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Utilizing management accounting information for decision making: limitations stemming from the process structure and the actors involved

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Abstract

Purpose—To be utilized effectively in decision-making processes, management accounting (MA) information should fit the business context and at the same time reflect the roles, responsibilities, and values of the actors taking part in the decision making. This study investigates the limitations for MA information utilization in decision making. In particular, the study explores limitations stemming from the decision-making process structure and the involvement of several managerial actors.

Design/methodology/approach—An exploratory case study of an energy company and its customer company illustrates the current challenges in providing and integrating MA information into decision making. The analysis is focused on the analytical and actor-based features of the decision making and thus the limitations for MA information utilization. As a part of the broader research process, the researchers facilitated a meeting in the customer company, where the actors relevant to investment decisions discussed the current limitations in utilizing MA information.

Findings—Analytical and actor-based features may take different forms in the decision making. Some relevant MA information may not be included in an organization's decision-making process structure that allows merely conventional, yet analytical, decision alternatives. At the same time, certain actors' viewpoints (such as sustainability metrics) can be excluded from the process without considering the logic behind the exclusion. The case study identified the following limitations, largely related to insufficient actor-based features in the decision making: 1) managers may lack expertise in the use of MA tools, 2) managerial interaction may lack reflection on taken-for-granted assumptions, 3) different managers may appreciate different scope, content, and timing of MA information, and 4) the process structure can ignore the required managerial viewpoints.

Research implications—This study demonstrates that both the decision-making process structure and the needs of the several actors involved may lead to limitations for MA information utilization. Although many limitations stemmed from the insufficient actor-based orientation in the case study, introducing new MA analyses and extending the validity of analytical approaches may also help overcome some of the limitations. Further research should address possibilities to 1) integrate different actors' viewpoints with MA information already in the decision-making process structure, 2) find ways to introduce MA information on unconventional decision alternatives, and 3) enable reflection among and about relevant actors with respect to decision making. These means could lead to more effective utilization of MA information for decision making and, consequently, economically viable decisions.

Originality/value—This study addresses the limitations in MA information utilization by combining the viewpoints of analytical decision-making processes and reflective actors, and thus unveils possibilities for enhancing MA practice.

Keywords Management accounting information, Analytical and actor-based decision-making, Decision-making process, Limitations, Process structure, Actors, Reflection

Paper type Research Paper

1. Introduction

One of the key functions of management accounting (MA) information is to support managers in decision making. Depending on the uncertainties and other characteristics related to the decision-making situation, MA information may have different roles, ranging from an answer machine to serving as a source for inspiration (Burchell *et al.*, 1980). As the potential roles of MA information in decision making vary, so do the requirements for supportive MA information. It is noteworthy that MA often fails to sufficiently support managers: irrelevant or useless information is produced and supplied, or the presentation of information hinders its application (Wouters and Verdaansdonk, 2002; Hall, 2010). To better understand the requirements for supportive MA information, this study investigates (practical) limitations for its utilization in decision making.

The literature distinguishes two different approaches for utilizing MA information in managerial decision-making: analytical and actor-based (Arbnor & Bjerke, 2008; Nielsen *et al.*, 2015). The analytical approach has its roots in calculative, rational decision making, with the assumption that comprehensive MA information is available or can be made available for decision making. The approach involves stages in the analytical decision-making process from problem definition to data collection and analysis (Arbnor & Bjerke, 2008, p. 88; Nielsen *et al.*, 2015). In the analytical approach, the process stages are defined objectively on the basis of contextual variables. The desired contingency fit between the business context and the decision-making process then ensures the most effective practice (Chapman, 1997). In this approach, MA information should be utilized objectively among decision makers to analyze alternatives for a given decision (see, e.g., Thyssen *et al.*, 2006). More specifically, the literature on analytical decision making stresses the importance of cost comparisons and their importance in the final choice (Nielsen *et al.*, 2015).

An actor-based approach emphasizes interactions between participants to cover the different managerial viewpoints in the organization (Arbnor & Bjerke, 2008, p. 152). The approach engages decision participants to actively develop alternatives and to produce information to evaluate these alternatives. This approach emphasizes reviewing, discussing, and appraising modifications to the information used in the decision-making process (Nielsen *et al.*, 2015). The actor-based approach emphasizes the fact that the majority of decision-making processes involve multiple managers with different intentions (Trenca and Nørreklit, 2017) and ways of reasoning. Each participant's action is driven by his/her own way of perceiving the decision-making context (*topos*, as discussed in Nørreklit *et al.*, 2010), and the participants hold unique pieces of information designed to serve different purposes (Ang and Trotman, 2014). Even the analytical MA tools used for decision making feature value-based choices on what scope and content should be included in the tools. Thus, communication enables collaboration among participants with conflicting values, different preferences (March, 1962), and constrained information provision capabilities (Nielsen *et al.*, 2015; Cohen *et al.*, 1972). Similarly to the analytical approach, the actor-based approach can also involve systematic methodological steps aimed at the best possible choice and a functioning practice (Nielsen *et al.*, 2015 p. 77). However, in the actor approach, these steps emphasize interactive and reflective techniques to utilize MA information for decision making.

The two approaches for decision making may take different forms, and they may even be combined to some extent in practice. Nielsen *et al.* (2015) presented two interesting outsourcing decision making cases, one representing the analytical approach and the other one the actor-based approach, to outline the possibilities for improving decision-making practices in different

contexts. By building on Nielsen *et al.* (2015), we argue that meeting the requirements set for MA information requires understanding the limitations of existing practice, which may contain features of both approaches. The need for interpretations and interactions is present in translating complex phenomena into economic calculations in the analytical approach (see, e.g., Chapman, 1997). On the one hand, producing supportive MA information for analytical decision-making processes requires reflections and interactions to genuinely support decision making; on the other hand, an actor-based approach may also sometimes benefit from thorough reflections on the comprehensiveness and objectivity of the comparisons, emphasized in analytical decision-making procedures (Arbnor & Bjerke, 2008).

Both analytical features (such as decision-making procedures or calculation sheets) and actor-based features (such as intentions or other behavioral aspects) deserve attention when discussing the utilization of MA information in actual decision-making contexts. To understand the limitations for supportive MA information in the existing practice, this study seeks to answer the following research question:

What kinds of limitations in MA information utilization stem from a structured decision-making process involving different managers?

To thoroughly understand the existing practice and its limitations, a qualitative, in-depth approach is desired. Empirically, this study is based on an interventionist case study (see, e.g., Jönsson & Lukka, 2005; Suomala *et al.*, 2014; Lukka & Suomala, 2014) with a focus on investment decision making within the network of a technology provider, which we refer to as the Energy Company, and its customer, referred to as the Delivery Company. The researchers were engaged in an active and close collaboration with the Energy Company (see Van de Ven & Johnson (2006) for a discussion on engaged research) to ensure their access to research data, and this engagement yielded both practically relevant and scientifically novel results. In practice, the current limitations in MA information utilization were first recognized in the Energy Company's sales function, which intended to communicate the financial impacts of investing in a particular vehicle technology to its potential customers.

Later, the antecedents of the current limitations in MA information utilization in investment decision making were identified and further elaborated upon. As a part of the broader research process, the researchers facilitated a group meeting of the managers involved in investment decisions in the Energy Company's important customer company, the Delivery Company. The meeting in the Delivery Company focused on vehicle investment decision making and discussed the role and content of MA information in the vehicle technology investment process. The group meeting served as a forum for managers' collective sense-making (see e.g., Laine *et al.*, 2016b) and reflection on the investment decision-making process in the Delivery Company. The managers also expressed their needs for new kinds of MA information in this process. Similarly to Nielsen *et al.* (2015), the present study explores the use of MA information in strategically significant decisions. Vehicles and their supporting infrastructure represent strategically important investments for both the Energy Company and the Delivery Company.

This study contributes to the understanding of supportive MA information utilization for decision making and holds implications for developing better functioning MA information utilization. In particular, the insights from the Delivery Company demonstrate the different managerial needs for MA utilization for decision making. The Delivery Company's representatives had different roles, responsibilities, and expectations for the investment decision

outcome. MA information must fulfill these managerial needs to bring value to the decision-making process. The Delivery Company's seemingly analytical decision-making procedure may exclude certain viewpoints that are relevant from different managers' perspectives or strategically important for the organization. The relatively narrow use of MA information in the Delivery Company serves the immediate needs of the present analytical procedure without additional reflection and dialog. Introducing more actor-based features to the decision making would enable determining whether the investment alternatives align with the decision makers' values, company practices, and economic objectives. Although many limitations stemmed from the insufficient actor-based orientation in the case study, introducing new MA analyses and extending the validity of analytical approaches may also help overcome some of the limitations. Thus, further research should address possibilities (1) to integrate different actors' viewpoints with MA information already in the decision-making process structure; (2) to find ways to introduce MA information on unconventional decision alternatives; and (3) to enable a reflection on relevant actors' values, roles, and responsibilities during the execution of the decision-making process. These actions could lead to more effective utilization of MA information for decision making and thus to more economically viable decisions.

The remainder of this paper is structured as follows. Section 2 gives an overview of the literature on MA information utilization in decision-making processes. In Section 3, the requirements set for MA information in actual decision-making processes is empirically demonstrated, and then the current challenges hindering the use of MA information in managerial decision making are elaborated in Section 4. The discussion in Section 5 focuses on the implications of the findings to further improve the understanding of MA information utilization in theory and practice. The paper ends with concluding remarks.

2. Utilizing management accounting information in the decision-making process

2.1 Approaches to the decision-making process

The utilization of MA information in organizational decision making has been addressed both from the analytical and actor-based approaches. We discuss first the analytical approach, which involves analytical stages in the decision-making process, from problem definition to data collection and analysis. The approach aims at observing and describing the decision-making situation objectively by using quantifiable terms whenever possible (Arbnor & Bjerke, 2008, p. 88; Nielsen *et al.*, 2015). This objective view of situational components is close to contingency theory.

Contingency theory suggests that the decision-making process should be structured on the basis of contextual variables (Chenhall, 2003; Waterhouse & Tiessen, 1978), and the contingency fit would then ensure the most effective practice (Gerdin & Greve, 2004). Contextual variables cover the external and internal conditions in which the company operates, the externals spanning the organization's operational environment, and the internals including elements such as size, strategy, and culture. The approach, at least implicitly, suggests implementing a decision-making process structure that best fits a given organizational context. While doing so, the organization enables efficient and straightforward decision making that suits its internal practices and external environment.

Contingency theory perceives MA information as a rather static tool designed to assist managers' decision making (Chenhall, 2003). Analysis on related future actions and their financial consequences is supported by MA information that should translate complex business

phenomena into calculations as efficiently as possible (Chapman 1997, see Thyssen *et al.*, 2006 as a practical example). In this approach, the decision makers involved are assumed to be guided by goals derived from their roles and responsibilities (Nielsen *et al.*, 2015; Nørreklit *et al.*, 2017, p.100). Thus, the decision-making process follows a somewhat structured step-by-step path in organizations. These steps involve identifying the need for a decision, gathering information, choosing and analyzing alternatives, and taking action. However, as the business contexts evolve, so do the needs for financial analyses and metrics that would inform decision making in different ways (see, e.g., Henri, 2010; Korhonen *et al.*, 2013). Especially strategically important decision making (e.g., investment decisions) requires acknowledging alternative opportunities because the various changes in different business contexts and within organizations set pressures for decision making.

Some decision-making models question this image of decision making being a matter of structured process steps and temporally well-ordered choices. For example, the garbage can model by Cohen *et al.* (1972) proposes that organizational decision making results from a complex mixture of problems, participants, choice opportunities, and solutions. These are fitted together by timing and chance, rather than through a linear, structured process of finding a solution to a problem. This view emphasizes the fact that actors have different access to information, to defining the problem, and to the decision-making process. Actors' ambiguous preferences and limited abilities for information processing affect the decision outcome.

The actor-based approach takes a sociological orientation toward organizational decision making (Nielsen *et al.*, 2015). It calls for a focus on actors as individuals and groups in the decision-making process. These actors act and cooperate through their intentions, values, and ways of reasoning. With their constrained information processing capabilities, individual actors partly trust their own views, estimates, and judgments (Wouters and Verdaasdonk, 2002) in decision making. Intuition is especially used when there is no time, expertise, or willingness to properly analyze all the available facts (Soll *et al.*, 2015, Sadler-Smith and Shefy, 2004). The reasoning from the provided information is also affected by individual actors' unconscious attitudes (Chassot *et al.*, 2015), emotions (Lerner *et al.*, 2015; Sawers, 2005), and personal experiences and contacts (Van de Laar and De Neubourg, 2006). Additionally, interaction with other actors in the group shapes the actions of each individual decision maker, which leads to complex joint behaviors that could not have emerged had individuals acted alone (Hasson *et al.*, 2012).

In the actor-based approach, decision making is an interactive process that adjusts to the actors' practices accordingly. The process serves as a forum for actors to express their interests related to the decision. Organizational decision making takes place in a complex or even chaotic context (Cohen *et al.*, 1972), in which internal politics on different goals, preferences, and values affect the decision making (March, 1962). The utilization of MA information is perceived to play a role in enhancing communication (Nørreklit *et al.*, 2010; Laine *et al.*, 2016a) and collective sense-making (Tillmann & Goddard, 2008; Hall, 2010) in this complex environment. MA information offers a way to help with collective sense-making and communication, especially at the boundaries of different organizational functions. MA tools help in choosing, constructing, elaborating, and communicating accounting figures (Laine *et al.*, 2016a). Decision makers communicate on the accounting figures, the possibilities derived from them, and the logic used in information generation (Nørreklit *et al.*, 2010). The presence of multiple actors in decision making also highlights the need for group discussions when identifying ambiguities regarding to the given decisions (Laine *et al.*, 2016b).

The context of organizational decision making may be characterized by both analytical and actor-based approaches. Established organizations, which our case companies represent, usually have a functioning decision-making procedure that can emphasize either the analytical or the actor-based approach. In this study, the decision-making processes are addressed by first recognizing the existence of certain decision-making process structures with given stages and responsibilities (analytical) in the organizations. Second, we recognize that managers as decision makers are individual actors with specific roles, values, and intentions (actor based). The contribution of this study, in particular, is a better understanding of what kinds of limitations these two perspectives together set for MA information utilization in practice, as well as how these limitations could be overcome in enhancing MA support for decision making. Recognizing these limitations increases our understanding of the requirements set for MA information in practice (Ahrens and Chapman, 2007) and, more broadly, the requirements for MA information supporting managerial work (Hall, 2010).

2.2 Effective utilization of management accounting information through collective sense-making

Utilizing MA information for decision making requires reflections at the individual and group levels. This study focuses on the settings where multiple managerial actors reflect upon the decision-making situation. The managers seek to make decisions as effectively as possible in their organizational contexts with the help of MA information.

Reflection refers to complex, active, and purposeful mental processes of becoming aware of meanings, exploring alternative interpretations, and engaging in dialog (Hildén and Tikkamäki, 2013). Through reflection, actors can question and evaluate their existing ways of thinking, feeling, and existing in institutions. Reflective processes are the key to maintaining continuous development both at the individual level (Schön, 1983) and in collective sense-making (Weick *et al.*, 2005), and they have been found to be central to transformational learning and managerial practice changes (Boud *et al.*, 1985; Crossan *et al.*, 1999; Lipshitz *et al.*, 2002; Cope, 2003). In other words, reflective processes are required to overcome the practical limitations of given decision-making situations and to find avenues for the further development of supportive MA practices for decision making (see also Ahrens & Chapman, 2007).

In an organizational context, reflection is not merely an individual's internal process, but also a social one that involves dialog and negotiation (Cuncliffe, 2004; Gherardi and Nicolini, 2001). Klimoski and Mohammed (1994) proposed a concept of shared mental models to determine the specific needs of group learning (Van den Bossche *et al.*, 2011). Drawing upon collective reflection is a way to illuminate subjective mental models and shared frames of reference. Collective reflection has the potential to make visible, and thus more manageable, the hidden processes of socio-political adaptation and negotiation within organizations. However, we still lack empirical evidence involving this type of collective reflection in business organizations (Boud *et al.*, 2013; Hildén and Tikkamäki, 2013; Jordan *et al.*, 2009; Vince, 2002; 2004). Existing research on reflective processes focuses on decision making in training or high-reliability organizations, such as in hospitals, where reflective capability is considered an integral part of professional competence (Jordan, 2010). Reflective inquiry has the potential to transform the processing of MA information because of its ability to disrupt routine thinking and enable novel ideas. As argued in this study, reflections on the limitations in using MA information for decision making may pave the way for the further development of MA practices.

The following observations can be made based on the existing literature:

- Organizational decision making is a structured process with certain steps and responsibilities. This structure has been shaped by the organization's internal and external contexts (Chenhall, 2003; Waterhouse & Tiessen, 1978).
- Organizational decision making refers to interaction involving multiple actors with intentions. Such interaction sets requirements for the decision-making process (Wouters and Verdaasdonk, 2002; Laine *et al.*, 2016a).
- MA information needs to fit this decision-making context that involves actors and the process structure so that managerial decision making is influenced and facilitated (Wouters and Verdaasdonk, 2002; Laine *et al.*, 2016a).
- Integrating MA information into the decision-making process in a meaningful way requires communication and reflection on managerial needs and contextual requirements (Laine *et al.*, 2016a).

The observations made regarding the existing literature highlight the need for reflections and interactions among the actors. At the same time, they remind us about the fit between the decision-making process, MA information, and the business context. Despite the overall understanding of the prerequisites of an effective MA practice for decision making (Ahrens & Chapman, 2007), little is still known on the limitations of utilizing MA information in existing decision-making practices. Decision making in practice may contain both analytical and actor-based features. More particularly, the dynamics of introducing and actually considering different managers' values and responsibilities in non-routine, yet strategically important, decisions lack attention in the MA literature (see Laine *et al.*, 2016a as an exception). Thus, the desired features of analytical and actor-based approaches for decision making in a given context (Nielsen *et al.*, 2015) could be more thoroughly understood with the help of practical cases. Examining investment decision making and related procedures in practice would provide a new understanding of managerial needs for MA information as well as the obstacles preventing MA information from being used to address such needs.

3. Methodology

Our empirical case study examines a decision-making process between the Energy Company and the Delivery Company. The exploratory study was conducted at the boundary of the Energy Company's sales function and its largest customer, the state-owned Delivery Company, in two years, 1/2015–12/2016.

A qualitative, in-depth research approach provides a thorough understanding of the existing practice and its limitations. Obtaining data in the real-life decision-making context requires researchers' engagement with practice as interactive actors (Ahrens & Chapman, 2006). This requirement was achieved through an interventionist case study setting (Jönsson & Lukka, 2005; Suomala *et al.*, 2014) in the Energy Company and its customer, the Delivery Company. The interventionist research setting included an actor-based approach (Laine *et al.*, 2016a), as the researchers worked as active and participating actors in the case. The interventionist work enabled building an interactive dialog between the researchers and the research participants. Instead of observing the flow of events and reactions from a distance, the interventionist research provided opportunities to facilitate analyses of and reflections on the material produced by the researchers. In this case, the interventionist approach allowed the researchers to encourage managers' reflections on their responsibilities and intentions in relation to the decision-making process.

The work began with the researchers and the Energy Company jointly recognizing the current development needs for MA information utilization in the sales function. Next, we jointly identified the processes and elements hindering the utilization of the provided MA information at the customer end. The intentionally participatory role of the researcher was utilized during steering group meetings, R&D workshops, and informal meetings, in which the researcher offered her expertise to the Energy Company (Table 1). The secondary research material consisted of documented phone, e-mail, and face-to-face discussions related to investment decision-making, as well as marketing materials and customer surveys provided by the Energy Company.

Table 1: Primary and secondary research data

Research data	Input for the study
<p>1. Case work at the Energy Company</p> <p>Primary:</p> <ul style="list-style-type: none"> • Four formal interviews: 20/3/2015, 8/4/2015, 6/6/2016, and 1/7/2016 <p>Secondary:</p> <ul style="list-style-type: none"> • Joint creation of investment calculation tools, 1/2015–3/2015 • Internal R&D workshop: Feelings in decision making, 2/11/2015 • Dozens of informal meetings, e-mails, and phone calls, 1/2015–12/2016 	<p>Internal reflection on the role of MA information in customers' investment decision-making processes</p>
<p>2. Interviews at the customer companies</p> <p>Primary:</p> <ul style="list-style-type: none"> • Group meeting at the Delivery Company, 10/4/2015 <p>Secondary:</p> <ul style="list-style-type: none"> • Nine interviews at other customer sites: 27/3/2015, 5/4/2015, 7/4/2015, 16/4/2015, 16/4/2015, 21/4/2015, 26/5/2015, 7/3/2016, 25/4/2016 	<p>Internal development discussion on the role and content of MA information and related managerial needs in vehicle investment decision making</p> <p>Reflection on the desired role of MA information in decision-making processes</p>

The researchers conducted simultaneous interviews at the Energy Company, its customer companies, and within its technology network (Table 1). The interviews helped deepen the understanding of the different perspectives affecting MA information utilization during investment decision making. The researcher could discover the actual role and content of MA information during the process by interviewing the companies about their experiences in switching to new vehicle technologies. The information acquired during the customer interviews had practical relevance for the Energy Company because it helped in its marketing strategy and infrastructure network planning.

The interviews at the Energy Company and the group meeting at the Delivery Company (Table 2) served as the primary data for the analysis. The group meeting worked as an intervention on the Delivery Company's investment practices by offering a forum for internal development. When we called the Delivery Company's Quality Manager to introduce the topic "facts and feelings behind gas vehicle investments in companies," the manager's spontaneous response was enthusiastic. The invitation resonated with the manager's thoughts on the theme

being topical in the organization and requiring more collective reflection. The topic required discussion with other decision participants from different functions. The Quality Manager saw the group meeting as a forum to introduce the topic to other managers and recognize how each manager's work was related to vehicle investments. Therefore, the intervention initiated by an interest in theoretical contribution had immediate links to practical development (see Lukka & Suomala, 2014 on intellectual virtues in interventionist research). In other words, the intervening researchers worked as boundary subjects (Laine *et al.*, 2016a) when offering a discussion forum for the managers working in the Delivery Company's different functions, and quite essentially, the research data represented a rather authentic interplay between the different managerial actors involved in the decision-making process.

This particular Delivery Company was chosen because of its large fleet, consisting of more than 1000 vehicles, indicating that it was likely to have established investment procedures. In addition, vehicle investment decisions consider sustainability, operational efficiency, and profitability targets, all of which partially overlap in managers' responsibilities. The Delivery Company has officially committed to considering environmental aspects in its procurement, subcontracting, and investment decisions, and has established an official sustainability agenda aimed at reducing its CO₂ emissions by 30% by 2020. It is voluntarily compensating for its carbon emissions, and it recently announced a target of 40% of its vehicle fleet running on alternative fuels.

Table 2. Interviewed managers at the Energy Company and the Delivery Company

Company	Title	Relation to the case company	Interview type
Case Company	Sales Manager	-	Face-to-face interview
Case Company	Network Development Manager	-	Face-to-face interview
Case Company	Head of Business Support, Strategy	-	Face-to-face interview
Case Company	Business Controller	-	Face-to-face interview
Delivery Company	Head of Sustainability, Development Manager, Senior Asset Manager, Heavy Duty Asset Manager, Asset Manager, Category Manager, four researchers	Customer	Group meeting

The group meeting consisted of the following four themes:

- An overview of the business context and decision-making process: The company representatives explained the significance of the vehicle fleet and its role in company operations. They also discussed their roles, interests, and responsibilities in the investment decision-making process.
- An example of investment decision making: The investment decision-making procedure was thoroughly examined by describing the recent switch to the new vehicle technology.

This part of the discussion focused on the criteria used, the influence of external parties, and the uncertainties during the switching decision.

- The role of MA information in decision making: The company representatives discussed the content, role, and sources of MA information in the decision-making process. They also reflected on their use of MA information during the switch.
- Refueling infrastructure as a specific example of the technology switch: The representatives explained the details of the current refueling station network and what potential barriers they saw for the new technology.

Each interview and meeting lasted, on average, for two hours. The interviews and the group meeting were recorded, transcribed, and coded using Atlas.ti, a program for qualitative data analysis. The researchers conducted the group meeting at the Delivery Company collectively to enable them to observe and document the meeting as it happened. Afterward, the observers compared notes and conclusions, and the interpretations were extremely similar. Additionally, a member check (Creswell and Miller, 2000) was conducted with the Delivery Company representatives. The meeting participants reviewed the documented notes, and the notes came back with only minor adjustments in terms of word choice.

4. Exploring the utilization of management accounting information in practice

4.1 Use of management accounting information for the customer company's decision-making process

This section first presents the Energy Company and its current assumptions regarding its customers' MA information use in decision-making. After that, the Energy Company's important customer, the Delivery Company, is analyzed more closely. We investigate the Delivery Company's decision-making process by looking at the analytical and actor-based features in the process. These discoveries unveil the limitations of utilizing MA information in a real-life decision-making context. Section 5 further elaborates upon the several practical limitations identified in the case study.

The Energy Company plans to make large investments in refueling infrastructure to find new distribution channels and markets for its products. The profitability of the infrastructure investment is highly dependent on the future demand for a new alternative fuel vehicle technology. The technology has not yet been widely adopted, but successful business-to-business sales work can increase the demand in the future. Companies' vehicle investments play a significant role in renewing national vehicle fleets and shaping the after-market for used vehicles. For example, in Finland, companies create 30% of new passenger car registrations and almost all new light-duty truck registrations (The Finnish Information Center of Automobile Sector, 2016).

Currently, the Energy Company's sales function is working to promote the adoption of a new vehicle technology. The Energy Company's previous business-to-business customers have mainly represented electricity producers and manufacturing industries. Now, the new vehicle technology is being promoted to other industries as well, such as delivery operators. The Energy Company's sales function is driven by an assumption that most of its customer companies consider vehicle investment decisions based on lower fuel costs. A few customers are assumed to invest in new technology because of lower CO₂ and fine particle emissions. Marketing arguments speak for the *profitability* of the technology, with the assumption that customers' investment decisions are made based on MA tools and facts, such as life-cycle cost (LCC)

analysis or, more specifically, fuel cost comparisons. The sales function has focused on demonstrating a good factual grounding for investment action when justifying the decision based on *profitability* and *sustainability*. Customers' decision-making processes could lead to choosing the Energy Company's new technology if the reasoning followed facts on *profitability* and *sustainability* logically and analytically. According to the sales manager,

If the customers were entirely rational, the facts related to the new technology should speak for themselves.

The marketing arguments related to *profitability* and *sustainability* seemed to be treated as proven facts in the internal discussions. The company representatives viewed the new vehicle technology as a more cost-efficient and environmentally-friendly solution compared with conventional solutions. However, parts of the customer companies' decision processes have remained unclear to the Energy Company, and the assumption on *analytical reasoning* has been questioned lately. Using other approaches to customers' decision making, such as the actor-based approach, is also possible. The actual role that MA information plays in the final investment decision is unknown, according to the sales manager:

There is some sort of a black box in the investment process that we do not understand. Something happens after the door closes and we leave the sales meeting. Even though we had agreed on the facts during the meeting and there was interest in lower fuel costs, the deal does not always get realized in the end.

The researchers facilitated the company representatives' reflections on customers' decision-making processes. Internal development work questioned shared assumptions on how customers reasoned about their investment actions, such as the belief that fuel cost was the main factor prompting customers to invest in the new technology. The joint internal development work included creating LCC analyses on different vehicle fuels, which facilitated reflections on the *profitability* of the technology. The work also included holding an internal R&D workshop on feelings affecting decision making, which questioned the assumption on *analytical reasoning*.

The internal reflections triggered the company's interest in studying the actual role of MA information in its customer companies' decision-making processes. To what extent does the MA information provided (e.g., financial figures, CO₂ emission factors, and technical performance indicators) guide customers' decision making, and how is the utilization of MA information hindered? An interview round (Table 1) was organized to better understand the reasons behind customers' switch in vehicle technology.

After clarifying and identifying the role of MA information utilization in its customers' investment decision-making processes, the Energy Company could gain new knowledge to positively affect customers' willingness to switch to the new technology. Extending the provision and use of MA information among all parties involved may positively affect a company's central processes and future investments. Next, the utilization of MA information for decision making is analyzed at the Energy Company's customer, the Delivery Company. The limitations in utilizing MA information in the decision-making process are also analyzed more closely by looking at the process structure and different managerial viewpoints involved.

4.2 Customers' organizational goals for decision making

The Delivery Company operates a large vehicle fleet of over 1000 vehicles, less than a hundred of which are alternative fuel vehicles. The company has been operating with a large

fleet for many decades, indicating that it has established investment decision-making practices and process structure.

During the past decade, digitalization has shaped the Delivery Company's operational environment in postal and package delivery. The company is partly operating in a regulated natural monopoly, which means that it has to meet service quality standards stipulated in national and EU postal legislation. Simultaneously, the company is competing with private companies offering other courier, shipping, and packaging services. Postal and package delivery has changed remarkably because of decreasing mail volumes and the growing demand for online shopping delivery. These decreasing volumes have set requirements for achieving savings and ensuring the *profitability* of the business. The vehicle fleet needs to adjust to changes in operations while also meeting *efficiently* and profitably the duties set by regulations.

The Delivery Company has officially committed to considering environmental aspects in its procurement, subcontracting, and investment decisions. It has established an official *sustainability* agenda aimed at reducing CO₂ emissions, and is voluntarily compensating for its carbon emissions. Recently, it has also announced a target of 40% of its vehicle fleet running on alternative fuels in the future. The Head of Sustainability expressed her concerns about current investment practices and the challenges of reaching their sustainability goals on time:

We have a pretty ambitious goal of reaching 30% CO₂ savings by 2020. It looks a little bad at the moment, as with these our current actions and operations, we are not going to achieve the goals. Then, we will have to state in public that we need to lower our goals or take more action. This is the specific part for which I join the discussion. In general, CSR is a collaboration between support functions, procurement, and operations, so we now have the right people around this table to discuss the topic. It is fun to do this sort of more systematic exercise about this so that all viewpoints are taken into account.

The changing internal and external conditions put pressure on the Delivery Company to update its current investment criteria and decision-making process. The Asset Manager summed up the situation that the changing conditions required decision outcomes that meet the *sustainability* goals while allowing *flexible* vehicle use in operations:

All in all, this is a new situation for us. Our operations and sustainability values are in transition, and the vehicle fleet needs be more flexible to adjust to these changes in the future.

4.3 Current decision-making process structure

The current decision-making process at the Delivery Company seems to follow a sort of analytical process structure. The current vehicle investment process is applied twice a year (Figure 1). The investments follow a bureaucratic decision-making process, meaning that several people at different organizational levels, instead of a single decision maker, influence the decision, with the final choices are subject to formal authorization. The process follows a structured step-by-step path that involves forecasting the need for a decision, specifying criteria, gathering and analyzing information in a Total Cost of Ownership (TCO) calculation, preparing a proposal on the chosen alternatives, creating tender invitations for the fixed alternatives, taking action, and obtaining feedback from operations.

The Category Manager elaborated on the process stages:

We do pretty large analyses for demand forecasts every five years. These are such significant investments that the decisions are introduced to the Board each year, according to the company's decision-making

principles. The decisions also need to make it through the normal conditions, certain decision-making levels, before they can even reach the Board.

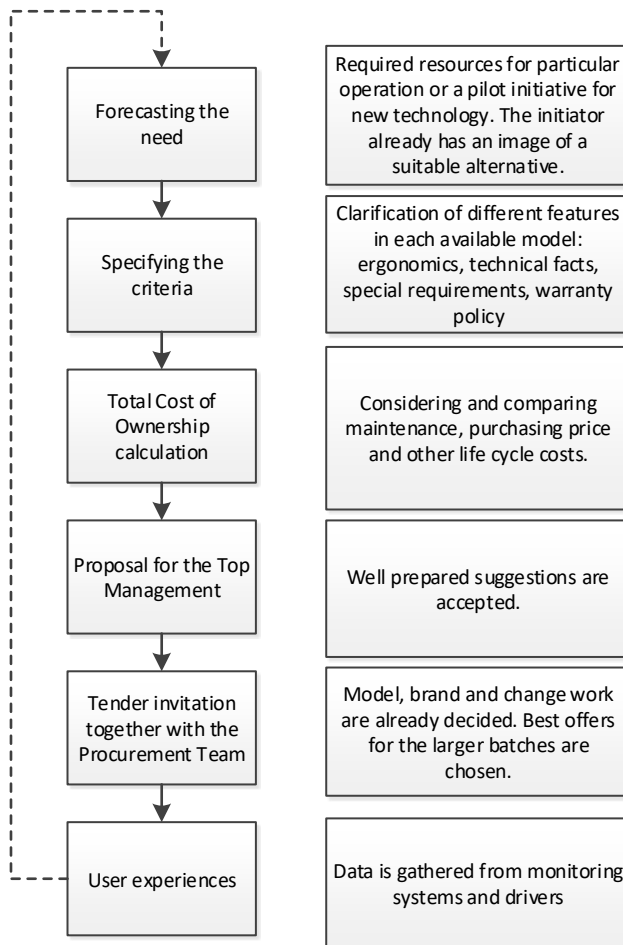


Figure 1. The Delivery Company's investment decision-making process

Fixed decision-making cycles reduce *flexibility* and *operational efficiency* in delivery operations, as the delay between the approved investment decision and the time the vehicles are available can amount to six months. This gap between the need for a vehicle and its delivery is filled by using rental or leasing vehicles. The Senior Asset Manager stated his concern about the current procedures:

We aim to get rid of the cyclical process so that the growing business could be quickly and flexibly supported by the needed investment decisions.

While the analytical features in the decision-making process bring structure and traceability to the Delivery Company's practices, they can also have their drawbacks on other organizational goals.

4.4 The decision-making procedure hindering the utilization of management accounting information

A closer look at the stages of the decision-making process offers an interesting insight into the limitations stemming from the analytical procedure. Certain pieces of MA information might not have a natural place in an organization’s decision-making procedure, although the organization has recognized the overall importance of MA information. While Figure 1 presents the overall decision-making process, Figure 2 presents the particular limitations stemming from the use of the analytical procedure in this particular decision-making context.

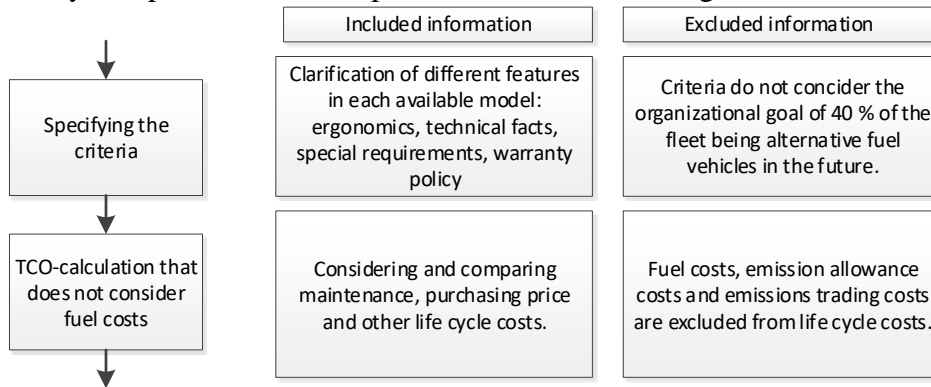


Figure 2. Process stages excluding information on emissions and fuel costs

Figures 1 and 2 show that the investment decision can go through several organization levels. It is compared, evaluated, and finally accepted without fuel cost or CO₂ emission information being considered, although both are regarded as important and are linked to organizational goals. While fuel costs are a major component of a vehicle’s life-cycle costs, representatives excluded them from the TCO calculation (Figure 1). Finding correct fuel consumption figures was considered impossible; consumption varied according to too many different factors, such as the route, stops, traffic, and drivers.

The Asset Manager commented on the decision criteria used that were now mainly defined according to the needs of *operational efficiency*. The defined decision criteria did not allow alternative technologies to enter the investment discussions. These analytical features limited the use of other information sources than those directly linked to criteria. The current decision-making tools were unable to provide alternative options for the decision making. Therefore, a separate decision-making track was used to adopt disruptive technologies outside the routine options:

Our company guidelines have precise definitions of the features that each vehicle model should have when it is ordered from the factory. We have, for example, the following: “the vehicle’s window profile needs to suit delivery operations and be approved by the company.” We do not have any investment criteria for fuel origin or alternative fuels at the moment. Alternative fuel vehicles have been considered as separate decisions, but, of course, these should also be included in the criteria in the future.

Similarly, linking the costs from carbon emission compensation to vehicles’ TCO calculations was considered too complicated. Therefore, CO₂ costs were excluded from the comparisons. Managers’ constrained information provision capabilities hindered linking the *sustainability information* to the decision-making process. In addition to this actor-based limitation, the managers considered the CO₂ allowance costs too small to have impact on organizations’ vehicle fleet decisions. The CO₂ information itself did not motivate the managers to integrate the

information into the decision-making process. The Quality Manager pointed out that CO₂ compensation costs had fallen too far to have any impact on organizations' vehicle fleet decisions:

In recent years, the cost of CO₂ emission allowances has been rather low. In fact, it has not brought us the incentive we initially thought it would—that when CO₂ costs us X euros, it would create an internal motivation to lower the costs. Lately, the allowances have been cheap.

The Energy Company may not have had an opportunity to communicate the less-expensive fuel costs or eco-friendliness of the new technology because the Delivery Company's institutionalized internal process did not require such information. Both the decision-making process and the supporting MA tools provided predictable outcomes rather than directing the decision maker to consider more sustainable or alternative solutions. These analytical features in the used criteria, process structure, and MA tools limited integrating other information into the decision-making process. Instead, the alternative solutions provided by the Energy Company were adopted through case-by-case decisions, according to the Asset Manager of the Delivery Company:

All the alternative fuel vehicles have been handled as separate decisions. They are special cases within the larger investment decision. So far, there have not been any cases in which we had been looking for a vehicle with certain specifications and an alternative fuel vehicle popped up and was chosen. Each time, we have clearly aimed at [purchasing] them.

The Delivery Company did not utilize MA information to integrate fuel costs and emissions into the process, although these were considered important in achieving the organizational goals of *profitability* and *sustainability*. The managers found the integration too difficult, or simply had not considered its impact on the cost comparisons and decision making. The decision on vehicle type was made before preparing the calculations, and the calculations were not used to question or raise new viewpoints. Even if CO₂ and cost-friendliness pointed toward the new vehicle technology, MA information would not suggest this idea for the decision-making process. Although analytical and logical, the procedure seemed to lack reflection on certain managerial viewpoints and even ignore some of the organizational goals.

4.5. Different managerial needs for management accounting information

While the analytical procedure and criteria can ignore information on certain managerial viewpoints, actor-based features can also limit MA information utilization. Managers have different organizational roles, which affect how they see the desired decision outcome. Different personal intentions and organizational roles set different managerial needs for MA information in the process. In their roles, different managers need or appreciate different scope, content, and timing of economic information regarding a decision.

The Delivery Company's decision-making processes involved managers from different organizational functions. The managers had different organizational responsibilities and intentions related to, for instance, the *sustainability* and *operational efficiency* of the vehicle fleet. The Head of Sustainability and the Quality Manager were responsible for *sustainability*-related development work, whereas asset management was more concerned with improving *operational efficiency* and *flexibility* of the fleet. The different expectations for investment

outcome mean different expectations for the MA information regarding the decision: what information should be included in the criteria and when?

Additionally, managers viewed the preferable means to achieve the desired outcomes differently. These different ways of reasoning resulted in different managerial needs regarding the scope, content, and timing of MA information. At the Delivery Company, the managers had different views on how to achieve the *sustainability* targets while ensuring the *profitability* of delivery operations. The representatives considered two ways to integrate fuel cost and emissions-saving considerations into vehicle decisions—either integrate the considerations into the decision-making process before the investment decision or optimize operations after the decision.

The Quality Manager emphasized the importance of integrating sustainability considerations into the vehicle investment criteria before making the decision:

We have tried to integrate corporate social responsibility themes more genuinely into our vehicle investments and our investment decision-making processes, in general, so that they would truly affect the decision making. My personal wish is that they would become even more visible there.

The Head of Sustainability wanted to integrate sustainability factors into the calculation stage of the decision-making process. MA information could serve this need by providing an appropriate decision-making template. A large set of variables, which changes over time, appears to have affected the vehicle investment decision. Making these variables visible in the decision-making process could help position the vehicle investment in the larger decision-making context:

I would be interested in a template presenting all the variables that we should take into account when making a large-scale vehicle investment decision that goes up to the Board. We have interesting factors: a changing market, decreasing volumes, pressure from the company, and municipal customers saying that we should be greener. Therefore, which variables do you include in the calculations? How can you value CSR and eco-friendly procurement, as well as all [other aspects]? That sort of a template would be needed. In the planning phase, we would need material linking our vehicle fleet costs and sustainability management, as well as scenarios that take into account oil prices and costs from carbon trading, which is a continuous and major cost for us.

The Quality Manager had already tried to create such a template using the LCC perspective. However, even external experts could not provide a practical solution to the problem. The variety of different information sources available made the template complicated and thus hindered its use as a helpful and practical tool. This case illustrates the challenges involved in such a complex case and the need to create solutions using MA information. However, lack of expertise in MA tools, an actor-based feature, limited MA information utilization in practice:

I have discussed with Motiva [a government agency offering expertise in energy and material efficiency] how to actually do life-cycle cost analysis so that we could really base our decisions on it. We did not receive a direct answer because there are too many variables involved. I personally hope that we can take a step forward with this in the future.

Contrary to the viewpoints of the Head of Sustainability and the Quality Manager, the Senior Asset Manager did not view the investment decision as a way to decrease costs and emissions. Savings received more attention when the vehicle was already in use. The operative and asset management side believed that driving performance indicators, optimizing routes, and using bicycles for delivery were more direct means of reducing the company's fuel costs and

emissions. Increasing utilization rates and lengthening the lifecycles of vehicles in use had already improved the Delivery Company's vehicle sustainability, according to the Senior Asset Manager:

We have already lengthened the life cycles by adding those vehicles with ending leasing deals to our own balance sheet and by continuing to drive them after that.

Integrating different managerial views from, for instance, sustainability aspects, to the investment decision-making process requires communication among different organizational functions. Making the different viewpoints visible at each stage in the process can help link organizational goals to vehicle decisions more firmly. MA information should therefore facilitate a reflection on how well the alternatives line up with decision makers' intentions and responsibilities, company practices, and economic objectives. One practical solution to finding an appropriate decision-making template would be to create a standardized template for the whole industry, which could agree on the included variables and their updating procedures. This standardization would help decision makers focus on the relevant variables, thus enhancing investment practices within the industry.

To articulate the vehicle solution by using MA information (such as TCO, fuel cost, or CO₂ compensation savings), the Energy Company's message needs to appeal to decision makers' values, intentions, and responsibilities. In practice, this sales work would include delivering suitable MA information and/or tools to the Quality Manager and the Head of Sustainability, as they have already emphasized their commitment to sustainability. The Energy Company should create an investment calculation template that considers the CO₂ savings gained with the decision. This would help with integrating the beneficial MA information into the decision-making process. Finally, the Delivery Company should reinvent its decision-making process structure to include sustainability considerations. This redesign would include persuading the Asset and Procurement Managers to consider fuel and emission savings prior to the actual investment decision, not only during operations.

5. Discussion

5.1 Limitations in the utilization of management accounting information

The aim of this study was to explore *what kinds of limitations in MA information utilization stem from the structured decision-making process involving different managers*. The case analysis focuses on identifying and reflecting upon the analytical and actor-based features of the decision-making in order to unveil such limitations. The case findings suggest that analytical and actor-based features may take different forms in the decision making, and that several practical limitations can hinder MA information utilization. Some relevant MA information may not be included in an organization's decision-making process structure that allows merely conventional, yet analytical, decision alternatives. At the same time, certain actors' viewpoints (such as sustainability metrics) can be excluded from the process without considering the logic behind the exclusion.

We use Figure 3 to structure the discussion on these limitations related to the analytical and actor-based features of decision making (Nielsen *et al.*, 2015; Arbnor, & Bjerke, 2008). The decision-making process in Figure 3 presents a certain process structure with given stages (steps

1–n). Different groups of managers are involved in each stage, as represented by dashed lines. These managers have different organizational responsibilities related to the whole process or to a specific stage. Essentially, the managers as decision makers are individual actors (a) with values (Nørreklit *et al.*, 2010) and intentions (Trenca and Nørreklit, 2017). MA information is utilized for collective sense-making (b) at the boundaries of different organizational functions (Laine *et al.*, 2016a). In this interaction, the managers reflect on how well the used MA information includes viewpoints regarding their responsibilities and perceived organizational goals (c). Such a reflection evolves and may take different forms during the decision-making process, as the configuration as well as the roles and responsibilities of the different managers may evolve along with the process (d).

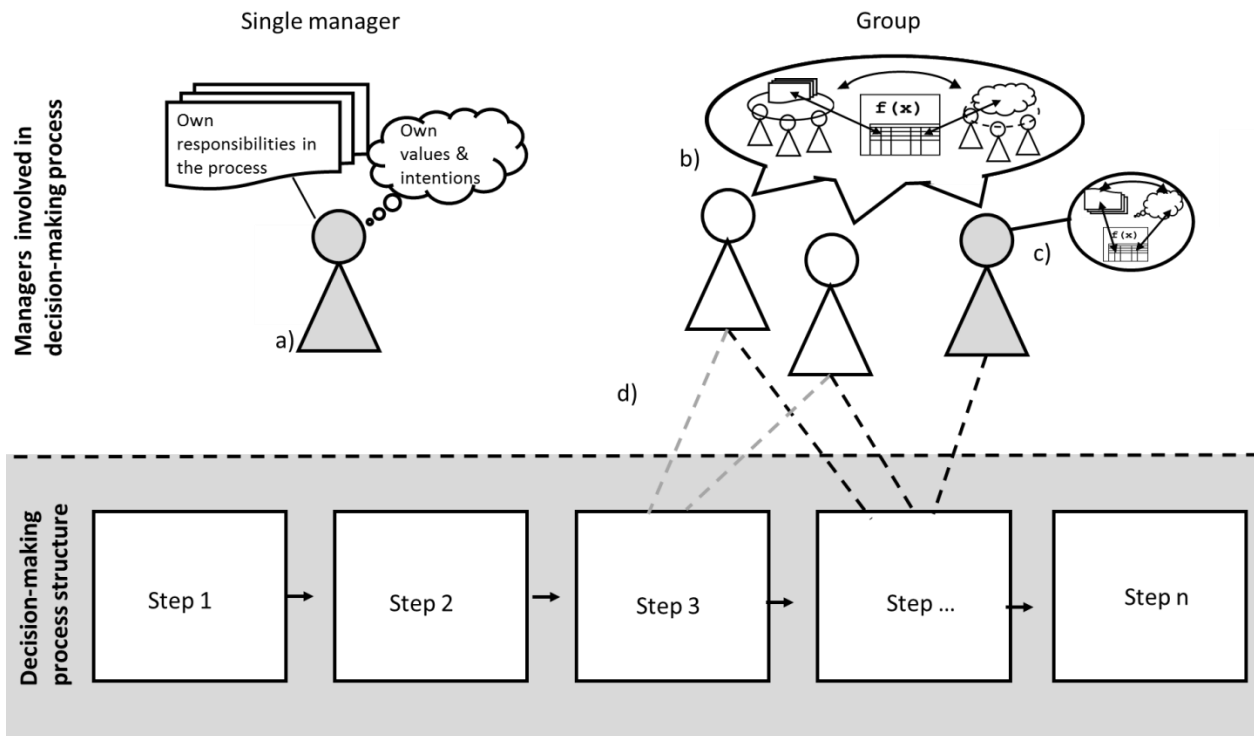


Figure 3: Utilizing MA information for decision making: limitations stemming from the process structure and the managers involved, developed based on the works of Nørreklit *et al.* (2010) and Nielsen *et al.* (2015).

The case study represents a decision-making setting with a well-established decision-making process featuring multiple managerial actors in different roles. The following limitations in MA information utilization were recognized based on the case study in the Energy Company and the Delivery Company:

First, a *lack of expertise in MA tools* hinders managers' ability to link their (or other managers') viewpoints to decision making (a). Managers' constrained information provision capabilities can hinder converting managerial responsibilities and individual intentions into financial terms. Obviously, the overall limitations of human beings in including all the possible aspects into a decision-making situation, such as translating complex phenomena into calculations (Chapman, 1997), always apply. However, the case study findings reveal that

decision making featuring multiple managerial actors with different viewpoints may lead to situations in which the most important factors from certain managers' viewpoints become excluded. Excluding these viewpoints from the calculations limit the use of MA information as an "ammunition machine," as in Burchell *et al.* (1980). From the analytical decision-making perspective, this limitation may hinder the validity of MA analyses and thus their utilization. However, this limitation in the case study was largely related to the insufficient involvement of and the reflections among the actors with respect to the relevant MA information.

In the case study context, although fuel costs and emission allowances were considered as strategically important information, they were not utilized in the decision-making process. The Delivery Company representatives lacked the capabilities and resources to convert sustainability information into financial terms. Individuals in the decision-making group called for integrating such information into the decision-making process, but they lacked a suitable template for the integration. On the other hand, including strategically important non-financial information, such as the CO₂ emissions of the vehicle fleet, into the decision-making process did not have the desired steering impact toward alternative technologies. Individual managers need to obtain expertise in using MA tools so that they can link their strategic aims to the decision-making process in financial terms (Nielsen *et al.*, 2016). For example, finding ways to integrate sustainability themes to the decision-making process requires knowledge of management accounting tools.

Second, *managerial interaction can lack reflection* on taken-for-granted assumptions, or exclude discussions on unconventional solutions (b). Therefore, MA information regarding unconventional decision alternatives is not required or needed in any stage of the decision-making process, and, thus, the decision-making process results in relatively expected decisions. Of course, routine decisions require efficient analyses to allow a smooth decision-making process. However, in the case, the investment decision making is related to the renewal of the company's operations, and thus there is often a need for exploration of unconventional perspectives and alternatives.

In the Delivery Company, MA information was utilized primarily for routine decisions. Calculations compared customary options that differed only slightly from one another in terms of technology and financial impact. The MA tools justified the decisions that were already made and delivered these justifications to the Delivery Company's Board (see, e.g., the rationalization in Burchell *et al.*, 1980). These routines indicate that at points of technological disruption, MA information is unable to introduce potential alternatives into the decision-making process, such as the solutions offered by the Energy Company. Such alternatives would be particularly helpful in this case, especially since Delivery Company representatives expressed interest in integrating sustainability options into future decision making.

Additionally, certain industry-wide assumptions (Tolbert and Zucker, 1999) relating to fuel types or reliable car manufacturers also seemed to influence MA utilization in the Delivery Company. Remarkably, these institutions affected the process as explicit choices regarding the investment criteria or considered options. The process lacked genuine questioning and reflection regarding these assumptions. For MA information to be effective during technological transitions, managers must find a way to position the decision making in a wider context. One such way to do this would be to build a greater understanding of the business context (Hall, 2010). This study also encourages decision makers to reflect on their organizations' collective ways of reasoning and following existing norms and routines. In practice, this could mean

questioning underlying assumptions and beliefs on perceived value and profitability (see Hall, 2010; Miller, 2001 on how accounting facilitates managerial work).

Third, *different managers appreciate different scope, content, and timing of MA information* regarding the decision (c). Different ways of reasoning affect how managers see the desired decision outcome. Thus, extending the actor-based features of decision making could enable an increased awareness of the cognition and preferences of the different actors with respect to the MA analyses. At the same time, the MA analyses could be developed to be more user friendly in some contexts, where this has been identified as a major limitation.

The case study shows that communication regarding MA information may involve technical, financial, or sustainability figures. The parties involved may hold different perceptions and may value certain factors over others. Quite typically, technical figures (such as cost impacts) and personal values (an individual's commitment to sustainability) are intertwined in the observed communication and cannot be easily separated. MA information can serve as a communication platform to open a dialog on different ways of reasoning and whether to include or exclude certain individual and strategic viewpoints (see Laine *et al.*, 2016a). This suggestion is in line with the observation that individual and collective knowledge may be expanded through dialog and negotiation (Cuncliffe, 2004; Gherardi and Nicolini, 2001; Hall, 2010).

Fourth, the *process structure can ignore the needed managerial viewpoints* (d). Although an established analytical procedure can help structure a complex decision-making context (Arbnor & Bjerke, 2008), it can exclude certain actors' viewpoints. Individual managers' unique information sources might not fit or are not included in the decision-making process—a limitation also identified in the case study.

For example, the current decision criteria and process structure in the Delivery Company ignored the sustainability target of 40% of the vehicles being alternative fuel vehicles in the future. This target was a responsibility of the Head of Sustainability, who was keen on including this consideration to the process structure. The case findings highlight the need for building links between individual managers' viewpoints and the process to establish the criteria to be included in the decision-making process. In this case, a few managers wished to include sustainability factors in the initial investment decision-making process, whereas others believed that it was natural to consider such factors when optimizing vehicle operations.

Not all possible managerial viewpoints can be heard and included at each process stage to ensure a functioning decision-making process. Communication and dialog are required to form a collective understanding of the case (Isaacs, 1993; 2001). A shared understanding of the external and internal conditions of the case can help outline the desired decision-making process (Gerdin & Greve, 2004). The process can be updated to involve the necessary parties that share responsibilities for each process stage. As suggested by Laine *et al.* (2016b), social processes of sense-making could help managers identify and interpret the business impacts of complex decisions. The results of the present study confirm this observation and further suggest that such sense-making could take place in different phases of the decision-making procedures, depending on the particular decision-making situation involved and its interfaces to the wider organization. Importantly, such sense-making could either enable consensus with respect to the decision, or result in critical perspectives that could question or significantly alter the present decision-making process.

In sum, the case study identified limitations that were largely related to the insufficient actor-based features in the decision making. Communication and reflection are required for effective MA information utilization in a particular case, as described by Nørreklit *et al.* (2010) among

others. Figure 3 conveys the idea that MA information can either support or contradict pre-assumptions regarding expected financial impacts. In this vein, reflection is required to bring up the particular viewpoints that may significantly affect the interpretation of MA facts regarding such impacts (b, c). However, the case study suggests that extending MA analyses may be also largely beneficial to overcome the limitations of the MA information utilization. In the case study, some managerial actors brought up the need for additional MA tools and MA information to help influence other actors and encourage reflection on the assumptions embedded in the existing decision-making process.

Altogether, reflections on the current analytical and actor-based features of decision making and the related limitations in MA utilization could help managers use MA information more effectively. In the long term the reflections could fulfill the idea of accounting information facilitating and enabling managerial work at different levels, as examined and called for in recent MA studies (Hall, 2010; Miller, 2001; Jordan and Messner, 2012).

6. Conclusion

This study investigated the practical limitations for MA information utilization in decision making. In particular, the study explored limitations stemming from the analytical decision-making process structure and the involvement of several managerial actors. The study contributes to the understanding of supportive MA information utilization for decision making. It also holds implications for developing better functioning MA utilization in practice, thus reinforcing the need to support managerial work through MA information (Hall, 2010).

The case study identified the following limitations hindering the effective use of MA information, largely related to insufficient actor-based features in the decision-making:

- 1) Managers can lack expertise in the use of MA tools.
- 2) Managerial interaction can lack reflection on taken-for-granted assumptions.
- 3) Different managers can desire different scope, content, and timing of MA information.
- 4) The process structure can ignore the needed managerial viewpoints.

The findings suggest that the utilization of MA information in typical analytical decision-making procedures may justify routine decisions without a broader reflection or dialog. This analytical way of use may deter organizations from recognizing potentially valuable solutions outside the scope of their routine decisions, thus decreasing the actual impact of MA information (Wouters and Verdaasdonk, 2002). Actor-based features can also limit MA information utilization. Managers have different organizational roles, which affect how they see the desired decision outcome. Different personal intentions and organizational roles set different managerial needs for MA information in the process. In their roles, different managers need or desire different scope, content, and timing of economic information regarding the decision. They also have limited expertise in MA tools, which limits the integration of certain managerial viewpoints.

Although in the case study, many limitations stemmed from the insufficient actor-based orientation, introducing new MA analyses and extending the validity of analytical approaches may also help overcome some of the limitations. The case study findings reinforce existing results on designing useful MA information (Wouters and Verdaasdonk, 2002) with MA information utilized in a facilitating manner (Miller, 2001), as well as the importance of attaining

an increased understanding of the business context in financial terms (Hall, 2010). More specifically, this study highlights the following avenues through which the existing limitations of effective MA information utilization can be overcome, combining analytical and actor-based features of decision making in a reflective manner:

- 1) Integrate different actors' viewpoints with MA information already in the decision-making process structure.
- 2) Find ways to introduce MA information on unconventional decision alternatives.
- 3) Enable reflection on relevant actors' values, roles, and responsibilities during the execution of decision making.

As a managerial implication, the findings of this case study highlight the need for reflection on the limitations of existing investment decision-making practices. The following questions could guide such reflection: What are the pre-assumptions that guide our investment decisions? Which viewpoints would bring up unconventional, yet potentially valuable, investment alternatives? Developing MA that supports investment decision-making processes is an unceasing process that requires continuous reflection on the industry, the business itself, and the financial impacts of the decisions made. The researchers supported this development work at the Delivery Company by organizing a group meeting that offered managers a discussion forum to reflect on their different viewpoints and decision-making principles.

Finally, ample scope for further research remains. The findings of this study are limited to one empirical context in one industry. The authors believe that building on current and forthcoming cases on MA information utilization would provide an extended understanding of the antecedents and impacts of effective, reflective MA information utilization for decision making.

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