nature of transparency in accounting and explore why (information) transparency is constructive for certain accounting routines and destructive for others. The main finding is that level-appropriate accounting information becomes transparent for learning and control only if accurate conclusions can be inferred, which is shaped by managers' attention-directing and activating strategies.

In the second comparative case study (Article II), I investigate how managers engage in initiatives to internalize competing objectives of efficiency and flexibility in the shift toward an enabling accountability system based on business analytics initiatives for the adaptation of automated financial forecasting and planning. The main finding is that a flexibility orientation (e.g., generating novel insights through exploring new ways of using accounting data with ML and AI technologies) in analytics initiatives allows managers to reconcile tensions to achieve top-down efficiency targets, making the adoption of innovative technologies for predictive forecasting and automated planning more likely.

Finally, in the third quantitative study (Article III), I test and analyze how financial managers' dual accountability can support managerial decision-making effectiveness in different communication channels of the top management. The results have two main implications: First, decision-making effectiveness improves if a CEO relies on a CFO's robust financial analysis; second, transparency created by accounting reports produced to change the CEO's behavior improves with the reliance on management discussion and dialogue. Overall, this study provides empirical evidence that the involvement of accounting can improve managerial decision-making effectiveness.

These three complementary studies contribute to prior research that examines formal, information-based routines and procedures managers use to maintain or alter patterns in business strategies. I advance this prior literature on accountability system design and innovation, based on the informants' responses to different accountability-transparency interrelations, by showing that better coupling of accounting-based information distribution and allocation of decision rights facilitates their effectiveness for contradictory control targets.

The remainder of this introduction provides an overview of the studies. Section 1.1 introduces the theories that underpin the studies. Section 1.2 describes the research paradigm and implications for the research design and methods. Sections 1.3 and 1.4 summarize the three studies that provide the basis for this thesis. The last section, 1.6, discusses theory contributions, managerial implications, and the conclusions (Section 1.7) from this dissertation project, to which the papers jointly contribute.

1.1 Background literature

1.1.1 Transparency

Reviewing the literature, the concept of organizational transparency can be categorized into four functions as regards the effects on the observed organizational performance: monitoring, transparency as process visibility, transparency as surveillance, and transparency as disclosure (Bernstein 2012). In the subject matter of accounting, this theoretical bracketing of transparency requires *conceptual* clarification. In particular, the aspects of surveillance as observation seem close to the concept of control and are, therefore, fruitful for enriching this study. Specifically, surveillance is close, constant, and comprehensive supervision by managers — in other words: "we're watching everything you do," either visually or through accounting-based data capture (Agre 1994). This can affect both enabling and coercive control over the observed (e.g., Adler and Borys 1996, Ahrens and Chapman 2004, Chapman and Kihn 2009, Cardinal et al. 2017). Relatedly, disclosure of information is a control mechanism for internal (Indjejikian and Matějka 2012) and external reporting (Bushman and Smith 2001).

From an *empirical* perspective, several experimental studies reveal arguments for the performance benefits of transparency (e.g., Shang et al. 2020, Bol et al. 2016, Tafkov 2013, Hannan et al. 2008) and bear some similarity to the literature on management control systems (MCS) and ambidexterity (Merchant and Van der Stede 2007, Raisch and Birkinshaw 2008); however, a key difference beyond the clinical environment remains. Compared with the interventions proposed by the literature, implementing transparency in practice can be far less contextually dependent. In fact, boundaries to visibility are low-cost, flexible, and often permeable (Bernstein 2012). If organizational transparency² indeed can have a similar impact on power dynamics and attention — and, thus, on performance — but without the substantial organizational changes required by the other design and control interventions, then it may be an important management tool in the quest to improve performance. At the same time, studies suggest that transparency in organizations leads to a shift in accountability of individuals by shifting the control of information flow between information producers and information users (e.g., Levy 2015, Burris 2012, Abernethy and Vagnoni 2004). To explain these diverging accounts, some authors have pointed to contextual factors (Chenhall 2003).

² AND/OR "privacy" as a synonym for the same underlying concept.

Relatedly, it is noted that with increased sharing and use of information (e.g., with in-memory database technology and cloud-enabled applications of the latest ERP systems), it is harder to achieve segregation of responsibilities and therefore assign accountability (Hirst 1981, Frederickson 1992). In such cases, organizations need to find ways to resolve these tensions, for instance, by adjusting responsibilities and control targets and the rights to receive and distribute information in an organization.

Although we know much about controls and their use for managerial purposes (Sitkin et al. 2020), we have little understanding of how organizational transparency might influence accounting practices on different levels of an organization (Bernstein 2017). Striving for a more holistic perspective on different "levels of control" and the related control targets (Bedford and Malmi 2015, Grabner and Moers 2013, Widener 2007, Simons 1990), the internal information environment is more complex, and trade-offs are likely to arise (Tushman and O'Reilly 1996, Gibson and Birkinshaw 2004, Kruijs et al. 2016, Burney et al. 2017). Yet, research on controls to date has not fully specified how transparency renders how systems of accountability operate (Roberts 2018) and if transparency is a new form of coercive control (Ahrens and Chapman 2004). In addressing these questions, I also build upon, and contribute to, the broader research direction of literature on responsibility accounting and organizational transparency more generally.

1.1.2 Accountability

The control system describes an organization-level concept that is distinct from its structure (Ouchi 1977) but serves as an integral component of an organization's overall design. Specifically, an organization's accountability system is comprised of various organization design elements that affect managers' abilities to direct subordinates in their tasks (Daft 1998).³ Earlier studies by Antle and Demski (1988) have already considered the structure–system relationship in accounting. In particular, one of the few agreed-upon *conceptual* design principles in accounting literature is the controllability principle, which says that authority over resources should equal or align with responsibility for performance (Merchant and Van der Stede 2012, 2007, Merchant and Otley 2006, Merchant 1985, Arrow 1974). This literature has acknowledged that accountability in organizations should typically be aligned, which reflects the logic of

³ According to Simons (2005), the formal system of accountability defines key positions in an organization and legitimates rights to set targets, receive information, and influence the work of others.

the controllability principle (see, e.g., Anthony 1989, Demski and Sappington 1989, Choudhury 1986, Solomons 1965, Ferrara 1964). At the same time, executives may want to violate the controllability principle to encourage information-seeking responses to uncontrollable events (Simons 2013, 2010, 2005, Merchant and Otley 2006, Antle and Demski 1988, Dent 1987). Consequently, doubts have been raised about the principle's meaningfulness in assigning accountability (Merchant and Van der Stede 2012, 2007).

From an *empirical* perspective, prior studies show that the principle is frequently not applied in corporate practice (see Fischer 2010, for a summary). In reality, high levels of complexity and uncertainty (internal, e.g., departmental interdependencies; external, e.g., dynamic competitive environments) make it difficult to apply the controllability principle in all situations because it seems impossible to always separate controllable from uncontrollable factors (e.g., Burkert 2011, Moers 2006, Hartmann 2000, Merchant and Manzoni 1989). Overall, the non-application-vs-application thinking has created continuous theoretical conflicts – with contrived gaps to be filled and issues not approached by prior studies, calling for more research on the benefits of disregarding the controllability principle for theoretical refinement and extension (Simons 2005).

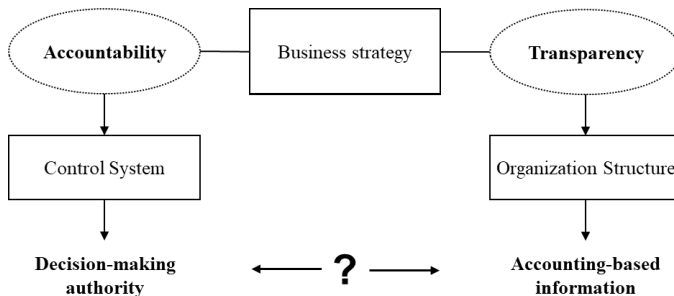


Figure 1 Research scope

Despite continuous interest in controllability as a theory, an examination of the literature indicates that several important research issues remain unexplored, ambiguous, or conceptually unspecified.

Just as the accountability (and controllability) literature has been vague about how it relates to transparency (the relationship has rarely been specified, and when it has, accountability has been viewed only as a dimension of transparency), the transparency literature has ignored seemingly important questions related to the antecedents of accountability (Roberts 2018). Specifically, studies often assume perfect transparency (without noise and friction) in their observations (cf. Prat 2009). This naturally conflicts with the aforementioned assumptions in organizational transparency literature (Schnackenberg and Tomlinson 2016). Furthermore, prior accounting and control research focused rather narrowly on particular elements of accounting systems (e.g., Moers 2006) and their targets (e.g., Burney et al. 2017). In contrast, this thesis integrates the technical and interpersonal aspects of accounting systems and combines them by investigating practices of accountability for contradictory control targets of business strategy (e.g., efficiency/flexibility).

In summary, the emerging body of literature cannot be used to make strong predictions about how accountability relates to accounting information and communication as (re)sources for decision-making. Most notably, while new technologies are reshaping the finance function, the controllability principle is well-established in explaining the interaction between accountability and the span of control (i.e., distributed resources as number of people who report to a superior) but it provides only limited predictive power in explaining the relationship between the distribution of accounting-based data and the allocation of decision rights, as illustrated in Figure 1. However, the cumulative body of prior literature on organizational transparency (Bernstein 2012), information processing (Galbraith 1973), attention-based view (Ocasio 1997), control theory (Sitkin et al. 2020), and accountability systems (Simons 2005) indicates the importance of information (e.g., transparent, accessible, and verifiable) as a resource to individuals and organizations, on which all knowledge-based learning (Argyris and Schon 1978), understanding (Sutcliffe and McNamara 2001), and sensemaking (Weick 1969) are based. Therefore, this thesis set out to identify the attributes, developments, and consequences of systems of accountability and transparency.

1.2 Research paradigm

In the following section, I briefly describe my research's philosophical position and the implications for the research design. I begin by explaining why it is essential to understand one's philosophical position and how it is extended into the empirics.

The ontological assumption of a researcher can be placed on a continuum from reality as a concrete structure to reality as a projection of human imagination (Ryan et al. 2002). In this work, I assume reality is a rather concrete structure (for instance, organizations' characteristics can be described and measured in a technical language).

Epistemology is about how knowledge is acquired (Ryan et al. 2002). My ontological and epistemological position naturally evolves with my purposeful empirical method choices. Positivism assumes that social phenomena can be studied as facts and that causal relationships between phenomena can be established through empirical data testing (Lukka 2010). The adopted positivistic paradigm lines up with quantitative study (e.g., Article III), while qualitative studies partially integrate interpretative elements. Distinctions between the emic (insiders' perspective) (e.g., quotes and statements of informants) and etic accounts are made where necessary (Lukka and Modell 2010). I follow the logic of dialectical pluralism to do justice to all these different types of evidence and methods of evidence collection. The key idea is to understand and purposively, dialectically, and dialogically engage with differences and interact with multiple paradigms, disciplines, positive values, and concepts. Instead of using an "either/or" logic, I apply a "both/and" logic (for instance, regarding the duality of control objectives/targets or dual responsibilities) in which the different evidence forms are brought into dialogue, constantly compared, and combined into a whole that is more than the sum of its parts. Research conducted in this way should help produce justified knowledge that is "thick" (i.e., value-laden), provisionally true, useful, and widely accepted (especially when one dialogues with practitioners and users) (Johnson 2011).

Articles I and **Article II** of this thesis build on distinct qualitative field studies to explore how accountability systems occur in their natural setting. As emphasized by Robson (2002), qualitative field studies enable researchers to investigate "a particular phenomenon within its real-life context using multiple sources of evidence." Furthermore, field studies enable researchers to capture how accounting evolves "in practice" (Yin 2009, Ryan Scapens and Theobald 2002, Eisenhardt 1989) by looking at

"the tensions which often develop around the use of accounting and the conflicting interpretations that give rise to them" (Ahrens and Dent 1998). The field study method is particularly suited to our purpose as it has enabled us to capture how accounting infuses action (Baxter and Chua 1998, Ahrens and Chapman 2006).

Article III is based on a quantitative method of survey research. The phenomenon under study has emerged from previous literature, including Articles I and II, while the research hypotheses have been proposed in a logical deductive process from existing empirical evidence. Further, the study variables have been operationalized using quantitative measures, mainly based on existing empirical literature constructs. Thus, the phenomenon under study (i.e., the interaction of dual responsibility and communication channels) has been reduced and modeled to its simplest possible elements to better understand the phenomenon under study.

1.3 Three articles on accountability and transparency

As illustrated in Table 1, this thesis consists of three correlated research articles on how accountability systems and transparency can be designed to facilitate and influence managerial decision-making and, thus, support performance outcomes. Each article discusses the notion of accountability by linking the use of management control and accounting information to the delegation of responsibilities and the need for transparency for both learning and control effects, yet with different foci to cover a narrowly defined research question. They complement the overall theme of this thesis.

Article I clarifies the nature of information transparency (henceforth transparency) as the accountability systems mechanism to coordinate accounting routines. In an inductive multilevel case study of 12 routines in four organizations, the study examines why transparency is effective for some but not all routines for achieving the intended outcomes (i.e., control and learning). Besides explicating boundaries to benefits of radical transparency, *configurations of transparency* are introduced to discover the attributes of *visibility* (i.e., access to and availability of accounting information) and *inferability* (i.e., the trade-offs affecting the utilization of accounting information to achieve verifiable conclusions). Thus, managers aligned global transparency with few inference rules for interpretation (i.e., many tradeoffs) of accounting information (e.g., by establishing general rules and harmonizing accounting principles). As such, matching internal transparency with an understanding of the local contingencies (e.g., the meaningfulness of accounting-based information) for a specific level of responsibility

by establishing many inference rules (i.e., few tradeoffs) made it more likely to reduce information-processing demands and yield constructive performance outcomes. A misalignment of these aforementioned attributes by the managers, in contrast, incentivized an increase in information-processing capacity, which is constructive for a learning orientation.

Overall, this study clarifies why and how access to accounting information and the corresponding inferences can be used to effectively activate and direct managerial attention. In summary, regarding the evaluation of the overall context of this thesis, this study shows how the *supply of* accounting-based information can both reduce and increase uncertainties in a manager's information environment.

Also, **Article II** explores the preceding initiatives through which organizations decide to change and adopt accountability systems in the first place. This study illustrates how deliberate one-sided *flexibility* or *efficiency initiative* for accounting innovations (e.g., predictive forecasts and automated planning) can be complemented with an *emergent* accountability practice in which members of the initiative decide to choose a flexibility orientation to overcome any resistance to change. Based on a longitudinal study of analytics initiatives in ten organizations, this study shows that accountants interact with senior executives to either routinize (for productivity gains) or unroutinize (for facilitating business insights) financial planning and forecasting, which causes the adoption of an enabling accountability system's design on a superior level. In successful initiatives, accountants broadened the initial scope of activities contrary to the direction set by senior executives through emergent efforts to compensate for friction and make use of new technologies.

Taken together, this study contributes to the literature by providing a dynamic process perspective on conditions and mechanisms that allow managers to internalize friction of efficiency/flexibility tradeoffs in the adoption of analytics initiatives. In the context of this thesis, this study should be interpreted in terms of how the managerial desire to reduce uncertainty in the information environment creates *demand for* accounting-based information (e.g., in financials derived from predictive forecasting and planning future states of the environment).

Finally, **Article III** tests outcomes and consequences of accountabilities in terms of the combinative effect of different linkages between accounting information and communication channels for decision-making. A quantitative study of 82 managerial

decision relationships across multiple CEO–CFO settings tests theoretical arguments regarding how accounting can add value to both *decision control* for reducing the riskiness of performance measurement and *decision support* for increasing CEO productivity. Previous research assumes that positive performance implications of support apply in all settings. The empirical evidence of this article suggests that, depending on the linkages between a CFO's dual responsibilities and communication channels, support and control and their combined effects (i.e., *duality*) lead to more transparent communication; therefore, they can improve strategic decision-making effectiveness. While a CEO's reliance on the financial analysis provided by accounting makes decisions more effective, there are negative effects of support through accounting talk. The article further underlines the supportive role of control, which was frequently considered ineffective; it is shown to improve decision-making effectiveness through strategic conversations about decisions.

Regarding this thesis's overall concept, **Article III** depicts the coupling of *supply of* and *demand for* accounting-based information and how their equilibrium alleviates ex ante and ex post decision uncertainty in the information environment, facilitating performance outcomes.

Summarizing, this dissertation contributes to prior research on accountability system design and innovation to address the effective allocation of information and decision rights. Firstly, it theorizes and empirically demonstrates complementary and substitutive configurations of visibility and inferability that should be reflected by accountability systems. Secondly, it uncovers how managers engage in initiatives to balance the competing control objectives of efficiency and flexibility in the shift toward enabling formalization of accountability systems. Finally, it tests outcomes and performance implications of enacted accountability and communication relationships within the top management team for effective managerial decision-making. Altogether, this dissertation recognizes that being informative and being responsible are among the essential human preoccupations and, thus, profoundly affect the aforementioned aspects of firm behavior. Hence, organizations cannot be successfully designed and managed without incorporating principles related to accountability and transparency.

1.4 Findings

In the following, Table provides an overview of the articles, including the objective, main research question, analytical focus, empirical context, theoretical concept, and main findings in the context of the dissertation. For more detailed elaborations, kindly refer to the full article in question.

Table 1 Overview of research projects

	Article I	Article II	Article III
Title	Managing Attention with Accounting Information: A Configurational Perspective on Transparency	The Emergence of Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting	Implications of a CFO's Dual Accountabilities for Managerial Decision-Making Effectiveness
Analytical focus and research question	What is the nature of transparency in accounting? Why is (information) transparency for certain accounting routines constructive and in others destructive, and how can it be managed effectively?	How do managers engage in initiatives to internalize competing objectives of efficiency and flexibility in the shift toward an enabling accountability system?	How can dual accountability of financial managers support decision-making in communication channels of the top management?
Empirical context	Accounting routines for budgeting, costing and strategy	Business analytics initiatives for the adaptation of financial forecasting and planning	Strategic investment decisions of the top management team (TMT)
Theoretical concept	Transparency in bureaucracies (Adler and Borys 1996), and organizational transparency (Bernstein 2017), attention-based view (Ocasio 1997)	Enabling efficiency/flexibility (Adler et al. 1999), and processes (Langley et al. 2013), ambidexterity (Raisch and Birkinshaw 2008)	Accountability (Demski and Feltham 1976), attention-based view on communication channels (Ocasio et al. 2018)

Table 1 continued

	Article I	Article II	Article III
Methodology	<i>Qualitative</i> – Multiple embedded case study of 12 accounting routines in four organizations	<i>Qualitative</i> – Longitudinal field study of accounting initiatives in 10 organizations	<i>Quantitative</i> – Dyadic survey study with regression analysis (OLS)
Reasoning	<i>Inductive</i>	<i>Inductive</i>	<i>Deductive</i>
Results	Level-appropriate accounting information is transparent when effectively inferred through directing and activating managerial attention	Flexibility orientation in analytics initiatives allows managers to reconcile tensions to achieve top-down efficiency targets	A CFO's dual responsibilities and managerial communication channels interact to influence decision effectiveness
Conclusion concerning dissertation	Transparency in accounting requires attention to complementary routines for managing inferences and understanding	Managements' transparency demands drive emergent accountability practices to adapt innovative technologies for financial forecasting and planning	Accounting information's utility requires transparency in managerial decision-making processes
Contribution	The more effective the balance between accounting-based information distribution and allocation of managerial decision rights, the higher their efficacy for contradictory control targets.		

1.4.1 Article I

The first article, "Managing Attention with Accounting Information: A Configurational Perspective on Transparency," is concerned with the determinants, attributes, and consequences of transparency. Building theory on transparency (Bernstein 2017) and attention (Ocasio 1997), this study examines why transparency provides for certain accounting routines' constructive and, in other cases, destructive performance outcomes and how they can be managed effectively. Prior studies have conceptualized transparency based on agency theoretical assumptions (Prat 2009, Lambert 2001, Jensen and Meckling 1976), or as a design feature for enabling and coercive formalization in accounting (Ahrens and Chapman 2004, Adler and Borys 1996). Yet, these studies do not fully specify when to open up and when to withhold accounting-based information so managers can enjoy the benefits of transparency while mitigating its unintended consequences, such as information overload, legitimizing endless debate and discussion about accounting data, and where financials are in the hands of employees who may not use them wisely (Cable and Birkinshaw 2017).

This study develops a conceptual integration of the attention and organizational control perspectives to understand how firms manage transparency for learning and control targets. An inductive multilevel case study of twelve accounting information routines in four organizations demonstrates that it is not possible to identify a universal transparency policy for organizations. Rather, I identify distinct attributes of transparency (i.e., visibility and inferability), which allows for describing the complex internal information environment that arises in practice.

This study reports several findings. The empirical evidence from four case studies supports the overall proposition, namely that each distinct transparency policy has an associated configuration of the different attributes of transparency. The configurations differ with regard to the control targets and the emphasis on the implementation of information-processing strategies to direct or activate limited attention. I further found suggestive evidence that the transparency configuration and the related information-processing strategy are closely linked to the firm's transparency policy, reflected in its prevailing visibility and inferability.

Most notably, effective managers were not only concerned with the availability of accounting-based information and reports but also with its inferability (the capability to draw accurate conclusions) for information users. Relatedly, the effects for activating

(to control) and directing (to learn) attention are primarily driven by a different configuration of these distinct attributes of transparency. Specifically, managers applied routines to establish verifiable conclusions based on accounting-produced information, in some situations by reducing the informational load on individuals while incentivizing exploring and resolving the attentional perspectives variation on available accounting data.

These findings suggest two important extensions to current thinking on transparency. First, I propose a configurational perspective. Prior studies suggest that a generic transparency policy can be applied to all control settings to benefit from transparency's potential value (Schnackenberg et al. 2020, Albu and Flyverbom 2019, Bol et al. 2016). This assumption is incomplete. Instead, the findings of this study suggest that the specific configurations of the transparency needed to achieve the control targets appear to vary in situations for cost accounting, budgeting, and strategic issues when incomplete accounting reports and imperfect monitoring abilities exist. Specifically, the empirical evidence shows that each distinct accounting routine has an associated configuration of the attributes (i.e., visibility and inferability) of transparency specific to the control target. In doing so, I advance prior literature (Burney et al. 2017, Roberts 2009, Ahrens and Chapman 2004, Bernstein 2012) by illustrating that extant theory on transparency leads to overestimating transparency's positive effects, underestimating transparent applications, and misunderstanding transparency's intricacy. Overall, this article adds a configurational perspective to transparency research and offers managers guidance about the alternative approaches they could take to establish effective transparency.

1.4.2 Article II

The second article, titled "The Emergence of Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting," recognizes the dynamics and procedural change of accountability systems within organizations in the context of digitalization and new technologies.

A large body of academic literature has emerged around the concept of enabling and coercive formalization (Adler and Borys 1996) and focused on understanding how firms achieve a balance between such competing objectives for efficiency and flexibility (Adler et al. 1999), alignment and adaptability, individualization and standardization, and mechanistic and organic – jointly desirable but competing objectives (Ahrens and

Chapman 2004, Wouters and Wilderom 2008, Jordan and Messner 2012, Wouters and Roijmans 2011, Adler and Chen 2011). Scholars have observed the enabling formalization of both systems and processes in performance management (Jørgensen and Messner 2009, Ahrens and Chapman 2004) and performance measurement (Jordan and Messner 2012, Wouters and Wilderom 2008) contexts. However, we know much less about the practices that lead organizations to the initiation of new features and mechanisms of accountability systems in the first place. Initiation (i.e., business analytics initiatives) is an important step because it is where the links between the firm's accountability system for efficiency and flexibility and its organizational technology are made, and it also involves a commitment to a course of action that includes significant costs and risks (e.g., Busco and Quattrone 2018, Dechow and Mouritsen 2005, Granlund and Malmi 2002).

Besides theoretical clarification, this study is designed to explore new technological realities that reshape accountability systems (Strauss and Tessier 2019). During the 2018–2020 period of this study, there was a growing interest in new technologies from the accounting discipline, including artificial intelligence (AI), machine learning (ML), and robotic process automation (RPA), a rise in predictive forecasting, and an emergence of automated decision-making, all of which create an incentive to adapt continuously, especially through a change of traditional accountability systems.

Based on a case study of ten analytics initiatives in accounting, this study illustrates how managers successfully initiate the adaptation of new technology through un-routinizing prevailing practices of financial planning and forecasting. A comparison of successful and less-successful analytics initiatives shows that a deliberate (or developmental) formalization can be complemented with an alternative *emergent* (or evolutionary) view on building more accurate financial forecasts with new capabilities in automated machine learning or predictive analytics. This study complements prior studies' implicit assumption of a developmental formalization of accountability systems whereby senior executives reconcile their different perspectives to build consensus on the adaptation or performance of an accountability system (Jordan and Messner 2012, Wouters and Wilderom 2008), which managers are then expected to implement. Specifically, I introduce an emergent accountability practice: Under certain circumstances, accountants take resources and responsibility for initiating a change from a one-sided efficiency or flexibility formalization to enable formalization for their

accountability system. This occurs, I propose, because there are times when accountants see and act on externalities in their work contexts (e.g., resistance to rationalization) of which senior executives at higher levels are still unaware (e.g., automation of forecasts). Also, I find that managers followed a superior path to successfully internalizing the tension between efficiency and flexibility.

These findings add to our understanding of efficiency/flexibility tradeoffs in the adaptation of accountability systems. The empirical evidence on an accountability system initiative contributes to shifting the theoretical consensus of prior management research towards an emergent management process (Zimmermann et al. 2015), which can resolve the parallel argument of efficiency and flexibility in accountability systems (Duncan 1976, March 1991) and the intrinsic tradeoff (Adler et al. 1999).

1.4.3 Article III

The third article, "Implications of a CFO's Dual Accountabilities for Managerial Decision-Making Effectiveness," empirically tests combined outcomes of responsibility and transparency for strategic decision-making. The underlying assumption in this study extensively draws on the theoretical insights of articles I and II by explicitly considering how accounting can add value despite or beyond its fiduciary (control) function—to not merely provide accounting information (i.e., increase in available and accessible accounting data) but make it usable, plausible, and accepted (i.e., inferable) in communicative interactions of the top management.

Prior research indicates that reporting is the input for incentive contracting to evaluate managers and decision-making (Friedman 2016, Evans et al. 1994). However, there is little empirical understanding of how decision-making procedures relate to characteristics of accountability systems (Papadakis et al. 1998, Eisenhardt and Zbaracki 1992), even though its information often represents the underlying source of decision-making (Naranjo-Gil and Hartmann 2006). Further, prior empirical studies have predominantly focused on one important dimension of dual accountability to facilitate or influence decision-making in isolation (Chang et al. 2014, Indjejikian and Matějka 2012), did not test if responsibilities were successful in informing a particular decision or strategy (for an exception, see Zoni and Merchant 2007), and have ignored combinative decision effects and strategic performance implications (Mahlendorf 2014).

To resolve this issue, this study combines insights from accounting and strategic management literature to test the linkages of dual responsibility enacted by financial managers (i.e., CFOs) for mitigating control conflicts through monitoring and/or for supporting decision-making through reporting and communication channels attended by general managers (i.e., CEOs) for strategic decision-making effectiveness. I rely on a multi-informant design with two separate data sources and have collected survey data of 82 CFO and CEO relationships. More specifically, I operationalize the allocation of resources as an investment decision to proxy for strategy implementation.

From this empirical setting, I find statistical evidence that the ability to convert the value of dual responsibility into effective strategic decisions depends on transparency (i.e., the quality [robustness] of the financial analysis and the conversation about the decision at hand). I contribute to the literature on the involvement of accounting (Chang et al. 2014, Indjejikian and Matějka 2012, Maas and Matějka 2009) and rhetoric and aural forms of accounting (e.g., Goretzki and Messner 2019, Puyou 2018, Hall 2010) by showing that accounting not only increases the utility of financial analysis for effective strategic decision-making with management support but also increases the communicative power of dialogues (i.e., disinterestedness) among members of the management under the condition that it retains its fiduciary obligation of management control.

These findings are also consistent with the assumptions of the theoretical literature on the attention-based view on strategy implementation (e.g., Ocasio 1997) that states that attention structures that provide local stimuli become more valuable if they are integrated while functional stimuli become more valuable if they are differentiated in communication channels (Ocasio et al. 2018, Joseph and Ocasio 2012).

1.5 Output and dissemination of research

My research resulted in a series of conference proceedings and research seminar presentations, which are summarized in the Appendix of this chapter.

1.6 Contribution

Accountability systems are fundamental for managerial decision-making and strategy implementation. The appropriate design of accountability systems is essential in achieving the desired behaviors and results. The purpose of this dissertation is to better understand the transparency and accountability mechanisms that govern human

conduct, both as self-control and behavioral guidelines for controlling others. Three empirical studies were conducted. In **Article I**, I explore the nature of transparency in accounting and examine how managers experience distinct configurations of accounting information availability and its inference. The main finding is that a theoretical consideration of the allocation of accounting information is too narrow. Rather, the interaction of practices governing the tradeoffs to achieve verifiable conclusions based on accounting-produced information (i.e., inferability) and availability of information creates positive effects to question the properties of financial numbers and figures more strongly or to use financial reports for target-oriented behavior. From this perspective, we learn how accounting numbers are used and why they are demanded. In **Article II**, I continue to investigate accountability systems with a dynamic process perspective on contemporary analytics initiatives. It shows that a deliberate top-down approach to implementing financial planning and forecasting systems can be complemented by an emergent process through which accounting managers internalize the tradeoff for efficiency and flexibility. From that, we learn that successful managers (either management accountants, data and analytics specialists, or hybrids) always to some extent emphasize a flexibility orientation and, in doing so, internalize the friction experienced by replacing or complementing prevailing forecasting systems. Finally, in **Article III**, I analyze the interaction of a CFO's responsibilities with transparency in communication channels for managerial decision-making of the CEO. Based on the argument that responsibilities shape executive attention, we learn that the value of a CFO's dual responsibility (i.e., responsibility for both learning and control) can improve the effectiveness of decision-making, depending on the choice of communication channel.

The results of this thesis have important implications. This thesis' primary contribution extends the accounting literature on the design of systems of accountability by showing, based on the informants' responses to different accountability-transparency interrelations, the conditions that facilitate performance outcomes. This empirical study more fully specifies situations and their experiences. This finding goes beyond the organization-level analysis by focusing on senior executives and accounting professionals who must make these accountability systems' design choices and are subject to the same systems. I advance this prior literature by considering the different characteristics of control objectives. These findings extend the accounting literature by

providing a situated perspective on accountability systems, which emerges from combining informational with responsibility processes. This situated conception of accountability systems captures control and learning's complementary and coalignment outcomes that explain accountability systems' effectiveness. This dissertation makes contributions to theory and practice.

1.6.1 Theoretical implications

At a theoretical level, these studies suggest that the firm's appropriate coupling of transparency and accountability systems can effectively resolve the tensions in contradictory control targets in many situations.

Management and accounting are built on observation (Bernstein 2017); local and global transparencies are needed in the design that enables formalizations in bureaucracies (Adler and Borys 1996) and accountability systems (Ahrens and Chapman 2004). Yet, the understanding of the interaction between different types and characteristics of transparencies and accountabilities is incomplete. **Article I** provides empirically grounded attributes of transparency in the subject matter of accounting. This study also points to the use of distinct configurations of transparency (Bedford and Malmi 2015, Cardinal et al. 2010). Further, I extend that literature by incorporating the tension in contradictory control targets (Widener 2007) to further specify the required tradeoffs, given that organizational and individual attention and information processing is limited (Ocasio 1997). As such, these findings add to the accounting literature on systems of accountability (Simons 2005). Also, these findings add to the related management literature on how transparency can be managed (e.g., Bernstein 2017, Schnackenberg and Tomlinson 2016). Furthermore, **Article II** theorizes and empirically illustrates how an *emergent* view on changes to the accountability system (i.e., analytics initiatives for automated forecasting and planning) allows describing the dynamic process of shifting between flexibility and efficiency demands (Zimmermann et al. 2015). In doing so, I put forward a multilevel model of how the business analytics initiative unfolds within the accounting setting. As such, I advance this prior literature by considering the characteristics of inflection points at which accountants and technical experts recognize to deviate from a direct path to attain top-down targets and internalize friction by providing flexible solutions based on new technologies (Jordan and Messner 2012, Wouters and Wilderom 2008). By reconceptualizing the competing logics, related tensions, and managerial solutions in this initiative, I contribute a multilevel

understanding of how adaptations of accountability systems emerge within an organization (Adler et al. 1999). Finally, **Article III** integrates and extends accounting and strategy literature on decision-making by explicating the effects of dual responsibility (Mahlendorf 2014, Chang et al. 2014). Unlike the previous accounting literature that tends to emphasize information provision, I empirically show that a hybrid CFO adds local value with a focus on support while retaining attention to control in managerial conversations (Indjejikian and Matějka 2012, Friedman 2016). As such, I contribute to a complete understanding of the coupling with communication channels (Ocasio et al. 2018) for managerial decision-making effectiveness (Garbuio et al. 2015). This study also provides insights on verbal forms of accounting (Hall 2010) and the CEO–CFO relationship in the top management team (TMT) (Naranjo-Gil and Hartmann 2006).

Overall, these complementary insights, described in each section in more detail, provide both relevant and interesting nuances to the prevailing arguments about the nature of transparency and accountability in the literature.

1.6.2 Managerial implications

In terms of practical implications, these studies provide relevant insights to managers about the important choices they have to make when facing uncertainty in their information environment, namely, which transparency and accountability policy to pursue through demanding and supplying accounting-based information and adjusting these functions based on advanced technologies, and for different control targets, to sustainably evolve.

Due to new enterprise resource planning (ERP) technology, companies can monitor and analyze transactional business activities in minute detail, using drilldowns from the balance sheet accounts to the journal entries and related documents, such as purchase orders or invoice documents. Yet, the tale of a great information system and business intelligence derailed by poor management is all too common (Chosen marketing names including ClearSky®, naVision®, Iris®, Crystal® (SAP), QlikView®, Sage®, Magic®, and Oracle® validate the unrestrained human desire for transparency).

This thesis presents a range of approaches, mechanisms, and principles on how to effectively design, change, and use systems of accountability for legitimating rights to set control targets, providing transparency, and delegating responsibility. Having an awareness of the meaning and dimensions of transparency should allow managers to

facilitate information quality given the specific nature of the managers' relationship with their employees.

Given the nature of our qualitative study (**Article I** and **Article II**), we cannot draw strong conclusions regarding the economic effects of the observed practices. It is possible that managers can be satisfied with their systems, even if they do not directly enhance performance in financial or other terms (Chapman and Kihn 2009). Regarding the quantitative survey study (**Article III**), arguments for performance implications can be made. In general, the conclusions of these studies should be interpreted in the context of potential limitations. Summarizing, the following insights and implications may be instrumental in learning more about the design and mechanisms of accountability systems:

As illustrated in **Article I**, managers who incorporated inferences in their accounting routines were more likely to establish constructive transparency configurations. Further, the main insight is that reducing accounting-based information seems less common than adding and producing additional accounting data. Thus, the management principle derived from the observation of successful cases is straightforward: For your business to achieve its potential, each employee's supply of accounting-based information should equal his or her demand for it; the same supply and demand balance must apply to every function, every business unit, and the entire company. As the adage goes: *The level of information should match decision-rights*. In fact, tracking multiple transparency practices in the accounting function of four large companies shows that visibility and inferability of accounting-based information are not independent. As such, the representative and interventionary potential must be considered together. The problem in business examined is that technology, accounting information systems, and the structure of social relationships incentivize the availability and unlimited access to accounting information. The irony is that it is unbelievably easy to find workers in any organization with too much accounting-based reporting. Hence, the first step is to ensure that visibility reflects the decision-making authority (e.g., authorization concept of ERP systems) in the access to information for each position and level that plays an important role in acting upon accounting insights. Yet, one should remain cautious of technological developments, labeled as digital finance in most organizations (e.g., data-oriented business analytics, visualizations and reporting, machine learning, and AI), because they make users believe that digital accounting is ready to be consumed as

inputs to decision-making. In an additional step, however, managers in high-performing organizations were able to go beyond the harmonization and standardization of accounting data to redirect information processing demands and use processing capability in a more target-oriented way. Specifically, with different question modes (e.g., probing, challenging with what-if and why questions, or scenario analysis), successful managers intensified the awareness of underlying assumptions in accounting data which increased the ability to draw accurate conclusions from only a level-appropriate set of financial numbers and figures. This created focused attention of executives and managers which made it more likely to establish constructive performance outcomes when dealing with environmental uncertainties. In fact, in the more successful cases, a space for mutual sensemaking has been created through shared targets, dialogue, and debate based on strong financial literacy. As the CFO in one case study noted, *"Transparency happens because we are in constant communication. But only when we collectively comprehend financial information, we get our big strategic bets rights."* At last, the aforementioned insights triggered further questions of how a firm chooses or redesigns a system of accountability.

Accountability systems are continuously subject to change. Therefore, **Article II** highlights how different paths towards the adoption of new technologies evolve. In terms of initiatives (predictive analytics, machine learning, and AI), specific use cases for the finance function mainly related to planning and forecasting. For business analytics initiatives to evolve, a clear alignment between the maintained persistent management model and new applications became a key principle in the examined case studies. Successful initiatives recreated established management models with predictive analytics technologies as a first step and only gradually adapted new features afterward. As a result, productivity gains through the automatization of finance tasks were achieved despite a clear orientation toward providing new insights, experimenting, and exploring new ways to use accounting data (i.e., expanding the forecasting function). In fact, managers in the analytics initiatives secured sustainable outcomes by offering incremental improvements to the end-users while providing established and new applications in parallel. This is in stark contrast to the promises of rapid change and direct paths towards implementation of advanced analytics for forecasting and planning. In addition, successful initiatives were embedded in and closely linked to operations. Further, the finance function was open to learn from other functional domains and

focused on internal rather than external capabilities. These activities jointly reconciled efficiency and flexibility in organizational technology. As such, new planning and forecasting applications successfully *emerged* through managers that identified opportunities to help solve known problems with previously inconceivable insights and, thus, reduced the initial resistance to change to prevalent features of forecasting and planning systems to which employees were accustomed.

Finally, **Article III** extends theoretical arguments on transparency and accountability to the level of interaction effects and tests how the effectiveness of managerial decision-making is affected by the degree of a CFO's dual responsibilities of providing information for both decision support and decision control. This study formally examines the role of transparency in communication for decision-making by the CEO and how it is influenced by a CFO's attention to strategy, planning, and financial analyses, or focus on internal controls, statutory reporting, and company regulations. As such, this study elucidates and tests where increased transparency becomes unproductively deceptive. The empirical findings support the advice to top management to encourage not only greater involvement of accounting in decision-making processes but also to direct their efforts toward controlling the immediate, internal information environment, adjusting communication channels and linkages accordingly. In particular, to fulfill the fiduciary control function and support as business partners, financial managers should question how top management's and executives' decision-making processes are structured. By more carefully considering the flow of information, distinct sets of control information and supportive analysis can be utilized more effectively. Specifically, the strength of financial analysis to be supportive cannot be compensated by mere "accounting talk" and management discussions. Relatedly, verbal explanations and guidance on rules and regulations about fiduciary functions are a valuable management support. Taken together, both support and control can adversely affect managerial decision-making effectiveness if the top management team (TMT) chooses the wrong channel to communicate.

Summarizing, I strongly encourage researchers and practitioners alike to think more carefully about shaping the distinct levers of transparency and accountability in different settings and to consider the responsibility for control targets, efficiency/flexibility tradeoffs, and ways accounting numbers are used and why they are demanded. I hope that these insights on the nature of accountability systems and how they might evolve

will help established firms increase the likelihood of sustainable changes to their organizations.

1.7 Discussion and conclusion

The studies in this dissertation are concerned with the determinants, attributes, and consequences of accountability systems' design choices. The aforementioned statements emphasized some points in the literature to which the studies jointly contribute. The contributions and limitations of the individual studies are described in detail in each study's discussion. The relationship between the studies is illustrated in Table 1.

Transparency and accountability at work require both great information infrastructure and a management system centered on openness and shared understanding. The better the bundling of accounting-based information distribution and allocation of decision rights and obligations, the higher their effectiveness for contradictory control targets. Executives and managers alike can shape high-and low-transparent contexts for focused attention on the duality of learning, control, flexibility, efficiency, decision control, and support. The complementary findings of this thesis suggest that the performance payoff from responsible and transparent organizations are unexpectedly significant.

On the level of general observations, I reached two basic conclusions: As the multiple and embedded cases illustrate, complex organizations must balance informational stability (through routinizing actions into rules) and flexibility (by keeping some level of equivocality in the accountability system). The degree of complexity and diversity within the organization must match the accounting-produced data processed. Not to communicate is to communicate, and it is the purpose of accounting to communicate numbers and figures constructively within and beyond organizations. Thus, remove noise for effective transparency as a strategy for smart reasoning and successful decision-making.

The quantitative survey study empirically shows that the information-based routines are influenced by the delegation of authority and decision rights. The distribution of responsibilities involves incomplete information by the center or imperfect monitoring ability. The conclusion of this study is that the quality of the information exchange on the content and the relationships dimensions within the top management team (e.g., CEO and CFO) is at least in most of the situations able to resolve these issue and, thus, enable effective decision-making outcomes.

1.8 Appendix

	Article I
Title	Managing Attention with Accounting Information: A Configurational Perspective on Transparency
Author	Stefan Edlinger-Bach
Abstract	While a few scholars have argued that transparency is a critical feature of enabling accountability systems, prior research has considered transparency as a contextual characteristic that influences the attainment of control targets. This has left transparency undifferentiated from information asymmetry and open to conceptual stretching. In this study, we develop a theoretical integration of the attention-based view and organizational control perspectives in order to understand how firms manage transparency for learning and control. This inductive multiple-case study of twelve accounting routines in four organizations demonstrates that it is not possible to identify a universal transparency setting for organizations. Rather, we identify distinct dimensions of transparency (i.e., <i>visibility</i>, <i>inferability</i>, and their relationship) that allow us to describe the complex internal information environment that arises in practice. The empirical evidence problematizes the maintained assumption that greater transparency is required under increasing task uncertainty. Overall, this study extends the configurational perspective to transparency research and offers guidance to managers about possible alternative approaches when seeking to establish effective transparency.
Keywords	transparency; management controls; accounting information systems; organizational attention; financial managers
Status	▪ Conference contribution at: ▪ Accepted for parallel session presentation at the EAA Annual Congress (online), May 26-28, 2021 ▪ Accepted for parallel session presentation at 43rd EAA Annual Congress 2020 in Bucharest (European Accounting Association) ▪ Presentation at the PhD Seminar as part of the Distinguished Scholars Seminar Series at the University of Zurich (Department of Business Administration, Chair of Organization & Management), May 22, 2019 ▪ ACA-UNISG Working Paper Series ▪ Preparing for submission to Accounting, Organizations and Society (AOS)

1.8 Appendix (cont'd)

	Article II
Title	The Emergence of Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting
Author	Stefan Edlinger-Bach
Abstract	Accounting research has presented a range of structural and contextual approaches for designing and implementing accountability systems for simultaneously achieving efficiency and flexibility in managerial decision-making. Much less is known about the preceding initiatives through which organizations decide to adopt new features in their management control systems. In this paper, we focus on this first step – the <i>emergent accountability practice</i> through which new information-based routines are agreed upon. Most prior studies implicitly assume that senior executives, at some point, identify the need to be more efficient or flexible and subsequently design formal systems and structures to implement their choice. Based on an inductive multiple case study of 10 analytics initiatives in accounting, we illustrate how managers seek to unroutinize financial planning and forecasting through the adoption of new technology. A comparison of successful and less-successful initiatives shows that the deliberate (or developmental) formalization can be complemented with an alternative emergent (or evolutionary) process. This emergent practice is important because it enables accountants to recognize inflection points for the adaptation in a timely manner and of which senior executives are still unaware. Our findings contribute to the literature by identifying the conditions and discovering the mechanisms that internalize friction of efficiency/flexibility tradeoffs in the adaptation of accountability systems, and the broader research on how new information processing technology in organizations evolves.
Keywords	accounting innovation; financial planning; financial forecasting; analytics; management control
Status	▪ Conference contribution at: ▪ Accepted for presentation at the 12th Conference of the Performance Measurement Association (Groningen and Cranfield), June 28-30, 2021 ▪ Accepted for parallel session presentation at 12th Conference on New Directions in Management Accounting (EIASM), December 16-18, 2020 ▪ Presentation at the Joint Seminar in Interdisciplinary Research (JSIAR), Accounting Workshop, of the University of Turku and Tampere University, November 26, 2020 ▪ ACA-UNISG Working Paper Series ▪ Preparing for submission to Qualitative Research in Accounting & Management (GRAM)

1.8 Appendix (cont'd)

	Article III
Title	Implications of a CFO's Dual Accountabilities for Managerial Decision-Making Effectiveness
Author	Stefan Edlinger-Bach
Abstract	This study examines how the effectiveness of managerial decision-making is affected by the degree of a CFO's dual responsibilities of providing information for both decision <i>support</i> and decision <i>control</i>. Based on the attention-based view, I argue that depending on the quality of communication channels (i.e., robustness of analysis, disinterested dialogue), CFO's dual responsibility can either improve or compromise effective CEO decisions. Using dyadic survey data on 82 CEO–CFO relationships, the empirical results show that, if a CFO provides high (low) support, top managements' reliance on <i>analysis</i> increases (decreases) decision effectiveness. In addition, if control is "weak" ("strong"), then managements' demand for <i>dialogue</i> about the decision at hand decreases (increases) decision effectiveness. Overall, these findings suggest that the value of dual responsibility depends on the quality of communication. These findings also cast doubt on the maintained assumption in prior work that accounting and operating decentralization are complementary.
Keywords	dual responsibility; communication channels; managerial dialogue; decision-making; attention allocation
Status	▪ Conference contribution at: ▪ Accepted for presentation at the 2021 AAA Management Accounting Section Midyear Meeting: Research Conference. Presentation with Discussant. Implications of a CFO's Dual Responsibilities for Managerial Decision-Making Effectiveness. January 5-9, 2021 ▪ Accepted for presentation at the 2019 ERMAC conference in Vienna, June 30 - July 2, 2019 ▪ Presentation at the CFO Forum conference in Vienna, October 18, 2019 ▪ Presentation at the Accounting Workshop of the University of Zurich (Department of Business Administration, Chair of Accounting), June 23, 2020 ▪ Presentation at the Accounting Research Seminar at the Vienna University of Economics and Business (WU), Department of Strategy and Innovation, October 21, 2020 ▪ ACA-UNISG Working Paper Series ▪ Under review at the Journal of Management Accounting Research (JMAR)

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ARTICLE I

Managing Attention with Accounting Information: A Configurational Perspective on Transparency

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2 Abstract

While a few scholars have argued that transparency is a critical feature of enabling accountability systems, prior research has considered transparency as a contextual characteristic that influences the attainment of control targets. This has left *transparency* undifferentiated from information asymmetry and open to conceptual stretching. In this study, we develop a theoretical integration of the attention-based view and organizational control perspectives in order to understand how firms manage transparency for learning and control. This inductive multiple-case study of twelve accounting routines in four organizations demonstrates that it is not possible to identify a universal transparency setting for organizations. Rather, we identify distinct dimensions of transparency (i.e., *visibility*, *inferability*, and their relationship) that allow us to describe the complex internal information environment that arises in practice. The empirical evidence problematizes the maintained assumption that greater transparency is required under increasing task uncertainty. Overall, this study extends the configurational perspective to transparency research and offers guidance to managers about possible alternative approaches when seeking to establish effective transparency.

Keywords: transparency; management controls; accounting information systems; organizational attention; financial managers

3 Introduction

One of the most vivid theoretical debates in recent years emerged from the transparency concept – the requirement of observation for accurate, and increased, awareness of others (Roberts 2009). When we are the object of transparency rather than the recipient of it—when the increased "awareness" is of us rather than of others—then we may feel more acutely exposed, creating a demand for privacy (Bernstein 2017). The eternal challenge behind the transparency concept is that both are simultaneously experienced as compromises or even violations of one another, producing contradictory conclusions. Managers need to reconcile these paradoxical organizational demands to enjoy superior performance (Bernstein 2012).

Prior research defines transparency as a design feature for enabling and coercive formalizations of bureaucracies (Adler and Borys 1996). Based on this seminal work, the accounting literature provides rich descriptions of how enabling formalizations of accounting systems (Ahrens and Chapman 2004) and their development (Wouters and Wilderom 2008, Jordan and Messner 2012) require transparency. However, the bulk of these studies take a fairly static perspective (Roberts 2009). While scholars describe the design features that allow managers to establish enabling systems, little is known about how transparency is enacted in systems of accountability (Roberts and Scapens 1985). Most studies implicitly assume an agency logic (Prat 2009): transparency is the observational "filter" defining the information asymmetry, just as in the traditional paradigm of agency theory (Jensen and Meckling 1976, Holmström 1979). Figure 2 depicts the relationship between transparency and information asymmetry.

While the accounting perspective may be fairly static, the larger transparency debate has benefitted from more situated contributions. The literature on organizational transparency argues that transparency (by those in control) without integrating the responses of the observed (i.e., the controlled) generates theoretical inconsistencies (Bernstein 2017). Given that observation is the foundational element of management and accounting, the exercise of transparency requires further theoretical and empirical clarification. Thus, managing transparency requires considerable thought about the scope, audience, and purpose of observation.

Existing Agency-Paradigm for Transparency

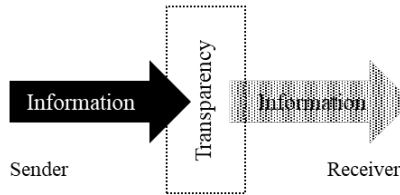


Figure 2 Theoretical conceptualization based on the agency perspective

In this paper, we study accountability systems, which define and legitimize rights and obligations for setting targets and receiving and distributing information (Simons 2005). This is done to understand how managers shape—or contribute to shaping—transparency for dealing with the tensions of monitoring that affect the observer and those who are observed (or put differently, those in control and the controlled). The theoretical motivation for this research focus is nurtured through changes in contemporary internal and external information environments. Whereas theory-building scholars attempt to escape the boundaries of principal–agency theory, new technologies (e.g., cloud computing, data lakes, machine learning, AI) and the increase of information, at almost zero cost, create incentives for unprecedented transparency in organizations. In reality, existing technologies (e.g., ERP systems), which will only advance in the future, create an extensive set of possibilities to multidimensionally generate, process, and distribute accounting information in an organization. As such, it becomes even more critical to have a theoretically more specific concept about the mechanism of information, transparency, and control – for example, with whom and how financial information should be shared for maximization of the organization's overall efficiency. Managing transparency thus requires considerable thought about the scope, audience, and purpose of dissemination of information (e.g., Burney et al. 2017).

To answer these questions, we tracked the transparency configurations of four large multinational enterprises (MNEs) in Europe with a comparative case study research design. This field-based approach is particularly useful for developing a theory on how executives reconcile the demand to disseminate information with the demand for guided self-control and privacy to achieve learning and control targets (e.g., Ahrens and

Chapman 1996). Given the lack of prior research on the accounting functions' particular role, we used an inductive method (Eisenhardt 1989). Scholars have previously suggested that inductive theory development is particularly well suited to answer such "how questions" (Glaser and Strauss 1967). We compare and contrast twelve distinct accounting routines that modify transparency for (1) cost accounting, (2) budgeting, and (3) strategic planning. We identified two distinct dimensions of transparency that describe senior executives and managers' attempts to aggregate, process, and distribute accounting information. Consider ELECTRO-COMP, a stock-listed manufacturing company headquartered in Europe (40,000 FTEs, 8 billion Euros sales in FY 2019) as one of your multiple case studies. (All firm names in this study are pseudonyms for confidentiality reasons.) For competitive advantages, the firm has to remain innovative. Significant price competition requires tight control over costs. This is an example of a company that performs many of these rule- and exception-oriented accounting practices for management accounting. The company believes so much in the importance of getting big bets right that it has built a whole management system around transparency in accounting. As the CFO of ELECTRO-COMP stated, *"Information on a need-to-know basis. To do my day-to-day job, I depend on multiple functions within the organization. But there is no 'nice-to-have' information."* Though managers only have limited information available, they are required to derive conclusions for their entity based on only a few principles, or inference rules (in German, *Spielregeln*), which are mainly based on an internal financial framework for costs and planning. The head of controlling at ELECTRO-COMP further explained, *"We question again and again what are our core beliefs (Glaubensgrundsätze), based on which we establish clear rules to derive scaling factors for cost developments and budgets."* Linking these insights back to transparency, it becomes evident that financial managers are not only concerned with the availability of accounting information but also with how inferable accounting information is regarding the performance of individuals within an organization.

The findings from our comparative case studies support the overall proposition that each distinct accounting routine has an associated configuration of the dimensions of transparency that is specific to the control target. Because prior research had not simultaneously examined accountability systems, targets, and transparency, this empirical setting allows for more situated configurations of distinct characteristics that could fully specify and explain the nature of transparency. At the same time, this

perspective also gives us the ability to ground our understanding of transparency in specific control contexts and targets (in our case, learning and control). The opposing directions of increasing or decreasing transparency in accounting routines allow us to observe financial managers and their active use of accounting information to deal with transparency tensions in accounting structure and the control system.

From the 12 accounting routines in our sample, 9 accounting routines ultimately achieved the intended outcome, while 3 failed to attain their initial target. Our rich case data showed that the financial managers in the successful accounting functions used two configurational routines (i.e., activities to align and realign their routines' organizational contexts) in order to cope with persistent structure-system tensions of information transparency. The first of these routines (configurational aligning) allowed the accounting function to pursue their control targets (to prevent undesirable behaviors), and the second routine (configurational misaligning) helped them generate learning effects (to promote desirable behaviors).

This study makes contributions to both theory and practice. Drawing on attention theory (Ocasio 2011), we reframe transparency research by developing a configurational perspective, which differs from the established design perspective in terms of the assumed nature of the transparency-privacy and observer-observation tension. Our multiple case study accounts for the rich complexity in reality and clarifies the nature of transparency, the organizational process with which to manage transparency, the managerial routines with which to achieve effective transparency, and their intended outcome. First, it suggests that transparency may rely less on the design of stable solutions than on the dynamic shaping and reshaping of accountability systems to deal with persistent tensions. Second, it characterizes the role of the management function in shaping transparency in organizations, thus calling for a more integrative view of the systemic interplay between organizational structures and individual's actions in the pursuit of learning and control strategies. In other words, and in contrast to the arguments of Schnackenberg et al. (2020), Albu and Flyverbom (2019), or Bol et al. (2016), we do not find it possible to identify a generic transparency feature that applies in all settings. Instead, in our case studies, the specific configuration of two complementary dimensions of transparency (*visibility*; and *inferability*; whether something is inferable) appear to vary depending on whether executives emphasized

learning or control targets. Overall, these insights provide important nuances to the prevailing arguments about the nature of transparency in the literature.

In terms of practical implications, our study provides relevant insights to managers about the important choices they have to make when facing uncertainty in their information environment, namely, which transparency policy to pursue regarding different control targets, and how to sustainably evolve over time.

The rest of this paper proceeds as follows. We first briefly describe the framework of enabling accountability systems before linking these notions to accounting practices. We then introduce our research setting and design and, in subsequent sections, present and analyze the empirical findings drawn from our multiple embedded cases. Overall, this work reconceptualizes transparency for the subject-matter of accounting.

4 Theoretical background

Many managers struggle to either focus attention on information that is of most operating and strategic importance or prevent attention from being distracted to less important and perhaps peripheral information (e.g., Doornich et al. 2019). A number of theoretical perspectives have been used to make sense of this phenomenon and to provide insights for managers about how they can become more effective in directing and activating attention for learning and control (e.g., Simons 1991). One highly influential approach is the attention-based view (Ocasio 1997). Previous theory (Ocasio 1997) suggests that what information attracts attention depends upon whether the claims surrounding it are supported by the following social structures of attention: the rules of the game, the status of the players, their structural position, and the available technology and resources. This particularly resonates with Simons' (2005, 1995) characterization of systems of accountability, which define key positions in an organization, legitimate rights and obligations to set targets, and receive (i.e., to observe) and distribute information (i.e., being observed). We rely on this metatheoretical link to further explore the relationship between attention and systems of accountability (e.g., Ocasio and Wohlgezogen 2010, Roberts 1985). Recent studies have highlighted the situated role of organizational mechanisms (e.g., systems and structures) for attention to information (for an overview, see Joseph and Gaba 2020).

A related theoretical perspective in connection with attention that has become quite popular in recent years is the notion of transparency, which can be understood as a mode

of information disclosure or as a social process (Albu and Flyverbom 2019). In the subject matter of accounting, however, research building on Adler and Borys (1996) defines transparency mainly by its outcome, characterizing it as either visibility (e.g., Ahrens and Chapman 2004), understanding (e.g., Chapman and Kihn 2009, Goretzki et al. 2018), or a combination of both (e.g., Free 2007, Jørgensen and Messner 2009). As such, transparency (as a design feature of enabling formalizations) has become implicitly related to several accounting and control aspects (for an overview, see Strauss and Tessier 2019), including control systems (e.g., Ahrens and Chapman 2004), performance indicators for measurement (e.g., Jordan and Messner 2012), governance channels (e.g., Doornich et al. 2019), information system integration (e.g., Chapman and Kihn 2009), forecasting systems (e.g., Goretzki et al. 2018), target setting (e.g., Cugueró-Escofet and Rosanas 2013), transfer pricing (e.g., Cools et al. 2008), supply chain controlling (Neu et al. 2014), employee participation (e.g., Groen et al. 2012), innovation and product development (e.g., Jørgensen and Messner 2009), and collaboration and team dynamics (e.g., Adler and Chen 2011).

Although the Adler and Borys (1996) framework provided a useful perspective for addressing theoretical accounting questions, contemporary social, organizational, and technological structures influence the relevance of the design features for enabling accountability systems (Jordan and Messner 2012). Today's primary barrier is no longer only technical but also social, cognitive, and behavioral (Bernstein 2012). Given the limited attentional and information-processing capacity of individuals and firms (Ocasio 1997), we suggest that it is useful to separate out Adler and Borys' (1996) two categories of transparency and examine their relationship with each other: first, the internal transparency feature, which refers to the extent to which users are able to see through and understand the logic of the system; and second, the global transparency feature, which relates to the extent to which users understand the upstream and downstream implications of their work. While there is empirical support for the importance of transparency in the design and implementation of accounting (e.g., Wouters and Roijmans 2011), far less research has examined how transparency can be shaped for different control targets (e.g., to promote desirable behaviors or to prevent undesirable behaviors). An implicit assumption across most of this literature is that universal transparency settings in organizations are fundamentally based on the premise that more and more accurate awareness of observations always improves understanding and

learning through the reduction of task uncertainty. However, Roberts (2009) conceptually defines limits to transparency since it makes an individual visible to others and could threaten information privacy and self-control.

Recent management literature reviews (e.g., Bhawe et al. 2020, Bernstein 2017, Schnackenberg and Tomlinson 2016) have taken a step toward resolving this ambiguity by arguing that many of the previously cited models of the relationship between transparency and privacy and attitudinal outcomes are not fully specified since they control for the characteristics of neither the tasks nor the managers (Bernstein 2017, Bernstein 2012, Lewis 2010). As articulated by Bernstein (2017), transparency provides two fundamentally different outcomes across which managers divide their attention and resources: first, learning outcomes, which relate to transparency that fosters problem-solving, correction of errors, exploration, flexibility, and adaptation based on best practices; and second, control outcomes, which relate to transparency which solves conflicts of interest and coordinates and fosters cooperation between individuals. However, the management of transparency could be more difficult than previously assumed. In fact, managers not only need to establish transparency with the right accounting information but also to account for the responses of information providers (Bernstein 2017).

Prior accounting studies, however, have devoted relatively little attention to *how* the observable is observed. Thus, the theoretical and practical question remains: Does seeing more really increase the effectiveness of learning and control, or is it moderated by behavioral effects of measurement and instead creates a paradox of "the closer you look, the less you see" (Mayo 1933, Roethlisberger 1941, Katz and Kahn 1966, 1978)? While some researchers specify the integration of structure and system for a proper fit (Donaldson 2001, Gerdin and Greve 2004), we argue that it is the *information-based routines performed* by managers (e.g., increase or decrease of transparency) that are subject to system-structure interactions impacting the attainment of learning and control targets. Accordingly, we assume that transparency may not arise directly from design choices but may also require routines of financial managers who actively shape accountability systems and processes to reconcile tensions of information availability, information privacy, and limited processing capability.

This conceptual framing serves to clarify our research strategy. In the remainder of this study, we take an inductive approach to the challenge of managing the transparency

of accounting information. We use the attention literature to focus on the two targets of transparency noted above (i.e., attention direction for learning or attention activation for control), which helps us to identify suitable accounting routines to study; and we use the transparency literature to guide our investigation of the nature of transparency managers in our case studies, put in place to support the attainment of their chosen targets.

5 Research methodology

We undertook an inductive study, using 12 in-depth embedded cases of four multinational companies' accounting routines. We used this setting to examine how managers shape, or contribute to shaping, transparency in accounting routines to achieve learning and control targets. Given that we generally know little about how accounting information contributes to transparency within organizations, we opted for a grounded theory-building approach (Glaser and Strauss 1967). Such field-based approaches are particularly useful for developing a theory on "how questions" (Yin 2008), and to explain complex organizational phenomena involving multiple organizational actors (Eisenhardt and Graebner 2007).

5.1 Research Setting and Sampling

We started by screening online news feeds for companies currently changing their accounting information system. In line with most prior studies, the focus was on large companies who were adapting their information structure (e.g., SAP S/4 HANA, ERP), or with implementing a new accounting information system (e.g., reformulation in authorization concepts and reporting), because this implies rich examples of changes in informational use (Abernethy and Guthrie 1994). We then sought to identify firms that had been early adopters and at least moderately successful in changing their accounting information system. These criteria helped us to select cases with similarly challenging functional contexts for subsequent case comparison. The use of multiple cases from different companies provided comparative data, which yielded more generalizable theory (Yin 2008). Since qualitative research requires good quality access to senior executives, we further selected Central European firms, since their geographical proximity allows intensive qualitative data collection during regular on-site visits. It is important to note that this approach to sampling is not driven by replication logic with generalizability as the primary objective, but rather aims at generating sufficient variety

to develop new theoretical insights. The theory developed in this study sets the ground for subsequent theory testing based on larger samples.

One firm we identified was (1) ELECTRO-COMP, a global market leader in electrical engineering and manufacturing. Although the firm had a well-integrated information infrastructure, it faced different interpretations of accounting information due to the complexity of the business, as well as the functional and divisional separation of operations. (2) MANUFACT-COMP, a leading global manufacturer of vehicles and equipment. The company faced a shift towards standardization and centralization of the administration function, which increasingly demanded integration of different ERP systems. At the same time, the group's expansion into emerging markets had led to the need for increased monitoring of business processes, for improved decision-making and higher profitability. (3) RETAIL-COMP, a dominant global distribution, and financial services company. The organization established bureaucratic features such as the application of consistent rules to operations, but was required to adjust the underlying system architecture of its accounting system for longer-term strategic budgeting and planning. (4) LOGISTIC-COMP, is a leading global storage system and logistics supplier. The company faced fast-paced growth that quickly made its existing reporting structures obsolete. Additionally, it experienced an emerging trend towards individualized use of accounting information to support organizational control for end-to-end solutions targeted at specific customer groups' engineering needs.

All these firms were improving their accountability system to harmonize, standardize, and integrate financial accounting, but also enhance managerial accounting, to remain competitive. In other words, they strived to improve learning and control opportunities with their accounting. Since we were particularly interested in the accounting function, our level of analysis was not the firm as a whole, but rather specific embedded accounting routines. By focusing on routines as distinct situations of accounting information use, we attempted to contribute to the transparency target by pursuing either a learning, or a control strategy (transparency either increasing or decreasing). This allowed us to better differentiate between different targets and contexts of information transparency in our sample. Through a series of initial interviews with financial managers (Head of Accounting, Head of Controlling, Finance Directors responsible for functional domains), we identified for each firm, accounting routines, explicitly tied to a particular learning or control opportunity. We asked our

informants to clarify whether the management accounting function of each situation targeted learning or control. Following Eisenhardt's guidance for case study research, we then applied a theoretical sampling strategy so that the embedded cases are also carefully selected to represent polar types with regard to the dimensions of interest. We facilitated the discussion by providing and clarifying the theoretical definitions of learning and control for accountability systems (e.g., Simons 2005). Accordingly, our refined sampling of firms was driven by the need to cover the two different transparency targets. Based on our informants' input, 12 situationally contingent and distinct routines became emergent. Aligned with our theoretical research question, managers in these routines used distinct configurations of transparency with the intent to activate (for control) or direct (for learning) attention with accounting information.

5.2 Data Collection

We gained access to the full sample of 12 accounting routines and primarily collected data via semi-structured interviews. A total of 23 informants were interviewed, some several times, during on-site visits in 2019 (an overview is included in the Appendix). We recorded more than 80 hours of statements specifically for this case study. Informants were asked to reflect on concrete situations rather than abstract concepts. The interview process included three sets of informants: (1) senior executives, who informed us about the organizational structure and strategic orientation and the formal design of the accountability system; (2) financial managers, who were responsible for finance processes, and accounting; and (3) controlling members, who were more knowledgeable about the accountability systems' technical details and inner workings. Selecting multiple informants at different levels helps to mitigate informant biases (Miller et al. 1997) and provides a broader range of perspectives (Bourgeois and Eisenhardt 1988). We collected data from between 3 and 6 informants per accounting routine until theoretical saturation was reached (Glaser and Strauss 1967). Furthermore, we attempted to verify individual reports by asking similar questions to multiple informants (Eisenhardt and Graebner 2007). For an overview of our sample, please refer to Table 1 in this paper.

Except for several follow-up telephone interviews, our interviews were all conducted on site and usually lasted between 60 and 120 minutes. Most of the interviews were recorded and transcribed (Yin 2008). A few informants did not wish to have their interviews recorded. In these cases, the researchers took detailed notes, created a written

summary immediately after the interview, and had the informants confirm that this reflected their responses. All interviews were conducted specifically for this study using an interview guide structured into 4 sections. First, we asked the informants to provide general information on the accounting system and their responsibilities, which enabled familiarization with their terminology (Fontana and Frey 1998). Second, we asked them to describe in detail the activities that they undertook to activate or direct attention with transparency. This provided us with an insider's viewpoint on situations to accurately interpret the informants' perspective and meanings for emic validity (Maxwell 1992). To reduce the risk of cognitive biases and impression management, informants were asked to reflect on concrete situations rather than abstract concepts (Miller et al. 1997). The final section was comprised of questions on the specific use of accounting information for (1) costing, (2) budgeting, and (3) strategy that occurred within the reporting period.

In addition to our primary interview data, we examined multiple secondary data sources, such as internal documentation, presentations, and annual reports, to further enrich our data and gain additional insights. While some of the materials were publicly available, our informants provided additional material. The triangulation of the collected data further increased the emic validity (insider's perspective) of our study (Maxwell 1992). We then followed structured coding procedures and created a list of first-order codes describing distinct dimensions of transparency that facilitated the respective transparency targets (i.e., learning and control) pursued in distinct accounting routines. Subsequently, these first-order codes were grouped into two categories (Strauss and Corbin 1998), specifically *visibility*, and *inferability*. The process ended with the aggregation of the second-order themes into two non-redundant dimensions of configurational transparency (Miles and Huberman 1994). Finally, we engaged in a cross-case analysis to identify similarities and differences for fully specifying our theory of how managers shape, or contribute to shaping, transparency in accounting (see Figure 3 for an overview of the categories, related first-order codes, and illustrative quotes for the four cases).

Table 1 Sample

<i>Company</i>	<i>Accounting Routine</i>	<i>Description of Accounting Routine</i>	<i>Intended Transparency Direction</i>	<i>Transparency Target</i>	<i>Outcome</i>	<i>Number of Informants</i>
ELECTRO-COMP						
	ELECTRO-COSTING	Accounting routine to integrate cost structures by reconciling different strategic cost targets and objectives.	–	Attentional Activation (Control)	Constructive	3
	ELECTRO-BUDGETING	Accounting routine to establish accounting frameworks for budgeting based on aggregated figures to redirect efforts.	+	Attentional Direction (Learning)	Constructive	4
	ELECTRO-STRATEGY	Accounting routine to increase consensual information and meaningful numbers in the strategic control system.	+	Attentional Activation (Control)	Constructive	3
MANUFACT-COMP						
	MANUFACT-COSTING	Accounting routine to generate and provide additional disaggregated accounting information.	+	Attentional Activation (Control)	Destructive	5
	MANUFACT-BUDGETING	Accounting routine to examine accounting figures to align individual interests with organizational goals.	–	Attentional Activation (Control)	Constructive	3
	MANUFACT-STRATEGY	Accounting routine to increase provision of standardized accounting information to align strategic planning activities.	+	Attentional Direction (Learning)	Destructive	5
RETAIL-COMP						
	RETAIL-COSTING	Accounting routine to restrict spatial availability of accounting information to align individual costing with organizational goals.	–	Attentional Direction (Learning)	Constructive	3
	RETAIL-BUDGETING	Accounting routine to disseminate available accounting information for planning and forecasting.	+	Attentional Direction (Learning)	Destructive	6
	RETAIL-STRATEGY	Accounting routine to strengthen usefulness of individual accounting information for strategic alignment.	–	Attentional Activation (Control)	Constructive	5
LOGISTIC-COMP						
	LOGISTIC-COSTING	Accounting routine to establish standardized terms for shared accounting information on costs.	+	Attentional Activation (Control)	Constructive	5
	LOGISTIC-BUDGETING	Accounting routine to decrease the access to private accounting information in budgeting.	–	Attentional Activation (Control)	Constructive	3
	LOGISTIC-STRATEGY	Accounting routine to distribute accounting information to validate decentralized understanding of strategy.	+	Attentional Direction (Learning)	Constructive	6

Notes: + Refers to accounting routines intended to encourage transparency; – Refers to accounting routines intended to reduce transparency (or increase privacy). The assessment only refers to the intended direction of changes in transparency, not the absolute level of transparency in organizations.

5.3 Data Analysis

As part of the data analysis process, we assessed the accounting routines' success of achieving their transparency targets. We defined successful routines as our informants did, in terms of both the presence of positive characteristics (e.g., accomplishment of efficiency gains, new insights and understanding, acceptance of management, improvements) and the absence of negative ones (e.g., no added value, increased complexity, resistance, reversed, or cancelled). Informant data from our interviews and focus group meetings helped us to not only classify the routines' adjustment of transparency, but also the intended direction of changes to transparency into two broad categorical directions. Table 1: + refers to an increase in transparency, for example with the acquisition and distribution of entirely new accounting information; and – refers to a decrease in transparency, for example with limiting access to accounting information beyond your functional domain.

This classification of more and less successful accounting routines refers exclusively to the match between the intended transparency targets and the realized outcome. This does not consider the accounting routines' impact on the economic performance. Based on this classification, we found that in 9 situations, transparency in these routines had generally realized the intended target. 4 of these situations had increased transparency (ELECTRO-BUDGETING, ELECTRO-STRATEGY, LOGISTIC-COSTING, LOGISTIC-STRATEGY), and 5 had decreased transparency (ELECTRO-COSTING, MANUFACT-BUDGETING, RETAIL-COSTING, RETAIL-STRATEGY, LOGISTIC-BUDGETING). In contrast, the remaining 3 transparency increasing routines (MANUFACT-COSTING, MANUFACT-STRATEGY, RETAIL-BUDGETING) did not attain their initial target of creating the intended attention.

After that, we initially examined how the senior management designed accountability systems to implement their transparency target. During this preliminary data analysis, we quickly realized that our informants assigned less importance to the formal design choices of visibility of information (i.e., its presence as opposed to its absence) than to the financial managers' subsequent configurational routines. The latter refers to the financial managers' communicative activities regarding adapting and aligning the understanding and meaningfulness of accounting information with the access to accounting information.

At this point, the understanding of two necessary and jointly satisficing conditions of transparency emerged. Since the first-order codes served as the basis for a phase of deductive reasoning, where first-order codes were grouped into theoretically established separate categories, distinct dimensions of information *visibility* and *inferability* (i.e., the capability of information to be inferred in the perception and behavior of the informants) materialized (see Figure 2). Yet, it became apparent that the activities in the routines were different. Hence, we used the categorization of distinct situations of accounting routines not only to better understand how accounting information should be disclosed and used, but also why certain accounting routines are constructive, and others are destructive. In the next step the dimensions were set in relation to each other and two configurations emerged throughout the embedded cases (for an overview, see Figure 3).

The first aggregate dimension (Figure 2a) reflects the accounting functions' effort to align systematic inference of transparency and its accounting structure to realize its target of attention activation. In Adler and Borys' (1996) terminology, this activities can be clustered in distinct categories of internal and global transparency. In our context, internal transparency relates to the visibility of information with close orientation towards processes and operations bound and embedded within an agency. Complementary, global transparency emphasizes an awareness of others' information in an orientation beyond an individual agency. We aggregated the two patterns (an internal transparency aligning to bounded inference; global transparency aligning to common inference) under the first dimension of *configurational alignment*.

The second cluster of codes (Figure 2b), which we labeled *configurational misalignment*, comprises a set of activities to develop specific capabilities, which allow for misalignment of opportunity constraints and values. We related these interpersonal activities to Simon's (1995) established categories of boundary and belief system for counterbalancing information content because these activities were directed towards managers representations of accounting information. We used Ocasio's (1997) established categories of communication channels and attention structures for situational knowledge constraints across organizational domains. We observed similar routines as the accounting functions' effort to configure the organizational contexts to support the implementation of the intended transparency strategy.

We then explored the two deviating cases utilizing a similar data analysis process and compared the findings to those of our main cases. The variation between the two types of cases allowed us to present comparable and contrasting results of accounting routines.

6 Findings

Our initial data analysis revealed that accounting routines functioned differently, depending on the specific learning and control targets. The 7 routines pursuing a control target (ELECTRO-COSTING, ELECTRO-STRATEGY, MANUFACT-COSTING, MANUFACT-BUDGETING, RETAIL-STRATEGY, LOGISTIC-COSTING, and LOGISTIC-BUDGETING) were designed as attention direction strategies to place increasing emphasis on existing inferable information. The financial managers involved in these routines asserted their target of controlling the interpretation of the information for the alignment of individual and organizational interests. In contrast, the 5 routines with a learning orientation (ELECTRO-BUDGETING, MANUFACT-STRATEGY, RETAIL-COSTING, RETAIL-BUDGETING, and LOGISTIC-STRATEGY) were set up with a deliberate attention activation strategy to facilitate experimentation under the condition of limited availability and visibility of information. The financial managers specifically highlighted these routines' imbalance of informational demands and needs.

While these initial findings were informative, we observed that the truly interesting stories started to unfold with changes in the accounting information system. In this scenario, the financial managers were confronted with tensions in their managerial routines. We, therefore, focused our analysis on these separable routines. Based on our data, we identified dyadic configurational routines that helped to manage the tension of the intended learning and control targets. *Configurational alignment* routines supported activating attention with accounting information to align individual interests with organizational targets, and *configurational misalignment* routines helped direct attention to learn from accounting information.

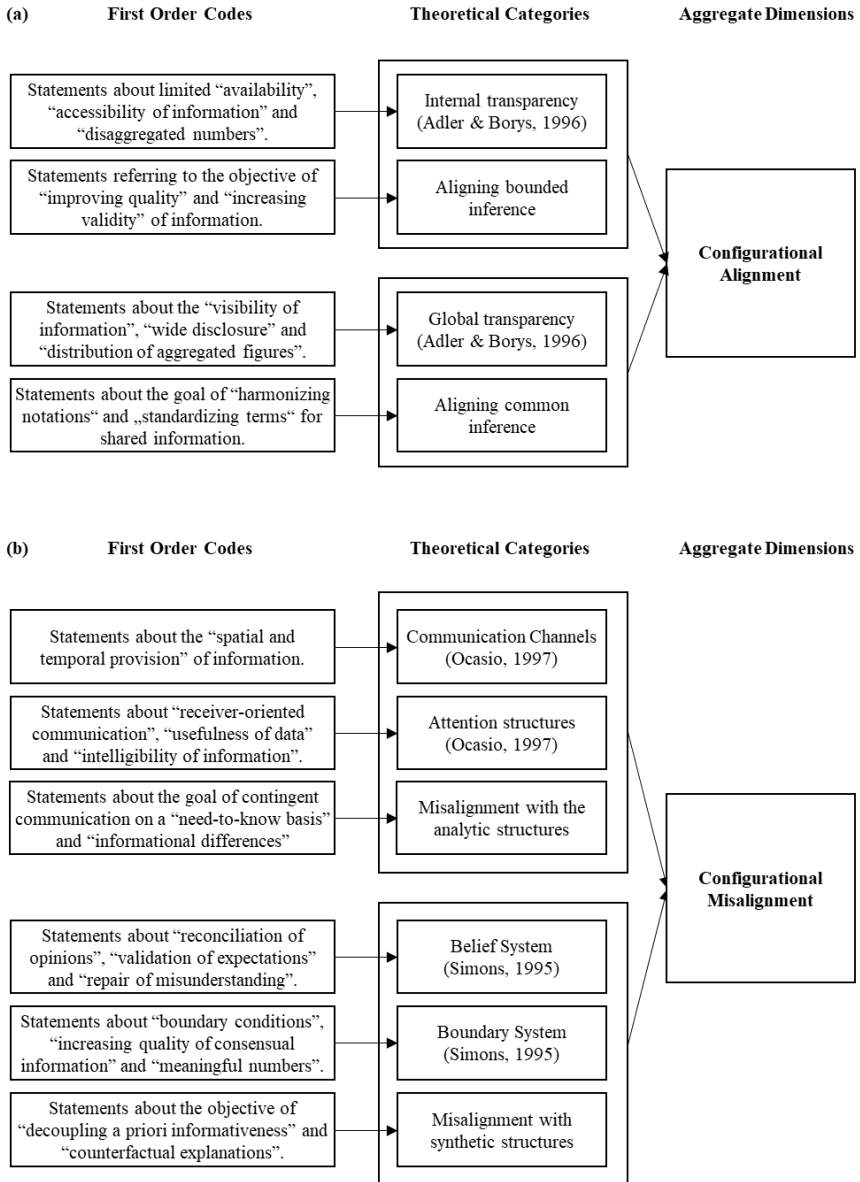


Figure 3 (a) Data structure – Configurational Alignment (b) Data structure – Configurational Misalignment

We next provide detailed descriptions of these *transparency configurations* in respect to 3 constructive cases – ELECTRO-COSTING, LOGISTIC-COSTING (with a control target), and LOGISTIC-STRATEGY (with a learning target). We then use three adverse cases to provide additional insight into how transparency configurations in some of these functions destroyed managers' ability to establish effective transparency. In addition, we contrast routines of MANUFACT-BUDGETING (with a control target), as opposed to RETAIL-BUDGETING and MANUFACT-STRATEGY (with a learning target). Table 2 provides further evidence in the form of illustrative quotes with respect to cases not presented in detail. Subsequently, we conceptually develop the transparency configurations that emerged from our case data and anchored them in prior research.⁴

⁴ From an etic perspective, the terms "accounting function" and "finance function" will be used interchangeably in the rest of this study. In practice, most informants referred to the accounting domain as "finance function". This notion encompasses managerial and financial accounting from an emic perspective.

Table 2a Additional Evidence for Configurational Alignment of Transparency in Accounting Routines

<i>Organizational routine</i>	<i>Control function</i>	<i>Transparency Dimension – Visibility^a</i>	<i>Transparency Dimension – Inferability^b</i>
Configurational Alignment			
ELECTRO-STRATEGY		We measure capital efficiency only at corporate level (...) we do not actively promote it at divisional level in detail, because otherwise we have discussions. (...) we openly communicate aggregated segment results in company meetings. (ELECTRO-COMP Senior Executive) – Global transparency	It is then mainly up to me to set the common framework without jeopardizing the strategy. (...) for me, of course, the economic (financial) frame is very important (...) I promote, "attend to your cost scaling principles, stick to your budgets", (ELECTRO-COMP Senior Executive) – Aligning common inference
		We (financial managers) coordinated sales and investments, if necessary, in close consultation with the entire management board. (ELECTRO-COMP Financial Manager) – Global transparency	I make it transparent for them (functions and divisions), I try to make it inferable for them, not only in the areas, but also in the regions (...). I always try to make it clear to them what action has what effect in our financial statements and why. (ELECTRO-COMP Senior Executive) – Aligning common inference

Notes: a) Refers to routines intended to encourage/discourage accounting information availability. b) Refers to routines intended to encourage/discourage the informativeness of accounting information.

Table 2a Continued

Organizational routine	Control function	Transparency Dimension – Visibility	Transparency Dimension – Inferability
MANUFACT-BUDGETING		Areas only see their turnovers and contribution margins. This information from others (areas), as it is confidential, I do not provide it to the whole organization. (...) there are certain meetings for a rough overview of financials of other areas, but it doesn't go into detail at all. So, we don't use the information from the other areas since I can't influence these other areas at all. (MANUFACT-COMP Financial Manager) – <i>Internal transparency</i>	I explain in workshops how to calculate EBIT or profit. (...) you hear it everywhere, even in the media, but I was certain they (sales team) did not know how this relates to their activities. And there I tried, we tried (senior executives), to show how it functions, quite simply, really – I was almost ashamed to show it (calculations) so simply (...) they said "yes, super, now this information is useful for us (sales department)". And there we (financial managers) tried to break it down, but really quite simply. For example, with the allowances and discounts. (...) and they understood (MANUFACT-COMP Financial Manager) – <i>Aligning bounded inference</i>
		You don't have transparency to make it apparent, even in the planning phase, it is not clear what the overall costs of productions are. (...) they are confidential, they are also classified as confidential. The cost center managers currently only can see the allocation of primary costs. (MANUFACT-COMP Senior Executive) – <i>Internal transparency</i>	The last time he (CFO) presented the effects on the balance sheet, he did it really well. He talked about the cash conversion cycle in front of the whole management team. We taught them, trained them, asked what the figure means for them, and in what context. What can the sales manager do to improve this ratio? Wow, there were gaps opening up, and that were successfully bridged. Where we say I'd like to have that in the end. And to improve that, do that, do that, do that, do that... because then it has the effect. (MANUFACT-COMP Senior Executive) – <i>Aligning bounded inference</i>

Table 2a Continued

Organizational routine	Control function	Transparency Dimension – Visibility	Transparency Dimension – Inferability
RETAIL-STRATEGY		I want to have this information that is relevant to me and that I somehow need for my daily actions when I get questions. This is the information I want to have. (...) there are certain topics where I say this is not relevant, then I'm glad if "I don't know". (...) so in principle, everyone should have all the information he needs for his work, he doesn't need more than that, (...) that is what we accomplished (RETAIL-COMP Senior Executive) – <i>Aligning internal transparency</i>	If one area performs well, or develops very positively, you actually look into the matter too little. Yet, in the areas where it works well there is the biggest potential. (...) and if something is positive, then I leave it alone. That's really, really from a financial point of view my approach. It really should always be balanced. That doesn't mean that if something goes bad, I don't even look at it – on the contrary. But the balance has to be right. There is even the term "negative reporting". Because if something works it's ok anyway. (RETAIL-COMP Senior Executive) – <i>Bounded inference</i>
		In principle, our operating units must be profitable on a stand-alone basis. At divisional level, they do not get an insight into the financial figures of the entire group. There used to be a contribution margin scheme. (...) now we have a contribution to earnings, fixed costs and other costs, and then earnings, EBIT, aligned to the appropriate level. The results are visible for the divisions, for the dealers below them, the results of the others are not visible, (...) that is the responsibility of the divisions how they handle it within their individual divisions. (RETAIL-COMP Senior Executive) – <i>Aligning internal transparency</i>	Everybody "fights" for himself (segment), only when it comes to the bigger picture, then you have to do it together. Once you've seen other areas, because you worked there, you just automatically tick differently, can draw accurate conclusions without having all the information from the other segments. (RETAIL-COMP Senior Executive) – <i>Bounded inference</i>

Table 2a Continued

<i>Organizational routine</i>	<i>Control function</i>	<i>Transparency Dimension – Visibility</i>	<i>Transparency Dimension – Inferability</i>
LOGISTIC-BUDGETING		We as financial managers of the respective units have no insight, because the spokesman is the sales-related managing director, that is the COO, who sits with us in the executive team. (...) in the budgeting phase, when it comes to personnel costs and personnel planning, the different areas don't see the salaries of the other areas. (...) you have to merge them into an Excel spreadsheet manually every time because there aren't different views of the database (information system). They must not see each other. (...) either we divide it up, or the division manager does it himself. (LOGISTIC-COMP Senior Executive) – <i>Aligning internal transparency</i>	The traditional cost center planning is very area-specific until it goes into the P&L planning. (...) we also do not have cost center costs, only the cost center manager is allowed to look at it, to prevent misinterpretations (...) you would often need it, it might be useful, but that is simply not possible or not permissible. (LOGISTIC-COMP Senior Executive) – <i>Bounded inference</i>
		(...) there's definitely everything that has to do with personnel costs and salaries every time. That's an impossible challenge to provide and get the data. (LOGISTIC-COMP Financial Manager) – <i>Aligning internal transparency</i>	We as a manufacturing unit deliver into all units. But we only see our "own piece of the cake". I don't know what the total order in the group looks like, I only know what my share looks like. (LOGISTIC-COMP Financial Manager) – <i>Bounded inference</i>

Table 2b Additional Evidence for Configurational Misalignment of Transparency in Accounting Routines

<i>Organizational routine</i>	<i>Control function</i>	<i>Transparency Dimension – Visibility^a</i>	<i>Transparency Dimension – Inferability^b</i>
Configurational Misalignment	ELECTRO-BUDGETING	Access to information, there is actually a very simple rule in our organization – on a need-to-know basis. If you need information, you get it. There is no "nice-to-have" information. We have very clear rules on what and to whom information should be provided. (ELECTRO-COMP Senior Executive) – Boundary System	We discuss a lot beforehand and question again and again what are our core beliefs. (...) the "Glaubensgrundsätze" (core beliefs), which are communicated across a range of channels. (ELECTRO-COMP Senior Executive) – Belief System
		An exchange with the division presidents takes place weekly, much ad-hoc, much joint meeting, always present at the divisions, dealing with all kinds of issues. We have overarching additional functions in multiple committees. We do a lot of reconciliation talks. We make it clear to our operation management colleagues what we need, but above all why we need it. (ELECTRO-COMP Financial Manager) – Communication Channels	That's a lot of coordination work, of course, but it's also about executing strategy, explaining to people why the situation is like this, and making everyone aware of what we need. Otherwise everyone says, I don't understand, I don't do it. (ELECTRO-COMP Financial Manager) –Misalignment with synthetic structures

Notes: a) Refers to routines intended to encourage/discourage accounting information availability. b) Refers to routines intended to encourage/discourage the informativeness of accounting information.

Table 2b Continued

<i>Organizational routine</i>	<i>Control function</i>	<i>Transparency Dimension – Visibility</i>	<i>Transparency Dimension – Inferability</i>
RETAIL-COSTING		I asked what reports are needed by which area (...) omitting formal reports, looking whether something is happening and if nothing is happening then he does not need the report. I am "mucking out" even standard reports. I clean up. I reduce information at different reporting levels. We cut off "old habits". You have to be careful not to add "extensions". The defining question I am asking is, does the information become too much? I believe the question of whether information becomes too much is one that you have to ask everyone, including yourself, from time to time. (RETAIL-COMP Senior Executive) – Misalignment with the analytic structures The management gets its information from two sides. One is the group reports that we prepare on group controlling, and then they have their areas of responsibility, which are also reported. Historically, the silos are quite obvious with the separation of the business areas. The business units were also very strongly autonomous, actually, very decentralized. (RETAIL-COMP Senior Executive) – Boundary System	All managing directors have been with the company for a very long time, they have all grown with the organization. And they already know the business from "bottom-up" and therefore they also have a very extensive knowledge of the business, especially for the business areas they are responsible for. (RETAIL-COMP Senior Executive) – Belief System I do not see everything, otherwise that is "micromanagement" and you no longer have the big picture. And RETAIL-COMP has always been managed in this way, there have been certain levels. (...) a holding level, a business unit level, a company level and then a dealer level. So, everyone is responsible for his level. (...) for finance the, intelligibility of a few key figures is important (quantity, turnover, EBIT, cash flow, net liquidity, ROS, investment in property, PPE, ROI). Finance delivers reports and information that are appropriate for the recipient, not simply throwing numbers around saying "find out what you need", but that it already says "look here, of course in coordination with the recipient, that is now actually the set of key figures, or numbers that are relevant for you. (RETAIL-COMP Senior Executive) – Attention Structure

Control Orientation: Configurational Aligning Routines

ELECTRO-COSTING. ELECTRO-COMP is a formal matrixed organization with autonomous divisions and separated functions for efficient operations and flexibility in the dynamic environment. The company produces a wide range of electronic equipment including semiconductors, microcontrollers, and security chips. The organization's objective is to maximize shareholder value. Besides its strong core business area, ELECTRO-COMP has to be innovative to stay ahead of the competition. However, price competition is also significant, so the company has to maintain tight control over costs. The organization-wide integration of cost structures was apparent in managerial performance reports and annual budgeting and forecasting processes. Accounting information was formally disseminated spanning relatively autonomous divisions managed as profit centers, such as production, R&D, and HR, and functional responsibilities for G&A and other cost positions. The senior executive of ELECTRO-COMP explained,

"Access to information, there is actually a very simple rule in our organization – on a need-to-know basis. If you need information, you get it. There is no "nice-to-have" information. We have very clear rules on what and to whom information should be provided."

With respect to consolidated contribution margin accounts and consolidated P&L statements and strategic planning on the group level, access to information was limited. As one of the senior executives of ELECTRO-COMP noted,

"Strategic financial planning, 5-year planning, consolidated financial statements, of course there is a very narrow circle that has this information available, because it is also clearly relevant to the stock price. For example, the divisions – i.e. we are organized into 4 divisions that are responsible for the business – and these 4 divisions each know their income statement. But they do not know the income statements of the other divisions. They have to supply these accounts to us in Group Controlling and we consolidate the individual statements at the corporate level".

Despite the clear accounting structure and reporting mechanisms, ELECTRO-COMP initially had frequent issues with reconciling different strategic cost targets and objectives due to the complexity of governmental structures. In particular, the reason for this was the tensions of dual responsibilities caused by the balance of formal structure of functions and divisions. A financial manager of ELECTRO-COMP attested,

"Because there is clearly a G&A line in the profit and loss account that is 90% my responsibility and this G&A function should, of course, grow at a disproportionately low rate to sales, and I know which functions are in there, and I know to what extent we can 'afford' something there, or not. The message from the controlling function has a significant influence. However, sometimes they (divisions) get around it, even when the evil controller says: No."

The tension becomes apparent by the explanation of the financial manager of ELECTRO-COMP, as he further added,

"It is circumvented by the fact that the heads of the departments, who actually I am in charge of, all report directly to the board. They contact a respective board member, which are divided into different departments. Most of them report directly to the CEO. They meet and complain about their suffering and then ask for additional budget or additional staff, which is then approved by the CEO. As a result, my hands are often tied. My complaint and the complaints of my boss to the board is that we cannot do effective controlling, if this detour – or as the Austrian says this 'Zwergertweg' – is possible, then we can only do ineffective controlling."

In the organization, the cost line needs to be based on the individual strategic plans, formulated and assessed by the autonomous divisions. As a result, the financial manager of one division of ELECTRO-COMP recalled,

"The board doesn't do anything. The governance dictates that we define the divisions' business strategy. Of course, the Executive Board formulates the company's business strategy and intervenes if our business strategy did not fit into the "overarching strategy." The company's vision is quite clear. As an integral part of the vision, we are also firmly anchored in the company. "Security is essential," it says. From this point of view, it is up to us, of course, to tell the Management Board what we believe is necessary to make our division successful. We are the business people, the entrepreneurs. It is essentially the divisional board that is responsible for our organization, or the division president flanked by me, of course, as it is the case with every other division."

That the information is nested, and accounting numbers are further disaggregated in each division, as the financial manager of ELECTRO-COMP told us,

"We then translate it into measures for the individual business lines, which are then essentially responsible for developing their sub-strategies. They formulate their strategy. The strategy is reviewed by us. The business lines are further disaggregated into product lines, which present their sub-strategies, summarized to a business line strategy, according to the criteria, which of course we have discussed before."

To control for these issues, the finance function of ELECTRO-COMP designed a strategically-oriented framework for cost management information to allow functions to derive general rules for the development of their cost structures. The senior executive of ELECTRO-COMP told us,

"We needed clear rules on how we want our costs to develop—with defined scaling factors."

The established routine was not a continuous mechanism where information was provided more frequently. An ELECTRO-COMP senior financial manager recounted,

"There are not so many committees that are regularly established. We have a regular coordination with operations – there a coordination with operations on a yearly basis, regarding the 'cost roadmap,' that you might call 'regular,' but that's a yearly task for me now."

On the contrary, besides perpetual barriers to the exchange of cost information between functions and departments, the informativeness of the accounting information was improved, as one of the senior financial managers of ELECTRO-COMP claimed,

"To be in control means to agree on a number and to commit to this number and to act together in the direction of this number."

The routines of the financial managers generated the organization-wide ability to draw accurate individual conclusions from the distributed accounting information, as one of the senior executives of ELECTRO-COMP noted,

"This cost scaling practice works quite simple: we plan our revenues. Every single product is planned—we have thousands of products—every single product is planned, based on our shared belief, how many pieces we can sell in a certain period. Regarding this piece-rate planning, there are 3 lines: so, there is a 'minimum plan,' where we say, that revenue will be generated with 1.000%, certainty—so if everything goes wrong, we will still sell it. Then there is a 'maximum plan,' that is, if everything goes well and we succeed in everything we do, then that will be the number of units we sell. And then there's another midpoint—a 'mid-plan,' that, in principle, doesn't necessarily have to be the midpoint between MIN and MAX, but that's just mid-planning whereupon the organization committed itself, where ultimately the division says in the end, 'that's my commitment to sales planning.'"

The routines of the financial managers made accounting information intelligible to all different functions and divisions (in particular production and sales), as another financial manager of ELECTRO-COMP noted,

"The plan is communicated to the production department, and they evaluate to what extent the production is feasible and then calculate prices accordingly. They then determine what the costs are that we incur when we produce it this way. And then, I have a plan for pieces evaluated with prices, so a revenue line per division and a plan on costs from operations of the production, providing information on the manufacturing costs and based on the respective sales plan we are able to determine the cost of sales."

The emerging routine helped to repair the misunderstandings and clarify individual measures even when individual commitments were not kept. An ELECTRO-COMP financial manager explained how deviations from the "plan" are managed without continuous reporting,

"Our marketers, as well as the research and development department, would like to have 300 more engineers themselves. It's up to me to set the framework without endangering the strategy. To define the economic framework under consideration of the strategic requirements. It is then up to me and the president of the division to define certain ideas that go beyond this financial frame, if we are convinced that we can persuade the board of management as well. But of course, we also have a financial frame as a whole, and the divisions understand the logic of this financial frame."

Owing to this principle, the cost structure and strategic orientation became an inferable policy without close monitoring and permanent reporting. The ability of ELECTRO-COMP to reconcile the limited access to accounting information with a clear guiding principle for individual plans and measures rendered cost information intelligible. This sparked effective cost management within each function and division.

LOGISTIC-COSTING. LOGISTIC-COMP had a persistently fast pace of growth. The expansion strategy over a long period of time was accompanied by the operational requirement to have a strong local presence. Newly acquired entities were given a great deal of autonomy to operate. The central corporate function of LOGISTIC-COMP set out detailed measures to integrate the decentralized entities to achieve the high-performing business objectives. However, this market-driven growth put pressure on administrative functions due to the increased complexity of information management. The scale of operations expanded rapidly, so the uniform reporting system evolved to provide managers with comprehensive and integrated information on costs, sales, and other data vital to decision-making. It allowed LOGISTIC-COMP to collect and share

extensive cost-accounting information and data on operating processes. As one senior executive of LOGISTIC-COMP described,

"The system landscape was driven by 100s of different tools. The LOGISTIC-COMP is extremely tool-enthusiastic. And there were great central programs started—based on the production function, with standardization elements, and partly already automating the control for the production, replacing production planning, up to layout positions for the installation at the customer. A lot of thought and work went into this, and it was great. But unfortunately, the LOGISTIC-COMP have grown so strongly that these topics are no longer sufficient, and it was like a straitjacket and you had to loosen it, and the whole ERP landscape had to be set up anew".

Despite the integration of information-management structures, the standardization and harmonization of cost and accounting calculations had failed to keep pace with this intense increase in accounting information, limiting the sight of the corporate function. One senior executive of LOGISTIC-COMP explained why the ability to draw accurate conclusions based on accounting information is so challenging for him:

"And it is even more difficult if the title (heading) is the same, but the content is different. Then, of course, it's very, very difficult to make optimal decisions based on data and saying, 'Look, this contains the same' ". But because the heading is the same, does not necessarily mean the data behind it is the same. In our organization a classic is the hourly rate calculation. What is in the hourly rate included? You're often confronted with the fact that you're the most expensive. Then you question the calculation by asking what costs do you have included? What hourly bases do you expect? What are productive hours? You will notice that even if you try to draw the same conclusion every year, it is almost impossible to calculate with all the different calculation systems".

To control for these issues, the finance function of LOGISTIC-COMP introduced cross-comparisons of specific project calculations. A senior executive maintained,

"We had an initiative which is called "operational excellence" and we did exactly these cross-comparisons. So, we examine the different characteristics in the decentralized, courageously grown structure".

A central LOGISTIC-COMP financial manager explained,

"We took a concrete project and gave it to several units, with the same starting assumptions, and measured and looked into the details afterwards and looked, what do they calculate there? What are they doing? How much engineering, how much project management, how would they 'set up' the services?"

One senior executive of a decentralized entity within LOGISTIC-COMP told us,

"In the course of the planning preparation, there was a topic that was triggered by the holding company. We looked at unifying the costing principles for calculating the hourly rates. When it comes to productive hourly rates, for example, we in the organization are always talking about them. Which hours are now called "productive" and which are not? Information was queried on how we do this and how the associated unit calculates. And then a specification was defined as to how this would be implemented in planning".

A financial manager of LOGISTIC-COMP acknowledged the point,

"Obviously, there have been different procedures in the past, but now, in the course of planning for the following year, a guideline has been issued defining how the hourly rate calculation has to be carried out".

A member of the accounting department of LOGISTIC-COMP explained:

"Then, we took the next step and looked at the hourly rates and the profiles that we have in there. Then, again went deeper—behind the hourly rate, and asked what else is in there? How much margins do we have, how much general activities, what is the level of raw capacity, the gross capacity, how much is spent on other topics, and so forth. We paid attention to every detail—through and through. And then, of course, we looked at the wages. We will continue these cross-comparisons. There was also an order from top management that is being implemented".

A senior executive of LOGISTIC-COMP recalled:

"We required analysis from the unit in the UK, the unit in Central Europe, to the Americans, and we've said: now reckon the project independently of each other and what is the independent outcome of it. then we put it next to each other, we compared, and what we finally saw was very thrilling. And everybody involved knew that the comparison was taking place. The interesting story with the result is that there are suddenly a lot of other relevant aspects exposed. So, how did you set up the IT, why did you get out there with completely different values, and then you got into the "Why," "Why," "Why" in order to get to the underlying topics. It was about the fundamental analysis and learning, but with the background of how we can improve our efficiency, where are the potentials we have. How can we improve our competitiveness and profitability?"

As the routine through which organizational members and collectives build their capacity intensified, the increased accuracy of the cost information was still insufficient as a senior finance official of LOGISTIC-COMP executive clarified:

"But even the analysis is again only a result and a number—a date, what is there? In any case, you have to go beyond the figure. What is your intention? Why did the unit in the UK suddenly want to send so many more people to the customer? Why does the staff only spend such a short time at the customer's premises and then so frequently drive back home?"

There are then all of a sudden quite many 'why' questions, and that is then the practice which fills the numbers with life."

While engaging in these "why"-processes, the organization gradually moved to higher levels of understanding. The new representations of accounting information enabled new learning opportunities to inform practice. A LOGISTIC-COMP senior executive recalled:

"Another aspect is that we harmonized hourly rates, which was a 'Teilaspekt' afterward. We have entered into the efficiency discussion within the frame of the financial planning and have taken the cross-comparisons saying, 'Why do you need so much in the management functions?' and urging the regional management: 'Take a detailed look at the other hubs. They are much more efficient there.' And with that practice, we held the mirror up to each other in order to be able to increase the first efficiencies from the organizational structure."

The constructive approach induced a new range of contextual information that fostered interaction with accounting information creatively. As such, the figures and numbers lent itself to further verifiable inferences as the financial manager of LOGISTIC-COMP emphasized,

"Then we noticed that there are so many 'job titles' that you can't really compare them. And with a Big Four consultancy firm, there was a huge program to harmonize job profiles in order to make them more comparable. We noticed that we have quite a lot of positions where only one title fits the tasks of one person, and that is not consistent at all—and that cases were in the hundreds. In our organization existed so many over-specified descriptions with too much singularity. And that's one of those issues that creates the required comparability."

The ability of LOGISTIC-COMP to align the additional availability of information with the usage of disclosed information built the effectiveness of transparency that no one had seen before on answers.

MANUFACT-COSTING. MANUFACT-COMP is a relatively strong decentralized organization with three segments and a strong market-focused cluster by region. The task of each of these business units is to market and sell the company's products in their defined geographic territory. The products are highly specialized and individualized. Specialization is necessary to understand and respond to local requirements and preferences. The organizational design of MANUFACT-COMP provides increased

responsiveness to customers and competitors, while the manufacturing plants are organized as functional units to leverage specialized expertise and knowledge. The organization had established relatively broad informational disclosure, and reports were distributed extensively. However, boundary conditions of privacy are acknowledged by a MANUFACT-COMP financial manager, who stated the following:

"It's not 'all' visible in the organization. But we are very transparent. I don't know how they used to handle it, but since the new chief financial officer arrived, it's actually a very extensive provision of information that we have [had] at our strategic platform meetings, our management circle, with our monthly report, which we publish monthly to provide comprehensive information at a group level, with key figures—external sales, EBIT per company—compared to the actual budget. Now Managing Director A can also see the company financials from Managing Director Z and where s/he deviates or does not deviate."

A financial manager of MANUFACT-COMP maintained,

"In some communication loops, we also distribute. ... When we have strategic meetings where they are all "insiders," we have detailed P&L of a company with the commentary of a particular month, as well as the commentary and the verbal commentary of the managing director, who comments on why he deviates, in which direction the organization is heading, whether he is "catching up" or not. And the audience is the entire management circle and that of the entire group. They also get all the information, which, to a certain extent, you might pass on to your accountants or the local controller. A PDF is immediately forwarded. That's the thing. However, it doesn't go down to the cost center level. It is also in our BI tool, the reporting tool, which is available online—yet, not everyone sees everything. There is an authorization concept ("Berechtigungskonzept"). Well, it cascades the information. But we do show a lot, though."

Extensive reporting structures and information distribution were set up to coordinate and inform the organization.

Contrary to ELECTRO-COSTING, however, the dispersed accounting information was not linked to specific budgeting routines and norms for cost management. Accounting information in MANUFACT-COMP was relatively visible but not under all circumstances inferable, as a financial manager acknowledged the point:

"We currently use integration software from the service provider Magic® in the controlling and finance function. Well, the system is a lot of "magic." Well, it circumvents every natural law of electronic data processing. All current problems—I am absolutely certain—were once solutions. The times have just changed. There were quick-fast solutions developed—since you always have too few resources—and just say, "We'll do that temporarily." And 10 years later? It's still there, and it's causing insane problems".

The visibility of information was even further expanded while increased information provision was not limited by management practices. As a financial manager of MANUFACT-COMP maintained,

"The more you go up in the organizational hierarchy, the more information you'll have available. But of course, it is also aggregated. Depending on the report you get. You have several individual items, postings in the P&L are grouped, several groups result in a heading, and so it adds up. However, I would always provide the detailed information of the individual postings. Especially because I don't trust the BI tool. Whether the number is correct or not. Where I say, I have these 3 postings, and the sum of the postings results in this sum. And if numbers do not add up, or are faulty, then you see that. And I can, more or less, prove what is displayed in the report is true. Others claim and say, no, I should not burden top management with that detailed information. They are only 'allowed' to see condensed (aggregated) reports so that the focus is on the essentials. Yes, I understand this approach. But I think we must, at the moment, first create confidence in our reporting, so that it will be right again, before information is reduced".

Thus, the validity of accounting information became a pivotal concern on many occasions for accounting information recipients. As a member of the controlling function at MANUFACT-COMP recounted,

"For example, the cost center managers may even have more confidence because they don't know the background. A cost center manager just looks, because they do not need it daily, if at all, every month once purely, what has been posted to his cost center. Top management looks at it at least every month. However, they see how often the management information system fails—where the posting run doesn't work, or the server crashes. The system doesn't show an error message; it just shows any value where now everyone checks, no matter what value is displayed, if that can be true at all".

A financial manager of MANUFACT-COMP explained why this issue was so important to him:

"We are at the point where so much time is just wasted. When I see a number, then that number should be correct. If a server has problems in the background, then this number should not be displayed at all. But if it is displayed, then it must be correct! Here, confidence must be re-created in the information the reporting tool makes available".

The finance function experienced a significant discrepancy between the global presence of accounting information and the overall applicability of this information, as a financial manager of MANUFACT-COMP recalled:

"Look, you have a lot of problems with the management report. And then they (top management) say, OK, we need a new solution. We in the controlling function start back at 0. And we build this [report name], this new sales report, build it and constantly check: Does it indicate the same values? With regard to accounting, is the turnover the same? If not, which data records are missing; which are too much? And then you have to go from one problem to the next until you're at the correct numbers at some point. There are always new problems, and you have to solve them again. As with the 'order entry report', for instance, I call it plain and simply 'wrong'. I would prefer to discontinue the report and remove it from the system. But I can't exclude it. Otherwise, the phone would run hot and everyone would ask me, what should I use now? That means you really need time and resources here for training, for announcements, for example. You also have to market it internally so that it is, of course, something "completely great." You have to present and communicate it, but you don't get that time. In our organization, everything is currently moving too fast with SAP, so we don't get to take old reports offline and replace them with new reports, providing the "only truth." For some areas, I can, of course, provide training, mostly if you are in direct contact with them via the [report name]. But for my areas, the [region], [region], they also use the new report. But then someone from a decentral unit says: "Hey, the incoming orders report in [report name] has 100 in it, and the [report name] has 20 in it. What's the correct number now?" And then the discussion begins. And that ties up a lot of time. And unfortunately, you don't have the time to invest beforehand to save it afterward."

The mismatch between the usefulness of accounting information and the scope of provision even led to mistrust in accounting and management reports, which produced several unintended consequences; as a financial manager of MANUFACT-COMP explained,

"In recent years, the company has concentrated on top management reporting due to the resources available. A cost center manager, similar to a standard P&L layout, receives a cost center report. But his business training does not give him the skills to do anything useful with the provided information. He can't even say: 100,000 above or below budget. Maybe he doesn't even know how the current budget was defined because his Head of Finance entered it into his system without his notice. In my opinion, creating a controlling concept from the cost center manager to the board of directors is an absolute "must-have" in the coming months and years."

Consequently, the accounting and controlling function became frequently confronted with inquiries for support, as a senior executive of MANUFACT-COMP attested,

"The acceptance of the controlling function in our organization is extraordinarily good, almost too good. It is actually cynical to say that a controller must be present wherever there is a number. No, it's rather that the employees from the divisions are begging for

controlling support. Compared to other companies I worked at, I have to do everything myself, otherwise you would have to do the math afterwards and then you come up with nothing. So, the early integration of controlling is therefore desirable, and that is very pleasant."

In reality, however, the representation of accounting information that is driven by monitoring intents drifted apart from the inference of disclosure and transparency and ultimately failed to control.

Configurational Aligning Routines. Our combined observations suggest that the accounting function enabled transparency by engaging in configurational aligning routines, which refer to their attempts to match the informal system of explainability with its visibility of accounting information in formal structures to realize its attention-activating target. (For additional cases, see also Table 2a provided in the paper).

The organizations had created accounting information structures that were aligned with the control target of attention activation. Prior literature already established that internal and global transparency are design features of enabling formalizations, while integrated structures promote learning and control (Adler and Borys 1996, Bernstein 2017). However, our case evidence suggests that the structures alone did not allow the function to achieve its target. In the function of striving for control, tensions arose due to the visibility of accounting information in the organization. While such a structural provision of information may have supported the accounting routines, it also made it more difficult for the organizational functions to infer and draw accurate conclusions from the increased availability of information. The financial managers, therefore, started to reinforce the integrative understanding of accounting information as a necessary condition for sufficient transparency. This matched the organizational structure of the intrinsic visibility of the information and the inferability contingent on the receptive capacity of the intended audience of the accounting information. Systematically aligning inferability with the formal structures of accounting information visibility ensures that the required common conclusions regarding applicable information are drawn.

In contrast, in routines striving for control, tensions emerged from the limited access to and availability of accounting information due to intrafirm boundaries and decentralized accounting information structures. While such spatial and temporal separation may foster bounded inference for local decision-making based on accounting

information, it made using accounting information difficult to derive general conclusions on strategic plans and requirements for the individual functions and divisions in the organization. The financial managers started reinforcing their routines' separate structures by elaborating clear principles and guidelines for the interpretation and use of accounting information (Gavetti 2005). This translated into stronger local awareness of individual functions and divisions within the organization, which decreased information transparency to reinforce attention activation (Ocasio 2011).

Our deviating case shows that the absence of configurational alignment can jeopardize transparency's success. In the MANUFACT-COSTING case, the financial managers' inability to align the unconstrained informational demand with supply through formal accounting structures triggered unintended and costly consequences throughout the organization. The observed configurational alignment routines show that an unintended misalignment of visibility and inferability can render transparency a destructive or even coercive design feature (cf. Ahrens and Chapman 2004). For organizations, the structural question of what accounting information is disclosed becomes an impairing factor without the corresponding condition of answering the question as to why the accounting information is disclosed.

Configurational alignment may thus be the first condition for effective transparency to emerge. However, as we describe next, successful transparency is also situated in further configurational routines, which allow the organization to purposefully create a constructive misalignment between the accounting information structure and system.

Learning Orientation: Configurational Misaligning Routines

LOGISTIC-STRATEGY. LOGISTIC-COMP grew tremendously fast as an organization by establishing market-oriented structures. The organizational structures enabled operations to service markets, products, and geographies. A LOGISTIC-COMP senior executive recalled what the high growth implied for the corporate functions in the organization,

"Actually, you need the best people to effectively execute the most difficult projects. However, you would need the best people also for further education and training on the job, to multiply and spread their knowledge. Though our organization grows at 100 million a year, and we hire about 250 new employees yearly. It's like blood thinning, every time. They come in and bring a little bit of knowledge with them, but until they have "fully arrived", you

lose efficiency, and you still depend on the key knowledge holders in your firm. That is an enormous challenge for an organization".

Another LOGISTIC-COMP senior executive told us,

"And with our rapid growth, it is of course very important that we can still successfully pass on the LOGISTIC-COMP DNA".

Despite the successful growth, our informants recounted that LOGISTIC-COMP struggled to distribute attention to all decentralized entities. As a financial manager told us,

"The smaller [specific name] units sometimes have a hard time dealing with the topic, so they have to get their hands on why and what is happening now".

Nevertheless, the issue was not related to younger (currently established) entities only, as another financial manager of LOGISTIC-COMP informed us:

"And then there are the ones (units) in between (between large and small entities), where we say they're the "dangerous" ones. Because those who have the skills, all fine. Those who know they cannot do it alone are also okay because they report and ask. But the dangerous ones are the ones in between; they think they know, but then maybe they don't know how to handle the financials and act like they should. We monitor and look into the details. We really review the numbers".

The rapid growth left its mark on the finance function, as the lack of capabilities and financial acumen led to flawed calculations and inaccurate management reporting. As a financial manager of MANUFACT-COMP explained,

"There was a severe issue last year, whereby that was only in the [entity name] itself, that they miscalculated the material overheads for strategic planning and then suddenly had huge deviations in the actuals due to a wrong calculation rate, again and again. So that led to a dispute between the units, and they have begun to argue."

To overcome these barriers to effective administration, the LOGISTIC-COMP established a formal reporting structure, besides legal accounting structures, as a means to couple entities with different maturities in three hubs in Asia, Europe, and the USA. A senior executive of LOGISTIC-COMP recalled,

"The HUB is comparable to a subgroup, even if the legal structure for that does not exist—there are no company law interrelations corresponding to this. But we set up the HUB in terms of the management and reporting structure. We provide the information on HUB-

level in a kind of subgroup result format, and we also make plans (budgets) based on that information, which also provides a solid foundation for comparison."

These hubs exchanged information to learn. A financial manager of LOGISTIC-COMP recounted on the learning effect,

"This would not have been possible to manage as a holding company or would have slowed down our growth otherwise. Thus, that is working quite well now".

Besides the changes in the decentralized entities and the formal reporting structure, the informal accounting routines of the financial managers at the corporate level alternated as well, as another financial manager of LOGISTIC-COMP told us,

"In Group Controlling, we have divided this up in such a way that each of us looks after certain units. Not everyone does everything, but each one responsible for an area (country) looks after certain other countries as well. They then have a relatively intensive insight on the numbers and know the 'where' and 'how', what makes sense, and where they might have to watch out".

As described above, even the observation of decentralized entities was limited due to scarce resources in the corporate function as one of the senior executives of LOGISTIC-COMP acknowledged,

"The intention was to create a structure – already in the fourth consecutive year – in which a growing and learning unit would be taken by the hand of an established unit. Because due to the size of the company, this would not have been possible to be performed centrally by the holding company".

A LOGISTIC-COMP senior executive recalled and said,

"With the increasing internationalization and growth, this was no longer feasible for the management in the holding company – to be able to give everyone the same attention, the same support, to have the same ability to give support was impossible. This has less to do with an SSC (shared service center) than with operational management, i.e., establishing processes, then really go after the day-to-day business".

This shielded decentral organizations from the oversight of the parent company, as the following comment from one of the financial managers at LOGISTIC-COMP attested,

"Maybe I can address another issue. What I think is good, or put differently, what I appreciate in our organization, what I value somehow, anyway, also related to me: In the past and currently again, we are at the takeover of the [Company Name]. That the management

simply places a certain trust in someone and says: 'o.k. look here, there's a new unit, please take care that it is integrated and look, these are the areas where you should harmonize and integrate and look for the contact persons in our organization, you know them anyway and you know how it works, so just do it.'"

Even the use of accounting information was limited to infrequent meetings and conference calls due to geographical separation, as the following comment from one of the financial managers in LOGISTIC-COMP attested,

"We had our short status meetings once a quarter, where we review our performance, where there may be issues where support is needed, but otherwise we just continue to execute and I think that's good, even now in daily business, in my position as well."

The emerging shared belief helped to mobilize central knowledge in support of decentral entities, as a senior executive of LOGISTIC-COMP told us,

"The intention was not to look under their bed linen, but really the intention was to link a more experienced, established, and grown unit, with a younger unit—a unit that manages a larger volume of business, more employees, so much more that there are uniform processes and procedures here, to be tied together with a unit that bakes even smaller buns, where there is a personal contact between the management and the ordinary worker, where the process is not yet fully implemented, because many issues are ad-hoc or intuitively regulated and answered—that one creates know-how, structures, processes translated to this fast growing unit. This provides the comparability for the set of financial figures, establishes stability and security, and of course with the ulterior motive of compliance for uniform procedures. But definitely not based on the ulterior motive of suspicion to monitor what goes wrong and the desire to uncover".

RETAIL-BUDGETING. Contrary to LOGISTIC-STRATEGY, RETAIL-BUDGETING was one of the routines where the structure-system configuration was destructive for the learning outcome. As a formal requirement, the strategic budgeting and planning cycle was expanded to 5 and 10 years. A senior executive of RETAIL-COMP explained,

"What was a major change for us in the core financial area is that we were a trading company and therefore also very short-term oriented. In our view, this simply means that we had to adapt very quickly to market changes, opportunities, and risks. We have also done this very successfully. That's why we always had a very short-term focus in controlling. We have always concentrated more on the subject of the budget. We always did make a multi-year plan, but that wasn't really the focus, but rather had a strategic aspect, that you had a feeling

for where the story was going. But it was a strong focus on the budget. And through [Parent Company] that has fundamentally changed."

The central finance function set up a driver-based planning and forecasting tool and reorganized the reporting structure for financial and managerial information; as one of the financial managers of RETAIL-COMP noted,

"This was also a completely new aspect for us. We still had to build it technically, but you also have to generate the administrative behavior. And that was, of course, a learning process for us. And whether we benefited so much from this change of perspective, well, I'm not so sure again. But what we have already achieved is that we have gained a stronger strategic focus. The [Parent Company] amplified the whole thing. We now have a 10-year plan, strategically 10 years, 5 years operational and then link it to the budgets, so it is a graduated approach".

Contrary to LOGISTIC-STRATEGY, however, the design adjustment of transparency failed. While providing more insights on possible scenarios and economic developments, the finance function was primarily concerned with the validity and provision of robust accounting numbers. A RETAIL-COMP financial manager recalled,

"In a value driver model, the planning should actually be bottom-up with the value drivers, and then you can actually see where the overall results are. And these are two worlds that collide in the group. For us in the Group this means that we can also do a little more with the planning data. Because we haven't really had much more detailed information to date, because the database is basically the same. Now, of course, we have a little more information about the companies and the planning about the value drivers, because that also gives us the opportunity to carry out simulations based on the planning data."

A member of the controlling function of RETAIL-COMP added,

"That is the financial frame. Yet, with the tool it is also difficult. If it is a business unit that is very stable, then the tool is great, because then you calculate everything straight through. Then there is an inflation, that fits well, that is then mostly in the framework and then you can play around. If this is a unit that is somehow not so straightforward, then it will be difficult. Because the individual effects are difficult to bring into the tool."

The function even rationalized measures and figures, as the following comment from one of the finance and controlling team members of RETAIL-COMP attested,

"In the past you planned everything with an Excel spreadsheet and uploaded it to the information system. And of course, if there were technical issues, for example, if the control checks for the numbers in the balance sheet were not zero, then you didn't notice it at first, for example with the decimal places. Now you are immediately inside the system. You have the

advantage that you no longer have to prepare the upload data. Previously, you had to load them in the system beforehand. And then you were able to distribute the financial information. That is no longer the case. And uploading doesn't take that long because it's actually already in the system. But it has become a bit more complicated, if you say you have a rough idea, these are my assumptions, this is how it should look, then I can only get there with difficulty. It really takes me longer to turn all the parameters I am able to select in the system to make it fit".

Consequently, this created an organizational inability to learn from these routines, and any benefits from the new accounting information structure never really materialized. With top-down pressure and the opportunity to misuse accounting information, the temptation for rationalization became the overarching routine. As one of the senior executives of RETAIL-COMP clarified,

"In my opinion, the role of finance, is not to crunch the numbers until the general managers are happy with it, and that the 'story' somehow sounds great, but it is important that you have a transparent picture, and that you are able to make appropriate analyses out of this picture. To discuss these analyses at eye level with an operative partner – to openly talk with another about which measures are necessary. And then you also have to keep up with these measures. And that probably requires different qualifications, or a different understanding as well".

MANUFACT-STRATEGY. The structural design of MANUFACT-COMP triggered the third destructive routine that failed to realize its learning target. The starting point was the strategic change towards the sale of more standardized products. MANUFACT-COMP's head of finance explained,

"We knew we should standardize as much as we can. Everybody on the Executive Board had agreed that we want to push ahead with cross-standardization. Due to the issue of our local markets and many technical requirements, standardization is extremely difficult to implement in the market, but was extremely important to remain profitable. As an organization, we had to learn how to accomplish that."

To recall how individualized products are, a financial manager of MANUFACT-COMP added,

"Our production is geared to a batch size of 1. We have an average order volume of 1.5 pieces per order. This means that the product is made-to-order, highly "tailor-made" and the manufacturing and production are designed for that."

A MANUFACT-COMP senior executive revealed how the creation of additional informational channels occurred,

"Cross-standardization and product alignment also had an impact on the organizational structure and the structure of divisions and units. A product management function was set up – that did not exist before. We also introduced a planning department, with line production, because we had to refine and position ourselves there so that the production processes could be prepared in an efficient manner. Because if there is no material in [manufacturing line], it's a disaster."

A MANUFACT-COMP senior executive further explained how management and the finance function tried to provide additional support under these new critical circumstances,

"That is actually what we as management still envision—that is the topic of cross-standardization, with value analyses. Value analyses have been around for a long time, but product management was about establishing common standards. It makes a lot of sense that not every change to the product (customization) offered by the sales reps is passed on to the technology and production function, but that a "filter" is installed for proper control checks. Is this an order-related adaptation, or would there be a standard solution available? That's (filter) what we've had for several years with the aim of improved cooperation. What we have also done since 2014 is that we have been doing management training for the management and extended leadership team and have tried to create the same vocabulary there, that is, where should the journey go, what is the strategy, what is a strategy at all, what can be the contributions of the individual, how can we communicate properly with each other. Such basics we had to learn and, of course, also leadership topics in order to bring new ideas into the organization. Yet, it remained difficult here to set targets. Of course, you can introduce control and feedback loops. But it doesn't make sense to just command and control because we would lose the market opportunity there."

The controller described his activities as follows,

"At the end, the cost center manager or production manager bears the cost responsibility. I'm just the one who, in alignment with production, says what budget we need, and what fits our corporate goals and the budget. And the monthly plan/actual comparison, or the budget deviation, is already prepared and discussed on a monthly basis. The cost center manager, however, has to take the responsibility; he must also release every invoice in the workflow of the release process and, thus, accept the costs accordingly. Sales planning is purely a sales topic. I am then only the one in between who says material, the material usage planning, is derived from the sales and the experience values of the products, accordingly still on top the costs of production as well as the investments in production because something like reinvestments or new investments are also relevant on the basis of strategic decisions. And these are then not influenced by the production volume."

Another MANUFACT-COMP senior executive told us what the intended integration of strategy formulation and execution implied for the organization,

"At present, and in the past the sales departments are incentivized according to sales (turnover). If production does not meet the demand, then there is nothing for sales too, which is already relatively strict in this respect. And of course, we will also maintain our EBT targets, not for the entire sales department, but for the senior sales managers. This means that there is an overarching element of responsibility."

Interestingly, due to the implementation of incentives and responsibility systems, our informants recounted that the general awareness of MANUFACT-COMP existed, but as we will later see had not any constructive effects, as a senior executive MANUFACT-COMP recalled,

"This means, for example, that the segment heads now only have the EBT target; they have no sales target. They do have an interest in improving the overall picture. The number is relatively high, of course, and the number is relatively profit-driven. This means that it could also make sense to switch to a ROCE target in order to bring in the working capital. That's how it is at the moment and that's why there's already a common awareness."

Apparently learning from previous issues of the tension between the production and sales department, MANUFACT-COMP even established a specific function to align the different perspectives in the organization. The Head of Finance of MANUFACT-COMP admitted,

"And despite the established planning department, this has not led to...[pause], so there are still high plan-actual deviations on a monthly level as far as output is concerned. And output for me now means not only production output, but also sales and turnover. And that means we want to improve the coordination between the planning department and actually the product managers, the project management that has to implement this, and of course with the sales department, and there is coordination there, and that should take place after the deadline. That you make sure you can realistically implement what the sales department ... or what we decide to do with the sales plan."

The inability of accounting information receivers to generate the common understanding of the issue – to match production capabilities and distribution planning – was not based on the absence of know-how or technical expertise of the employees but the limited utility of provided information, as the Head of Controlling of MANUFACT-COMP explained:

"The phenomenon of MANUFACT-COMP is that there are a lot of people who have been around for a long time. And those people, even if they're in sales now, have had different positions in the organization. I've never seen a company that is so vertically and horizontally 'permeable.' And that means that the sales team, the sales managers, are real professionals. They know what they are selling. They know the product very well. Maybe somehow the general awareness is missing."

The lack of specific features in the accounting information system intensified the tension, as an accounting and controlling employee of MANUFACT-COMP recounted:

"The awareness is not due to the scattering of the distribution that I have to give them, but it is much more due to the fact that I have to give them an instrument suitable for distribution, in which they can make a well-calculated price offer in a meaningful time. It may not be right on the millimeter, but there is a really good indicator where I say, 'I offer this now at that price.'"

As described above, even the common understanding of measures was limited, which did not allow the organization to interpret and draw accurate conclusions from the sent signals of the senior executives and management board, as one of the controllers of MANUFACT-COMP clarified:

"I have to say, we're growing very strongly. And the sales department is in a very happy situation and production is in the process of catching up, questioning where should we create the capacities to produce the volumes required by sales? I think the board members are discussing the vision and the strategy. Then the silos appear when inquiries come from the CEO or directly from the Executive Board, where the controlling function realizes, 'Aha, ok, they (executive board) are working on it, why aren't we involved there?' As an example, there were profitability calculations created that completely ignore the input from controlling. Or after production approval, a pro forma profitability calculation was requested, but decisions were already made anyway. These are issues where you think that has nothing to do with cooperation, where you wonder: are you involved in the process, or am I an outsider? However, you are still made responsible in the end. The silos pop up when it's too late, or when you think I would have liked to or should have made a contribution earlier. But with information, it's often about interpretation".

Contrary to LOGISTIC-STRATEGY, however, the design adjustment of transparency failed. While creating more information channels, the distributed management information was at odds with the principle of intelligibility. A MANUFACT-COMP financial manager recalled,

"New sales targets were communicated in September last year. That were [amount] millions for [region name]. We then budgeted and made sure that we achieved the target. And

then there was the capacity planning and in the course of capacity planning we were told that we could not do this project and this project... some projects were dropped out. In other words, the objectives were no longer feasible. But not because we didn't have the projects, but because it wasn't possible in terms of production capacity. New targets were set by the CEO and CFO. But actually, the CEO, there is a financial conference in September, where he communicated the strategic targets.[stet] I found the goals ambitious but also realistic. It wasn't just a new assumption, so our CEO, Mr. [CEO name], is a number freak himself and was a controller himself. He knew from the past years and from detailed three-year planning how much turnover per country would be possible. Based on that, targets were calculated. Suddenly, there were numerical targets. That was new in terms of detail. That means in figures, [region name] makes [amount] million EUR turnover, turnover, and contribution margin as a key figure. So, I found it ambitious but still feasible. We really looked at how we could do that. Especially with our [Asian subsidiary name] subsidiary, because they always make a really good result. And they have already supported us very strongly, and we would have been able to do it according to plan. In capacity planning, it was recognized that production was not feasible".

This created an organizational inability to learn, and the new accounting information structure never really materialized. With the market pressure for profitability and the strategic ambition for standardization of products, the misunderstandings could not be repaired, and different opinions were not reconciled, as a MANUFACT-COMP financial manager further added:

"And that was very, very surprising to me. Because first, they (management board) say you have to make [amount] millions. And then they (management board) say that it's not possible. As far as that is concerned, there was, of course, a very great lack of understanding among our sales staff, who then say, what should we do? Should we now make sure that we sell as much as possible and make as many sales as possible, and then everything will be canceled anyway? That was rather demotivating. And then it was difficult for me to communicate the whole issue. Because before, I tried everything to achieve the sales target. And then you have to withdraw again. Or in other areas, it went in the other direction. In [the product category], for example, it went in the other direction vice-versa, and then it was said that you had to do more".

However, the intensified communication of targets and increased visibility of the objectives did not direct the attention towards the critical issues for effective coordination of distribution and production. Even the senior executive of MANUFACT-COMP recounted the destructive learning outcome, as the finance function was unsuccessful in enabling the organization to draw accurate shared conclusions from the provided accounting information,

"The problem I see, however, is that transparency is also not yet sufficiently probable to enable stronger cross-cutting discussions to take place. It is still currently difficult for someone who is not responsible for sales to infer the proper measures from the sales figures, as it is also difficult for sales to have the intelligibility for production figures. Because of that, transparency is not sufficient. What does that mean when productivity is good or bad? What exactly does that mean? What can we do? It is still too little operational – the number. It's not a linear correlation, sure. That will always be the problem anyway. It's not a trivial answer machine but remains a relatively complex issue".

Configurational Misaligning Routines. Our observations suggest that the financial managers instrumentalized transparency by engaging in configurational misalignment routines, which refer to a purposeful counterbalance of accountings' formal structure and informal system, to promote learning (see also Table 2b). Prior studies found that learning is one of the key consequences transparency could enable as a design feature. Referring to Levitt and March (1988), Adler and Borys (1996) describe the link in this way: "Procedures provide organizational memory that captures lessons learned from experience." Many arguments in the accounting literature are based on the positive performance effects of learning. For example, research built on the distinction between interactive and diagnostic control systems (Simons 1995) studied the effects on organizational learning but did not integrate the perspectives of the observer and the observed (Simons 1995).

A new insight from our case studies is that transparency is not an enabling feature per se, seeing that it can be value-neutral, but it can easily become an enabling or coercive factor when the disclosed accounting information has an impact on the system of accountability. Such an impact depends on the conditions of visibility and inferability, which is strongly influenced by boundaries (in our case, the communication on how to use accounting information) and beliefs (in our case, the shared understanding of accounting information) within organizations.⁵ Rather than striving for consistent configurations (e.g., Cardinal 2001), managers in accounting routines actively fostered inconsistencies between the attention structures and communication channels of accounting information on the one hand and the informational controls of boundary and belief systems (Simons 1995) on the other hand.

⁵ The belief system refers to statements communicating the basic values and premises for action of the firm. The boundary system refers to statements defining acceptable or unacceptable domains of activity (Simons 1995).

Overall, we observed that managers in the successful routines seek to destabilize attention on accounting information through deliberate misalignment. Our deviating cases indicate that an alignment of information transparency and usefulness generated insufficient answers rather than learning effects. The RETAIL-BUDGETING case presented above shows the risks associated with an accounting routine that lacks configurational misalignment, specifically its failure to infer (i.e., draw accurate conclusions) from existing accounting information. The MANUFACT-STRATEGY case in this section shows that a lack of configurational contrasting can hinder the learning effect of increased transparency. As such, neglecting this configurational routine runs the risk of looking for the already known.

7 Discussion

We began this study by noting that transparency research has emphasized that more, and more accurate, awareness of others benefits learning and control and, therefore, improves performance (Huber 1991, Levitt and March 1988). In contrast, the logic of privacy (Bernstein 2012, Huber 1991, Foucault 1977) correlated more, and more accurately, with an awareness of the risks of learning and control rather than benefits. This left transparency and privacy as interrelated yet conflicting levers in systems of accountability. Empirically, however, we observed that these design solutions of accountability systems did not solve the transparency and privacy tension and that observer and observed continued to experience persistent tensions in their daily routines.

To cope with these tensions, managers in the accounting function in the successful cases engaged in two types of configurational routines: They pursued configurational aligning and misaligning routines to achieve their accounting routines' learning and control targets. Configurational aligning refers to financial managers' efforts to balance belief structures that represent organized knowledge about accounting information (Ocasio 1997) with its accountability system to realize attention-activating effects. Configurational misaligning, on the other hand, describes these financial managers' efforts to counterbalance the accountability system with a variation in attentional perspectives and sensemaking (Ocasio 1997), which support its learning target. This provided organizations with the ability to realize attention directing effects. Both configurational routines work in different contexts (see Table 1). Given their opposing directions, the configurational alignment and misalignment were established by

transparency captured through the theoretical constructs of visibility and inferability. Our observations from the adverse cases suggest that the absence of any one of these capabilities reduced the routines' ability for constructive transparency—that is, when accounting information visibility exceeded its inferability. We therefore conclude that the interplay between the two transparency dimensions enables learning or control.

Toward a Dialectic Configuration of Transparency

Our key theoretical contribution is reframing transparency as a topic of significant theoretical and practical relevance by developing a configurational perspective on how the accounting function copes with the abundance of accounting information that increased transparency creates. From this configurational perspective, transparency is not a control feature in itself but a condition for enabling or coercive systems of accountability, depending on the dynamics between visibility and inferability.

The results enhance the understanding of how and what sort of accounting information should be disclosed and why it should, or more importantly, should not be provided. Further, this perspective explains how to implement and make accountability systems constructively work. Figure 4 summarizes the key characteristics of this novel configurational perspective. Figure 5 contrasts it with the established agency perspective.

Configurational Transparency Routines

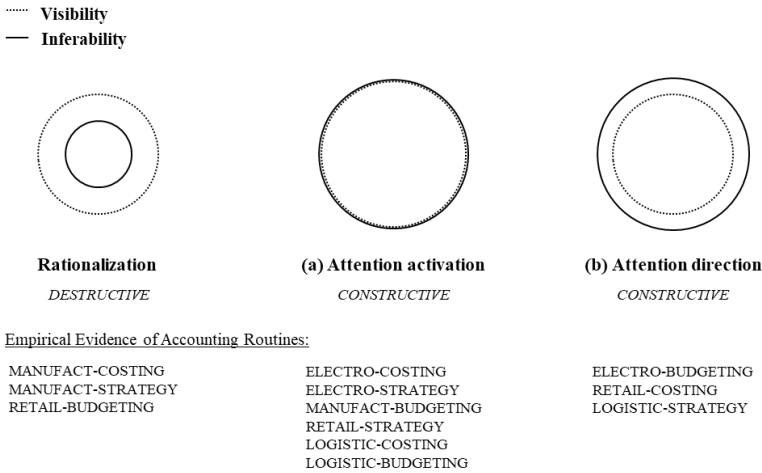


Figure 4 Configurational Transparency Routines in Accounting

The first difference between our findings and the dominant view in the transparency literature refers to the nature of the transparency tensions. Most prior transparency studies described a uniform and relatively stable tension between transparency and privacy's organizational requirements (for an overview, see Albu and Flyverbom 2019, Bernstein 2017). In contrast, we observed persistent tension between the availability and usefulness of information to draw accurate conclusions from it, which established effective transparency. Aligned with recent attention theory insights (Ocasio 1997), we thus conclude that the privacy-transparency tension is less stable and uniform than the prior transparency literature generally assumed. Accounting functions experience situated tensions, which are dependent on the properties of disclosed information. This contribution concerns the problem of defining what kind of information should be disclosed by managers when the controlling nature of information transparency is taken into account (e.g., Burney et al. 2017). The common understanding of transparency—as the process of disclosing information—has been challenged as too limited, in favor of a more inclusive definition that also takes into account the control targets factually endorsed in distributing information. On the basis of such a definition, we argue that disclosing not only relevant information but also details of why such information has

been distributed enables those control features—both those that depend on information and those that regulate it.

These two contributions were each contextualized and empirically tested. In so doing, we analyzed the challenge of implementing the control of information transparency in the context of accounting information and the coordination of decision-making authority. These findings suggest that the payoff in performance resulting from transparency in an organization is unexpectedly significant, and that accounting functions have four distinct "configurations" for achieving it. We contrast and compare how senior executives and managers in the same firms created both high- and low-transparent contexts. This illustrates that extant theory on transparency leads to an overestimation of the positive effects of transparency, underestimation of transparent applications, and misunderstanding of the intricacy of transparency. As such, this paper is positioned to provide the first step into investigating the challenging issue of how transparency is related to control. The problem of assessing the implications of how disclosed accounting information is utilized by managers in their processes for learning and control is the first contribution of this research (Burney et al. 2017).

Second, by shedding light on the complex relationship between information system and structure, we contribute to the understanding of what drives the use and acceptance of transparency in accounting, when transparency can be legitimized by financial managers, and why managers would forgo the advantage of getting accounting information that emerges from subordinates' self-developed and not officially sanctioned system (Giddens 1979, 1984, Ahrens and Chapman 2004). To us, it seems hard to believe that a centralized accounting function can resist the force to preserve total control. Technological advancements will prove fruitful if, rather than simply increasing divisions between the controlled and the controllers, it creates machines that measure what can be observed; albeit not at the expense of forgetting the impact of measurement and fostering a plurality in perception. Complementary, it seems hard to lead by "guided self-control" if increased information by transparency invites managers to be prepared for all circumstances without any process of mediation leading to a pragmatic "balanced" decision or compromise. Even though there is a vast literature stream on accounting, there is almost no research that explores the informational context and the behavioral implications of accounting methods based on a configurational perspective. It is for that reason that with this study, we examine the relationship of

transparency and accounting, rather than expanding research questions focused merely on a technical phenomenon (particularly, cost accounting or accounting information systems). The informants of our study agree that the impact of transparency in management and accounting must be considered. However, there is ambiguity about what transparency means in accounting; this study aimed at addressing this concern without an existing narrow focus within which modern accounting research is framed. Therefore, this research is putting the organization before the technique to explore the interplay of behavioral aspects and the organizational contexts, in which it is sought that modern accounting approaches should ultimately inhabit. A better appreciation of these interlinkages is viewed as beneficial in examining accounting practices to support control targets beyond the realm of the purely technical. As technological already, and even more with future advancements, creates an extensive set of possibilities to multidimensionally generate, aggregate, and distribute accounting information in a company, it becomes even more critical to have a theoretically more specified concept about the mechanism, transparency, accounting, and control.

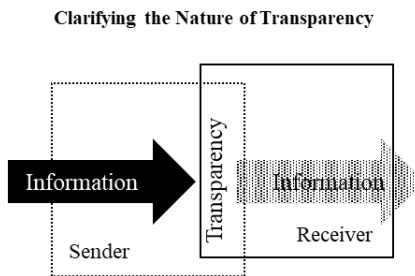


Figure 5 Reframing of Transparency based on Empirical Finding

Our empirical insights into the configurational perspective on transparency originate from specific research on the accounting function, where learning and control are achieved by matching the visibility and inferability dimension of transparency. The advantage of this research context was that it combines a strong need for differentiation between learning and control targets with a strong need for accounting information across these accounting routines. Thus, change in accounting routines at any company provides a natural opportunity to study the effect of transparency on controls at various organizational levels and in different settings. We examined if transparency can create

learning and controlling effects under different contexts. Our study aims to conduct an in-depth and on-site investigation on transparency. In examining how executives manage transparency to learn and align ambiguous relationships within the boundaries of an organization, we extend the empirical focus of the literature on transparency and accounting. While our findings are limited to this situated empirical context, we nevertheless expect to see similar routines in different functional domains within an organization. We encourage future research to study the potential similarities and differences between our case accounts and those from other informational contexts.

7.1 Implications for Future Research

The configurational perspective on transparency provides two particularly exciting avenues for future research. First, we introduced in this paper two distinct transparency dimensions to advance theory from previous agency perspectives on monitoring and control. In our cases, the perspective on how visibility relates to inferability allows organizations and managers to move away from a visibility mindset and toward a deeper appreciation of managerial knowledge. Thus, it becomes apparent that effective managers step away from constantly drawing an accurate picture to building the boundaries (i.e., frame) of the canvas for entrepreneurial activity. For the accounting and management discipline, designing the financial frame in organizations may be increasingly essential for success in today's competitive business environments. The duality perspective on transparency opens up interesting avenues for future research. Most importantly, future research could examine the boundary conditions under which our theoretical framework applies. While our post hoc analyses show that our assumptions hold for different cases of information use, the interaction effect between visibility and inferability could be potentially different in other domains.

Second, transparency literature generally speaks of organizational solutions (e.g., Bernstein 2017, 2012), which suggests that the transparency tension (i.e., knowing less by seeing more) can be, at least in part, resolved. Research on organizational attention, however, argues that such tensions may be situated, which are to be attended by individuals (Ocasio 1997). Transparency, or accurate observability, of an organization's activities, behaviors, output, impact, and performance provides the foundation for both organizational control and the attention-based view of the firm. This view is closely aligned with that which we observed in practice. Consequently, transparency should not be regarded as a stable state or static balance (cf. Ahrens and Chapman 2004, Adler and

Borys 1996), but rather as a triggering change or event. Given this situated perspective, it is important to explore how these triggers unfold processes over time. While recent research has studied the implementation phase of transparency (for an overview: Albu and Flyverbom 2019), less is known about the initiation phase. This study provides a theoretical explanation for the intended transparency and privacy direction of informational system and structure interactions. However, further qualitative and quantitative research is needed to develop a more comprehensive understanding of transparency as a trigger and process.

7.2 Managerial Implications

The cases provide rich, illustrative examples that could help the accounting function to achieve transparency targets. However, the nature of our qualitative study does not allow us to draw strong conclusions regarding the effects of the routines we observed in respect of organizations' economic success; it is limited to the constructive or destructive outcome within an organization. Instead, across all four companies in our sample, it became clear that the key driver behind configurational routines' effectiveness was the financial managers' initiative. First, the accounting function had the autonomy to make organizational decisions and shape their systems and structures (i.e., decreasing or increasing transparency). Second, financial managers had the ability and competence to engage in configurational routines (i.e., [mis-]aligning dimensions of transparency). The latter is quite different from organizational capabilities for efficiency and effectiveness (e.g., Ahrens and Chapman 2004) or systemic use (e.g., Bedford and Malmi 2015, Adler and Chen 2011). Since transparency tensions are nested in the systems and processes and then pursued in relation to each other, financial managers' sensemaking skills become more important than individuals' motivation. This, in turn, has implications for managerial and accounting routines and the broader leadership development practices (e.g., Goretzki and Messner 2016).

8 Conclusion

We conclude with a call for further research into the crucial question of how transparency is enacted in organizations through a dynamic and continuous interplay between the distinct dimensions of visibility and inferability. The theory developed in this study offers a potentially new way of thinking about the links between transparency, accountability systems, and organization design in complex organizations. At the same

time, we directed attention to the previously neglected role of the accounting information in creating organizational transparency. We showed that accounting understands the transparency-privacy tension in very different ways and that financial managers experience and cope with the observer-observation tension in a configurational manner. The logical next step is to integrate these two perspectives. It is our hope that these insights on the nature of transparency configurations help established firms to improve their track record of successfully adapting accountability systems.

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10 Appendix

Minutes

	Level*	Person	1st round	2nd round	Validate model**
ELECTRO-COMP					
	1	Chief Financial Officer (group)	1		–
	1	Corporate Senior Executive	1	1	(yes)
	2	Corporate Financial Manager	2	1	yes
	2	Financial Officer (business unit)	1		–
	3	Controlling Manager (business line)	1		–
MANUFACT-COMP					
	1	Chief Financial Officer (group)	1		–
	1	Head of Controlling (group)	1	1	(yes)
	2	Senior Executive (sales)	1		–
	3	Group Accountant/Controller (reporting)	1	1	yes
	3	Group Controller (factory)	2		–
RETAIL-COMP					
	1	Chief Financial Officer (group)	3	2	yes
	1	Head of Controlling (group)	1	1	–
	2	Head of Finance/Controlling (segment)	1		–
	2	Head of Finance/Controlling (sales segment)	1		–
	2	Head of Finance/Controlling (financial segment)	1		–
	3	Head of Controlling (segment)	1		–
	3	Accounting Manager (development)	1	1	(yes)
LOGISTIC-COMP					
	1	Chief Financial Officer	1		–
	1	Senior Executive (regional hub)	1	1	(yes)
	1	Head of Finance/Controlling (segment)	1		–
	1	Head of Finance/Controlling (segment)	1		–
	2	Head of Accounting (group)	1		–
	3	Accounting/Controlling Manager (development)	2	1	yes

Several informants were interviewed more than once, with over 80 hours interviews being conducted during the primary data collection.

* Set of informants: 1 = Senior Executives; 2 = Financial Managers; 3 = Accounting and Controlling Employees

** "–" means that we did not show the model to the individual due to timing (early stage of the study) or schedule (short interview).

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ARTICLE II

The Emergence of Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting

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12 Abstract

Accounting research has presented a range of structural and contextual approaches for designing and implementing accountability systems for simultaneously achieving *efficiency* and *flexibility* in managerial decision-making. Much less is known about the preceding initiatives through which organizations decide to adopt new features in their management control systems. In this paper, we focus on this first step – the *emergent accountability practice* through which new information-based routines are agreed upon. Most prior studies implicitly assume that senior executives, at some point, identify the need to be more efficient or flexible and subsequently design formal systems and structures to implement their choice. Based on an inductive multiple case study of 10 analytics initiatives in accounting, we illustrate how managers seek to unroutinize financial planning and forecasting through the adoption of new technology. A comparison of successful and less-successful initiatives shows that the deliberate (or developmental) formalization can be complemented with an alternative emergent (or evolutionary) process. This emergent practice is important because it enables accountants to recognize inflection points for the adaptation in a timely manner and of which senior executives are still unaware. Our findings contribute to the literature by identifying the conditions and discovering the mechanisms that internalize friction of efficiency/flexibility tradeoffs in the adaptation of accountability systems, and the broader research on how new information processing technology in organizations evolves.

Keywords: accounting innovation; financial planning; financial forecasting; analytics; management control

13 Introduction

Prior accounting literature assumes that accountability systems are increasingly required to simultaneously pursue the dialectics of efficiency and flexibility – jointly desirable but competing objectives.⁶ A large academic literature has emerged around the concept of enabling and coercive formalization (Adler et al. 1999), and focused on understanding how firms achieve a balance between such competing objectives for alignment and adaptability, individualization and standardization, exploration and exploitation, and mechanistic and organic (e.g., Raisch and Birkinshaw 2008, Adler and Chen 2011, Ahrens and Chapman 2004).

However, we know much less about the initiation that led organizations to adopt new features in the first place. Initiation is an important step because it is where the linkage between the firm's control imperatives and its organizational technology are made, and it involves a commitment to a course of strategic action that includes significant costs and risks (e.g., Busco and Quattrone 2018, Dechow and Mouritsen 2005, Granlund and Malmi 2002).

We address this gap in the literature through a longitudinal field study of multiple case companies that intended to adopt automated planning and forecasting systems. As illustrated in Figure 6, most prior accounting research on adoption decisions and their performance implications focus on design features and implementation of such systems from a cross-sectional perspective rather than from a longitudinal view (cf. Davila and Foster 2005, Cardinal et al. 2004). Managerial forecasting qualifies as an extreme case in terms of several characteristics relevant to our theoretical interest (Brueggen 2020). Specifically, errors in financial forecasting would not only affect the quality of managerial decisions on planning and budgeting (Jordan and Messner 2019, Merchant and Van der Stede 2007) but also deceive external financial reporting (Hemmer and Labro 2008, Ittner and Michels 2007). At the same time, new technological realities (e.g., artificial intelligence, machine learning, robotics, predictive analytics, from on-

⁶ In this paper, we use the notion "accountability system", which defines key positions in an organization, legitimate rights and obligations to set targets, and receive and distribute information (Simons 2005). This definition resembles the characterization of management accounting systems as "the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" (Simons 1995), as a subset of management control systems (MCS). Thus, the terms "management accounting system", "accountability system", and "system of accountability" will be used interchangeably in the rest of this work.

premise to cloud) are reshaping the finance function (Strauss and Tessier 2019), as this statement by the CFO in one of our case studies (TECHCOMP) illustrates: *"[It is] an opportunity we mustn't miss. We better learn to rely on the 'machine' and let go."* Digital technology, and taking advantage of AI's enormous potential, is exciting (Brock and von Wangenheim 2019), but the transformation is equally important, if not more. We therefore need to learn more about how an organization initiates the move to adopt its accountability systems for efficiency and flexibility.

From the management perspective of ambidexterity, the cases present a theoretically interesting tension since the contradictory forces and reconciliation of paradoxical organizational demands are subject to continuous rearrangements (cf. Zimmermann et al. 2015). For some time, an argument has been evolving that flexibility does not necessarily undermine efficiency and might, under certain conditions, even strengthen it (Luger et al. 2018). In this vein, Cardinal, Sitkin, and Long (2010) distinguish different controls (input, behavior, output control) that stabilize (i.e., routinize) and destabilize and balance and rebalance organizations, depending on the extent of the employees' internalization of controls (see Sitkin et al. 2020).

In relation, Adler et al. (1999) claim that an important aspect of the coexistence of flexibility and efficiency is how the interplay of different controls (e.g., Simons 1995, Malmi and Brown 2008, Bedford 2015) shapes the conditions where employees internalize direct and indirect learning mechanisms. Several studies on single- and double-loop learning argue for the importance of controls (e.g., attraction, selection, attrition) in innovation-dependent settings (e.g., Grabner 2014, Argyris and Schon 1978, Weick 1969, Mintzberg 1979). However, none of the prior studies, to our knowledge, explain a situation such as our case firm, where efficiency targets are successfully applied, leading to productivity gains via a continuous stream of experimentation and innovations. Our research sets out to identify the conditions of such a situation and explain how they function, addressing the following research question: *How do accounting managers interact with senior executives and technical staff to cause the adoption of a forecasting system that is designed for flexibility and efficiency in managerial decisions in their organizations?*

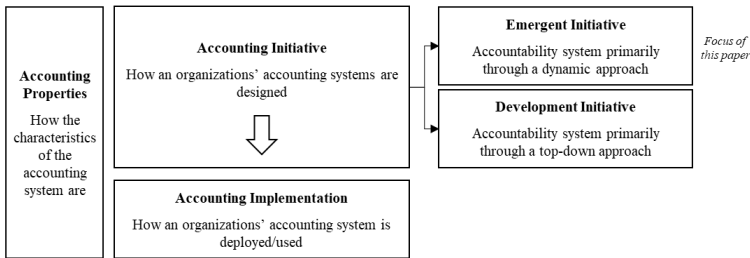


Figure 6 Accounting Initiative versus Accounting Implementation Process

We approach this question through an inductive study of analytics initiatives that were pursued in the accounting of 10 firms.⁷ We conducted a series of observations in the accounting departments of the multiple case firms where high productivity gains from automated financial forecasting systems were anticipated, sufficient resources and capabilities were available, and the intervention was on the management agenda. During the research, we observed that initially, the analytics initiatives had a clear one-sided formalization, with six of them focusing on efficiency (but not flexibility) and the other four focusing on flexibility (but not efficiency). An efficiency initiative is one intended to advance and utilize information processing technology for *administrative accountability*, and a flexibility initiative is one intended to create and utilize information processing technology for *entrepreneurial accountability* (Simons 2005, 1990). Five of the initiatives subsequently broadened their scope of activities through emergent efforts so that they ended up with an accountability-enabling system (i.e., accountability for both efficiency and flexibility formalization). By studying these changes in detail in multiple firms, we were able to see how accountability practice unfolds.

The empirical evidence shows that managers' efforts to shift firms directly toward a higher flexibility/efficiency equilibrium are problematic due to friction (i.e., resistance to change). Our findings indicate that managers achieved productivity gains by discovery and research, taking responsibility for risks, and on-going experimentation

⁷ We defined business analytics (BA), as our informants did, in terms of an initiative which refers to the extensive use of data and corresponding sophisticated analyses to support managerial decision-making. The professional accounting bodies', the Chartered Institute of Management Accountants (CIMA), IMA (Institute of Management Accountants), the association of accountants and financial professionals in business, also refer to this definition as "Data Analytics", "Advanced Analytics", or "Predictive Analytics".

with process innovations, despite the efficiency orientation induced by the senior management. Thus, managers have the emergent ability to deviate from a static efficiency/flexibility equilibrium to internalize friction for effective adaptation.

Our rich description of this emergent practice has important implications. The primary contribution of this study extends the literature by putting forward a dynamic process model of how accountability systems develop. This combines field insights with Adler et al.'s (1999) theoretical perspective. Our results are contrary to some prior studies' implicit assumption that it is the senior executives who establish an accounting system, which is subsequently perceived as coercive or enabling (Wouters and Wilderom 2008) or used interactively or diagnostically (Simons 1995). Implicitly, they assume that a deliberate formalization is perceived differently by different stakeholders, and a decision based on organizational understanding defines when to switch from one priority to another. Our findings suggest an equally plausible scenario would be for a switch to be triggered by accountants through an emergent practice. The emergence of accountability systems, by contrast, describes how managers sometimes identify the opportunity to reconcile efficiency and flexibility in organizational technology. In such settings, they are increasingly indifferent between the efficient or flexible obligations that senior executives assign to organizational technology, and their attention to both efficient and flexible applications is required for the analytics initiatives' success. This contradictory engagement creates friction across and within hierarchical levels, which are resolved through relational initiatives and through the gradual shift toward an enabling formalization of accountability systems. By conceptualizing the competing logics, the related tensions, and the managerial solutions in this practice, we contribute to a situated understanding of how accountability systems emerge within an organization. Such an emergent accountability system may help to explain how organizations identify productivity gains in planning and forecasting.

In addition, our findings add to the related literature on the development of organizational ambidexterity (e.g., Posch and Garaus 2020) by demonstrating why and how the understanding of accounting system adaption that supports effectiveness and flexibility emerges in the internal environment (i.e., the specific interrelation of those controls within the internal environment). Thereby, we advance this prior literature beyond the traditional contingency and systems view (Chenhall 2003) and agency theories (Baiman 1982), in which accounting system adoption is primarily seen as rare,

episodic, coercive, and top-down, toward one in which adaptation is continuous, aggregated, and situated. Our findings show that accountants see and act on friction in their administrative work contexts (e.g., resistance to rationalization), of which senior executives at higher levels are still unaware (e.g., automation of forecasts).

More generally, the findings are relevant to the literature on management control system developments (e.g., Davila 2005, Bedford and Malmi 2015, Grabner and Moers 2013), explaining how the evolution of those systems relies on the dynamic process of transitioning from routinizing to unroutinizing tasks and their interrelation with other controls.

This study also provides insights into the literature on the coupling of management control systems (e.g., Demartini and Otley 2020), offering a theoretical mechanism through which continuous innovation processes integrate with existing accountability systems.

The next section provides a brief overview of the literature on flexibility/efficiency tradeoffs and accounting initiatives and develops the theory. We then describe the research design and, in subsequent sections, present and discuss the empirical findings drawn from our multiple cases. Overall, this work suggests a theory of emergent accountability systems on the nature of the initiation, evolution, and dynamics of efficient-flexible tradeoffs.

14 Theory development

14.1 Theoretical background

The theoretical lens of enabling formalization (for an overview, see Strauss and Tessier 2019) has been applied to divergent levels of analysis and a wide array of organizational issues. Whereas the term "enabling control" has been used in a number of different ways in the literature, we follow the emerging consensus, which is to view enabling formalization as referring to how organizations manage the duality or tension between efficiency and flexibility (Adler et al. 1999). Scholars have observed the formalization of both systems and processes in performance management (Ahrens and Chapman 2004) and performance measurement (Jordan and Messner 2012, Wouters and Wilderom 2008) contexts, governance channels (Doornich et al. 2019), information system integration (Chapman and Kihn 2009), planning systems (Goretzki et al. 2018), target-setting (Cugueró-Escofet and Rosanas 2013), transfer pricing (Cools et al. 2008),

supply-chain controlling (Neu et al. 2014), employee participation (Groen et al. 2012), and innovation and product development (Jørgensen and Messner 2009). At the same time, there is a tendency toward idiosyncratic single cases in this literature stream (Adler and Borys 1996, Adler et al. 1999, Ahrens and Chapman 2004, Wouters and Wilderom 2008, Jørgensen and Messner 2009, Mundy 2010, Adler and Chen 2011, Groen et al. 2012, Jordan and Messner 2012, Neu et al. 2014, Englund and Gerdin 2015, Henttu-Aho 2016, Goretzki et al. 2018, O'Grady 2019, Doornich et al. 2019).

To summarize this extant literature stream, existing theories mostly describe enabling characteristics but make it difficult to understand how efficiency-flexibility tradeoffs are initiated and evolve over time. The context of analytics initiatives is particularly suitable for studying how an enabling accountability system is initiated since accounting systems are assumed to be "generally" either flexible-focused or effective-focused when they are set up (Wouters and Wilderom 2008), but they often benefit from experimentation and knowledge integration in their development (Englund and Gerdin 2015) and potentially emerge differently.

Prior studies have not formally analyzed accounting routines; most implicitly assume developmental formalization, whereby senior executives reconcile their different perspectives to build consensus on the adaptation or performance of an accounting system (Jordan and Messner 2012, Wouters and Wilderom 2008), which managers are then expected to implement and, thus, become more routine over time.

On the contrary, we introduce an emergent accountability system, where accountants—under certain circumstances—take resources and responsibility for initiating a change from a one-sided efficiency or flexibility orientation to an enabling system of accountability (i.e., successfully internalizing the tension between efficiency and flexibility). This occurs, we suggest, because there are times when accountants see and act on friction in their administrative work contexts (e.g., resistance to rationalization) of which senior executives at higher levels are still unaware (e.g., automation of forecasts).

This chosen terminology helps to clarify that a process perspective on enabling accountability systems can be divided into two procedures. The accountability practice is the pattern of actions exhibited by managers of the administrative unit and their superiors that leads to the adoption of the enabling accountability system. The accountability system usage is the subsequent pattern of actions through which an

enabling accountability system is implemented (see Figure 6). In our setting, an enabling accountability system is, therefore, a shared understanding that an accountability systems support efficiency and flexibility rather than one or the other. This terminology helps to clarify that a process perspective on enabling accountability systems can be broken down into two procedures. The accountability practice is the pattern of actions exhibited by managers of the administrative unit and their superiors that leads to the adoption of the enabling accountability system. The accountability system used is the subsequent pattern of actions through which an enabling accountability system is implemented (see Figure 6). Specifically, our focus in this paper is on initiatives through which some administrative units end up enabling accountability systems. This practice can theoretically take one of two forms: deliberate or emergent. In deliberate practice, the system is defined on a top-down basis and implemented by those in accounting. In an emergent practice, accountants take responsibility for initiating the change to their unit's accounting system from the bottom up in a way that goes to some degree against the direction set by senior executives. These emergent practices are important since they enable organizations' responsiveness and agility to incorporate changing requirements. Further, they are challenging because accountants are likely to experience friction when they act in ways that are inconsistent with the dominant objective set by the top management. For example, senior executives may be reluctant to move to an enabling formalization because of their angst of losing control (Jordan and Messner 2012), a threat to managerial authority (Anthony 1965), or their reluctance to accept the associated costs and risks (Bedford 2015), or overconfidence.

Prior literature assumes that the cost of output flexibility can be reduced if the associated internal processes can be made more routine (Adler et al. 1999). In particular, the explicit paradigm in prior literature and practice is that technology helps to routinize non-routine activities. This is questionable for accounting because assuming that planning is a non-routine activity does not go with ease (firms are 'continuously rolling plans'). Otherwise, we need to ramp up our academic efforts quickly in order to better account for the non-routine perspective on machine learning and AI for planning (e.g., Busco and Quattrone 2018).

Our premise is this: assuming that accounting numbers and figures make for the output of administrative processes, only one number reflects the actual (planned) revenue, and only one number is printed in the annual report (as a planned target); thus,

this unquestioned theoretical proposition about the subject matter is not suitable. Specifically, a core function of planning is to commit to projected numbers for the future and work towards attainment. Thus, a variety of outputs could potentially have negative effects in terms of forecasting errors (Brueggen et al. 2020). It is nonetheless argued that flexible computer-based automation reduces the cost of high product variety (Adler et al. 1999). In particular, the underlying assumption is that a variety of outcomes is favorable. While theories on the economics of scope assume a reduction in the cost of output flexibility, we problematize that postulate to offer a new point for a theoretical departure. This is because accounting is aimed at the opposite — precisely to avoid pluralistic outputs (e.g., harmonization, standardization, consolidation of accounting models, single sources of truth) (see Madsen 2011). As one senior executive in our case told us, *"Not everyone in the firm should have their own 'number' and their own definitions and standards for accounts."*

During the 2018–2020 period of this study, there was growing interest from the accounting discipline in new technologies with respect to artificial intelligence (AI), machine learning (ML), and robotic process automation (RPA), a rise in predictive forecasting, and an emergence of automated decision-making. All of these entities place an incentive on the ability to adapt continuously, especially through the change of traditional accounting systems. Ever since accounting was involved with the generation, aggregation, and distribution of decision-useful information (Simons, 1990), and thus was technology-dependent (Orlikowski, 1991), it seems that the "digital transformation" eventually freed accountants from being slaves to the machine. This was a sign of the arrival of "modern times." As the CFO from one firm vividly articulated, *"An opportunity we mustn't miss. We better learn to rely on the 'machine' and let go."*

14.2 Initiatives as a research setting

As noted in the introduction, we chose analytics initiatives as our research setting because they provide a structured environment in which to examine how technological developments evolve in accounting.⁸ In particular, as accounting systems vary across time and space in different industries and the organization's hierarchical levels (which could restrict the strength of the research design), several specific choices regarding the research design have been made.

⁸ The notion "analytics initiatives", "accounting initiative" will be used interchangeably in the rest of this work.

First, the study was limited to the corporate accounting of MNEs. Analytics initiatives were sampled as the unit of analysis because they provide the potential starting point of accounting change while offering boundaries for a distinct set of activities.⁹

Second, prior research argues that new innovative projects arise as a result of a perceived gap between what is expected and what is required to accomplish the task (Bower 1970). Empirical findings suggest that over time, initiatives may be expanded to reconcile efficient and flexible knowledge practices and thereby become enabling. For example, Eisenhardt et al. (2010) found that microfoundations of performance, such as initiatives, benefit from balancing efficiency and flexibility for knowledge practices in dynamic environments.

Finally, an additional advantage of initiatives as a research setting is that they are a combination of existing individual and organizational capabilities that make it possible to compare and contrast entire practices. Initiatives also exhibit a clear separation between senior executives (those who define the initiative's objectives and structure) and middle managers (those who manage the initiative on a day-to-day basis), which is useful for understanding the technical (e.g., data scientists, technical IT specialists) and managerial (e.g., senior executives, financial managers, controllers) perspectives.

The above factors were important in selecting initiatives as the setting for our research.¹⁰ Having said this, it is also true that initiatives have unique features that do not apply to other settings. Relatedly, the conclusions of this longitudinal study are a function of the time at which the study was conducted and could vary with changes in the time boundary. Our empirical findings should, therefore, be interpreted with clear boundary conditions for theory (Glaser and Strauss 1967).

⁹ Theoretically, initiatives are patterns of action alternatives for addressing issues, finding answers, and the fundamental source of variation in firm activities (Ren and Guo 2011). Decision-makers are most receptive to what is consistent with their current frame of reference (March and Simon 1958) and are selective in the issues and initiatives they consider (Ocasio 1997). The pattern of an initiative is defined partly through its formal rules and governance but also through the cross-understanding of those who manage and control it.

¹⁰ Prior studies showed that research in an initiative context can be fruitful to derive more general implications for organizational and control theory (e.g., Sitkin et al. 2020, Cardinal et al. 2017, Miller and Power 2013, Cardinal et al. 2004), and strategy (e.g., Raisch et al. 2018, Gibson and Birkinshaw 2004, Tushman and O'Reilly 1997).

15 Research design

15.1 Methodology

This paper builds upon a multiple–case study design to investigate a contemporary phenomenon: multinational companies' adoption of machine learning and AI technology in accounting. Case-study methodologies have been used in a number of process studies (e.g., Eisenhardt et al. 2010, Goretzki et al. 2018, Jordan and Messner 2012). We opted for multiple cases to use a "replication logic" to generate new insights (Eisenhardt 1989a) on how to sequence and balance multiple facets of initiatives. We capitalized on the fact that field-based research provides the opportunity to understand the antecedents and consequences of accounting practices (e.g., Ahrens and Chapman 2007). Langley et al. (2013) have further argued that the types of research questions conducive to theory development include how practices unfold and the examination of theoretically novel phenomena (Langley 2011). This allowed us to generate rich, field-based insights into the actions of key individuals, governance mechanisms, and the resulting knowledge processes for efficiency and flexibility (Yin 2008).

15.2 Data access and sampling

We started by screening information on digitalization initiatives in accounting for initially 16 companies participating in executive education at the university. The firms studied are a mixture of large multinational organizations in Central Europe, all of which started to explore new technologies (e.g., AI, machine learning, robotics, RPA, big data, cloud) to digitalize core activities in accounting. The geographical proximity and access to the senior management of the organizations allowed intensive qualitative data collection. Over a period of three years, we regularly visited the companies or met companies' employees at the university, where qualitative data was obtained through interviews. The use of multiple cases from different companies provided comparative and distinctive data that yielded a more generalizable theory (Yin 2008).

All these firms faced the issue of exploring new technologies for their planning and forecasting systems. (Firm names are pseudonyms for confidentiality reasons.) (1) ITCOMP, the largest European subsidiary of a dominant global computer company, with direct reporting to the global CFO. The company offers operating-system software and develops, manufactures, licenses, sells, and supports software products. Accounting faced a surge in the complexity of the product portfolio, which increasingly demanded

data-driven decisions on pricing and costs for consolidated planning and forecasting. (2) CHEMCOMP, a chemical company and one of the largest chemical producers worldwide. The company operates through six segments in a wide variety of markets and provides a range of system solutions and services. Uncertainty and technologization along the entire value chain required the accounting community to rethink its rigid planning processes. (3) BUILDCOMP, one of the largest manufacturers of formwork and scaffolding. An increasing production network for projects and contracting necessitated central control for information systems and reporting. Decentralized operating structures with close proximity to local markets and customers incentivized entrepreneurial activity but increasingly demanded accounting to coordinate the planning process. (4) TECHCOMP, a semiconductor manufacturer in Germany. As an engineering company, the tech-savvy firm is keen on pushing technological boundaries, where accounting has a supporting role in all processes and operations. Technological developments and increasing market volatility made the demand for products challenging to predict with all its consequences based on investments and the building of new manufacturing facilities. (5) COMCOMP, a major telecommunications provider in Switzerland. Although the firm is in a regulated environment, it faced continuous market saturation and high cost pressure due to investments in future technologies while prices to customers decrease, as well as shifting customer demands due to demographic changes that became more difficult to predict. (6) MAILCOMP, a closely regulated public company providing postal services. The company is accustomed to reconciling the demands of the market and policymakers. Administrative efficiency in the control and planning processes was complicated by changing customer requirements and new, often international, competitors in dynamic markets. (7) MEDICSUB, a company that develops, manufactures, and markets innovative medical products and services to the healthcare industry. As a subsidiary in a highly specialized market niche, the firm's accounting function operates with an integrated financial planning and accounting information system for administering a broad portfolio of individual products. An expanding assortment of items made prices and margins complex to analyze and plan. (8) TELECOMP, a major telecommunications provider in Germany. Similar to COMCOMP, the company faced continuous market saturation and high-cost pressure due to investments in future technologies. In the matrix organization, accounting worked on realigning the planning and forecasting processes through a "campus-approach" and

consolidation of planning systems. As a data-oriented company, further automation of planning procedures was envisioned. (9) LUXURYCOMP, a conglomerate manufacturing high-quality glass products. It is a jewelry maker and partner for the fashion industry, a producer of optical instruments, and a manufacturer of grinding, sawing, drilling, and dressing tools. The company not only sells but also designs and manufactures the highest quality goods. The dependence of sales and marketing on dynamic market trends required an increasing integration of scenarios in planning and forecasting along the entire value chain.¹¹ (10) TOOLCOMP, a global market leader in the tool and construction industry. As part of global business consolidation, the company migrated all of its systems onto a single accounting information system. The company faced a digital transformation that has provided the opportunity to help increase the productivity of customers, which increasingly demanded a business partner role of accounting. In addition, the company ever since has a strong focus on corporate culture. Besides a prominent sales orientation, technical possibilities for revenue analysis and planning were not fully applied.

Since we were particularly interested in the impact of the digital transformation of finance, our level of analysis was not the firm as a whole but rather the accounting domain. Through a series of initial interviews with corporate managers (in finance, accounting, and controlling), we identified each firm's total current portfolio of analytics initiatives in accounting. At least one initiative in each firm had been launched with a clear strategic intent to change financial planning and forecasting. We asked our informants to clarify whether the intention was for initiative-targeted efficiency and the automation of existing information-processing technology, or flexibility in the optimization of new information-processing technology. At the same time, these initial interviews revealed that managers attempted to either pursue a quantitative machine-based forecasting approach (data mining, algorithmic oriented), a driver-based forecasting approach (planning with cost drivers), or a synthetic approach (combining algorithmic forecasting and driver oriented).

¹¹ Data on this embedded case is not fully integrated at the current stage of this multiple case study due to changes in the top management team of this company.

15.3 Data collection

We gained access to the full sample of 10 analytics initiatives and primarily collected data via semi-structured interviews.¹² All were conducted by one of the authors, either in person, via field visits to headquarters, or via conference calls.¹³ A total of 28 informants were interviewed, some several times, over three years (2018 to 2020), with multiple phases of data collection. Data of multiple primary data sources comprises (1) 40 interviews with informants from the initiatives, (2) semi-structured responses from 14 managers, and (3) 14 participants in focus group meetings. We, therefore, obtained data from a total of 68 encounters. For an overview of our sample, please refer to Table 1.

¹² The interview process included two sets of informants: senior managers, who informed us about the analytics initiatives' formal design and relationships with the corporate team, as well as business analytics managers (e.g., data scientists, IT specialists), who were more knowledgeable about the initiatives' informal organization and inner workings.

¹³ Two interviewers were present in each case. The interviews were recorded, transcribed, and archived by interviewee name, date, location, and type (see Appendix). With the exception of several follow-up telephone interviews, our interviews were generally conducted during site visits and usually lasted between 60 and 90 minutes. Exceptions were initial interviews with senior executives, where insights were gathered through detailed notes from field visits.

TABLE 1: Description of Case Data

Company	Objective of Analytics Initiatives	Informants	Interview Rounds	Interviews	Focus Group	Structured Response	Examples
BUILDCOMP	Efficiency	2	2	5	2	2	"Efficiency measures became unavoidable. " "Independent businesses required a firm-wide standardized and harmonized data model for planning. "
CHEMCOMP	Efficiency	3	2	4	1	1	"Strong push for digitization to reduce administrative staff by 30-50% in the next 10 years. " "Improve forecast for resource savings and efficiency benefits. "
COMCOMP	Efficiency	2	1	2	1	1	"Efficiency rounds have been held in recent years. " "Considered digitization as the answer to the economic situation to become more efficient in planning and forecasting processes. "
ITCOMP	Efficiency	2	1	2	1	1	"Maximize the productivity of accounting in planning and forecasting. " "Developing automation technology to help people maximize productivity. "
LUXURYCOMP	Flexibility	3	3	4	1	1	"Exploratory stage with commitment to develop new data-driven solutions for Finance. " "Cost reduction was considered also positive, but not the central motive. "
MAILCOMP	Efficiency	4	3	6	2	2	"Aimed at cutting costs in the areas of Finance, HR and Communication by up to 30 percent. " "Improving productivity was prioritized by reducing the effort in planning. "
MEDICSUB	Flexibility	2	2	4	2	2	"Encouraged to explore new possibilities. " "Additional predictive models should complement managerial judgements based on experience. "
TECHCOMP	Efficiency	5	4	6	2	2	"Efficiency in mind when the initiative was commissioned. " "Reducing manual activities and automating standardized plan and forecast processes. "
TELECOMP	Flexibility	2	1	2	0	0	"Attempt to experiment, the idea was to try something new. " "Insights were certainly the more significant driver to introduce an automated forecast based on big data. "
TOOLCOMP	Flexibility	3	4	5	2	2	"Intent to investigate and discover, with unconventional data analysis for new insights. " "We considered analytics as new option to improve decision-making. "
		28	23	40	14	14	
							68

The multiple case study design was selected to use recurrent interviews that facilitated probing and obtaining managers' perceptions directly during different phases. As opposed to an in-depth field study or a more broad-based survey (e.g., Chapman and Kihn 2009), the adopted method may be classified as a cross-sectional field study (Lillis and Mundy 2005). An advantage of this approach was that retrospective data provided more observations (and thus, a better grounding), and real-time data helped us to mitigate retrospective bias (Miller et al. 1997). We used two interview guides to conduct semistructured interviews in different phases of data collection. The first interviews were relatively unstructured in order to minimize the possibility of interviewer bias and to allow the managers to describe the factors that they felt were important.¹⁴ The subsequent interviews were adjusted in line with our theoretical interest. The interview questions typically dealt with the following themes: the informants' roles and responsibilities; their involvement in business analytics; current issues in budgeting, planning, and forecasting; technological developments; the work environment in general; and the outcomes of their work. Based on our preliminary findings, we added a fourth part for the second round of interviews. This final part was a structured questionnaire that asked respondents to give numerically scaled responses in order to identify characteristics (e.g., digital maturity, decision-making, and strategy) of the current set of projects.

15.4 Data analysis

In analyzing the interview transcripts, one of the authors compiled a memo for each case and conducted a content analysis to identify differences and similarities in the way the initiatives were structured and managed. The trustworthiness of the theoretical findings was supported in three ways.

First, in addition to our primary interview data, we examined multiple secondary data sources, such as internal documentation and project reports and presentations, in order to further enrich our data and gain additional insights. Although these internal materials were not publicly available, our informants shared additional material in the

¹⁴ This phase of inquiry also constituted questions on what the actual expectations about the development of analytics within accounting are and what the managers would specifically expect from a successful adaptation of new organizational technology. Specifically, the section comprised questions of what critical knowledge and competences for setting up this specific use case of analytics for forecasting and planning are required. We framed, in particular this question, as to how they would benefit from a workshop and training session with other practitioners. That allowed to de-bias the inherent assumptions about the accounting system transition towards the analytical forecast.

research setting. A triangulation of the data collected from the interviews and the archival data allowed us to crosscheck our findings and increase their accuracy (Eisenhardt and Graebner 2007, Eisenhardt 1989).

Second, we sought to verify the interview sources by later asking the same informants related questions at a focus group meeting. We also challenged individual accounts by asking multiple informants similar questions. With these measures, we sought to reduce the risks of cognitive biases and impression management, which often relate to single data sources (Miller et al. 1997).

Third, we were able to compare and contrast cases in which the intentions fully emerged with those in which they did not. As such, we identified constant elements in more than one case. This was argued to provide replication for a general process model (e.g., Eisenhardt 1989, Eisenhardt and Graebner 2007) and helped us additionally validate the relationship between our observations and the outcomes.

Finally, we presented our findings and conclusions to our informants to ensure our theoretical explanations' plausibility (Miles and Huberman 1994). Two independent researchers who participated in the focus group meetings and interview sessions assisted in reviewing and reconciling the case study protocol. Based on qualitative and quantitative data, we used tables and graphs to structure, compare, and analyze informative elements and went continuously back to the interviews to ensure that the level of abstraction was rooted in the specific data. This iterative process led to the insight that follows.

16 Empirical data and analysis

What emerged from our data were insights on initiatives that clarify the sequence and nature of accountability systems' adoption (see Table 2). We defined successful initiatives as our informants did in terms of both the presence of positive initiative characteristics (e.g., proof-of-concept, acceptance of management, planned roll-out) and the absence of negative ones (e.g., abandoning, cancellation). Similarly, we assessed less successful initiatives as our informants did in terms of the absence of positive initiative characteristics (e.g., value-added, uncertainty and complexity reduction, validity) and the presence of negative ones (e.g., resistance of employees, costs, project stop). We supplemented these data with a questionnaire in which informants were asked to rate antecedents, outcomes, and moderators of the analytics initiative using a 7-point

Likert scale. We also gathered qualitative assessments from the interviews. Tables 2 and 3 show this combination of qualitative and quantitative data, which creates more emic validity than either data type alone.

As indicated in Table 5, there were substantial differences in analytics initiatives' outcomes across firms. Five firms (BUILDCOMP, CHEMCOMP, ITCOMP, TECHCOMP, TOOLCOMP) had successful analytics initiatives. For example, ITCOMP faced a major challenge with revenue forecast (complex businesses, enterprise-wide forecast, and consolidation system were spreadsheet-based, multiple versions of the forecast) and the analytics initiative transitioned planning and forecasting to a machine learning forecast, providing better forecast quality (i.e., accuracy, from 2.7% to 1.5%) than the traditional bottom-up process and reduced the planning effort substantially (from quarterly aggregated 32.000 to 4 hours). For the context of this study, most notably, the initiative transpired initial friction (e.g., the inefficiency of the forecast) in utility for organizational agreement on accountabilities and thus part of the enabling accountability system as a blueprint for development (i.e., and later implementation).

TABLE 2: Summary of Data on Analytics Initiative Performance

Company	Developed Applications	Proof of Concept [*]	Relative Progress	Examples	Performance	Rank
BUILDCOMP	24	10	42%	"Positioning of the analytics initiatives as a service offering. " "Enablement theme was emphasized in the strategy for analytics. " "Were able to better compare the automated forecasts with manual results. "	Successful	5
CHEMCOMP	1	1	100%	"Used the automated forecast as the basis for our forecast. " "Useful discussion about how our business will actually develop. "	Successful	2
COMCOMP	3	1	33%	"Supportive, but not the panacea. " "We canceled the project ... and forecasts remained logic-driven. "	Less successful	6
ITCOMP	3	3	100%	"Skipped the traditional bottom-up process and reduced the planning effort, from 800 people and 1 month to 2 people and 2 days. " "New responsibilities, and many financial professionals went along on that journey. "	Successful	1
LUXURYCOMP	3	0	0%	—	Less successful	7
MAILCOMP	0	0	0%	"To date, the costs and benefits of the initiative balanced each other out. " "Disillusionment set in, we have arrived at a realistic level. "	Less successful	10
MEDICSUB	2	0	0%	"Decided to immediately stop the project. " "We did not put in any more effort. "	Less successful	8
TECHCOMP	3	2	67%	"We made good progress. After extensive testing, it went live. " "More operational units were beginning to ask for implementation. " "The Management Board also liked that evolving practice lot. "	Successful	3
TELECOMP	1	0	0%	"Because the initiative caused such severe difficulties, we had to stop it. " "If we were to start another project, we would do it differently. "	Less successful	9
TOOLCOMP	2	1	50%	"Got more resources in return, and the commitment to go through this transformation process. " "Forecast, and the credit engine, became a productive pilot initiative. "	Successful	4

^{*}) Proof of concept describes the unconditional technical and managerial acceptance for a roll-out, or go-live of the application.

16.1 Evolution of the efficiency initiatives

Despite the fact that the main context and formal setting for management and accounting were similar for the six efficiency initiatives, we observed the emergence of significant differences in how they performed (see Table 4). Specifically, whereas initiatives at COMCOMP and MAILCOMP continued to operate according to the formalization defined at the outset, initiatives at ITCOMP, CHEMCOMP, BUILDCOMP, and TECHCOMP evolved – management and accounting began to get engaged in developing new innovative ideas and to transform the initial technological advancements to develop planning solutions that neither the central nor the decentral managers had previously deployed, including a machine learning technology, a new way of predictive planning, and superior forecasting methods. This became, in other words, an enabling accountability system. To make sense of this phenomenon, we sustained touchpoints with multiple firms in our sample, with a view toward understanding the pattern that led to a gradual shift of the efficient-flexible tradeoff.

At ITCOMP, the objective of efficiency was the starting point for a multi-year transformation effort. Historically, ITCOMP Finance was defined by a centralized system, focusing primarily on controllership and the fundamentals. As the company's business became more complex, from a product and geographic standpoint, accounting was decentralized, moving finance roles into growing business groups and appointing new divisional CFOs. Until then, the complexity of the business (B2C, B2B, direct and channel, cloud and subscription, software licenses, software, and hardware) increased exponentially. ITCOMP faced an abundance of data in multiple, disparate environments and found that most of its analysts' time was spent simply collecting and compiling data. Part of the reason was that the teams often performed planning and revenue forecasting in offline, siloed environments, and unnecessarily invested in a variety of redundant financial systems and "shadow applications." At that time, the enterprise-wide forecast and consolidation system was spreadsheet-based, and multiple versions of the forecast existed. Thus, it took a two-to-three-week process to generate the quarterly forecast. In addition, forecast accuracy was not meeting expectations. As a company that *"prides itself on its long history of developing technology to help people maximize productivity and realize their full potential,"* change was clearly inevitable: *"ITCOMP's top management decided to address these challenges head-on by embarking on a digital transformation."*

To start, accounting performed an internal self-assessment that exposed several areas for potential improvement of existing capabilities in accounting. As one senior manager recalled, *"The first step was examining our data, systems, and standards to make sure we had the right discipline at the core to efficiently convert data into insights and gain a unified view of our business."*

As a result, the analytics initiative focused on improving operational efficiency within the ITCOMP Finance organization as part of the so-called "One Finance" initiative. The company began to outsource repetitive, non-strategic finance activities, including accounting (e.g., accounts payable and procurement), to *"maximize the productivity of accounting"*. At this stage, the IT department examined the architecture of the ITCOMP accounting systems and collaborated with the financial managers to establish a reliable data source and consistent taxonomies – forming the basis for a corporate standard for business intelligence. *"To create a single master data source from which all financial reports could be generated was a game-changer,"* one manager recalled. Subsequently, the initiative was relabeled "Core Finance", as it was not without difficulties. Different needs created divergent demands, and thus, technical answers varied. *"The accounting function struggled to consolidate different perspectives, and all the individual applications, to find some common ground. In the finance departments, decentral and central, we have built a lot of reports because information was not provided in the system, the system was not powerful enough, or it did not address the demand,"* the same manager clarified. Another senior manager acknowledged the point: *"Our technical experts are leaders in the industry. Still, we had a lot of discussions with IT, [...] business or finance leaders had to repeatedly explain, and remind, what is actually the intention of the whole exercise."*

Over time, financial reporting (in particular, management reporting) became simpler and more standardized with the potential to *"transform data into insights and impact"*. Whereas the transition from on-premise to cloud services (a centralized hybrid cloud infrastructure) as a single portal provided consistent access to reliable data and the strict rigor for data quality, compliance, and security exhausted accounting. In fact, accounting had to regain its position as a trusted business partner within the organization: *"We had to streamline the discussion toward a single, centralized version of the truth based on the agreed-upon taxonomies and prove the validity of financial numbers to the businesses."*

TABLE 3: Summary of Data on Characteristics of Analytics Initiatives (1/2)

Company	Initiative Relevance ^a	Routine Accounting Tasks	Resources for Initiative ^b	Transition	Speed
BUILDCOMP	(2) YES. Topic for future agenda.	Automated: YES "Centralized services and harmonizing administrative processes."	(3) Yes. Medium-term investments.	Parallel	Incremental
CHEMCOMP	(4) YES. Prior agenda, already a key technology.	Automated: YES "SSC for Finance; Global system and process landscape."	—	Parallel	Incremental
COMCOMP	(4) YES. Prior agenda, already a key technology.	Automated: YES "SSC and 'Controlling Factory' approach to centralize solution development."	(3) Yes. Medium-term investments.	Parallel	Rapid
ITCOMP	(4) YES. Prior agenda, already a key technology.	Automated: YES "SSC in particular for accounts payable and procurement; corporate standard for business intelligence (BI)."	(0) No. Investments are currently not relevant; ^c	Parallel	Incremental
LUXURYCOMP	(2) YES. Topic for future agenda.	Automated: YES "Harmonized administrative processes and centralized services of Group Controlling."	(4) No. Projects are currently being developed.	Parallel	Rapid

a) Relevance of analytics initiatives: 0 = n/a; 1 = Not on agenda; 2 = Topic for future agenda; 3 = On current agenda, with a degree of maturity; 4 = Prior agenda, already a key technology; b) Current and planned investments for business analytics; 4 = No, projects are currently being developed; 3 = Yes, medium-term investments; 2 = Yes, long-term investments; 1 = No, currently under discussion; 0 = No, investments are currently not relevant. c) "...because already implemented."

TABLE 3 Continued: Summary Data on Characteristics of Analytics Initiatives (2/2)

<i>Company</i>	<i>Initiative Relevance^a</i>	<i>Routine Accounting Tasks</i>	<i>Resources for Initiative^b</i>	<i>Transition</i>	<i>Speed</i>
MAILCOMP	(2) YES: Topic for future agenda.	Automated: YES "Centralized accounting services and streamlined administrative processes."	(4) No. Projects are currently being developed.	Sequential	Rapid
MEDICSUB	(2) YES: Topic for future agenda.	Automated: YES "SSC on corporate level; automation of month-end closing with workflows and runbooks."	(4) No. Projects are currently being developed.	Sequential	Incremental
TECHCOMP	(3) YES: On current agenda, with degree of maturity.	Automated: YES "Accounting (standardized reporting and consolidation processes) outsourced in domestic and foreign SSC."	(3) Yes. Medium-term investments.	Parallel	Incremental
TELECOMP	(3) YES: On current agenda, with degree of maturity.	Automated: YES "SSC Finance Factory 2.0; High level of automation and standardization for routine tasks."	—	Sequential	Rapid
TOOLCOMP	(3) YES: On current agenda, with degree of maturity.	Automated: YES "SSC for accounts receivables and billing; Consolidated back-end system as foundation for a service orientation."	(3) Yes. Medium-term investments.	Parallel	Incremental

a) Relevance of analytics initiatives: 0 = n/a; 1 = Not on agenda; 2 = Topic for future agenda; 3 = On current agenda, with a degree of maturity; 4 = Prior agenda, already a key technology. b) Current and planned investments for business analytics: 4 = No, projects are currently being developed; 3 = Yes, medium-term investments; 2 = Yes, long-term investments; 1 = No, currently under discussion; 0 = No, investments are currently not relevant.

After this initial reluctance, ITCOMP recognized that it would face some cultural resistance when further transitioning from traditionally accepted accounting practices, in particular, with respect to the automated planning and forecasting tools. While the initial objective was to incorporate new digital efficiencies (specifically to cut time in the manual forecasting process and costs related to data preparation), the transition evolved in a more flexibility-oriented direction. *"We started thinking about new ways to use that intelligence to influence decision-makers and empower our finance employees with the flexible technology tools and applications they need to drive impact,"* the ITCOMP manager explained.

Accordingly, managers at ITCOMP Finance shifted the focus away from productivity gains and improvements in the execution of planning. In fact, managers adjusted their original efficiency formalization and took the initiative to attain shared objectives. The manager of ITCOMP explained, *"While we started working on automated planning solutions, we knew we had to deliver additional value to our internal customers."* This demand was reinforced by a different perspective on the core activities: *"Changes in the information architecture freed up employees to spend less time on data collection and more time on analysis."*

Recognizing that intuitive user experience would be critical to the adoption of the analytics initiative, ITCOMP Finance next started promoting a culture of self-service *"where finance professionals within the company could access one 'business insight portal' as an access point for standard reports and scorecards."* This action resulted in the first attentional processes that were, however, against the initial objective. One ITCOMP manager recalled, *"We had to promote all the features and self-service, [...] and prioritized simple, intuitive user experiences to assist the workforce with secure self-service productivity tools."*

This induced mindset shift set the analytics initiative into motion and encouraged the managers on the frontline to suggest new and innovative solutions that were beyond their control purpose in financial planning. *"What really brought intelligence: only when you prepared data to derive conclusions. The discussions shifted, from numbers to visualization and the background story,"* one manager told us.

Structures provided the boundaries to the attention of ITCOMP Finance: *"financial analysis and reporting, strategy and forecasting, business process automation, and risk management."* The centralized organization of data scientists (selectively, external

consultants) along the corporate functions governed the decentral business demands and managed the collaboration, while innovations were directly embedded in accounting operations with only a few resources, which generated a spillover in flexibility-oriented practices. This was true for advances in management reporting, as well as for other data-oriented innovations in accounting. For example, newly created chatbots reduced ad-hoc requests about customers' orders and credit status. The impact was a decrease in response speed from 5-10 minutes to 5-10 seconds, which reduced manual touchpoints by 12,000 queries per month, which was equivalent to a labor effort of 1,800 hours per month. *"It took us two weeks to build the engine and another two weeks to implement,"* a manager recalled. The support staff could chat with the credit and collection chatbot to ask about the account receivables of a particular customer.

Efficiency, paired with flexibility, brought value to jointly secure a further transformation of ITCOMP Finance. *"At ITCOMP, Finance became very focused on driving impact so we could maximize shareholder value,"* one senior manager acknowledged. Another manager recalled, *"For some people, it was really difficult – at the beginning – to adapt to that change. But many went along on that journey."*

After the initial steering, senior executives also adopted the formal context for the analytics initiative. Whereas the initial objective was still valid, the ITCOMP managers were given the required discretion to proceed with the flexible formalization of the initiative. As the executive presentation described, *"The CFO was now expected to be a key strategist and leader, shape overall strategy and direction, and act as an agent of change who can instill a performance-driven culture throughout the company."* The communication from the CEO summarized this approach: *"It was not about tradition, but just about innovation."*

In contrast, the other five firms (COMCOMP, LUXURYCOMP, MAILCOMP, MEDICSUB, TELECOMP) had less successful analytics initiatives. Most notably, when originating from a flexibility objective, the success rate was only 25.0% in our sample. For example, whereas TELECOMP's analytics initiative improved the forecast quality (i.e., forecast accuracy became satisfactory, below 2%), a transition did not get acceptance of the organization and thus did not initiate development. In fact, analytics initiatives changed to a limited extent but failed to evolve into an enabling accountability system.

In the case of COMCOMP, the technological changes were naturally part of operations, but the explorative use of big data and analytics for value-generating platforms and new business models was limited by regulation. Accounting was decentralized and linked to individual businesses. Due to cost orientation, the administrative functions are used to focus on productivity. Market saturation and high-cost pressure led to the establishment of a "controlling factory" approach to centralize solution development. *"There was fierce pressure on the entire cost structure. Thus, various efficiency rounds have been held in recent years,"* the COMCOMP senior executive told us. The competition was considered global—not local—as the head of accounting stated, *"The question was not how we compete against [local firm], or [local firm], but how we could and how we should compete against Google (Alphabet), Amazon, and Apple."* The objective of remaining competitive was demanded by internal and external stakeholders. As one manager described the situation: *"The future outlook was that efficiency measures had to continue. Our benchmark was Italy: 40 GB data flat for EUR 5.99, including a 20% value-added tax. Unlike in Italy, we have the statutory mandate to operate the network throughout the country. That put and still puts substantial pressure on our margins."* COMCOMP's CFO cited an aggressive cost-cutting target of 30% in the support functions, which meant that *"the functions had to move."*

In this setting, the initiative was intended to improve existing capabilities in accounting. As one COMCOMP senior manager described, *"We considered digitization as a major challenge but also as the answer to the economic situation (e.g., digitization of processes, use of robotics, new tools, to become more efficient)."* For accounting, this meant, at first, measures in terms of optimization of reporting and planning procedures. Another senior manager described the issue: *"In the past, we had a separate budgeting and planning system for each of our products and services forecast. And in our industry, with this abundance of data, it was difficult to extract the 'right' data, fast and easy. Getting exactly the right data for the right problem was the challenge."*

However, the analytics initiative helped to build up competencies: *"We integrated many different data in our data warehouse. We utilized the latest advancements in BI as centralized platform for business intelligence. In addition, we started to use 'microstrategy' as business intelligence, data analytics reporting tool, and aim to provide all management information digital only. To foster self-service reporting, we*

created Excel-Powerpoint interfaces – web-based. [Software name] for reusable and customizable components that collectively made an automation package for the solution deployment. Further, we configured the necessary security permissions that all managers can go through the data themselves. The endgame was, everything online and self-service."

As a result, reporting became more efficient: *"measures are visible in real-time for Group Controlling; reports are now jointly divisible and retrievable."* While the data quality improved and the *"data from the system was always accurate, thus all you had to do was recognize certain developments and focus on the measures"* the analytical insight for accounting was still lacking. One COMCOMP manager acknowledged this fact: *"Certainly, room for improvement existed. In particular, there were many manual data analyses on customer stocks, additions, disposals. We knew we had to better link data in order to increase penetration and aggregate information. This would have been, as an example, helpful for introduction of product launches and new tariff plans."*

A paradigm shift was expected, as the following comment from one of the senior executives in COMCOMP attests: *"The controller cannot be replaced but the roles are changing. Nonetheless, we expect approx. 50% of the control function to be automatized, while the task shifts towards deriving adequate measures."* Despite the attention given to these issues, they could not be fully answered. As another COMCOMP manager said, *"We knew that the customer demand in the young customer segment was decreasing, but we lacked the insights to understand when exactly we are losing them. Otherwise, we could have developed measures (quality improvement programs) to prevent the change of service provider. We needed to better understand deviations in customer experience to manage and control. That remained a real pain point."*

However, the formal governance mechanisms and the central monitoring prevented COMCOMP managers from deviating from the chosen path of efficient operationalization: *"Different solutions in the various specialist areas existed based on different IT infrastructure, thus we challenged these projects. If you want something new, the IT 'architect' was called in to support. He had an overview of the IT infrastructure."* Even though *"many trends were initiated by the specialist departments ... solutions were provided by the central function."* The prevailing rationale was that

"the zoo of tools is being examined in order to unify and standardize them, so that no 'uncontrolled' exorbitance of applications occurs."

Largely as a result of this, the attention shifted from the support processes toward the main processes to exploit attentional processes. As one manager indicated, *"Controlling was very strongly integrated in this and this was 'pushed' by controlling. But this has been going on for years."* Over time, the level of efficiency formalization was even strengthened, but not synchronized with the abovementioned flexibility demand. By contrast, *"analytics was pooled,"* with an unrelatedness to flexibility-oriented practices. In particular, COMCOMP's analytics initiative transitioned toward the adaptation of process mining to identify and monitor inefficiencies in administrative procedures. As one manager described, *"We made our IT systems traceable to see how things 'really' operate. This increased transparency. You can see how processes really run by looking at the data and identify difficulties in the processes. For instance, we created tremendous transparency in the accounts payable process and identified 20 different payment options according to the system. When we asked the accountant [...] he assured us that only a few options exist. Further, we determined throughput times and quantity structures."* Another example of no effect on explorative analytics solutions was to robotize the invoice process in accounting. COMCOMP's manager explained, *"We developed robots that log into the legacy system of our key customer and compares invoice details and automatically assigns and allocates them in accordance with our cost center structure. Residuals were posted on a sub-account for manual allocation."*

In terms of the outcomes from the analytics initiative, executives at COMCOMP evaluated the initiative as successful: *"The finance core processes were the interesting ones. In our case, customer relocation inevitably required substantial administrative work and, thus, were very costly. Our administrative staff always had to ask a 'second question.' After extracting insights from the actual event logs in our information system we identified that we could combine both requests to the customer in one process step, performed by our customer service. This adaptation generated solid efficiency increases."*

Along the same line, COMCOMP managers understood the necessity of the initiative: *"Evaluation with regard to process improvement brought important and valuable questions how to improve. Still, if you want to implement measures, then you*

will first have to face some skepticism and headwind. But it was not about blaming, it was about improving. Thus, the initiatives were accepted." Another COMCOMP manager validated the same point, *"Initiatives were supported by the workforce. In particular, the younger generation of our employees is tech-savvy and accustomed to change."*

Structure provided an *"agile work environment without allocation of fixed budgets"* while no external support was the core message in the organization as *"keeping and promoting know-how in-house was of high importance – how the business works must be understood within the company."* Explicit boundaries controlled the balance of costs and rewards as resources were limited available and had to be justified: *"budgets were centralized and were available only if an entity could proof a business need. For the resource allocation no development plans existed, they were with short cycles every 3 months."*

But the accountability system remained untouched. Despite experimentation with the new technology, the formalization was not adjusted as the following comment from one of the senior executives in COMCOMP attests: *"We had a showcase at IBM where the machine (IBM Watson) reviewed the income statement and developed hypothesis where critical issues might occur within the company. However, identification of relevant issues is much more difficult in our setting. This means we are very much dependent on understanding inflection points (reversals) in the market, where an artificial solution still has its drawbacks."* After gaining some experience, the current accounting practice was mostly retained. As the COMCOMP manager stated, *"We used time-series extrapolation for forecasting. Most analytics functionalities related to customer data to better understand customer behavior."* But *"forecasts remained logic-driven,"* which meant the involvement of different subject matter experts (in particular, marketing, strategy, risk, controlling) to share perspectives on, assess, and agree on them (in particular, market share and growth potential).

This allowed accounting to continue as a coordinator at the center of information processing without embedding the analytics initiative in operations: *"In our organization the concept of a 'data scientist' was not so relevant since the whole organization is very data-oriented. The controller has to make logical links between different perspectives. For instance, how do you align fiberglass expansion with customer development. A huge coordination effort by controlling was necessary to*

match marketing and development." Consequently, bottom-up initiatives were not formulated further as *"no roadmap for data analytics existed."*

Likewise, the intention of the management remained the same: *"use digitalization to initiate process improvements, which can then be 'pushed' (applied) then universally."* Unlike the more successful initiatives (ITCOMP, CHEMCOMP, BUILDCOMP), the managers at COMCOMP were not able to initiate an adaptation of the formal context and its execution in the long run. As one COMCOMP senior executive said, *"Digitalization was supportive but not the panacea."* Part of the reason for this was that the governance mechanisms prevented any deviation from the initial formalization and reduced to almost zero the discretion COMCOMP managers had to change the project's formal terms. Top management support remained as given for the following reason: the *"top-down target is to increase efficiency. How this is accomplished, is up to each entity. Analytics is one way to do this."*

In the end, accounting was not able to utilize a flexible approach for an expanded forecasting function, which could have improved the budgeting and planning procedures at COMCOMP. Even though the latest technology (in particular, data lakes) and resources (manpower equivalent to 300 FTE) were available, how to further improve the planning process remained at the idea stage. In particular, the risk identification would be an application area for analytics (e.g., risk management for risk identification of business and regulatory optimization of network capacity utilization). At the same time, in order to improve planning, the pricing topic is known to be highly relevant, as due to market saturation, promoting is the defining factor in how to grow and attract new customers. Most notably, COMCOMP managers had a doubt about the current status: *"Do we think in terms of analytics openly enough, or is our focus already rather limited?"*

16.2 Evolution of the flexibility initiatives

We also observed a significant divergence in the way the individuals in the four flexibility initiatives, notwithstanding their common starting point, conducted themselves, and this led, once again, to a significantly different set of outcomes, with analytical processes at TELECOMP, MEDICSUB, and LUXURYCOMP, remaining with a flexibility formalization, while the analytics initiative at TOOLCOMP developing an enabling accountability system. As in the preceding section, the interesting question is, how did this evolution in the initiatives' activities emerge?

TABLE 4: Summary of Data on Analytics Initiative Emergence (1/2)

Company	Tension	Embeddedness	Synchronization	Structure
BUILDCOMP	Value added not tangible: "Improvements questioned because had performed quite well already." "Critical business information not in reports anyway."	Initiative embedded: "Built teams based on certain analytics issues, which then collaboratively worked with operations."	Management model and analytics synchronized: "Enabling data-driven decisions (new insights) were combined with automated analytics solutions." & "We probed what technological solution delivers the highest value added."	Established boundaries: "Setup provided limited resources which necessitated prioritization." "Structure for reporting and self-service, planning and simulation, and analytics and big data."
CHEMCOMP	Reduce rationalization doubt of value added: "Concerns raised, what would happen to the jobs and employees." "Created unease at the frontline."	Initiative embedded: "In order that it is not an IT project, we hung it up in the supply chain." "Controlled by means of 'dialogue'."	Management model and analytics linked: "High level of autonomy was granted for the individual businesses to act." & "Technology aligned with 'demand' and bilateral agreements."	Established boundaries: "Structure of three central functions for digitization with sufficient budgets." "Small teams, we kept it very lean." "Formalisms' could have slowed down the progress."
COMCOMP	Architect permission to add value: "IT 'architect' was called in to support, if new solution was demanded." "Had overview and prevent 'uncontrolled' exorbitance of applications."	Initiative remained unrelated: "Controller had extensive coordination effort." "Analytics was up to each entity."	Management model and analytics not synchronized: "Artificial forecast solution had drawbacks for our management model and was <u>not</u> compatible."	Loose Boundaries: "Agile work environment without allocation of fixed budgets." "Analytics was centralized, and were available only if an entity could proof a business need."
ITCOMP	Reconcile views on value added: "Struggled to consolidate different perspectives, found common ground." "Prove the validity of financial numbers to the businesses."	Initiative technology embedded: "Access one 'business insight portal' for standard reports and scorecards." "Promote all the features and self-service in the operating systems."	Management model and analytics linked: "Became very focused on driving impact so we could maximize shareholder value." & "Provided technology to transform data into insights and impact."	Established boundaries: "Structured in financial analysis and reporting, strategy and forecasting, business process automation, and risk management." "Capacity and resources were sufficient."

TABLE 4 Continued: Summary of Data on Analytics Initiative Emergence (2/2)

<i>Company</i>	<i>Tension</i>	<i>Embeddedness</i>	<i>Synchronization</i>	<i>Structure</i>
LUXURYCOMP	—	—	—	—
MAILCOMP	Value added not visible: “Too much hypothetical prototyping behind closed doors.” “Not visible what was going on.”	Initiative remained unrelated: “No employees thought about analytics applications in Finance.” “Analytics, Admin and Operations were totally independent.”	Management model and analytics not synchronized: “Analytics saw its mission as part of a bigger vision.” “The analytics model did not work at the management level. Financial data in silos was good, but once data aggregated it became difficult.”	Constraining boundaries: “Money for the operation of the platform was available, but no more investments in new interfaces.” “Businesses had to cover costs if they had a request to centralized analytics.”
MEDICSUB	Overcome disappointment in value added: “Results were unsatisfactory, the output was far from reality.” “Results were unusable.”	Initiative remained unrelated: “Analytics expert team was expected to prototype and test before revealing any solution to the business.”	Management model and analytics not synchronized: “We did not plan to adjust accountabilities in the management model to account for analytics changes.”	Constraining boundaries: “Limited budget for trial project only.” “Setup of one expert analytics function.”
TECHCOMP	Consideration of value added: “Businesses had little understanding what you can accomplish with analytics and new technology.” “Scrolling in Excel Sheets, was already called ‘Big Data.’”	Initiative embedded: “Initially, developments remained in the supply chain.” “Company did not make centralized specifications.” “Startup’s on several levels.”	Management model and analytics linked: “Easy to agree with the business what features were important.” & “Management ‘thinks’ like that, then the model must also ‘think’ like that.”	Established boundaries: “Structure for limited resources required prioritization in workstreams (development activities in each entity).” “Not centrally controlled – centrally coordinated at most.”
TELECOMP	Overcome rising conflict on value added: “Results were close to the actual process. Thus, the added value was strongly questioned.”	Initiative remained unrelated: “Analytics did not collaborate with the internal technical experts or operations.”	Management model and analytics not synchronized: “Wrong level of analysis and a detachment from the traditional financial model created complexity.”	Loose boundaries: “Absence of internal formal rules. Only limited budget for external support was granted.”
TOOLCOMP	Consciousness to add value: “Were passive as ideas have led to errors, and returns had not materialized.” “Challenge of analytics to generate value in the end.”	Initiative technology embedded: “Initiated the analytics application directly in the information systems for business operations.” “Automated credit engine targeted group-wide in operations.”	Management model and analytics linked: “Finance Business Partners were well trained to be results-driven.” & “Any technical solution that helped them was welcomed.”	Entrepreneurial boundaries: “Budget only if you convinced top management and could proof a business case.” “The return was prioritized.” “Information management structure consisted of reporting and advanced analytics.”

Given the fact that TELECOMP was one of the world's leading integrated telecommunications companies, the digitalization context created an ambition not only to leverage all of the data for products and services but also internally to optimizing its administrative processes and partly disrupt accounting. This was already reflected in the existing systems and processes. In fact, TELECOMP had efficient planning processes and accurate forecasts. Routine finance activities were outsourced (Finance Shared Service Center, Finance Factory 2.0, with several sub-factories for accounting, payment, closing, consolidation, reporting), and high levels of standardization and automation were achieved for the remaining tasks already. As one senior manager described: *"TELECOMP has undergone a large-scale consolidation of our BI and planning systems and improved technological performance. Tools have been rolled out to in all areas and the interfaces were automated. Processing data became way easier within the individual units. All in all, the processes became efficient and highly automated, especially with regard to data streams and scenario modeling."*

To further facilitate the digital transformation in accounting, an analytics initiative was aimed at working on entirely new solutions for financial planning, where accounting and IT had no prior knowledge. This was not a major impediment because resources and know-how became quickly accumulated (internally and externally). Individuals involved in the initiative were highly motivated as the new solution was considered technically revolutionary. However, this began to change when the technology had passed the predevelopment phase and questions on its implementation came to management's attention. Suddenly, technical staff and accountants had to build upon accounting logic and make it work, but they were reluctant to do so since they subtracted data from the operating legacy systems and forced integration of all local contingencies.

At first, they had begun to work on an alternative planning method. As a TELECOMP manager stated, *"The objective was to introduce an automated forecast based on big data."* In the end, the TELECOMP manager acknowledged, *"The project was a 'trail project,' and because it caused such severe difficulties, we had to stop the whole initiative."* The following description of prior events shows how TELECOMP got to this point.

In this setting, the initiative was intended to apply new capabilities in accounting. As one manager described, *"The attempt was to experiment, and the idea was to try something."* TELECOMP was concerned with applying new methods in order to gain

insights from data, which should then lead to better knowledge for the attainment of the strategic objectives. In particular, for accounting, this meant exploring and prototyping to improve. The existing financial planning was sound: *"We were definitely satisfied with the forecast accuracy and the process was, indeed, very efficient,"* the business model did not require short-cycle forecasts (2 times a year, similar to MEDICSUB), and *"the process was also relatively efficient with sufficient quality,"* as one TELECOMP manager described. While executives considered efficiency gains as positive side-effects, additional insights were the main objective: *"Insights was certainly the more significant driver. But one element was also accumulated time across the entire organization until a forecast is finalized. We had expected a game changer. We had hoped for a faster process, at the push of a button."*

To start, TELECOMP set up a team of controllers and technical experts to collaborate with an external consultant to introduce new technology for financial planning. Functional and spherical cooperation was selectively established: *"Group controlling, together with a subsidiary, pursued the approach of deriving an automated forecast directly from operational data."* As one TELECOMP manager noted, *"The project was actually supported by an external party. These were IT and business consultants, that we assigned with the overall project responsibility."* In the absence of formal rules, however, the subsequent activities did not closely relate to each other. In fact, TELECOMP's managers did not collaborate with the internal technical experts (e.g., the existing data lab and analytics function), which is in contrast to the approach at ITCOMP and BUILDCOMP. Similar to TOOLCOMP, TELECOMP followed a flexible approach for expanding the forecasting function. As one manager told us, *"Basically, this was set up as an agile project, so that we subdivided in workstreams, and worked in sprints."* As one TELECOMP senior manager described the situation, *"The support from the local organization was given."*

At this stage, controlling launched rapid and comprehensive developments in *"forecast revenue for product and services, on customer level, with the corresponding movements and trends."* Furthermore, while TECHCOMP refrained from using external data, TELECOMP was ambitious to integrate even additional data: *"We had planned to include in the forecast model not necessarily unstructured data, but newsfeeds, feedbacks from the shop floor (point of sale), and even internet based information on advertising offers of our competitors."*

While TECHCOMP understood the inherent variance in demands, TELECOMP aimed at one standardized solution aggregating all the different demands: *"You almost had to rebuild the whole BI logic."* After backtesting and a trial period, the application provided good results. As one manager told us, *"In the end, TELECOMP achieved less than 5% square errors between forecasted and actual values. So, we ended up even under 3%. That was actually very good."* But the intended added value of additional information was not achieved. As the manager described the situation, *"TELECOMP had generated a prototype that also produced a useful result at the sales level. The only issue was that the model was not explainable to the controllers afterwards. In other words, relatively little could be done with this aggregated revenue line. In other words, we couldn't really generate any added value."*

Largely as a result of this, attentional processes were impeded by rising conflict. As one TELECOMP manager recalled, *"Since the results were very close to the actual process, the added value was strongly questioned."* Another TELECOMP manager added, *"Although the collaboration was anything but destructive, there was suddenly an extreme persistence on the traditional approach. For example, users began to replicate old individual reports on the proposed platform."* The collaborative environment with the external project partners likewise declined. As one senior manager noted, *"Technical experts had great programming skills but lacked business acumen of the industry. This required additional effort to offset, but we did not manage that. It left them in the dark, and they did not get the support that would have been necessary to push the project."*

To overcome these impediments, the financial managers began to market the work with change management: *"Training sessions and change management for constructive communication became an integral part. For example, controllers were integrated and participated, also in workshops with other stakeholders."*

At the same time, TELECOMP further developed the driver-based planning to make it even more "intelligent." As one manager described, *"TELECOMP further developed the intelligent driver model. For example, all the essential real factors were input for the machine to automatically select the top 5 drivers for sales trends."* Experimentation and integration continued. As a TELECOMP manager told us, *"We tried a whole bunch. That's the beautiful thing about modern statistics. Once you have loaded a data cube into the system, you can try many methods to decide for the best one. Starting with ARIMA, we have also done driver analysis, vectoral autoregression, but rejected that."*

After that, we went in the direction of Granger causality. We did not use ML, but we did use automation for method selection." Still, no reconciliation to the financial data could be made. However, dashboards and visualization have been developed to display "data cleansing and data transformation with statistics and reports (e.g., dashboarding solutions based on HTML5 and Java)." In addition, "data lakes (Hadoop) were also established to better use the statistical methods." Implementation was facilitated with new interfaces, as a TELECOMP manager explained: "The data was pushed from the data warehouse, and certain transformation processes were run in Phyton. Basically, we didn't want to load the analytics data back into the data warehouse but into another consolidation system."

However, the flexible structures did not provide any boundaries to balance costs and rewards. As one manager described, *"Forecasting quality wasn't the problem at TELECOMP, but the high costs associated with the complexity of the data landscape [was]. It wasn't that we didn't get good results but simply that the effort was too great, which is why we decided not to continue."* TELECOMP was not able to align the data and management model as required for a successful outcome, as one manager described: *"In order to generate this added value, the project would have to be revisited and the data would have to be examined in greater depth."* Another manager added, *"The one problem was the data. And especially the reaggregation of the data. The problem was the claim, because we had the forecast at company level, and there was the focus on sales."* One manager of TELECOMP explained why a procedural change was so important to him: *"The conclusion was that it only made sense if TELECOMP also adapted its management model—a detachment from the traditional financial data and emphasis on the actual operating performance (i.e., output units, prices, and the like), without the financial transformation in revenue, costs, and income and expenses."* As a TELECOMP manager explained, *"That meant it would have taken a lot of effort to take the next step to translate it into financials, and from a cost perspective, that was no longer justifiable."* However, there was no intention to adjust the management model: *"Responsibilities for the forecast would not have changed and would have remained unchanged with the decentralized units."* This rendered the top-down approach incapable of providing additional insights: *"The approach to start directly at the highest level of aggregation, however, was too complex."* And the accounting logic made the extensive approach even more infeasible: *"This meant that in the end, we had to come*

up with a sales line that also reflected the actual sales. But the end-to-end process was too complex (e.g., revenue recognition, accounting logic) in our business. To completely automate a forecast was too difficult."

Over time, tension increased to an unsustainable level. Thus, the flexibility approach was crowded out by emerging efficiency considerations. As the following comment from one of the managers in the TELECOMP analytics initiative attested: *"Unfortunately, the initiative was quickly understood wrong. Managers claimed that they had the same results and the same effort. That was true for the project phase but would have been strategically different. As a result, skepticism increased significantly."* Another manager added, *"And that led to a negative attitude of the local organization. So, if I don't have a quality problem and there is a project for automation of the forecast, then controllers certainly get the idea that personnel will be saved. So, if the quality was satisfactory, then there was only one thing left: to save on costs."* While ITCOMP, CHEMCOMP, BUILDCOMP, and TECHCOMP applied a parallel planning and forecasting system without any issues, TELECOMP expected different effects: *"At the latest, if we had tried to integrate this forecast into the operational processes, it would have been a big problem if accountants then replicated their own dashboards and continued to live the old process. Then the organizational component would be too cumbersome."* In fact, the acceptance of the initiative was lost, while management did not even consider efficiency gains: *"Resource savings were difficult to estimate. We did not know how many units could actually work with it—it could be a lot or a few. It was not clear,"* as one TELECOMP manager recalled.

Despite the initial focus on flexibility, top management did not adjust the formalization but left the accounting practices uncontrolled. As one TELECOMP senior executive explained, *"It could only have changed if we also had a high explanatory effect, that also found acceptance."* Instead, the initial intention likewise remained, and top management support faded: *"But this turned out to be so difficult that in the end, after we completed the project, we had to stop the initiative."*

Divergence of technological advancements and procedural change was another impediment to the transition. As a manager explained, *"The other component, which should not be underestimated, is the issue of culture and change. To generate the manual forecast the main tasks of the controllers were in excel. It was a huge step to suddenly have a statistically advanced automated forecast from operating data."* TELECOMP

did not consider the impact as adjustments generated alternative issues. As one manager recalled, *"The readiness of the organization was an important aspect. To be fair, we all underestimated how important that factor was. We then tried to incorporate new elements that helped the controllers to better understand the model, to analyze the model themselves, and to vary parameters to get a feel for it."* In fact, the transition towards flexibility came too late, and the TELECOMP initiative could not recover: *"Ultimately, it also meant that it was a balancing act between something new, with added value, or something very close to what already existed, which in turn, did not create acceptance either."*

In the end, accounting was not able to utilize an efficiency approach, which could improve decision-making in financial planning at TELECOMP and abandoned the initiative. Managers explained what they have learned from this less successful setting: *"If we were to start another project from corporate headquarters, we would do it differently."* These late insights are comparable to the performed activities of the managers at TECHCOMP. As one manager of TELECOMP explained, *"Less big data, but more machine learning methods. Use statistical models to make forecasts on an aggregated level—an automated top-down forecast to use it as an instrument to challenge the bottom-up forecast of the individual units. You can only succeed with the model if it is better than what was delivered by the segments. And maintain an 'objective' expert forecast. That was the biggest lesson, if you work with financial data, then you rarely have a Big Data application. In the BI and data warehouse information is already aggregated and condensed, so you would require an access to the (operational) legacy systems to benefit from Big Data. Potentially this generates additional business understanding not in the data warehouse. But this also means that if I want a financial key figure forecast, the intended approach does not work. In short, if you really want to make a profit from Big Data capability, you would also have to think about a different management model."* In comparison, TELECOMP focused on data for gaining new insights, while TECHCOMP gained insights through rebuilding the management model.

TABLE 5: Summary of Multiple Case Comparison

Company	Emergent Initiative	Enabling Accountability System	Unroutinized	Examples
BUILDCOMP	Flexibility	Realized	YES	Flexible unroutinization: "Improvement either by increasing efficiency and saving costs, but it could also be by generating new insights, that lead to better decision-making." "Many possibilities for innovative application."
CHEMCOMP	Flexibility	Realized	YES	Flexible unroutinization: "Business units also started developing their own models to improve." "Hierarchical levels in between were filled with new solutions."
COMCOMP	Efficiency	Not realized	NO	Controlled routine: "Analytics was pooled." "Controlling was very strongly integrated and 'pushed' application for productivity."
ITCOMP	Flexibility	Realized	YES	Flexible unroutinization: "Knew we had to deliver additional value to our internal customers." "Many intuitive user experiences to assist the workforce emerged."
LUXURYCOMP	Flexibility	Not realized	NO	—
MAILCOMP	Efficiency	Not realized	YES	Controlled routine: "Only on demand, if someone had a real case." "The question remained, 'how could we support the back office'?"
MEDICSUB	Flexibility	Not realized	NO	Salient routine: "We explored possibilities for automated forecasting as separate 'pilot project'." "Still, our underlying goal was to reduce the effort."
TECHCOMP	Flexibility	Realized	YES	Flexible unroutinization: "Approach was if planning could become more 'neutral'." "Developed additional new predictive application and did not abolish existing solutions." "Developed new applications."
TELECOMP	Flexibility	Not realized	NO	Negative routinization: "... initiative was misunderstood as efficiency measure."
TOOLCOMP	Efficiency	Realized	YES	Unroutinized flexibility: "The additional features had to generate value with efficiency too." "Later, the return was prioritized."

16.3 Emerging accountability systems

Despite the promise of the digital transformation, why do some firms adopt analytics in accounting while others' efforts with such analytics are falling short? Previous research (e.g., Goretzki et al. 2018, Jordan and Messner 2012, Wouters and Wilderom 2008) suggests that balancing knowledge integration and involvement among different levels may be an answer. These theories highlight the critical role of interaction and formalization for developments in accounting. In the initiative setting, however, balance is difficult to sustain at any point in time, thus a dysfunctional organization is attributed (e.g., Doornich et al. 2019), while technology causes authority and distances to collapse (Quattrone and Hopper 2006). Moreover, intervals in accounting adaptation are either temporarily consonant or dissonant, and the caused tension can be resolved (e.g., Raisch et al. 2018, Van de Ven et al. 1984). The evidence from this study, as summarized in Figure 7, suggests an alternative view. We show that, in some circumstances, managers followed a superior path to internalize the tension between flexibility and efficiency.

In the accounting context, almost two-thirds of the initiatives were started with an efficiency orientation; i.e., they were intended to improve existing capabilities in accounting, which in this context meant productive planning and forecasting, but not to create any new knowledge. CHEMCOMP, for example, started to work on forecast automation for productivity gains. This analytics initiative was targeted at replacing the manual forecast. Initiatives in slightly more than one-third of the companies were set up based on a flexibility objective; i.e., they were intended to explore new opportunities that moved beyond the existing knowledge (expanding the forecasting function), which in this context meant creating entirely new solutions to planning issues, but without capitalizing on existing accounting knowledge. As an example, MEDICSUB initiated the test of machine learning algorithms. This analytics initiative was aimed at getting additional automated forecasting numbers parallel to maintaining prevailing practices and systems for creating discussions on (i.e., to challenge) the manual bottom-up forecast (i.e., facilitate accountability extension). In sum, the initiatives in the firms were intended to increase the effectiveness in financial planning, either by exploiting existing accountability or exploring new accountability.

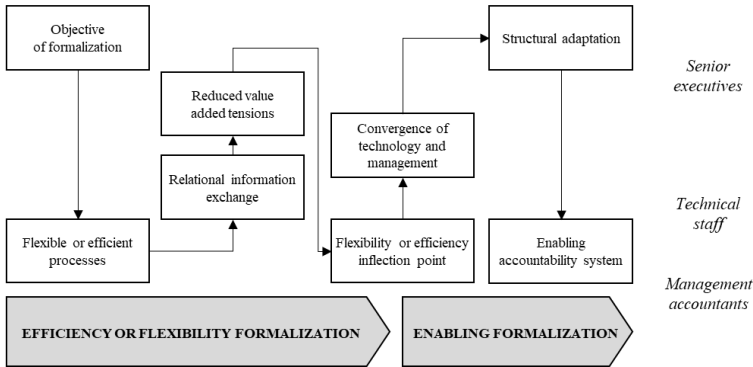


Figure 7 The Enabling Accountability Practice

The formal structural mechanisms used to manage these initiatives reflect either their efficiency or flexibility formalization. While exploration was associated with initial successful non-routine tasks, purely productivity measures for routine tasks were not. In fact, neither efficiency nor flexibility was the answer. Rather, the managers of these firms balanced between efficient and flexible by combining automation of routine with non-routine tasks. One illustration is BUILDCOMP. Here, accounting provided descriptive solutions while establishing predictive innovations that got increasingly accepted and even demanded by accountants. In this setting, experience, experimentation, and professionalism were fostering innovations in the evolution of accounting. The initial capabilities were consistent with our expectations from the extant literature (Wouters and Wilderom 2008), and we, therefore, spend relatively little time discussing them. They were intended to reinforce the intentions of the 10 initiatives and were effective in doing so, at least in the early stages of the 7 initiatives. Whereas the analytics initiatives had similar starting conditions, the subsequent evolvement diverged. Of the six initiatives with efficiency formalization, the COMCOMP initiative and the MAILCOMP initiative remained officially oriented to towards efficiency, whereas the ITCOMP initiative, CHEMCOMP initiative, BUILDCOMP initiative, and TECHCOMP expanded their orientation. Of the four initiatives with a flexibility formalization, the TELECOMP initiative, MEDICSUB initiative, and LUXURYCOMP initiative remained focused around its original orientation, whereas the TOOLCOMP initiative broadened its orientation. In the terminology of this paper, then, the

TOOLCOMP initiative, ITCOMP initiative, CHEMCOMP initiative, BUILDCOMP initiative, and TECHCOMP initiative developed an enabling accountability system for effectiveness, combining efficiency and flexibility accountabilities. The interesting question, therefore, is how did this happen?

Potentially, we could learn from past findings indigenous to the accounting discipline (e.g., enterprise resource planning, or ERP) on the introduction of new systems and processes.¹⁵ For instance, Granlund and Malmi (2002) only found a modest impact of new technology on accounting practices and found that practices are slow to change. By contrast, it may turn out that new technology (e.g., AI and machine learning) can remove impediments to information usage that derive from human and social issues (e.g., Orlikowski and Yates 2002). Hence, if new information technology is similar to other technologies that companies adopt and implement (Brock and von Wangenheim 2019), we would not expect any significant differences in firm behavior (e.g., Quattrone 2016). However, Granlund (2001) argued that continuity in accounting practices is defined by many more institutional, economic, and human factors than mere resistance to the intended change. In reality, consulting operations and the managerial desire to imitate leading companies vividly puts forward the competitive advantage to be quick and effective in AI (e.g., Brock and von Wangenheim 2019). We address this controversy in the literature, as the empirical question remains: Is a change towards advanced analytics (e.g., AI and machine learning) any different from the earlier attempts to solve managerial problems by building new information systems?

The observations derived above apply to emergent enabling accountability systems in general, regardless of whether they started out with an efficiency or flexibility objective. However, it is worth underlining that the adaptation practices in the multiple cases differed along several dimensions. In attempting to understand these differences, we found that managers with successful analytics initiatives evolved from their initial deliberate accountability system to an emergent accountability practice. Further, they established boundaries to resources and embedded the initiative within existing routines to be more effective in balancing the competing pressures of efficiency and flexibility

¹⁵ At the time of this study, AI-type technologies were rapidly spreading and at the same time evolving (e.g., Brock and von Wangenheim 2019). However, it was also a fact that so far, only a few firms have had experience of these systems in accounting and finance for a longer time period. Institutional factors, such as accountants' professionalization (networking, etc.), up-to-date university and executive education, and consulting revealed that it was exactly the right time to start a study of these issues, as actual initiatives in firms could be observed.

(see Table 4). Specifically, the initiatives that started out with an efficiency objective had to address a lack of commitment on the lower level and the upspring of resistance to accountability changes that were rooted in the middle managers' fear of becoming irrelevant or streamlined. Conversely, the initiatives that started out with a flexibility objective had to address an absence of attention on planned measures for operationalization and senior executives' concerns about losing productivity. Finally, these managers linked analytics initiatives through synchronized mechanisms of technological and accountability change to adapt planning and forecasting at a slow and incremental pace, in contrast to managers who attempted fast and radical disruption (what we call "*short-cut fallacy*", as illustrated in Figure 8).

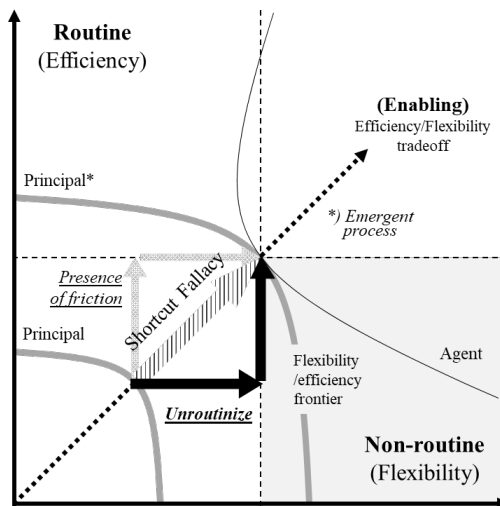


Figure 8 Tradeoff shifting to circumvent the "shortcut fallacy"

In the deliberate process of top management, the initiative to reconcile the tensions between efficiency and flexibility is driven from the top down by senior executives. In the accounting literature, this practice is primarily implemented by establishing separate initiatives with distinct efficiency or flexibility objectives (e.g., Ferreira and Otley 2009, Malmi and Brown 2008, Simons 2005). By contrast, the emergent process (see Figure 7), as we saw in the initiative at ITCOMP, CHEMCOMP, BUILDCOMP, TECHCOMP, and TOOLCOMP, involves accountants taking the initiative to reconcile the tradeoff

between efficiency and flexibility, creating contexts for positive unroutinization effects. Even though the top-down expectation was to increase efficiency, this expectation was not shared by lower management (and in particular, technical staff). Even the stark opposite holds true. Managers did not expect any efficiency gains based on the initiatives. A comparable phenomenon of divergent corporate management's intention and the attention of decentral managers has been observed in accounting (Doornich et al. 2019). In other words, it is a practice in which financial professionals on the frontline take it upon themselves to decide that compromising between effective and flexible features in their financial function may be worthwhile, rather than waiting for senior executives to make such judgments on their behalf. In initiatives ITCOMP, CHEMCOMP, BUILDCOMP, and TECHCOMP, financial professionals reported that, by engaging with operations, they realized quite early in the adaptation that a pure efficiency or coercive focus would impede the initiative's success (i.e., friction dominates). To engage in the additional explorative practices, they initially extended their accountability for tasks. They subsequently engaged in communicative activities to convince senior executives to broaden their initiative objective.

16.4 Management approaches to deal with friction

For the emergent practice, we observed a different set of accounting strategies that were initially directed toward improving flexibility in the specific tradeoffs. Accountability-based resistance (concerning the outcome of the initiative) and task-accountability friction (concerning the initiative itself) within the organization are addressed through involvement in role making activities. Identifying additional opportunities to add value with new technology required the identification of current friction. We observed that the financial professionals in initiatives ITCOMP, CHEMCOMP, BUILDCOMP, and TECHCOMP were engaging in learning processes close to operations (e.g., data transformation, or bridging different data sources, for financial analysis) to facilitate immediately visible outcomes (Zollo and Winter 2002). However, data-oriented "quick-wins" alone were insufficient to overcome accountability-based resistance: the individuals also needed to actively curate learning and create a common understanding. For that purpose, the individuals in initiatives ITCOMP, CHEMCOMP, BUILDCOMP, TECHCOMP, and TOOLCOMP worked together to sharpen expectations and mitigate prejudices (e.g., unrealistic expectations of AI). Task-accountability friction was managed through a clear alignment of operative

and administrative activities and a proactive series of measures to help operating staff and the senior executives understand the challenges of the analytics caused by the narrow focus of the initiatives' initial formalization. Once all stakeholders involved had developed an understanding of how progress can be made, accountants engaged in more formal adaptations of the schedule and task accountabilities. Interestingly, the senior executives we spoke to were extremely positive about the *moderate* speed of the initiative. They realized a *radical* change could do more harm than good and were thus open to performing certain adaptations slower than originally requested. These forms of relational initiative (i.e., horizontal identity-building and vertical negotiations) are also potentially relevant in other control settings. In the broader accounting literature, there is substantial research showing how managers shape and contribute to shaping accountabilities to support strategy implementation (Dechow and Mouritsen 2005, Mouritsen 1996, Simons 2005).

17 Discussion

This research began as an exploration of the less-studied analytics initiatives for accounting. Our study provides rich illustrative examples of how managers were engaging in adaptations with regard to technological opportunities for planning and forecasting systems.

Were the less successful analytics initiatives at COMCOMP, MAILCOMP, TELECOMP, MEDICSUB, and LUXURYCOMP simply the result of an absence of competence? While we certainly observed a number of practices that many would call a lack of knowledge, we think that this explanation is too simplistic. Given the change in the technologized environment, knowledge and expertise on the "right" next step are scarce; the competence of these managers would have been reasonable and sufficient in other settings. So, rather than attributing less successful practices to a lack of competence (although there probably was some), a more useful observation is that managers did not direct attention solely toward one polar type of the efficiency-flexibility tradeoff. Hence, we introduced the notion of *emergent accountability systems* as distinct from a developmental process of such systems. Across all 10 companies in our sample, it became clear that managers had the willingness to *make* systems (i.e., get engaged in technical specifications and produce) and *expose* them internally, without relying on use cases and trends in external environments. The latter is quite different

from cognitive and behavioral abilities (Doornich et al. 2019), which may enable a few exceptional managers to think and act based on double-loop learning (Wouters and Wilderom 2008). This, in turn, has implications for the team composition of initiatives, broader human resource and performance management, and leadership development practices.

We are aware that our research approach has certain limitations. First, our sampling allowed us to gain in-depth insights and compare and contrast 10 interesting cases in a highly structured setting. However, we cannot rule out that further contingencies and factors exist that are relevant in the initiatives, which might look different depending on the maturity and strategic orientation of an organization. Given the nature of our qualitative study, we cannot draw strong conclusions regarding the effects of the practices we observed with respect to initiatives' economic success. Managers can be satisfied with their systems even if the systems do not directly enhance performance in financial and other terms (Chapman and Kihn 2009). Investigating the most knowledgeable informants in multiple settings enabled us to better compare and contrast the initiatives' intention, underlying conditions, timeline, and involvement on a higher level of abstraction. Still, we cannot, and did not intend to, perfectly attribute all individual viewpoints (in particular, local versus global) of actors involved, their heterogeneous power relationships, and perceptions of design characteristics in the setting (cf. Goretzki et al. 2018). As initiatives, by nature, have only a few individuals involved at an early stage, pluralistic perceptions of these changes might remain salient. Our research strategy compensated for the absence of more informants' accounts per case with the sample size of cases and the longitudinal approach in order to establish moderately general conclusions.

Our theoretical perspective contrasts with several assumptions in organizational and control thinking, in which planning processes are assumed to be policing adherence to pre-determined courses of action (Chapman 1998, Anthony 1965). These concepts were developed in a context where technological and artificial capabilities were not yet relevant enough to gain informational advantages than they were for contemporary firms (Brock and von Wangenheim 2019, Jordan and Messner 2019). While these attributions accurately describe organizational behavior in resource-efficient, long, and certain environments, they are not well suited to describe advanced technologies for predictive analysis and forecasting (e.g., initiation, trial-and-error, sketching, and mockups) and

behavior by which contemporary firms compete for advantages. We delineate the sequence of organizational innovations that progressively shift the tradeoff frontier of flexibility and efficiency in dynamic environments.

In order to formulate some systematic expectations in the face of new planning and forecasting technology, we argue that in the presence of friction, the actions of senior executives and managers cause changes in the value of an activity (i.e., task) or objective, which then affects other firm participants. Friction is an unavoidable side effect of scarce resources within a firm. Thus, the value of flexibility/efficiency tradeoffs evolves. Although they influence the value of an activity, they do not cause an invaluable consumption of resources. With friction, the firm continues to deliver an efficient (optimal) performance. However, friction can have a major influence on the distribution of benefits and costs of a measure among different agents (and tasks) within a firm. This is particularly important in the case of investments in new technologies, which usually benefit certain employees and burden others with their opportunity costs. Such an outcome leads us to question and reconsider the value of new technology for flexibility and efficiency in order to understand triggers and drivers of change. Who ultimately benefits from accounting innovations? The accountant, who is, in the end, rationalized anyway, is intuitively rather unbelievable.

Today, practitioners and the accounting literature predominantly describe financial planning and forecasting as an important routine managerial task performed to decide on future activities and/or to build employees' commitment to these plans. Yet, new technology to predict and analyze either may substitute managerial interaction for discussions about what future actions may be appropriate, thus, routinize non-routine tasks.

Interestingly, this is the same paradigm in practice, as we heard it multiple times: *"we automate routine tasks, and apply new technology, so that the controller finally has more time to do other important stuff."* One would critically ask, *"time for what"?* Or, new technology rather makes accounting render a relatively complete version of events and, therefore, generates a variety of inputs to improve managerial discussions on how to plan for changes which unfolding events made necessary – i.e., unroutinize routine tasks.

18 Conclusion

This study focused on the broad question of how managers engage in initiatives to internalize competing objectives of efficiency and flexibility in the shift toward an enabling accountability system. We theorize and empirically demonstrate that the deliberate and emergent accountability system involves patterns of activities intended to shift the tradeoff in efficiency and flexibility towards a higher aggregation level, as illustrated in Figure 8. Evaluating whether such practices have been successful is difficult and can only be done in the context of the performance of the firm as a whole (March 1991). However, it is useful to consider outcomes more narrowly here, in terms of the extent to which each adaptation practice in the multiple cases differed along several dimensions. We elucidated the accounting initiatives' defining characteristics, the means through which it is initiated and successionaly enacted, and its consequences for organizations as a whole. The rationale is that accounting research has become locked into the static perspective that emphasizes the design characteristics of technology at the expense of understanding the iterative formation that is in the foreground of many managers' experience (Sitkin et al. 2020). Langley et al. (2013) captured our mindset on this study of emergent practices, and Strauss and Tessier (2019) encouraged us to investigate a contemporary and technology-driven phenomenon in accounting.

This study contributes to the literature on accounting adoption and change and, more generally, to research on efficiency/flexibility tradeoffs. By articulating a dynamic view on analytics initiatives for financial planning and forecasting, we were able to provide insights about the different paths to enabling accountability systems, their boundary conditions, and the important role of new technologies in these settings, extending the management control system literature toward initiatives (Davila 2005, Bedford and Malmi 2015, Grabner and Moers 2013). More generally, this study explains situations of tight, loose, and decoupled prevalent forecasting practices with emergent analytics initiatives. Specifically, it shows that systems are either run in parallel or sequential to their transition speed and to what extent management models and information systems are synchronized and coupled (e.g., Demartini and Otley 2020).

Furthermore, our findings are contrary to prior research on ambidexterity, as successful firms always choose to work, at least temporarily, toward the flexibility orientation to either circumvent negative friction or create positive friction for

expanding the forecast function when applying new technologies to unroutinize routine task, as illustrated in Figure 8. We thus argue that flexibility in tradeoffs has potentially greater utility than enabling flexibility and efficiency and can be successfully internalized by managers to initiate adaptation (Luger 2018, Raisch and Birkinshaw 2008). It is known, from studies in related areas, that through the bottom-up practice of sensemaking (Weick 1979), strategic prioritization (Bourgeois and Eisenhardt 1988), and agenda-setting (Zimmermann et al. 2015), organizational change (Langley and Sloan 2012) often leads to formal changes for strategy implementation (e.g., Simons 2005, Levinthal and March 1993, Teece et al. 1997, March 1991). Our expectation, then, is that our arguments may also apply to the organizational level. We thus would like to encourage research across other settings and domains to establish the boundary conditions around our theorizing on how flexibility unroutinizes to enable efficiency.

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ARTICLE III

Implications of a CFO's Dual Accountabilities for Managerial Decision-Making Effectiveness

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21 Abstract

This study examines how the effectiveness of managerial decision-making is affected by the degree of a CFO's dual responsibilities of providing information for both decision support and decision control. Based on the attention-based view, I argue that depending on the quality of communication channels (i.e., robustness of analysis, disinterested dialogue), CFO's dual responsibility can either improve or compromise effective CEO decisions. Using dyadic survey data on 82 CEO–CFO relationships, the empirical results show that, if a CFO provides high (low) support, top managements' reliance on analysis increases (decreases) decision effectiveness. In addition, if control is "weak" ("strong"), then managements' demand for dialogue about the decision at hand decreases (increases) decision effectiveness. Overall, these findings suggest that the value of dual responsibility depends on the quality of communication. These findings also cast doubt on the maintained assumption in prior work that accounting and operating decentralization are complementary.

Keywords: dual responsibility; communication channels; managerial dialogue; decision-making; attention allocation

22 Introduction

A fundamental theme in accounting is that CFOs and other financial managers have dual and sometimes conflicting responsibilities, each with different expectations for communicating information (Indjejikian and Matějka 2012).¹⁶ Prior studies assume that CFO-managed reporting information is not only the input to monitor and evaluate managers for decision *control* (Indjejikian and Matějka 2006), but also an informative signal to *support* managements' productivity (Friedman 2016, Bushman and Smith 2001). There is also recent evidence that the higher the levels of a CFO's dual responsibility the more resources for purposeful constraining or enabling the flow of information and presenting information differently through different channels of communication (e.g., Goretzki et al. 2018). Without empirically considering whether support, control, or both were successful in informing a particular decision, prior accounting research makes it difficult to understand not only how CFOs provide information but ensure its effective use within communication channels for managerial decision-making (e.g., Mahlendorf 2014, Hartmann and Maas 2011, Maas and Matějka 2009, Zoni and Merchant 2007). We are therefore confronted with a puzzle: how can accounting support managerial decision-making effectively if, in doing so, it risks undermining the required control obligation for managerial decisions?

To resolve this issue, I combine insights from accounting and strategic management literature to investigate dual responsibilities' coupling with two separate quality dimensions of communication channels: (1) a robust financial *analysis*, for evaluating the potential financial returns and risks of a decision, and (2) disinterested *dialogue*, as fact-based and transparent conversation about the decision at hand (Garbuio et al. 2015).¹⁷ Studies on the attention-based view of the firm suggest that differences in the allocation and focus of top managements' attention within and between communication channels, rather than heterogeneity in internal information environments, and reporting information, explain differentials in decision effectiveness (e.g., Ocasio et al. 2018).

¹⁶ In this article, I explicitly use the term "responsibility" instead of "accountability" to address the task-oriented and pre-decisional nature of accountability of individuals. Throughout the cumulative work these terms are used interchangeably, if not otherwise indicated.

¹⁷ Disinterested *dialogue* is defined in accordance with the terminology in strategic decision-making literature (e.g., Garbuio et al. 2015), as individuals' engagement in an objective fact-based transparent discussion that addresses a decision as part of the company's existing portfolio of decisions. The construct also includes how the experienced members of a decision-making group engage in a decision (particularly, how they discuss the assumptions underlying predictions about future states of the world as a result of a decision).

Managerial decision-making effectiveness is more likely if a CEO focuses attention on financial analysis (Garbuio et al. 2015). I expect decision support to increase CEOs' attention to an analysis by providing quantifiable and tangible accounting information (Indjejikian and Matějka 2006). At the same time, a CEO's reliance on a robust financial analysis encourages the CFO to provide accounting information for decision support, consequently making effective decisions more likely (Maas and Matějka 2009). In contrast, decision control typically sets the focus on post-decision consequences and additional functional requirements that are more likely to distort a CEO's attention to analysis (Dessein 2002). Equally, a strong CEO focus on a financial analysis disincentivizes CFO efforts to draw the attention to other functional issues of decision control (Friedman 2016, Rötheli 2001), which makes effective decisions less likely. I thus hypothesize that the stronger the support (control), the more (less) CEOs are able to translate a robust analysis into an effective decision.

Further, a CEO's reliance on dialogue provides a well-suited forum for the CFO to make a CEO more attentive to decision control (Hall 2010). On the one hand, a CFO is more likely to put functional issues on the agenda of meetings, which gives a CEO a clear sense of decision consequences and functional measures to reflect upon (Mack and Goretzki 2017). On the other hand, a CFO's decision support is more likely to frame accounting information in a way that is incompatible with disinterested dialogues (Lambert and Sponem 2012, Fauré and Rouleau 2011). I thus hypothesize that the stronger the control (support), the more (less) CEOs are able to convert a disinterested dialogue into an effective decision.

In a supplementary analysis, I investigate dual responsibility as the interaction between decision support and control (Mahlendorf 2014). Decision effectiveness varies because the level of combined and balanced attention to decision support and control may influence the costs and benefits of communication, potentially in different directions for different communication channels (e.g., Puyou 2018). Prior studies describe hybrid CFOs as more aware of the conflicting expectations of the dual responsibilities, and thus as exerting stronger strategic discretion over information dissemination (e.g., Goretzki and Messner 2018, Byrne and Pierce 2018). First, I posit that dual responsibility positively interacts with robustness of analysis on decision effectiveness; as the use and quality of accounting information increase (Byrne and Pierce, 2007). Second, I expect that disinterested dialogue and dual responsibility

substitute each other in their effect on decision effectiveness; as management does not always demand strong CFO involvement (e.g., Morales and Lambert 2013).

To test the hypotheses, I rely on a multi-informant design using dyadic survey data on 82 CFO and CEO relationships in decentralized subsidiaries of a multinational enterprise headquartered in Europe. The context of the top management team (TMT) provides a focused setting for theory testing with fewer confounding factors (e.g., Naranjo-Gil and Hartmann 2006). The assessment of strategic investment decisions in this study not only warrants that the CEO can credibly assess the consequences (in this study decision effectiveness), but also the relevance of accounting data (and thus, information from the CFO).

The results confirm the predictions. The findings indicate a positive and significant interaction effect for support with analysis, as well as for control with dialogue. These findings cast doubt on the widely held belief that emphasis on decision control compromises decision effectiveness, and also suggests that increasing this emphasis can improve decision effectiveness. Besides, the findings indicate a statistically significant negative effect for support with dialogue, as well as for control with analysis. Thus, these findings cautions against overly emphasizing the CFO's decision support of the management. In the supplemental analysis, I find evidence that support strengthens the effect of control on CFO's involvement in managerial decision-making, and vice versa. Further, the results show that the balanced presence of support and control (i.e., CFO's dual responsibility) complements analysis but substitutes dialogue in managerial decision-making. These findings suggest that a CEO coupled with a hybrid CFO focuses more attention on financial analyses and gives less weight to managerial talk. Prior studies have defined CFOs and other financial managers, as impersonal information providers with responsibilities for decision support and control (e.g., Chang et al. 2014, Abernethy et al. 2004, Evans et al. 1994). The findings of this study suggest that this definition is insufficient to fully capture the challenge that CFOs face when striving for effective managerial decision-making.

This study contributes to the accounting literature in several related ways. First, I empirically show that neither decision support nor control affect managerial decision-making effectiveness directly, but rather enable effective decisions through their coupling with communication channels. This mechanism is important because there are situations in which robust analysis exists without disinterested dialogue, and vice versa

(Garbuio et al. 2015). Further, this study addresses the theoretical conflict on (dis-)advantages associated with dual responsibility (Mahlendorf 2014). It empirically confirms that hybrid CFOs can successfully overcome the potential negative effects of control for effective decision-making (e.g., Sathe 1983). As such, this study identifies *supportive control* as a mechanism that has been generally neglected in prior literature (Quattrone 2016). Second, I provide empirical evidence, consistent with the attention-based view (ABV), on how the structural coupling of a firm's internal accounting system and communication channels influences decision-making at the TMT level (Ocasio 2011). Incorporating managerial communication in this setting (cf. Friedman 2014), suggests that both support and control can adversely affect managerial decision-making effectiveness. As such, this study also adds to the debate on accounting communication (e.g., Goretzki and Messner 2019, Puyou 2018). Finally, in taking a situated perspective on the internal information environment, I explicitly consider variation in a CFO's discretion on support and control (e.g., Mack and Goretzki 2017). As such, I deviate from many prior accounting studies investigating the average effects of accounting involvement (e.g., Chang et al. 2014, Indjejikian and Matějka 2012, Zoni and Merchant 2007, Abernethy et al. 2004). In doing so, this study also adds to the complementary view of controls (Grabner and Moers 2013). From a practical point of view, thinking only about accounting information but not about the means through which it is communicated results in missing a controllable opportunity to increase returns.

In the following sections, I provide a theoretical grounding for communication channels' coupling with systems of dual responsibility and introduce the design of this study. Subsequently, I present the results, discuss the conclusions and limitations, and provide suggestions for further research.

23 Theory and Hypotheses

23.1 Prior Literature on Dual Responsibility

A tenet of prior accounting literature is that firm's internal accounting systems should provide information that (1) improves individuals' abilities to make organizationally desirable decisions (*decision-facilitating*), and (2) information that helps align the interests of agents with principals by directing an agents effort and attention to activities that benefit the organization (*decision-influencing*) (Zimmerman 2000, Demski and Feltham 1976). In Indjejikian and Matějka (2006), and Maas and

Matějka (2009), financial managers (CFOs) contribute to firm output directly, and the internal accounting system purely complements incentive contracting, whereas Friedman (2016) shows in an analytical model that CFOs also contribute indirectly to firm output through effort that improves the CEO's productivity. Experimental research confirms that decision support improves decision effectiveness (for an overview, see Sprinkle 2003), by reducing the ex-ante decision uncertainty (Friedman 2014).

Relatedly, prior research finds that decision control can also be informative to decision-makers in reducing ex-post decision uncertainty (Drake et al. 1999, Holmström and Milgrom 1994), providing functional signals (e.g., on risk-sharing with the parent company) to improve local managements' judgment and decision effectiveness (Sprinkle 2003). Tuttle and Burton (1999) found that incentive contracting improved the information processing capacity for decisions, thereby mitigating information overload and increasing task performance. Also, management even demands decision control to develop knowledge of their work environment (e.g., to comply with group-wide requirements and regulations, such as credit line, investment criteria, or budget) more generally (Hall 2010).

Some prior studies further stress the relevance of effects associated with the interplay between these two responsibilities when they are examined jointly (e.g., Abernethy and Bouwens 2005, Sprinkle 2000), and encourage further research to understand more about specific decision-making contexts through which decision support and control impact decision-makers, rather than overall "use" patterns (Grafton Lillis and Widener 2010).

Extant qualitative studies reveal how CFOs can manage the expectations of dual responsibility with informational tactics (Goretzki and Messner 2018) but remain inconclusive on complementary and substitutive effects between decision support and control. Besides, some studies argue that certain benefits of decision support and control become particularly salient in verbal forms of communication. Conversations make local management more aware of hierarchical (i.e., functional) concerns (Mouritsen 1996), allowing them to exert "rather soft" influence (e.g., by explicitly making "suggestions" rather than "commands") (Mack and Goretzki 2017), and increase the relevance of accounting data (e.g., by signaling that something must be looked into more carefully or fundamentally) (Ahrens and Chapman 2007). Specifically, several studies identify informational tactics for disseminating information in conversations as a

beneficial decision-control resource (e.g., Goretzki et al. 2018, Goretzki and Messner 2016, Jönsson 1998, Ahrens 1997). However, there is little empirical understanding of how channels for decision-making relate to internal organizational characteristics of accounting systems (e.g., Papadakis et al. 1998, Eisenhardt and Zbaracki 1992), even though systems of responsibility often represent the underlying source of decision-making for internal as well as external purposes (e.g., Bushman and Smith 2001, Naranjo-Gil and Hartmann 2006, Sutcliffe and McNamara 2001).

23.2 Prior Literature on Communication Channels and the Attention-Based View

Recent studies on the attention-based view of the firm have highlighted the role of situated information processing and organizational attention in managerial decision-making and adaptation (for an overview, see Joseph and Gaba 2020), theorizing on coherence between communication channels and organizational attention structures for effective decision-making (Ocasio and Wohlgezogen 2010). Although accounting information is not merely "used" but it is drawn upon selectively (Hall 2010), prior empirical studies rarely examine communication of accounting. Conversely, the "communication channel view" on attention (Ocasio 1997) is particularly useful to investigate the procedural means through which communication happens (e.g., Ocasio et al. 2018). Channels are defined as the anticipated formal opportunities for communication that establish attentional engagement of decision-makers (Joseph and Ocasio 2012, Ocasio and Wohlgezogen 2010, Gulati et al. 2005).¹⁸ A diverse large sample study of strategic planning decision problems has highlighted how a more robust financial analysis and disinterested dialogue improve decision effectiveness (Garbuio et al. 2015). While financial analysis integrates accounting data (e.g., Papadakis et al. 1998), the disinterestedness in managerial conversation differentiated opinions (e.g., from specialists with different skills and expertise) (e.g., Rousseau 2012, Miller 2008, Dane and Pratt 2007, Papadakis et al. 1998). Consistent with this literature, I state that depending on the degree of coupling (i.e., tight, loose coupling, decoupling) between channels and attention structures (decision support and control), an investment decision is more or less effective. Tight coupling between a CFO (decision support) and CEO focuses attention on the overlapping commonality in the financial perspective, which

¹⁸ I consider informal communication as elusive to purposive control.

makes integrating channels more effective (Ocasio and Joseph 2005, Gulati et al. 2005). Decoupling between a CFO (decision control) and CEO focuses attention on differences, allowing financial and managerial logic coexist within differentiating channels making decisions more effective. Further, I expect the relationship between loose coupling (hybrid CFO) substitutes for differentiating channels and requires integrating channels to facilitate effective decisions (Joseph and Ocasio 2012, Ocasio 2011).

23.3 Hypothesis Development

Decision support entails activities to facilitate managerial decisions (Maas and Matějka 2009). Typically, local management also relies on decision support (Lambert and Sponem 2012). Reinforcing decision support creates tight coupling between a CFO and CEO to be aware of underlying assumptions of accounting data, enhancing its common understanding, and engendering a better attitude towards it (Byrne and Pierce 2007), thus making a financial analysis more robust.

Analyses are typically characterized by a gap between what is known and what needs to be known to perform well (Hartmann and Maas 2011). Attaining effective decisions from analyses crucially depends on attention to the scenarios, sensitivities, risks and financials of a project (Garbuio et al. 2015). Since decision support focuses on a multitude of quantitative techniques to model, predict and report the financial outcomes (Elbanna and Child 2007b), it is positively associated with the comprehensive understanding of a situation (Papadakis et al. 1998), performance management effectiveness (Chang et al. 2014), performance on an aggregate firm-level (Zoni and Merchant 2007), and even compensates for the relative incompleteness of accounting information (Chapman 1998). For this reason, it can be especially helpful to produce a robust financial analysis.

Relatedly, given that co-locating information and decision rights improves performance (Indjejikian and Matějka 2012, Baiman and Rajan 1995), decision support is expected to positively affect the robustness of analysis through better reflecting local contingencies (Maas and Matějka 2009, Abernethy et al. 2004). This service helps the CEO to better accommodate the dynamic requirements of managerial decision-making for sensing, seizing, and reconfiguring opportunities (Ocasio Laamanen and Vaara 2018).

Prior literature also underscores the positive behavioral effects of decision support, as a local focus (e.g., as "strategic partner" or "business advisor") is expected and even

demanded (Byrne and Pierce 2018, Goretzki et al. 2013). It is further perceived as enabling the reduction of decision complexities, uncertainty, and ambiguity (Hartmann and Maas 2011, Pierce and O'Dea 2003).

Based on both the co-locating-argument as well as the behavioral implications outlined above, I reason that the more focus on decision support, the better managers are able to translate a robust financial analysis into effective decisions, and therefore state the first hypothesis:

H1: There is a positive interaction between decision support and the robustness of analysis on decision effectiveness.

The situated coupling of decision support for mobilizing accounting through verbal forms of communication (Ahrens and Chapman 2007), beyond a robust financial analysis, depends on the discursive knowledge of individuals (Fauré and Rouleau 2011). Different communication channels, however, change the expected utility of accounting information (Chong 1996). This condition makes decision support liable to unintended consequences (Fauré and Rouleau 2011), especially on the informal side of communication (Puyou 2018).

Dialogues discursive performance varies with its disinterestedness (Garbuio et al. 2015), characterized by the evidence base, use of disconfirming information, portfolio perspective, transparency, and careful consideration of divergent opinions. Strong decision support, however, introduces a skewed distribution of attention toward local private information (Lambert and Sponem 2012, Maas and Matějka 2009), and proactive search behavior for alternative explanations, the emergence of different opinions, and a broader perspective become less likely (Miller 2008), whereas the tendency to overweight positive aspects of a decision increases (Eisenhardt and Zbaracki 1992).

Further, a prolonged dialogue among managers probably provides diminishing returns when substantial accounting data is already analyzed (March 1994). Since sustained concentration is limited in duration (Ocasio 2011), new insights become more difficult to generate (Hall 2010). Hence, attention to useful information is compromised as useless information enters the conversation (Miller 2008). Available empirical evidence in the audit literature provides some support for this dilution effect of redundant information and trivial information (e.g., Shelton 1999, Hoffman and Patton

1997, Glover 1997). Skewed information and its distraction effects probably become significant as dialogue is intensified but is likely to be problematic from the very start if a reasonable analysis is already conducted. As such, it becomes more difficult to avoid redundancy if discussions continue endlessly.

Similarly, more co-locating of local private information increases the local managers' informational advantage causing a drift in governance (Fauré and Rouleau 2011, Indjejikian and Matějka 2006), thus creating opportunities to extract rents from the organization. If firms emphasize decision support more, the reporting effort of local private information is more likely to crowd out attention to central information, and a learning effect is diminished (Friedman 2016, Rötheli 2001). In these situations, agency costs exceed the additional expected utility of improved conversations for managerial decisions (Dessein 2002).

Prior literature further posits that disinterestedness in dialogues is subordinate to rhetorical tactics in political dynamics that shape managerial attention (Ocasio Laamanen and Vaara 2018, Lambert and Sponem 2012). Financial managers require such informational tactics to effectively facilitate convergence in discussions (Goretzki et al. 2018). The possibility to channel and regulate information flows in social interactions without immediate sanctions (Puyou 2018), however, is constrained by the quality of dialogues. Disinterested dialogues expand the discursive spaces to multiple knowledgeable participants and increase transparency, which makes it more likely that these tactics become exposed (Miller 2008).

Combining tacit and discursive arguments, the more important the disinterestedness (i.e., detachment of interest) is for decisions, the more harmful is the interestedness of decision support and, by implication, the less effective decisions become. Thus, I formulate the following hypothesis:

H2: There is a negative interaction between decision support and disinterested dialogue on decision effectiveness.

Decision control entails activities to influence managerial decisions. A CFO's decoupling from decision-making allows for top-down direction (e.g., of the parent) and typically ensures the achievement of pre-defined objectives (Hartmann and Maas 2011). As such, the focus is set on a remote and objective positioning for monitoring and

reporting (Fauré and Rouleau 2011). However, returns from decision control are often not as easily or timely integrated in financial analysis. Fiduciary efforts and different perspectives on decisions can adversely create an exclusion despite the intended influence (Byrne and Pierce 2007), which is likely to reduce the effectiveness of robust financial analysis. The robustness of the analysis is the extent to which management analyzes information about the potential financial returns and risks of a decision.

Analyses depend on the collection and completeness of information relevant to the decision (Miller 2008). A maintained distance between accounting and management, however, usually distorts the quality of available accounting information (Lambert and Sponem 2012). Relatedly, when decision control increases, it becomes more difficult to accommodate all the additional criteria management has to deal with (Indjejikian and Matějka 2006, Jönsson 1998). Thus, ambiguity with competing signals about the same underlying object (i.e., investment) is more likely (Goretzki and Messner 2016),

At the same time, the development of internal controls and the preparation of financial statements, ensuring compliance with corporate guidelines and accounting principles, often does not allow the CFO to put an early stop to defective behavior (Lambert and Sponem 2012). In fact, managers do not always welcome interaction that seeks to serve a monitoring, information gathering, or interfering function, in particular an excessively tight approach to budgetary control (Byrne and Pierce 2007). For example, a higher emphasis on decision control is also positively associated with coercive budget use (Hartmann and Maas 2011). The resulting financial short-sightedness creates an attentional pattern to follow indicators and actions with predictable outcomes (Papadakis et al. 1998), rather than flexibly exploiting windows of opportunity (Lambert and Sponem 2012).

Further, more decision control reduces the managements' incentive to collect information. Typically, it allows the principal (e.g., group accounting, or a controlling CFO) to overrule the agent and, therefore, reduces the likelihood that collected information will effectively be analyzed to make decisions (Indjejikian and Matějka 2012, Aghion and Tirole 1997). When principals retain formal authority, the likelihood that the principal will overrule the agent increases with stronger decision control (Dessein 2002, Alonso et al. 2008). In this situation, a decrease in net productivity of management exceeds any gains from the monitoring effort by reduced riskiness of the performance metric (Friedman 2016).

Based on both the overrule-argument as well as the behavioral implications outlined above, I conjecture that the more focus on decision control, the less the quality of a robust analysis is exploited. I thus derive the following hypothesis:

H3: There is a negative interaction between decision control and the robustness of analysis on decision effectiveness.

Decision control guides the independent actions of decentralized managers in order to decrease the likelihood of dysfunctional behavior by giving them the ability to determine what is supposedly in the best interest of the organization (Indjejkian and Matějka, 2006). Evidence suggests that the influence of decision control for decisions becomes especially salient the more lateral the hierarchical form of influence becomes (Goretzki and Messner 2016). As decision-making is typically characterized by lateral conversations (Hall 2010), decision control is potentially helpful for capitalizing on the disinterestedness of dialogues.

The quality of a disinterested dialogue is defined by knowledge differentiation (Elbanna and Child 2007b), in which decision control strengthens with the selection and participation of the most appropriate individuals. Having highly functional controls ensures that management is capable of gathering and processing global information residing within a variety of different stakeholders, creating "panoramic knowledge" that matches the transparency demand of disinterestedness in dialogues (Mack and Goretzki 2017).

Prior strategic decision research confirms that attention to contrasting specialist expertise is a condition for effective decisions (Rodrigues and Hickson 1995). Examining how managers use planning meetings, Goretzki and Messner (2016) suggest that enacting a socializing form of decision control can be effective in coming to a shared understanding of an uncertain future. For example, by sharing local and central perspectives through budgeting conversations, management can better understand the consequences of different actions, and is thus more likely to achieve its own objectives (Fauré and Rouleau 2011). Although the distant objectivity of decision control emphasizes a fact-based orientation (Dean and Sharfman 1993a), a disinterested dialogue better incorporates the respective constraints of decision control (Fauré and Rouleau 2011). Hence, well-fitting verbal explanations and guidance on rules and

regulations can be communicated more efficiently, which in turn makes them more specific and frees up time to focus on answers to issues typically occurring during an investment decision (Garbuio et al. 2015).

Similarly, if communication channels are not without friction, the delegation of decision control to a better-informed agent can be a dominant solution for the design of organizations (Alonso et al. 2008, Dessein 2002). If accounting centralization decreases the quality of locally relevant information (Indjejikian and Matějka 2012) and given that management bears the rents of local private information, dialogues should improve the quality of the information exchange. Thus, decision control requires some form of dialogue to be effective in managerial decisions.

Prior literature posits that decision control can better exert its influence through verbal forms of communication, as the risk of generating managers' resistance is reduced (Mack and Goretzki 2017). As such, it could situationally amplify weak external signals for management attention. In the circumstances such as these, a disinterested dialogue is the most valuable, and the returns are likely to be the greatest. Stated formally:

H4: There is a positive interaction between decision control and disinterested dialogue on decision effectiveness.

24 Research Design

24.1 Sample and Data Collection

The selected research setting addresses prior studies' limitations and considers the recommended alternatives. After an extensive review of the literature, I approached one multinational enterprise in Europe and interviewed a group of executives about their decision practices during on-site visits in June and July 2019. From these interviews, I find that the process of how evidence is collected, solutions are discussed, and decisions are made, varies in different managerial settings.¹⁹

I chose a multi-informant design to account for heterogeneity in managerial communication, project evaluation, and selection.²⁰ To maintain a degree of standardization on decision objectives, authority, and level of decentralization, in the study design (Spekle and Widener 2018), the sample consists of decentralized subsidiary firms all with the same ultimate owner (parent). Prior work used data from financial managers in isolation, which suppresses others' voices concerning expectations, attitudes, and beliefs that drive behavior in accounting and its effective involvement (Mahlendorf 2014, Pierce and O'Dea 2003). In contrast, the unique dataset in this study complements previous accounting studies' reliance on modeling and archival data to investigate the inner workings of the firm (e.g., Buchheit et al. 2019, Friedman 2016).²¹

After gaining high-level approval from the parent company, I was able to collect data on the top management teams (TMT) of its legal entities (i.e., subsidiaries).²² I contacted each participant via email in order to ensure they were accustomed to participating and aware of the confidentiality guarantee, to curb respondent subjectivity, nonresponse, and coverage biases (Speklé and Widener 2018, Bedford and Speklé

¹⁹ This anecdotal evidence provided a range from "*gut-feeling and intuition, to sophisticated financial indicators*", and "*meetings to reconcile different views, to implicit understanding*" emerged. These observations are in line with previous research which found that the context of managerial decision-making within organizations can vary considerably (e.g., Libby et al. 2019, Indjejikian and Matějka 2006). In addition, the field work informed the subsequent measurement of the multi-faceted phenomenon as it occurs in its natural setting.

²⁰ Institutional Review Board (IRB) approval in regard to the use of human subjects was obtained.

²¹ Throughout the survey, "company" refers to the subsidiary firms (also known as "business unit") the respondent is affiliated with. "Organization" and "Business / Group Finance" refers to the group company (parent) to which the subsidiary belongs.

²² According to the sampling plan, 140 executives (i.e., financial and general manager) indicated they met the inclusion criteria in the theoretical sample, potentially representing 90 pairs in the target population. 82 CFOs completed the survey (that is equivalent to 91.1%), but only 41 (that is equivalent to 82.0%) of their CEOs completed their particular part. Thus, in total, I received data from 123 respondents, requiring the interpolation for about half of sample, which is expected to statistically run counter to the significance of the effects, representing 82 complete pairs (66.7%) and 41 unique decisions.

2018). I comprised the responses of 123 CFOs and CEOs, obtaining a sample relevant to the theory being tested. To be prototypical of the design and decision problem the organization faces, respondent pairs had to meet three criteria: (1) the executives are either financial or general managers (2) the executives must have worked in their current functions for at least two years, and (3) the organization must have made a significant investment decision in the period of observation. Within the final sample, 87.4% of the CFOs (CEOs) have a job tenure with the company longer than 5 years, 58.7% (98.9%) longer than 10 years, and 52.9% (85.1%) as CFO (CEO) longer than 5 years. The average functional job tenure of CFOs (CEOs) within the firm is 11 (9) years.

The unit of analysis in this study is a managerial decision-making process.²³ Each respondent was asked to choose an investment decision s/he had been involved in and answer questions about it. Further, to attenuate any effects of potential recollection biases (Golden 1992), I follow previous studies of managerial decision-making (Garbuio et al. 2015, Naranjo-Gil and Hartmann 2006), and asked respondents to focus on an investment decision that: 1) was made in the past two years, 2) was made in the course of normal business (not in response to a crisis), 3) was intended to have a significant impact on their organization's performance, 4) was typical of their company's decision process, 5) had results that are largely known, and 6) affected their company. Hence, this survey setting provides real cases similar to qualitative studies, but with more observations and standardized empirical measurement.²⁴

To strengthen the reported results, I employ transparency concerning the following potential issue. Even though common method bias is a potential problem of survey studies (Podsakoff et al. 2012), interaction effects are less likely to be susceptible to CMB (e.g., Braumann et al. 2020). Still, I address this concern ex-ante through the multi-informant survey design and ex-post using statistical controls in multiple ways (e.g., Siemsen et al. 2010). First, the use of respondent pairs (as recommended by Mahlendorf 2014) increases the construct validity and reduces the potential common

²³ Also, the outcome variable investigated in this study is the effectiveness of a decision, rather than broader variables such as organizational performance, which is rather problematic in cross-sectional studies given its potential to add systematic error (Grabner and Moers 2013).

²⁴ The sample comprises about 90.5% of companies with annual sales growth (about half with growth above 10%), and 64.10% with an increase in profit above 5%. Four different business models in two industries are represented, with the largest being operations (35.6%), wholesale business (26.4%), retail business (20.7%), and financial services (17.2%). The average firm size is 595 FTEs, and 90.8% of the firms employ more than 100, and 40.2% more than 500 employees. In terms of region, the sample is distributed as follows: Central Europe (70.9%), Eastern Europe (21.8%), and developing markets, including Latin America, China, India, and Asia/Pacific (7.3%). Finally, all companies are owned by the same publicly listed group company headquartered in Central Europe.

source bias.²⁵ Further, I apply factor analyses, calculate Cronbach's alpha, and review the item scale for the constructs to establish both content and construct validity. Table 1 shows a summary of the results, which overall support the unidimensionality of the constructs employed in this study. Second, to decrease the likelihood that the responses were socially desirable (Speklé and Widener 2018, Hiebl and Richter 2018), participants were assured of complete anonymity and confidentiality, and that only aggregated statistics would be revealed. As the participants were informed that firm-level results are presented (non-traceable and aggregated) by the author of this study at the annual CFO conference of the company soon after its administration (in October 2019), all participants were aware that results would not be meaningful unless they answered the questions truthfully. Finally, the questionnaire the current study belonged to is not labeled an examination of control and support activities, communication, or decision-making. In addition, I randomized the order of the questions across respondents to address conceptual concerns of "other-deception" (Podsakoff et al. 2012). Thus, it is very unlikely that participants' attention was drawn to the constructs and their relationship (e.g., Speklé and Widener 2018).

24.2 Measures

The variables employed in this study are based on pre-established items in empirical accounting and strategic management literature to tie the results back to these pivotal studies. Respondents rated all items on a seven-point fully anchored Likert scale (Table 1).²⁶ With prudence, I only retain items with a Cronbach's alpha coefficient above the 0.70 benchmark (Bedford and Speklé 2018). Table 2 Panel A provides descriptive evidence for the sample of this study. Based on this analysis, I then measured the final

²⁵ Questions related to "how the decision was made" and to decision performance were answered by the CEO, while questions related to "what the activities of the financial function were" were mixed with unrelated questions in the survey of the CFO. Even if it would be favorable for respondents to report that their decisions delivered the expected results, non-traceability was assured since the decision need not be further specified and was only categorized. In fact, on a scale from 1 to 7, about 78.1 percent of the respondents rated their managerial decision effectiveness below 6. Additionally, each question was very specific (e.g., Bedford and Speklé 2018) and attempted to describe common practices with the terminology used by the managers of the company based on initial qualitative interviews.

²⁶ I pretested a pilot version of the survey among three experienced scholars and three senior executives of the firm who did not participate in the final survey but had characteristics similar to those of the managers in the population (Bedford and Speklé 2018). In particular, to improve the internal validity of the study, participants were asked to complete the survey and, at the same time, comment on the potential antecedents of the items describing activities and practices. I reflected comments critically and made necessary firm-related adjustments to the survey constructs accordingly. Finally, Cronbach's alphas of the scales were calculated, and principal component analyses were performed. Triangulation of the pretest methods helped to shorten the survey and validated the trustworthiness of the metrics.

variables by averaging the items for each construct. As a next step, I analyzed the descriptive statistics and correlation matrix for all survey constructs. The results in Table 2 Panel B further support their discriminant validity, given that no inter-item correlation exceeds the Cronbach's alphas illustrated in the diagonals of the correlation matrix (Churchill 1979). The final survey items measure the constructs.

The proxy for a system of dual responsibility in the model is the financial manager (CFO). I asked for activities instead of roles (cf. Chang et al. 2014), to reduce the impact of potential bias (Mahlendorf 2014). Evidence suggests that the CFO's dual responsibility also mirrors the centralization-decentralization tension of accounting (Indjejikian and Matějka 2006).

Decision-Making Control (DMC) is measured with the items that Maas and Matějka (2009) used to assess the importance of functional responsibility. Corresponding to decision-making, the scale refers to financial reporting, monitoring, and internal control activities.

Decision-Making Support (DMS) is measured with the items that Hartmann and Maas (2011) used to assess the importance of local responsibility. The scale refers to financial steering activities for increasing CEO productivity with financial planning, analysis, and performance management.

Dual Responsibility (DUR) is an aggregate multidimensional construct comprising the interaction of two dimensions. The first dimension concerns the relative balance, or match, between *DMC* and *DMS*, which is measured as the absolute difference between their scores. I use the reversed score from this calculation so that higher values equate to higher levels of balance. The second dimension refers to the combination of *DMC* and *DMS*, which I calculate as the multiplication of scores. The aggregate construct of duality (*DUR*) is then calculated as the multiplication of the balance dimension and the combined dimension. This operationalization recognizes that a hybrid CFO's duality is achieved only by balancing high levels of control and support rather than by attaining balance at any level of emphasis (Mahlendorf 2014, Sathe 1983). That is, a high score on *DUR* indicates that *DMC* and *DMS* have a high emphasis of a similar magnitude.

The quality of communication channels for decision-making is assessed based on two distinct dimensions (*RA* and *DD*).

Robustness of Analysis (RA) is measured with items from empirical strategic decision-making research (Garbuio et al. 2015), and following prior literature (Dean and

Sharfman 1996, 1993a, 1993b, Elbanna and Child 2007a, 2007b). I asked questions used by Garbuio et al. (2015) to measure the reliance on accounting data for decisions.

Disinterested Dialogue (DD) is assessed using items that measure the extent of detachment from any interest and fact-orientation in a management discussion about the analysis performed. I asked questions used by Garbuio et al. (2015) concerning the characteristics of a conversation for decisions.

Managerial Decision Effectiveness (MDE) is conceptualized following Speklé and Widener (2018). To identify specific aspects of effectiveness, I measure the extent to which the decision generated the expected results (on a scale from 1 to 7), in each of the following areas: expected revenue increase, expected profitability, expected increase in market share, and increased efficiency or productivity. These items are also in accordance with Garbuio et al. (2015). Perceived measures are considered to be appropriate because I conduct theory-testing at the individual decision-making level (e.g., Elbanna and Child 2007b). Further, respondents' perception is more reliable to reflect evaluations of decision inputs, and thus, is most likely to guide their actions (Van der Stede et al. 2005).

Control Variables commonly used in studies of decision-making (Dean and Sharfman 1996, Elbanna and Child 2007b), such as the firm size, industry, and other situated factors, are included in the analysis.²⁷ In particular, Papadakis et al. (1998) find that effectiveness depends more on the decision-specific characteristics rather than the characteristics of the decision-makers themselves. In line with Simons' (2005) conceptualization, and to control for characteristics of the TMT setting (e.g., Hambrick and Mason 1984, Naranjo-Gil and Hartmann 2006), I distinguish four items: resources, dependence, support and influence.²⁸ As a final step, following the approach by Garbuio et al. (2015), I add categories of decisions to investigate differences in the decision-making process on investments.

[Insert Table 1 and Table 2]

²⁷ For supplemental analyses, I assess *Strategy Process Involvement (SPI)* with items that measure the extent to which the financial managers performed several tasks within the strategy process (e.g., providing strategically relevant information and analyses, challenging management's proposals, or providing recommendations to management). The items are adapted from Erhart et al. (2017). Prior research identified involvement as a key variable in accounting studies (e.g., Hartmann and Maas 2011, Indjejikian and Matějka 2006).

²⁸ Given that the dataset available is cross-country and includes companies of various sizes, which can be more or less formalized for different types of managerial decisions, I also control for the region in which the company is located, and the authority of entities.

25 Results

25.1 Model Specification

As a basis for testing the main hypotheses, I test whether both a robust analysis (RA) and disinterested dialogue (DD) have a significant direct positive effect on decision effectiveness (MDE) (Model 1). The first column in Table 3 presents the results. Consistent with the empirical analysis of a larger survey sample in the management literature (Garbuio et al. 2015), both *RA* (0.455; $p < 0.01$, two-tailed), and *DD* (0.228; $p < 0.05$, two-tailed), have a significant positive impact on *MDE*. Further, an added interaction effect is not significant (0.049; $p > 0.10$, two-tailed). This confirms the finding of prior studies on the independence between these two dimensions (Garbuio et al. 2015).²⁹ Consequently, extending the model for the accounting constructs in Table 3, neither *DMC* (0.052; $p > 0.10$, two-tailed), nor *DMS* (-0.016; $p > 0.10$, two-tailed) in isolation, appear to have a significant main effect on *MDE*, while the positive effects of *RA* and *DD* remain (Model 2). Thus, on average, both dimensions of dual responsibility (*DMC* and *DMS*) do not significantly translate into better investment decisions. This can, in fact, be seen as a first hint that the translation of control and support into effective decisions is contingent on their interplay and interaction with other variables (Main model (3) Adjusted R-squared = 0.775, $p = 0.000$) and each other (Supplemental model (4) Adjusted R-squared = 0.570, $p = 0.000$). Therefore, I examine the results of the main analysis (Model 3) in Table 3.

25.2 Hypotheses Tests

The hypotheses were tested using multiple regression analysis. Table 3 provides an interaction equation, including four interaction terms for decision support (*DMS*) and decision control (*DMC*) with analysis (*RA*) and dialogue (*DD*), respectively.

Looking at the interaction coefficients, the results of Model 3 represent empirical evidence for all four hypotheses (graphically displayed in Appendix B, Figure C1 and C2). Specifically, hypotheses 1 and 4 state that the interaction terms for dual responsibility (*DMS* and *DMC*) and the quality of communication channels (*RA* and *DD*)

²⁹ In addition, I checked whether the inclusion of other potentially relevant control variables changed the results (equivalent to Model 2; C1–C12, RE–FS) The results remain qualitatively unchanged. Appendix A estimated a Seemingly Unrelated Regression (SUR) with insignificant correlations indicating no interrelation between *RA* and *DD*. The results from this estimation were qualitatively the same as those presented in the tables.

have a positive impact on *MDE*. As predicted, I encounter a positive, statistically significant coefficient for the interaction term of *DMS* and *RA* (0.192; $p < 0.05$, two-tailed), as well as a positive statistically significant coefficient for *DMC* and *DD* (0.219; $p < 0.05$, two-tailed). Contrary, hypotheses 2 and 3 state that the interaction terms for dual responsibility (*DMS* and *DMC*) and the quality of communication channels (*RA* and *DD*) have a negative impact on (*MDE*). As predicted, I encounter a negative, statistically significant coefficient for both, the interaction term of *DMS* and *DD* (-0.262; $p < 0.01$, two-tailed), and for *DMC* and *RA* (-0.392; $p < 0.01$, two-tailed). I stress that *DMS* and *DMC* are based on CFO's responses, while *RA* and *DD* are based on CEO's responses – hence, these correlations are not an artifact of the common method bias. Rather, it suggests that the degree to which dual responsibility is beneficial or harmful is not uniform but depends on the coupling with communication channels for managerial decision-making.

[Insert Table 3]

25.3 Supplemental Analyses

To strengthen the understanding of these findings, and most importantly, to shed light on CFOs' ability to effectively attend to both responsibilities (e.g., Mahlendorf 2014), I specify interaction equations for *DUR* with *RA* and *DD*. I expect dual responsibility to improve decision effectiveness in the context of financial analysis because increased decision support is more likely to produce detailed knowledge (and hence information) (Goretzki et al. 2018, Byrne and Pierce, 2007). This, in turn, strengthens decision control to put an early stop to ineffective courses of action and decisions (Hartmann and Maas 2011). Conversely, I expect that dual responsibility is less suitable for disinterested dialogues, as a hybrid CFO is more likely to use discretion over information dissemination in social interactions (e.g., Puyou 2018, Goretzki et al. 2018, Lambert and Sponem 2012). In turn, keeping dialogues free of interest and transparent becomes more difficult for the CEO (Lambert and Sponem 2012). Thus, the higher the dual responsibility, the more a CEO is limited in translating disinterested dialogues into effective decisions.

Looking at the interaction coefficients, Table 4 (Model 4) represents empirical evidence on the interaction terms for dual responsibility (*DUR*) and the quality of communication channels (*RA* and *DD*) on *MDE* (displayed in Appendix B, Figure C3). As predicted, results reveal a positive, statistically significant coefficient for the

interaction term of *DUR* and *RA* (0.491; $p < 0.01$, two-tailed), as well as a negative statistically significant coefficient for *DUR* and *DD* (-0.258; $p < 0.05$, two-tailed).

[Insert Table 4]

Table 4 further shows that the adverse effects of decision control (see also Table 3, Model 3) for analysis are outweighed by the benefits of the combined and balanced attention of a CFO to decision support and control. This result empirically confirms that high levels of dual responsibility allow CFOs to add value directly to the subsidiary, while ensuring the integrity of financial information and effectiveness of compliance and control in the interest of the parent (Burns and Baldvinsdottir 2005, Mouritsen 1996, Sathe 1983). At the same time, it also decreases, at least to some extent, the benefits of a disinterested dialogue (e.g., Preston 1986). This finding is consistent with prior accounting literature showing that under high levels of dual responsibility, CFOs avoid exposing their main locus of loyalty through tactful and judicious withholding of critical information, thus, causing disinterested dialogues to malfunction (e.g., Puyou 2018, Goretzki et al. 2018, Rousseau 2012, Fauré and Rouleau 2011).

25.4 Robustness Checks

In addition to the main analysis, I conduct a battery of additional tests to mitigate concerns about these results being partly attributable to correlated omitted variables and endogeneity. First, the results of the main model (reported in Table 3) with the regression against *MDE* as an outcome variable is estimated while including control variables based on theory and prior literature.³⁰ To avoid potential effects from multicollinearity stemming from the interaction terms in Model 3 and 4, I mean-centered all survey constructs for independent variables before entering them in the regression model (Aiken and West 1991). Second, the appropriate use of an interaction specification requires that the interacting variables are not strongly related, in the sense that certain values of one variable are only observed in combination with certain values of the other one (e.g., Aiken and West 1991). The cross-tables in Table 2 (Panel A and Panel B) verify that. Whereas small sample sizes make it difficult to detect small correlational effects, Table 3 lends empirical support to this approach of estimating an

³⁰ I also test whether adjusting the sample for only unique decisions changes the results. The results remain qualitatively unchanged for all main analyses (thus, not tabulated to preserve space). Despite using averages for each category and interpolating for about half of the general managers, which is expected to statistically run counter to the significance of the effects and mitigate a potential coverage bias, the effects retain its validity in the full sample. Thus, I feel confident that this sample accurately captures the relationships of interest.

interaction model, as Model 3 (as compared to Model 2) explains an additional 5% variance in the outcome variable. Finally, as an extension of the OLS method (provided in Appendix A), I estimate a seemingly unrelated regression (SUR) to test for complementary effects between choice variables (*DMC*, and *DMS* in Model 5; *RA*, and *DD* in Model 6) confirming the expectation that *DMC*×*DMS* is significantly and positively related (hence, Model 5 supports the theoretical argument of dual responsibility). In addition, *RA*×*DD* is significantly unrelated (replicating results by Garbuio et al. 2015, and results in Model 1).³¹

In summary, the empirical findings, subsequent robustness checks, and supplemental analyses materially corroborate the hypothesized interaction effects between dual responsibility and quality of communication channels on managerial decision-making effectiveness.

26 Discussion and Conclusion

In this paper, I examine how the effectiveness of managerial decision-making is affected by the degree of a CFO's dual responsibilities. Prior empirical studies have predominantly focused on one important dimension of dual responsibility in isolation (Chang et al. 2014, Indjejikian and Matějka 2012). This paper contrasts unidimensional from the combinative effects of dual responsibility by theoretical arguments of the attention-based view (Ocasio 1997).

I find that dual responsibility and communication channels interact to influence decision effectiveness, and thus CFO practices either help or hinder management in its investment decisions. The results suggest that support (control) strengthens (weakens) the robustness of analysis for decision effectiveness, whereas control (support) increases (decreases) the disinterestedness of dialogues about decisions. In an additional step, the results indicate that financial managers' (CFOs) dual responsibility improves a general managers' (CEOs) financial analysis for effective decisions, at the cost of compromising disinterested dialogues.

This study makes several contributions. First, by integrating and extending accounting and strategy literature on decision-making, I explicate the effects of dual responsibility and contribute to a complete understanding of the coupling with communication channels for managerial decision-making. To ensure a separate

³¹ I use the SPI construct (Erhart et al. 2017) of financial managers for supplemental analyses.

measurement of these constructs in this study, I consciously collected them from different sources of accounting and management. In doing so, I not only improve the validity of this study (Speklé and Widener 2018, Mahlendorf 2014) but also disentangle control and support responsibilities from the quality of communication channels and outcomes on an individual-level among the TMTs, providing an additional explanation for the mixed evidence in prior literature. Second, this study also contributes to the decision-making literature outside the field of accounting, explaining why some top executives among the TMT are better in utilizing communication channels than others (Miller 2008). Relatedly, the findings also suggest that decision effectiveness can be significantly enhanced by a temporal tight, loose and (de)-coupling of attention structures external to communication channels (e.g., Ocasio 2012).

Finally, I follow Mahlendorf (2014) in suggesting that a duality-based argumentation can be fruitfully expanded to interaction relationships in a management accounting setting. Unlike the previous accounting literature that tends to put emphasize on information provision, I empirically show that a hybrid CFO adds local value with a focus on support, while retaining attention to control in managerial conversations. This provides practical implications for how accountants, internal auditors, or controllers can walk the talk.

Taken together, the essence of a more behavioral conception of a system of dual responsibility and communication is that firms must create an internal information environment in which a CFO's, and other financial managers, have the ability to shift the attention towards different responsibility demands. This flexible capability provides them with the power required to master both: the duality of responsibility *and* the different qualities of communication for managerial decision-making. Given managers' natural tendency to demand "more" information, and new reporting and analytics technologies (Quattrone 2016), effective responsibility-communication coupling to manage executives' limited attention (Ocasio et al. 2018), promises to be an especially relevant avenue for future research.

The conclusions of this study should be interpreted in the context of potential limitations. First, the design of the study provides results concerning the effect on (perceived) managerial decision effectiveness of past operations but is unable to investigate past cognitions, and what happened between the time the decision was made, and the time the results were obtained. I took several preventive measures, as discussed

in detail in the methodology section, such as expressly asking respondents to categorize and consider only material decisions made in the past two years. To further minimize this concern, it was not the intent to retrospectively assess individual attention processes, but the selection and engagement in communication channels, which affects how individuals attend to accounting information in the managerial decision situation. Future studies should be positioned either for a more disaggregated investigation of management attention to accounting information, or dual responsibility related choices, such as the distribution of different types, timing and form of (non-)financial information. Also, although decisions have clear expectations and objectives and are temporary in nature (Naranjo-Gil and Hartmann 2006) and accounting departments' work is rarely influenced by external conditions (Mouritsen 1996), the results represent necessary but not sufficient conditions for causality. The optimal approach to deal with such limitation, randomly assigning different managerial choices in an experimental setting, however, is not feasible given the nature of strategies as an endogenous firm-level capability. Future research using longitudinal designs could help corroborate the findings in this regard. Lastly, in adding to the literature evidence on the situated differences of decision control and support for managerial decisions, results need not generalize to other decision settings in companies and industries.

Despite the limitations, this study makes an important contribution to accounting and management literature. Consistent with arguments on the internal information environment's relevance for decision-making (e.g., Gallemore and Labro 2015), it jointly shows managerial accountings' decision support and control effects (Hall 2010, Grafton et al. 2010). It further provides empirical evidence that managerial decision-making originates from the coupling of organizational attention structures and communication channels, which is consistent with arguments made in the theoretical literature on the attention-based view of the firm (e.g., Ocasio 1997).

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Table 1: Construct Validity

Panel A: Completed by the General Manager (Quality of Communication Channels for Decision-Making)	Factor
To what extent did you analyze information about the potential financial returns and risks of the decision at hand?	
<i>Robustness of Analysis (RA)</i>	(0.61)
Sensitivity analysis and financial models of the risk	0.865
Multiple comparable situations to provide a reality check on the financial analysis	0.698
An examination of the risks of this project combined with the risks of other projects in the firm's portfolio	0.693
A detailed financial model of the decision (e.g., Net Present Value, Internal Rate of Return, ROI, etc.)	0.850
Analysis of the potential reaction of capital markets/analysts	a
Information that would contradict the investment hypothesis	a
<i>Disinterested Dialogue (DD)</i>	(0.70)
The decision was discussed as part of the firm's whole portfolio of decisions	a
Discussions of the decision explicitly explored the major uncertainties inherent in it	a
Participation in the decision-making process was determined by person's skills and/or experience	0.835
The criteria for the approval of the decision were transparent to everyone involved in the discussion	0.886
The discussion included points of view that were contradictory to the views of senior leaders	a
The discussion was predominantly based on a robust fact base	0.778
<i>Managerial Decision Effectiveness (MDE)</i>	
To what extent did the decision generate the expected results in terms of:	(0.64)
Revenue increase	0.958
Expected profitability	0.543
Expected increase in market share	0.848
<i>Decision Category (DC)</i>	
(Investment in existing products, services, or geographies, Expansion into new products, services, or geographies, Construction of new infrastructure, Mergers and acquisitions, Organizational change for other reasons)	—
Panel B: Completed by the Financial Manager (Dual Responsibility)	Factor
Please indicate how important these activities are in your current job.	
<i>Decision-Making Support (DMS)</i>	(0.56)
Analyzing product and customer profitability	0.745
Development and evaluation of investment opportunities	0.681
Developing new business unit strategy	0.763
Finding new ways to meet business unit targets	0.723
Developing cost saving and revenue increasing plans for the business unit	0.814
<i>Decision-Making Control (DMC)</i>	(0.54)
Developing internal controls and procedures	0.744
Ensuring that the business unit observes all financial reporting requirements	0.812
Developing performance reports for higher level managers	0.658
Assessing whether the BU observes agreements with Business / Group Finance and adheres to company regulations	0.682
Ensuring that BU managers do not spend more than strictly necessary from a Business / Group Finance perspective	0.760
<i>Strategy Process Involvement (SPI)</i>	(0.56)
During the strategy process, the finance department performs the following tasks:	
Support of objective setting (e.g., by quantifying business goals)	0.728
Provision of strategically relevant information/analyses (e.g., on int. factors or through cont. monitoring of ext. env.)	0.628
Administration/coordination of the strategy process	0.680
Challenging of management's proposals (e.g., regarding realism, objectives and assumptions)	0.763
The finance department:	
...consults management on own initiative with proposals regarding the strategic development of the firm.	0.764
...is influential with respect to strategic content.	0.796
...takes part in decisions when choosing strategy.	0.843

This table provides an overview on the factor loadings per item (in bold), as well as the average variance extracted per construct (in parentheses in the top line of each construct). a) Item deleted from this analysis due to the low factor loading. If deleted items are kept, the results in the regressions do not substantially change.

Table 2

Panel A: Descriptive Statistics

	Number of Items	Mean	Std.	Min.	1 st Q.	3 rd Q.	Max.
MDE	3	5.45	0.75	1.00	5.45	5.67	7.00
DMC	5	5.58	1.01	1.00	5.00	6.40	7.00
DMS	5	4.95	1.32	1.00	4.20	6.00	7.00
RA	3	5.16	0.80	1.00	5.00	5.17	7.00
DD	4	5.93	0.59	1.00	5.96	6.00	7.00
DUR	—	173.65	75.23	7.00	131.04	237.34	343.00
SPI	7	4.93	1.12	1.00	4.29	5.57	7.00
RE	1	5.57	0.75	1.00	5.59	6.00	7.00
DP	1	5.77	1.13	1.00	5.78	7.00	7.00
SU	1	5.95	0.80	1.00	5.92	6.00	7.00
IF	1	5.67	0.68	1.00	5.67	6.00	7.00
FS	1	2.56	0.47	2.00	2.32	2.78	3.41

n = 82. See Table 1 for variable definition.

Panel B: Correlation Matrix

	-MDE	-DMC	-DMS	-RA	DD	DUR	SPI	RE	DP	SU	IF	FS
MDE	0.709											
DMC	0.182	0.778										
DMS	-0.065	0.446***	0.798									
RA	0.502***	-0.028	-0.266*	0.776								
DD	0.335**	0.172	0.053	0.163	0.779							
DUR	0.017	0.615***	0.931***	-0.295*	0.186	—						
SPI	0.082	0.382***	0.431***	-0.177	-0.028	0.445***	0.866					
RE	-0.108	0.088	0.160	0.056	-0.033	0.178	0.109	—				
DP	0.038	0.036	0.018	0.142	-0.088	-0.007	0.025	0.314**	—			
SU	0.255*	0.260*	0.070	0.313**	0.149	0.148	0.061	0.370**	0.249*	—		
IF	0.265*	0.143	0.057	-0.093	0.223	0.167	0.231*	-0.043	-0.134	-0.018	—	
FS	-0.092	-0.071	0.203	-0.095	-0.081	0.124	0.024	0.234*	0.037	-0.051	-0.147	—

*, **, *** Represent $p < 0.10$, $p < 0.05$, and, $p < 0.01$, respectively, using two-tailed p-values. See Table 1 for variable definition.

The diagonal of the matrix shows the Cronbach's alpha for each variable (all greater than 0.70). The other cells of the table report bivariate correlation coefficients. (No value available for control variables *RE*, *DP*, *SU*, *IF*, and *FS*, since they are not measured with a survey construct). All correlation coefficients are below 0.50, except for variable *DUR* (as multidimensional constructs consisting of *DMS* and *DMC*), and *SPI*, which are used for supplemental analyses only, which indicates that multicollinearity is not a major threat. This was further verified in the regression analysis using variance inflation factors (VIF) coefficients, which are all below the 7 threshold (Speklé and Widener 2018, Cohen et al. 2003).

Table 3: Main Analysis

Effects of Accounting on Managerial Decision Effectiveness (MDE)		Model 1 (main direct effects only)	Model 2 (including main effects)	Model 3 (including all interaction effects)
Decision-Making Control	DMC		0.052 (0.058)	0.143** (0.061)
Decision-Making Support	DMS		-0.016 (0.046)	-0.101** (0.050)
Robustness of Analysis	RA	0.455*** (0.088)	0.531*** (0.094)	0.662*** (0.121)
Disinterested Dialogue	DD	0.228** (0.110)	0.453*** (0.114)	0.560*** (0.125)
Decision-Making Control × Robustness of Analysis	DMC × RA		—	-0.392*** (0.143)
Decision-Making Control × Disinterested Dialogue	DMC × DD		—	0.219** (0.105)
Decision-Making Support × Robustness of Analysis	DMS × RA		—	0.192** (0.088)
Decision-Making Support × Disinterested Dialogue	DMS × DD		—	-0.262*** (0.096)
Robustness of Analysis × Disinterested Dialogue	RA × DD	0.049 (0.098)	—	—
Category (Existing Products/Services)	C1 (dummy)		-2.734 (1.740)	-1.191 (1.824)
Category (New Business Model)	C2 (dummy)		-2.895 (1.761)	-1.388 (1.839)
Category (Construction/Infrastr.)	C3 (dummy)		-3.536** (1.718)	-1.973 (1.888)
Category (M&A)	C4 (dummy)		-2.087 (1.755)	-0.505 (1.876)
Category (Org. Process)	C5 (dummy)		-2.566 (1.722)	-1.334 (1.824)
Resources	RE		-0.214** (0.089)	-0.181** (0.085)
Dependence	DP		0.140** (0.059)	0.108* (0.058)
Support	SU		-0.154* (0.091)	-0.186* (0.106)
Influence	IF		0.146 (0.145)	0.187 (0.155)
Firm size	FS		0.013 (0.026)	0.003 (0.023)
Entity (Retail Business)	C6 (dummy)		-0.417 (0.501)	-0.987** (0.455)
Entity (Financial Services)	C7 (dummy)		0.094 (0.547)	-0.367 (0.471)
Entity (Wholesale Business)	C8 (dummy)		-0.698 (0.484)	-0.990** (0.471)
Entity (Operations)	C9 (dummy)		0.308 (0.680)	-0.737 (0.636)
Country (Central Europe)	C10 (dummy)		0.042 (0.371)	0.970 (0.749)
Country (Eastern Europe)	C11 (dummy)		-0.222 (0.366)	0.385 (0.774)
Country (Other)	C12 (dummy)		-1.651* (0.827)	0.943 (0.848)
Constant		5.445*** (0.070)	2.952 (1.872)	6.762*** (1.821)
R ²		0.333	0.805	0.850
Adj. R ²		0.308	0.729	0.775
Wald chi ²		3	21	25
Prob > chi ²		0.001	0.000	0.000

n = 82. *, **, *** Represent $p < 0.10$, $p < 0.05$, and, $p < 0.01$, respectively, using two-tailed p-values. Dependent variable: Managerial decision effectiveness (MDE). In Model 1 and 3, main-effect variables and the interaction variable are centered. Values reported are unstandardized coefficients with standard errors in parentheses. If control variables (C1–C12, RE–FS) are added in Model 1, the results do not substantially change.

Table 4: Supplemental Analysis

Variables		Model 4 (Dependent variable: MDE)
Dual Responsibility	DUR	0.024 (0.094)
Robustness of Analysis	RA	0.384*** (0.103)
Disinterested Dialogue	DD	0.310*** (0.100)
Dual Responsibility × Robustness of Analysis	DUR × RA	0.491*** (0.144)
Dual Responsibility × Disinterested Dialogue	DUR × DD	-0.258** (0.123)
Category (Existing Products/Services)	C1 (dummy)	-0.095 (0.216)
Category (New Business Model)	C2 (dummy)	-0.317 (0.205)
Category (Construction/Infrastr.)	C3 (dummy)	-0.531** (0.230)
Category (M&A)	C4 (dummy)	0.589** (0.270)
Category (Org. Process)	C5 (dummy)	0.132 (0.256)
Resources	RE	-0.330*** (0.094)
Dependence	DP	0.066 (0.058)
Support	SU	0.152 (0.105)
Influence	IF	0.204 (0.165)
Firm size	FS	-0.000 (0.031)
Entity (Retail)	C6 (dummy)	-0.173 (0.245)
Country (EU)	C7 (dummy)	0.019 (0.222)
Constant		5.833*** (0.208)
R ²		0.668
Adj. R ²		0.570
Wald chi ²		17
Prob > chi ²		0.000

n = 76. *, **, *** Represent $p < 0.10$, $p < 0.05$, and, $p < 0.01$, respectively, using two-tailed p-values. Main-effect variables and the interaction variable are centered. Values reported are unstandardized coefficients with standard errors in parentheses.

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30 Appendix A

Seemingly Unrelated Regression (SUR)

		Model 5		Model 6	
Variables		DMC	DMS	RA	DD
<i>A: Coefficient Estimates</i>					
Dual Responsibility	DUR				
Managerial Decision Effectiveness	MDE			0.594*** (0.101)	0.266*** (0.094)
Strategy Process Involvement	SPI	0.349*** (0.092)	0.502*** (0.113)		
Resources	RE				
Dependence	DP				
Support	SU				
Influence	IF				
Firm size	FS				
Entity (Retail)	Dummy				
Country (EU)	Dummy				
Constant		0.027 (0.102)	0.057 (0.125)	-3.238*** (0.556)	-1.448*** (0.519)
Observations		78	78	82	82
<i>B: Residual Correlations</i>					
Decision-Making Control	DMC	1			
Decision-Making Support	DMS	0.34***	1		
Robustness of Analysis	RA	—	—	1	
Disinterested Dialogue	DD	—	—	0.06	1
R ²		0.155	0.203	0.297	0.088
RMSE		0.90	1.10	0.68	0.64
Chi-square		14.31***	19.86***	34.57***	7.91***

*, **, *** Represent $p < 0.10$, $p < 0.05$, and, $p < 0.01$, respectively, using two-tailed p-values. Values reported are unstandardized coefficients with standard errors in parentheses. The Breusch-Pagan tests (Chi-square 9.086, $p = 0.003$) indicate that residuals correlations are significant in Model 5 and not significant in Model 6 (Chi-square 0.303, $p = 0.582$). If all control variables of the main analyses are kept, the results in the SUR do no substantially change.

Model 5 suggests that dual responsibility should not universally be viewed as two distinct dimensions of responsibility but rather as complementary in nature (please refer to the residual correlations). The significant Breusch-Pagan test indicates that, as a whole, the set of residual correlations is significantly different from zero, and so is each individual residual correlation. These results show that, after controlling for the theorized influences on responsibility, greater use of one practice is associated with greater use of another. Overall, this calls for explicitly including dual responsibility (DUR) as the antecedent to decision-making and strategy implementation in future studies (e.g., Mahlendorf 2014). Model 6 suggests that RA and DD are two distinct constructs quality dimensions of communication channels. The nonsignificant Breusch-Pagan test provides support for the expectation that there are situations in which robust analysis exists without disinterested dialogue, and vice versa, although they are correlated.

31 Appendix B

Plot of Two-Way Interactions

Figure C1 Plot of Two-Way Interactions for Responsibility Systems

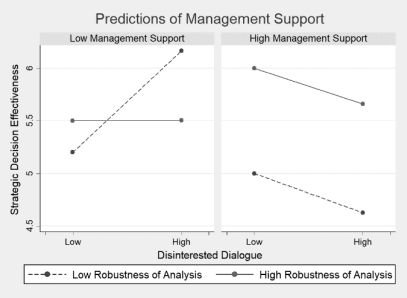


Figure C2 Plot of Two-Way Interactions for Responsibility Systems

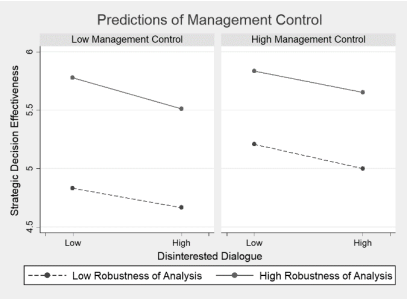
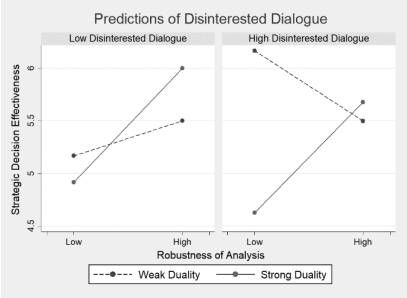


Figure C3 Plot of Two-Way Interactions for Dual Responsibility



Curriculum Vitae

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Education

PhD, Accounting and Business/Management (PMA) 09/2017 – 09/2021
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Professional Experience

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Academic Work

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Publications

Invited conference and workshops

GMARS, 2021. GLOBAL Management Accounting Research Symposium. Decision-Making Paper Accepted for Presentation. Michigan State University, University of NSW, and CBS.

PMA Conference, 2021. 12th conference of the Performance Measurement Association. Groningen and Cranfield. Paper Accepted for Presentation. How AI Unroutinizes Planning and Forecasting.

AAA Management Accounting Section Midyear Meeting: Research Conference, 2021. Paper Accepted for Presentation with Discussant. Implications of a CFO's Dual Responsibilities for Managerial Decision-Making Effectiveness.

EAA Annual Congress, 2021. Paper Accepted for Parallel Session. Managing Attention with Accounting Information: A Configurational Perspective on Transparency.

12th Conference on New Directions in Management Accounting (EIASM), 2020. Paper Accepted for Parallel Session. The Emergence of Enabling Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting.

Joint Seminar in Interdisciplinary Research (JSIAR) 2020. Accounting Workshop. The Emergence of Enabling Accountability Systems: How Analytics Initiatives Unroutinize Planning and Forecasting, University of Turku and Tampere University, Finland.

ERMAC Research Conference. 2019. Paper Proposal, Discussant: I. Grabner. Controllability Effects on Relative Performance Information. Vienna University of Business and Economics (WU), Austria.

Transfer journals

Strategic Management of Platform-based Business Models: systematization and identification of success factors for decision-making. Edlinger-Bach, S., Möller, K., Huth, L. Controlling – ZfC, 2021.

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