

RISK MANAGEMENT WITH MANAGEMENT CONTROL SYSTEMS: A PRAGMATIC CONSTRUCTIVIST PERSPECTIVE

Rainer Lueg*, Magdalena Knapik*

* Aarhus University, School of Business and Social Sciences Department of Management Bartholins Allé 10 8000 Aarhus C – Denmark

Abstract

This paper addresses the issue that calculative practices build on socially constructed facts that have both subjective and objective components. Using risk management as an example, we take a pragmatic-constructivist stance to explore how such a tool might be integrated in actor-based Management Control Systems. We propose a conceptual framework and a research agenda that accounts for actorship (L. Nørreklit, 2013) beyond numerical facts.

This paper is conceptual and draws on secondary literature. Our framework highlights the non-linear, iterative nature of integrating calculative practices that specifically require complex reflection concerning the [1] validation if possibilities are factual (combining subjective and numerical data), [2] the elimination of illusions and sur-realities through constructive conflict/dialectical management, and [3] the co-construction of organization-wide topoi (causality and pertinent accounting practices). Our research furthers practice research on calculative practices through the development of a prescriptive rather than descriptive framework. It also offers propositions that future case study researchers can use.

Keywords: Management Control Systems, Risk Management, Pragmatic Constructivism, Calculative Practice, Practice Theory

1. INTRODUCTION

Practice theories have become established analytical frameworks in the area of management for understanding how practices vary in organizations (Feldman & Orlikowski, 2011; Vaara & Whittington, 2012). They offer behavioral, actor-based alternatives to dominant systems-based schools of thought, such as contingency theory (Jarzabkowski, 2005). Actor-based theories draw on a variety of concepts, e.g., habitus (Bourdieu & Passeron, 1977), language (Schatzki, 1996), governmentality (Foucault, 1977), networks (Latour, 1987), strategy-as-practice (Whittington, 2006), and pragmatic constructivism (H. Nørreklit et al., 2007). Recently, actor-based perspectives have surged in accounting research, where they help to better understand calculative practices for decision making, strategic performance management, new product development, outsourcing, customer accounting, and strategy development (e.g., Ahrens & Chapman, 2007; Cinquini et al., 2012; Cinquini et al., 2013; Jakobsen et al., 2011; Jakobsen & Lueg, 2012; Jørgensen & Messner, 2010; Laine, Cinquini, et al., 2013; Laine, Suomala, et al., 2013; Nielsen et al., 2015; Roslender & Hart, 2010; Seal & Mattimoe, 2014; Whittle & Mueller, 2010).

However, the practice turn in accounting research is far from completed. First, there are several open calls in the literature to investigate how actors construct causality based on calculative practices (Laine, Suomala, et al., 2013), e.g., in balancing strategic objectives (Nixon & Burns, 2012, p. 236), the interplay of organizational practices and

topoi with individual ones (Jarzabkowski & Spee, 2009, p. 83), or variations in the same practice among actors (Vaara & Whittington, 2012, p. 87). Second, many related studies are inductive or descriptive. The lack of prescriptive work disadvantages actor-based work against mainstream research. The development of practice frameworks would lend validity to existing findings. Our work addresses this research gap. We pick the topic of risk management because it is a popular calculative practice across industries and company sizes. Alhawari et al. (2012) note that risk management is a key success factor in many organizations. Mikes (2009) adds that there has been increased interest in enterprise risk management. According to Neef (2005), a company cannot manage risk without sharing information. Without sufficient knowledge to communicate risk, risk management is both ineffective and inefficient. The problem with managing risk appears to lay in the design of management control systems (MCS). MCS play an important role in facilitating and supporting communication and knowledge sharing to achieve organizational objectives (Boer, 2005; Davenport & Prusak, 1998; Hansen, 2002). Klinke and Renn (2002) refer to this concern and steer the debate to the interaction of actors and the calculative practices. Their key issue concerns the assessment of probabilities and the degree to which such assessments can be represented objectively/technically by analysis (*pragmatism*). Otherwise, appraisals reflect only the (subjective) conventions of risk assessors (*constructivism*). The dual nature of risk assessment suggests a pragmatic

constructivist view of reality - employing values, facts, logic/possibilities and communication - which influences how risk should be managed. To sum up, we ask: *How can actors use MCS to manage risk in the pragmatic constructivism paradigm?*

To address this question, we develop a framework that maps the role of MCS (e.g., input, process and output controls) for risk management according to the elements of reality in pragmatic constructivism (facts, logic/possibilities, values, communication). We highlight that the integration among the latter four elements is the key to creating a joint reality among actors, and to developing a functioning risk management (L. Nørreklit, 2011a). In particular, we emphasize the integrative elements of the framework that require complex reflection by the actors, i.e., the [1] validation if possibilities are factual (combining subjective and numerical data), [2] the elimination of illusions and sur-realities through constructive conflict/dialectical management, and [3] the co-construction of organization-wide topoi (causality and pertinent accounting practices). We contribute to the literature by offering a prescriptive actor-based framework and pertinent propositions for future research.

The remainder of the paper is organized as follows. Section 2 offers a theoretical background on risk management, MCS, and pragmatic constructivism. Section 3 develops the framework. Section 4 discusses the limitations of our work and contemplates the contribution to future research.

2. THEORETICAL BACKGROUND

2.1. Risk Management

Generally, risk describes various, quantifiable outcomes to which probabilities can be attached. In this basic form, risk depicts variance that can lead to losses, but also gains. The assessment of its magnitude must be based on facts, which are often deduced from small samples taken of a basic population (Preyssl, 1995; Ross & Westerfield, 2015). Accordingly, risk differs from uncertainty, for which it is not possible to obtain a quantifiable measurement of likelihood (Borisov & Lueg, 2012; Lueg & Borisov, 2014).

In risk management, risk is often seen more narrowly as a potential loss. Some managers may try to exploit opportunities of risk. Yet, most risk managers have the organizational topos to minimize, monitor, and control risk (Andersen, 2008; Klinke & Renn, 2002). The amount of risk depends on the strength of the *cause-and-effect* relationship between the underlying risk driver (e.g., the weather) and the consequence (e.g., agricultural harvest). Risk management responds by using *finality* relationships to manage the risk drivers (e.g., for the weather: choice of location and timing) or mitigating the consequences (e.g., alternative supply chains, or price adjustments) (for new product development, cf. Laine, Suomala, et al., 2013). Managing risk is complex as risk can have several causes and intertwined effects (Alhawari et al., 2012, p. 51). Smith and Merrit (2002) summarize the usual components of risk management in five procedural steps. First, the logical underlying sources and consequences of risk must be identified. They should be documented and communicated to all

involved actors. Second, the sources of risk have to be linked to a timeline of occurrences, the probability of each occurrence, and the impact on the organization. Third, the actors need to map and prioritize which risk factors have to be managed timely and thoroughly. Fourth, action plans have to be implemented. Risk can either be accepted or avoided. For the latter, actors may share their knowledge of the best alternatives to avoid risk-carrying activities, transfer risk, provide redundant emergency paths, or mitigate risk by developing prevention plans. Fifth, risk must be monitored to ensure that action plans can be initiated when needed.

Neef (2005) states that an organization cannot manage risk without sharing information and best practices among actors. MCS facilitate this communication (Boer, 2005; Davenport & Prusak, 1998; Hansen, 2002). According to Neef (2005), effective risk management is rooted in an organization's ability to mobilize its employees' expertise on sources of risk, and to provide decision makers with accurate and timely information (also: Laine, Suomala, et al., 2013). This corresponds to the pragmatic-constructivist view that an ongoing narration on accounting enables actors to create and integrate their topoi, while exerting control at the same time (L. Nørreklit, 2013, p. 59). Some of this communicated information may be quantifiable. Yet, research suggests that much of this information is qualitative, implicit, and rooted in the values of the involved actors (e.g., Baldvinsdottir et al., 2011; Jørgensen & Messner, 2010; Laine, Cinquini, et al., 2013; Mikes, 2009). This view makes the application of pragmatic constructivism particularly suitable, as facts and possibilities have to be integrated into a shared reality among actors.

2.2. Management Control Systems for risk management

This section introduces the concept of MCS to explore how these systems can inform risk management by mobilizing workers' knowledge and expertise (Ditillo, 2004, 2012; Hansen, 1999). MCS enable information processing and create incentives and boundaries for actors to behave in accordance with company objectives (Burkert & Lueg, 2013; IFAC, 2002; Turner & Makhija, 2006). The literature provides different approaches to MCS (Anthony, 1965; Chenhall, 2003; Malmi & Brown, 2008; Merchant & Van der Stede, 2011; Otley, 1999; Simons, 1990). According to Merchant and Van der Stede (2011) and Ferreira and Otley (2009), management control refers to managing behavior for achieving organizational objectives. Abernethy and Brownell (1997) follow the same line of thinking and define MCS as a combination of controls that increase the probability that actors behave coherently with organizational topoi (L. Nørreklit et al., 2006). MCS provide information that is used to support managers in performing their duties and that assists in developing and maintaining patterns of behavior (Otley, 1999). MCS provide decision-making support, allowing managers to scan the system not only to use up-to-date information, but also to monitor the organization's current situation by comparing that information against prior goals and expectations. We use the conceptualization of

Merchant and Van der Stede (2011) since it is both the most recent and comprehensive one, thereby incorporating many previous ideas. In the following, we elaborate on Merchant and Van der Stede's (2011) typology grouped by input controls (*personnel* and *cultural* controls), process controls (*action* controls) and output controls (*results* controls).

2.2.1. Input controls (*personnel and cultural*)

Input controls comprise personnel controls (e.g., personnel selection, training, job design, and resource provision) and cultural controls (e.g., tone from the top, codes of conduct, rewards, and mutual monitoring). Merchant and Van der Stede (2011) claim that personnel controls help organizations build on actors' inclination to manage themselves. Cultural controls refer to a set of values—such as trust, social norms and beliefs—which are shared, and guide actions (Ditillo, 2004, p. 409).

Values can be extrinsic and intrinsic motivators. Organizations can facilitate congruence between organizational and personal topoi by fostering commitment (L. Nørreklit, 2013). Turner and Makhija (2006) state that group culture introduces harmony to processes and provides a shared view of reality (Lueg et al., 2014; L. Nørreklit, 2011a). Trust supports controls in various ways: trust and control can be perceived as alternatives, control can build trust, a control system can be an expression of a trust, and trust is necessary to build control (Berry et al., 2009; Beusch, 2012; Lueg & Pedersen, 2014). According to Hansen (2002), knowledge transfer can be achieved not through formalization of the content, but instead through direct relationships among actors. As a result, personnel control in the form of careful selection and training can help develop common knowledge among actors and thus can trigger knowledge transfers (Hansen, 1999).

2.2.2. Process controls (*actions*)

Process controls - e.g., accountability - also enable knowledge transfers among actors (Ditillo, 2012; Merchant & Van der Stede, 2011). They help to determine who is accountable for which decisions, how decisions are made, how decisions affect other areas, and what the best practices are. According to Turner and Makhija (2006), process controls reveal operating procedures and rules, and clarify established manners of sharing information regarding related job descriptions, relationships, groupings and settings. Process-related rules and procedures motivate individuals both to interact with one another and to devote time and effort to knowledge sharing and personal development (Ditillo, 2012, p. 431).

To ensure that people's knowledge is credible and that everyone is committed to organizational objectives, interaction among individuals is necessary (Ditillo, 2012, p. 429; L. Nørreklit et al., 2006). Hansen (1999) emphasizes that discussions are necessary to clarify missing information when actors encounter complexity-related difficulties in transferring knowledge about risk. Furthermore, Ditillo (2012) claims that action controls define roles and activate connections, and when individuals

collaborate, controls stimulate the knowledge transfer of existing opportunities.

2.2.3. Output controls (*results*)

Results controls comprise target setting, rewards, and decision-making authorization. These facilitate the transfer of knowledge through vertical information flow, which can be accomplished through dialogue instead of through one-directional communication (Ditillo, 2012). According to the results-oriented approach, control can serve output-related behavior (Albertsen & Lueg, 2014; Turner & Makhija, 2006) by "*setting targets, reporting achievements, accountability, and reward structure that serve to foster output-directed behaviour,*" (Ditillo, 2004, p. 409). The challenge is to obtain cost-efficient, precise, understandable, congruent (with personal topoi), and timely results.

'Outcome-related knowledge [...] can be transferred in a mediated way, without requiring a face-to-face and immediate contact [...]. Based on these properties, the results control in a form of goals setting [...] may provide useful information for benchmarking purposes and transfer information on the objectives and results achieved [...].' (Ditillo, 2012, p. 429)

2.3. The Pragmatic Constructivist perspective on calculative practices

To better understand the integration of risk management with MCS, we take a pragmatic-constructivist perspective (Cinquini et al., 2013; Laine, Cinquini, et al., 2013; L. Nørreklit, 2011a). Pragmatic constructivism is an actor-based approach that accounts for the subjective, value-laden nature of human perception. This approach causes a shift from deterministic management and control toward actor-based leadership, in which actors co-create their managerial reality (called "actorship"; L. Nørreklit, 2013). Such an approach aims to generate intrinsic motivation by empowering actors to influence their reality (L. Nørreklit, 2011b). Pragmatic constructivism thereby targets the issue why risk is assessed differently among actors, and how they can communicate to create a shared reality (L. Nørreklit, 2011a).

A positivist view might ignore human information processing in risk analysis and assessment. Conversely, a genuine constructivist perspective would only focus on subjective assessment, which under-values the existence of facts in risk assessment (Klinke & Renn, 2002). The pragmatic-constructivist view, however, allows for a dual risk management strategy in which values and possibilities create a fact-based reality. As Klinke and Renn (2002, p. 1073) put it:

"The constructivist camp claims that risk assessments constitute mental constructions that can be checked at best against standards of consistency, cohesion, and internal conventions of logical deduction. However, these estimates of risk constitute true representations of observable hazards that can and will affect people as predicted by the calculated results regardless of the beliefs or convictions of the analysts involved."

The dual nature of risk management is reflected in pragmatic constructivism, which

integrates facts, possibilities/logic, values, and communication to a shared reality (L. Nørreklit, 2011a). When these four dimensions are not integrated, assessments can be abstract and can lead to meaningless results (L. Nørreklit et al., 2006). Applying the four dimensions facilitates the assessment of practices in risk management:

Facts are phenomena that can be easily referenced, and that are known from experience or systematic observation. Facts can be socially constructed, so they are not automatically the same as 'things' we would encounter in the 'world'. This makes reality a construct, and thus different from 'the world' (L. Nørreklit, 2013). Still, facts are reliable and widely accepted (H. Nørreklit et al., 2010). Facts are also regarded as the cognitive relationships between the 'world' and an actor, i.e., they facilitate action (L. Nørreklit, 2011a). *Possibilities* (also called *logic*) can be found through the constructive use of logical operations, and they can modify actors' reality. Factual possibilities therefore arise from reflection through logical operations that offer possibilities.

"Facts themselves do not constitute reality, possibilities are also necessary [...]; if one cannot recognise possibilities, then one cannot plan for the future." (Nørreklit et al., 2006, p. 46)

Values guide actors' decisions and actions. To identify the existence of possibilities, facts must exist that one can reflect upon. Thus, it is important to define who the actors are, and which values motivate them (not) to act:

"[I]f the world does not appeal to the values of a person, that person becomes passive." (L. Nørreklit et al., 2006, p. 47)

Communication is the mechanism that integrates the other elements of reality (L. Nørreklit, 2011a). Communication is more than a simple exchange of information; rather, it involves coordination, social positioning and interaction (Seal, 2012). It enables values and possibilities to be combined so that people can act.

"Without communication, only individual reality exists: there is no intersubjective socially organised reality, and neither companies nor institutions to be managed [...]. Communication, including the fundamental tool of language, enables people to cooperate and management to access the subjective worlds of the values and reasoning of employees." (L. Nørreklit et al., 2006, p. 48)

Seal (2012, p. 236) suggests avenues for future research on pragmatic constructivism. He proposes an iterative structural model, in which communication creates reality through the integration of facts, possibilities and values. Each possibility represents a different option that could be decided upon, and it must be easily and clearly communicated in a manner that conforms to the actors' values and to their limits of accountability; otherwise, they will not perform. We follow Seal's (2012) basic ideas when drafting our framework. Risk management focuses on a reality in which elements such as facts, values, communication and possibilities must be integrated to create functional results. MCS should be implemented in risk management to promote an actor-based reality in complex environments requiring compromises between actors that will eventually lead to shared, organizational topoi (L. Nørreklit, 2011a, 2013; Seal

& Mattimoe, 2014). Hence, the first parameter of our framework will be the four elements of reality according to pragmatic constructivism (facts, possibilities, values, and communication). The second parameter is the range of general options of control in any given MCS (input, process, and output). Within the currently white spot of the framework, we will suggest how calculative practices (in our case risk management) can unfold.

Figure 1. Basic framework

	<i>Facts</i>	<i>Possibilities</i>	<i>Values</i>	<i>Communication</i>
<i>Input controls</i>	RISK MANAGEMENT			
<i>Process controls</i>				
<i>Output controls</i>				

3. FRAMEWORK DEVELOPMENT WITHIN MANAGEMENT ACCOUNTING

We will now suggest how essential elements of risk management can be integrated into MCS from a pragmatic constructivist perspective, i.e., according to facts, possibilities, values and communication. Thereby, input controls generally support identifying risks, process controls foster the evaluation of risks (planning, prioritizing, resolving), and output controls serve to monitor and manage risks.

3.1. Facts

Actors are confronted with facts. Facts are phenomena that can be easily referenced and that provide information. These can be brute facts (such as the weather), physical resources of which they can dispose, or socially constructed facts (such as the changing value of inventory). Accounting information can reveal issues that are overlooked during normal activities; moreover, it can provide independent control over operations to increase managerial awareness. Accounting information makes important aspects about the company available, allowing actors to determine the meaning and significance of all company operations (H. Nørreklit et al., 2010; L. Nørreklit et al., 2006). Accounting data might also supply assistance for risk assessment in an implicit, rather than an explicit, manner (Farrelly et al., 1985, p.279). These manifest in IT systems, accounting principles, notes, or manuals on risk management.

To ensure that facts are controlled for management purposes, output controls can be implemented. According to Ditillo (2012), outcome-related knowledge provides information for benchmarking purposes, and reporting achievements can emerge in the form of knowledge about risks. Results controls help define benchmarks that are important for identifying both risk and how to decentralize the source of accounting information to match local expertise.

3.2. Logic/possibilities

In terms of logistics, the managers might rely on their own idiosyncratic business and management ideas and values; however, they could also draw on a

body of expertise about management nurtured in university courses and communicated via specialist journals and conferences (Nielsen et al., 2015). In any case, it should be assumed that actors need to mindfully reflect on risks, because quantitative analysis of risks alone cannot make a business work. There are several types of controls that can motivate actors to exercise their qualitative judgements. These include personnel controls where knowledgeable, experienced actors are responsible for risk management, a specified catalogue which actions are prescribed and which request empowerment, as well as a shared set of rules and guidelines actors should follow (L. Nørreklit, 2011b). As pointed out by Jakobsen and Lueg (2014), superiors need to discuss in detail if they want to adhere to the controllability principle (i.e., individual accountability = individual discretion), or if for the sake of the bigger picture, such as group performance or inter-departmental collaboration, the controllability principle should be breached (individual accountability > individual discretion).

An analysis of the facts from the input enables the identification of risk factors to reduce risk through risk analysis, assessment and finally, the decisions made (e.g., L. Nørreklit, 2013, p. 61). At this point, the perspectives of facts and possibilities become integrated into reality (L. Nørreklit, 2011a). The discussions of risk in management-accounting texts have most commonly been linked to rational concepts and the use of probability analysis (decision trees, deviations, variance and portfolio analysis), primarily in the context of capital budgeting decisions to reflect the unpredictability element (Collier & Berry, 2002, p. 276). During the process of making outsourcing decisions, special simulation-driven analyses have also been conducted to estimate revenue impact and additional savings when assets are disposed of following outsourcing (e.g., factory and building closures) (Nielsen et al., 2015, p. 73). However, risk assessment also has subjective components. Besides numerical facts, actors also need to exercise judgment if the facts they encounter contain possibilities to manage risk (H. Nørreklit et al., 2010). Some of these possibilities will turn out to be *factual* and make the business work. Others will turn out to be *illusive* after mindful consideration (L. Nørreklit, 2013), e.g., historic prices of inventory that cannot be realized anymore given technological progress. The integration of facts and possibilities can happen as logical analyses with accounting data are performed, such as decision trees on outsourcing, variance analyses, or net-present-value analyses. At this point, it might be conducive to the risk management process to establish links to other accountable departments beyond the finance and accounting function in order to profit from their input (Seal & Mattimoe, 2014).

The joint planning of departments allows the creation of output controls, such as target setting, the drafting of budgets, and monitoring schemes for value drivers. Depending on how control is implemented in an organization, the budgeting process can reflect a compromise among topoi. Differences in topoi need to be shared, since risk analysis will prove difficult when actors keep their implicit expectations to themselves until the end of a budget period (Collier & Berry, 2002).

3.3. Values

As to input controls, values are reflected in risk assessments and management decisions (Pidgeon, 1998). If the facts and possibilities related to reducing risk are supposed to be valuable to actors, it is important to know who is involved in the process, what is required from such individuals, and what the motivation is for an actor to be involved in the system. There is a danger that corporate policies from top management create a non-functional relation between the underlying causes of risk (the 'world') and the actor who locally manages risk 'in reality' (L. Nørreklit, 2011a). An example could be that inventory re-valuations relating to technological obsolescence are made periodically only, or - alternatively - whenever a decision to invest into new technology is due. In this case, the corporate headquarters would perform very different risk assessments and inventory valuations than the local business units who are in daily contact with customers that might be unwilling to pay for outdated technology. Whether such a *surreality* (Jakobsen & Lueg, 2014) is created depends on the integration of the four pragmatic constructivist elements. If communication functions, top management and the accountable actors can agree on construct causality (Laine, Suomala, et al., 2013), and co-create MCS that truthfully represent a joint reality. The values/motives of actors are the basis for action. If the situation does not appeal to the person's values, the person will not be willing to contribute (H. Nørreklit et al., 2010). Joint values foster cultural controls, while disagreement would be - wrongfully - understood as obstructive (Seal & Mattimoe, 2014).

Values can also be subject to process controls in risk management. According to Brunsson (1989, p. 105f), budgets are not neutral reflections of economic rationale:

"Because of its relatively loose links with action, budgeting provides a good instrument for conducting politics and producing hypocrisy."

Ryan and Wentzel (2000, p.134) suggest that actors' risk preferences impact resource-allocation decisions in participative budgeting processes. During situations of unfavorable variance and pressure, actors might engage in more risk-seeking behavior (Tversky & Kahneman, 1992). Under stable conditions, actors may prefer to play safe and underinvest in new, riskier technologies (Ko, 2004). Both reactions are likely to be unfavorable for the organization as a whole.

The output in the value dimension can then be linked to output controls (Collier & Berry, 2002, p. 276). The social construction perspective is represented in work such as that of Czarniawska-Joerges and Jacobsson (1989, p. 29), who depict calculative practices, such budgets as

"a symbolic performance rather than a decision-making process; a means of conversation rather than a means of control; and an expression of values rather than an instrument for action."

Such purely 'symbolic' use of calculative practices (Vandenbosch, 1999) can render support for any opportunistic motives an actor might have to shield herself against surrealities created by top managers. If - on the contrary - top managers and actors share values and co-create MCS and their

logical links, organizations may profit from adjusted cognition and behaviors. Actors tend to learn from their mistakes and eliminate some biases when using calculative practices (cf. section 3.2). Thereby, budgets are an expression of actors' values, and their attainment and variances can reflect how values changed in a time period.

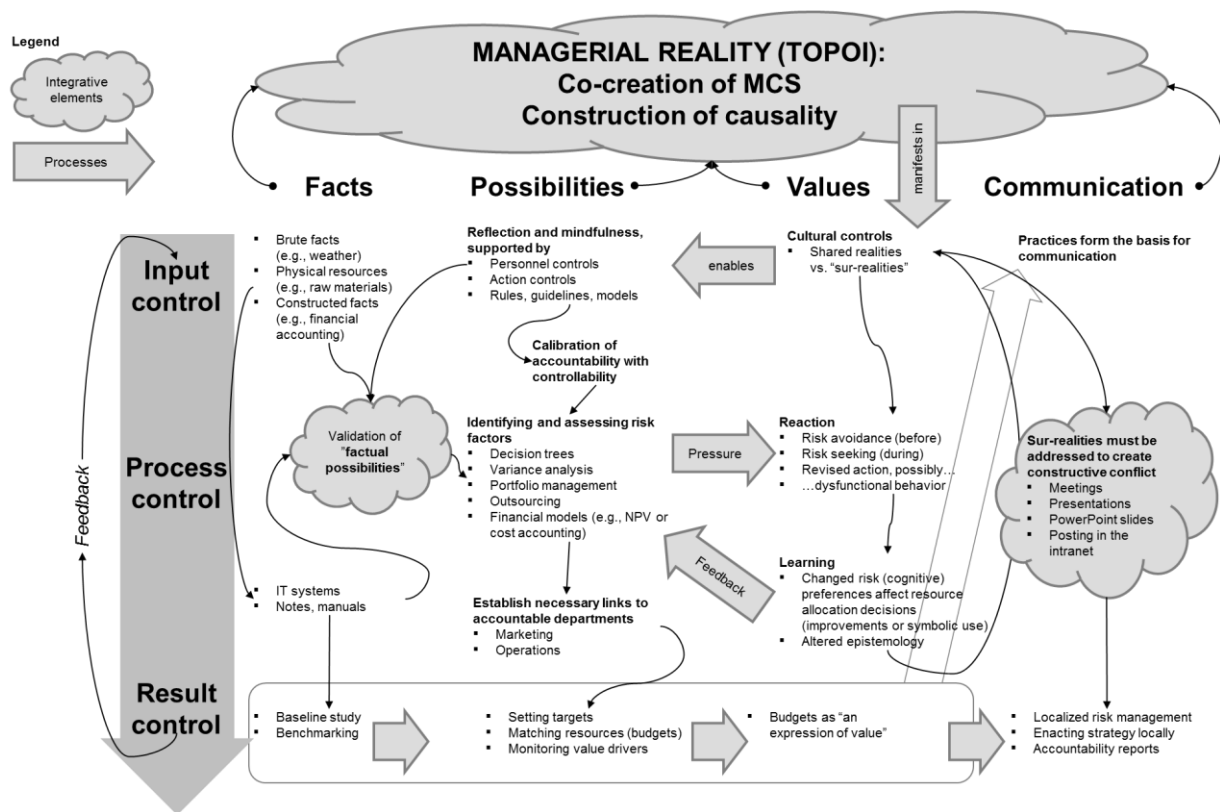
3.4. Communication

Communication should be organized in a manner that specifies who performs which roles in the system, which competencies one has, how information is communicated, and to whom. The calculative practices discussed above can be used as inputs to communication, e.g., in presentations and meetings. In addition, personnel control - in the form of competence training and job design - facilitates the sharing of feedback. Information feedback loops are developed to provide management with almost real-time risk data.

For the process controls in risk management - in which the identification of risk factors and planning actions is required (cf. section 3.2) -

communication plays a key role, especially in resolving discrepancies among risk perceptions, values and expertise (Miller et al., 2008). Participatory discourses are used to search for solutions, and they allow people with the necessary competencies to reflect on the facts, and to identify opportunities to reduce risk. Process controls need to ensure that actors are incentivized to engage in 'constructive conflict' (if it is across functions: "dialectical management": Seal & Mattimoe, 2014) that exposes illusions (Jack, 2014; L. Nørreklit, 2011a), surrealities (Jakobsen & Lueg, 2014), and realities that actually work for managing risks. To ensure that discussion occurs between the actors who provide the information for the system, and that the rules are clarified to share information, action control is advisable (Ditillo, 2012). Communication among involved actors can be initiated through mandatory meetings, presentations, or posting comments in the intranet how an actor has appraised a specific risk (e.g., how updates are done, assessing the effectiveness of risk treatment, and identify new sources of risk).

Figure 2. Framework consisting of selected MCS controls with pragmatic-constructivist elements and risk management processes



As to output controls, actors must have access to financial and operational reports which give them feedback on risk levels. Financial reports are a means for communication, for example, by providing evidence of the perceived riskiness of inventory (Farrelly et al., 1985, p. 278). This feedback is useful for verifying the effectiveness of decisions. In addition, calculating risk exposure provides a view of residual risk that is dynamically updated when changes in underlying factors occur. By discussing risk exposure, causality is being constructed, and the risk management system becomes a better reflection of reality (Grody et al., 2010, p. 11). With shared organizational topoi, trusting actors and handling risk becomes easier. Eventually, risk management and the accountability for it can be localized. This increases the effectiveness of risk management as actors can give local meaning to 'what works' in risk management. We summarize the relations of controls and reality construction for the specific case of risk management in Figure 2.

4. DISCUSSION

4.1. Contributions

Our work problematizes how actors can use MCS to manage risk in a pragmatic constructivism paradigm. We make several conceptual and practical contributions.

First, we address relevant research gaps between practice theory, calculative practices, and pragmatic constructivism (Mikes, 2009; Seal, 2012; Whittington, 2006). We highlight the importance of implementing controls while providing a constant discourse among the actors to verify both the causes and levels of risk (L. Nørreklit, 2013). Consequently, decisions to lower risk can be made. Control can also ensure that activities are performed and that relevant facts are considered in the risk management process (H. Nørreklit et al., 2010). If discourse is provided and information can be defined by experts, then the analysis can be trustworthy. Otherwise, there is no commonly shared risk reality, and risk is perceived differently by different actors (L. Nørreklit, 2011a). We specifically lay emphasis on the fact that the framework is not a matrix that invites for a 'box-ticking exercise'. Effective risk management is not in place when certain content or controls are simply 'present' as system-based theories suggest. Rather, actors a necessary that shape risk management practices (Jarzabkowski, 2005; Lueg & Nørreklit, 2012). Hence, our framework relies on several intertwined processes (arrows) and reality-integrating elements that require complex reflection by actors (clouds). We highlight that a pragmatic-constructivist approach is more of a management paradigm that needs reflection when executed, not a deterministic *how-to/if-then* list for quick fixes (Ancelin-Bourguignon, 2012). As Nørreklit (2013, p. 64) puts it:

"There is, however, no theoretically a priori correct way to integrate the four dimensions. In the end there is only a pragmatic answer. Therefore the integration, which is a construct, is a pragmatic construct."

Second, we strengthen the interpretative paradigm in research surrounding calculative practices (Lueg, 2009; Nielsen et al., 2015; Olsson, 2007; Seal & Mattimoe, 2014). Specifically, we substantiate that risk management has both calculable and qualitative elements. Thereby, we highlight that incalculable elements cannot be automatically seen as *uncertainty* (Klinke & Renn, 2002) and should hence not be categorically excluded from risk management.

Third, this paper contributes to pragmatic constructivism in an actor-based reality by examining facts, values, possibilities and communication (Jakobsen et al., 2011; H. Nørreklit et al., 2010; L. Nørreklit et al., 2006; Seal, 2012), which have been previously reported in an actor-based approach (Olsson, 2007; Pidgeon, 1998). We highlight that communication through MCS (Hansen, 2002) plays a pivotal role in integrating the four elements into a coherent reality (Ditillo, 2004, 2012; Turner & Makhija, 2006).

4.2. Propositions for future research

The framework should support future research on investigating calculative practices from a pragmatic-constructivist view. Case studies on single organizations would be particular suitable given the pragmatic-constructivist paradigm. Mixed methods would be the most appropriate (Mary A. Malina et al., 2011), because they would do justice to the objective/subjective nature of calculative practices. We encourage future researchers and practitioners to specifically focus on the three main integrative fields of the framework (indicated by the balloons). We make the following general propositions:

1. *Calculative practices must be reflections of factual possibilities.* To begin with: if managers use calculative practices such as risk management or budgets simply symbolically for political purposes (Vandenbosch, 1999), the practices are not reflection of values of all actors. A validation if possibilities are factual can be done by combining subjective and numerical data to see in how far the latent values are reflected in manifest constructs. Huelsbeck et al. (2011) use longitudinal data to verify if the intended business model of a company has worked over the past years. While they cannot show a statistical relationship of the MCS and performance, they find the qualitative narratives of managers why they pursue this business model compelling. Already Malina et al. (2007) have found qualitative evidence that MCS create an effective climate of control (*finality, intentionality*) even without statistically significant relationships (*cause-and-effect*). Another aspect of possibilities—or *logic* (L. Nørreklit, 2011a)—is how MCS can work. Future research on performance management should better define *how* MCS contribute to performance through practices, not which components they consist of. They should better differentiate between finality and cause-and-effect to come to more meaningful conclusions (Lueg & Nørreklit, 2012; Mary A. Malina et al., 2007; H. Nørreklit, 2000).

2. *Illusions and surrealities can be eliminated through communication and constructive conflict.* Control departments might have different topoi concerning risk management, which may lead to different assessment principles depending on

whether they are a corporate or a local unit. This may lead to surrealties (or even illusions) when the risk managers at headquarters value the technical inventory differently than the local risk managers to satisfy their topoi. Jakobsen and Lueg (2014) trace such surrealties back to unintended breaches of the controllability principle. They suggest resolving these conflicts through communication across hierarchies. Similar, Mattimoe and Seal (2014) see constructive conflict (dialectical management) as a strength that actors need to exploit rather than avoid.

3. *Actors need construct causality so that their values and topoi are reflected in the MCS* (H. Nørreklit et al., 2012). Mainstream researchers suggest a top-down implementation of centrally coordinated MCS (Kaplan & Norton, 2008). Yet, the paradigm of pragmatic constructivism requires that all relevant actors' facts, possibilities, values and communication are integrated across managerial levels. An example of this is practice is depicted by Baldvinsdottir et al. (2011) on the MCS of the British organization TESCO. Again, future research could delve into the issue which kind of causality the MCS depicts (H. Nørreklit, 2000). Our framework is a further step toward what Nørreklit (2013, p. 59) calls "actorship": the development of formal and informal communication among actors should shape their individual topoi into an organizational one, which can "guide the ongoing coordinating narration controlling the (inter-)action".

4.3. Limitations

Our conceptualization is subject to several limitations. First, a differentiation among facts, values and possibilities is not always conclusive. Values can be understood as motives, which are affected by the facts that can be obtained. Therefore, facts and values become one element, i.e., valuable facts. Similarly, logic/possibilities can be interpreted as the means to obtain facts, but when new facts are obtained, new possibilities emerge that can become facts, leading to factual possibilities. Another difficulty concerns whether the specialized, technical language of calculative practices should be treated as communication or as a factual terminology used (Schatzki, 1996). Expressions of facts and their interpretations could be analyzed as either facts or communication. A specific problem related to a possible future case study concerns whether technical language is an innate competency of an actor, or an expression (communication) thereof.

All of these dilemmas caused bias in the interpretation of these elements in the risk management process and in the choice of controls for the specific pragmatic-constructivist elements in risk management. Therefore, the compatibility of pragmatic constructivism and MCS was presented generally, which caused a problem to emerge with respect to how to adjust control methods to pragmatic-constructivist elements, requiring further conceptual and empirical research into control in a pragmatic-constructivist reality (L. Nørreklit, 2013; Seal, 2012).

REFERENCES

1. Abernethy, M. A., & Brownell, P. (1997). Management control systems in research and development organizations: The role of accounting, behavior and personnel controls. *Accounting, Organizations and Society*, 22(3-4), 233-248.
2. Ahrens, T., & Chapman, C. S. (2007). Management accounting as practice. *Accounting, Organizations and Society*, 32(1-2), 1-27. doi: <http://dx.doi.org/10.1016/j.aos.2006.09.013>
3. Albertsen, O. A., & Lueg, R. (2014). The Balanced Scorecard's missing link to compensation: a literature review and an agenda for future research. *Journal of Accounting and Organizational Change*, 10(4), 431-465.
4. Alhawari, S., Karadsheh, L., Talet, A. N., & Mansour, E. (2012). Knowledge-based risk management framework for information technology project. *International Journal of Information Management*, 32(1), 50-65.
5. Ancelin-Bourguignon, A. (2012). Getting out of mechanical management: lessons from Chinese thought. *Proceedings of Pragmatic Constructivism*, 2(1), 3-9.
6. Andersen, T. J. (2008). The performance relationship of effective risk management: Exploring the firm-specific investment rationale. *Long Range Planning*, 41(2), 155-176. doi: <http://dx.doi.org/10.1016/j.lrp.2008.01.002>
7. Anthony, R. N. (1965). *Planning and Control Systems: A framework for Analysis*. Boston, MA: Harvard Business School Press.
8. Baldvinsdottir, G., Johansson, I.-L., & Nørreklit, H. (2011). Actor-based management - The TESCO way. In M. Jakobsen, I.-L. Johansson & H. Nørreklit (Eds.), *An Actor's Approach to Management: Conceptual Framework and Company Practices* (pp. 75-98). Copenhagen: DJOEF.
9. Berry, A. J., Coad, A. F., Harris, E. P., Otley, D. T., & Stringer, C. (2009). Emerging themes in management control: a review of recent literature. *The British Accounting Review*, 41(1), 2-20.
10. Beusch, P. (2012). Highlighting the complex interrelationship between the concepts of trust and control. *Proceedings of Pragmatic Constructivism*, 2(2), 33-50.
11. Boer, N.-I. (2005). *Knowledge Sharing Within Organizations*. Rotterdam: Erasmus Research Institute of Management (ERIM).
12. Borisov, B. G., & Lueg, R. (2012). Are you sure about what you mean by 'uncertainty'? The actor's perspective vs. the institutional perspective. *Proceedings of Pragmatic Constructivism*, 2(2), 51-58.
13. Bourdieu, P., & Passeron, J.-C. (1977). *Reproduction in Education, Society and Culture*. London: Sage.
14. Brunsson, N. (1989). *The Organization of Hypocrisy: Talk, Decisions and Actions in Organizations*. New York, NY: Wiley.
15. Burkert, M., & Lueg, R. (2013). Differences in the sophistication of Value-based Management - The role of top executives. *Management Accounting Research*, 24(1), 3-22.
16. Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, Organizations and Society*, 28(2-3), 127-168.
17. Cinquini, L., Falconer, M., Nørreklit, H., & Tenucci, A. (2012). Methodologies for managing performance measurement. In F. Mitchell, H. Nørreklit & M. Jakobsen (Eds.), *The Routledge Companion to Cost*

- Management* (pp. 342-359). New York, NY: Routledge.
18. Cinquini, L., Tenucci, A., Campanale, C., & Passetti, E. (2013). Understanding performance measurement in public organization under pragmatic constructivism. *Proceedings of Pragmatic Constructivism*, 3(1), 3-22.
 19. Collier, P. M., & Berry, A. J. (2002). Risk in the process of budgeting. *Management Accounting Research*, 13(3), 273-297.
 20. Czarniawska-Joerges, B., & Jacobsson, B. (1989). Budget in a cold climate. *Accounting, Organizations and Society*, 14(1-2), 29-39.
 21. Davenport, T. H., & Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know*. Boston, MA: Harvard Business Press.
 22. Ditillo, A. (2004). Dealing with uncertainty in knowledge-intensive firms: the role of management control systems as knowledge integration mechanisms. *Accounting, Organizations and Society*, 29(3), 401-421.
 23. Ditillo, A. (2012). Designing management control systems to foster knowledge transfer in knowledge-intensive firms: A network-based approach. *European Accounting Review*, 21(3), 425-450.
 24. Farrelly, G. E., Ferris, K. R., & Reichenstein, W. R. (1985). Perceived risk, market risk, and accounting determined risk measures. *The Accounting Review*, 60(2), 278-288.
 25. Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science*, 22(5), 1240-1253.
 26. Ferreira, A., & Otley, D. (2009). The design and use of performance management systems: An extended framework for analysis. *Management Accounting Research*, 20(4), 263-282.
 27. Foucault, M. (1977). *Discipline and Punish: The Birth of the Prison*. London: Vintage.
 28. Grody, A. D., Hughes, P. J., & Toms, S. (2010). Risk accounting—a next generation risk management system for financial institutions. *Journal of Financial Transformation*, 29(1), 43-56.
 29. Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative science quarterly*, 44(1), 82-111.
 30. Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232-248.
 31. Huelsbeck, D. P., Merchant, K. A., & Sandino, T. (2011). On testing business models. *The Accounting Review*, 86(5), 1631-1654.
 32. IFAC. (2002). *Competency Profiles for Management Accounting Practice and Practitioners*. New York, NY: International Federation of Accountants, Financial and Management Accounting Committee.
 33. Jack, L. (2014). Further explorations of possibilities, methodologies of the future and rogue traders. *Proceedings of Pragmatic Constructivism*, 4(2), 32-38.
 34. Jakobsen, M., Johanson, I.-L., & Nørreklit, H. (Eds.). (2011). *An Actor's Approach to Management: Conceptual Framework and Company Practices*. Copenhagen: DJOEF.
 35. Jakobsen, M., & Lueg, R. (2012). The Balanced Scorecard: the illusion of maximization without constraints. *Proceedings of Pragmatic Constructivism*, 2(1), 10-15.
 36. Jakobsen, M., & Lueg, R. (2014). Balanced scorecard and controllability at the level of middle managers – The case of unintended breaches. *Journal of Accounting and Organizational Change*, 10(4), 516-539.
 37. Jarzabkowski, P. (2005). *Strategy As Practice: An Activity Based Approach*. Thousand Oaks, CA: Sage.
 38. Jarzabkowski, P., & Spee, A. P. (2009). Strategy-as-practice: A review and future directions for the field. *International Journal of Management Reviews*, 11(1), 69-95.
 39. Jørgensen, B., & Messner, M. (2010). Accounting and strategising: a case study from new product development. *Accounting, Organizations and Society*, 35(2), 184-204.
 40. Kaplan, R. S., & Norton, D. P. (2008). *The Execution Premium: Linking Strategy to Operations for Competitive Advantage*. Boston, MA: Harvard Business Press.
 41. Klinke, A., & Renn, O. (2002). A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies. *Risk analysis*, 22(6), 1071-1094.
 42. Ko, K.-C. (2004). *Prospect Theory and the Risk-Return Relationship: Evidence from Mutual Funds*. Puli: National Chi Nan University - College of Management.
 43. Laine, T., Cinquini, L., Suomala, P., & Tenucci, A. (2013). Roles of accounting in New Service Development within Servitization – The viewpoint of pragmatic constructivism. *Proceedings of Pragmatic Constructivism*, 3(2), 97-110.
 44. Laine, T., Suomala, P., & Nørreklit, H. (2013). NP accounting: unveiling the potential through pragmatic constructivism. *Proceedings of Pragmatic Constructivism*, 3(1), 23-34.
 45. Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press.
 46. Lueg, R. (2009). Führt der Einsatz externer Berater zur Überimplementierung innovativer Steuerungsinstrumente? *Zeitschrift der Unternehmensberatung*, 4(6), 249-253.
 47. Lueg, R., & Borisov, B. G. (2014). Archival or perceived measures of environmental uncertainty? Conceptualization and new empirical evidence. *European Management Journal*, 32(4), 658-671.
 48. Lueg, R., Malinauskaitė, L., & Marinova, I. (2014). The vital role of business processes for a business model: the case of a startup company. *Problems and Perspectives in Management*, 12(4), 213-220.
 49. Lueg, R., & Nørreklit, H. (2012). Performance measurement systems – Beyond generic strategic actions. In F. Mitchell, H. Nørreklit & M. Jakobsen (Eds.), *The Routledge Companion to Cost Management* (pp. 342-359). New York, NY: Routledge.
 50. Lueg, R., & Pedersen, L. D. (2014). How do controls and trust interact? The case of failed alliance negotiations in the financial services industry. *International Journal of Business Research*, forthcoming.
 51. Malina, M. A., Nørreklit, H., & Selto, F. H. (2007). Relations among measures, climate of control, and performance measurement models. *Contemporary Accounting Research*, 24(3), 935-982.
 52. Malina, M. A., Nørreklit, H., & Selto, F. H. (2011). Lessons learned: Advantages and disadvantages of mixed method research. *Qualitative Research in Accounting & Management*, 8(1), 59-71.
 53. Malmi, T., & Brown, D. A. (2008). Management control systems as a package – Opportunities, challenges and research directions. *Management Accounting Research*, 19(4), 287-300.
 54. Merchant, K. A., & Van der Stede, W. A. (2011). *Management Control Systems: Performance Measurement, Evaluation and Incentives* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
 55. Mikes, A. (2009). Risk management and calculative cultures. *Management Accounting Research*, 20(1), 18-40.

56. Miller, P., Kurunmäki, L., & O'Leary, T. (2008). Accounting, hybrids and the management of risk. *Accounting, Organizations and Society*, 33(7), 942-967.
57. Neef, D. (2005). Managing corporate risk through better knowledge management. *Journal of The Learning Organization*, 12, 112-124.
58. Nielsen, L. B., Mitchell, F., & Nørreklit, H. (2015). Management accounting and decision making: two case studies of outsourcing. *Accounting Forum*, 39(1), 64-82. doi: <http://dx.doi.org/10.1016/j.accfor.2014.10.005>
59. Nixon, B., & Burns, J. (2012). The paradox of strategic management accounting. *Management Accounting Research*, 23(4), 229-244.
60. Nørreklit, H. (2000). The balance on the balanced scorecard - a critical analysis of some of its assumptions. *Management Accounting Research*, 11(1), 65-88.
61. Nørreklit, H., Nørreklit, L., & Mitchell, F. (2007). Theoretical Conditions for Validity in Accounting Performance Measurement. In A. Neely (Ed.), *Business Performance Measurement*. Cambridge: Cambridge University Press.
62. Nørreklit, H., Nørreklit, L., & Mitchell, F. (2010). Towards a paradigmatic foundation for accounting practice. *Accounting, Auditing & Accountability Journal*, 23(6), 733-758.
63. Nørreklit, H., Nørreklit, L., Mitchell, F., & Bjørnenak, T. (2012). The rise of the Balanced Scorecard - Relevance regained? *Journal of Accounting and Organizational Change*, 8(4), 490-510.
64. Nørreklit, L. (2011a). Actors and reality: A conceptual framework for creative governance. In M. Jakobsen, I.-L. Johanson & H. Nørreklit (Eds.), *An Actor's Approach to Management: Conceptual Framework and Company Practices* (pp. 7-38). Copenhagen: DJØEF.
65. Nørreklit, L. (2011b). Actors and reality: a conceptual framework for creative governance. In M. Jakobsen, Lill-Johansson & H. Nørreklit (Eds.), *An Actor's Approach to Management: Conceptual Framework and Company Practices* (pp. 7-38). Copenhagen: DJØEF.
66. Nørreklit, L. (2013). Reality as a construct: outline of a pragmatic constructivist perspective. *Proceedings of Pragmatic Constructivism*, 3(2), 57-66.
67. Nørreklit, L., Nørreklit, H., & Israelsen, P. (2006). The validity of management control topoi: towards constructivist pragmatism. *Management Accounting Research*, 17(1), 42-71. doi: <http://dx.doi.org/10.1016/j.mar.2005.04.002>
68. Olsson, R. (2007). In search of opportunity management: Is the risk management process enough? *International Journal of Project Management*, 25(8), 745-752.
69. Otley, D. T. (1999). Performance management: a framework for management control systems research. *Management Accounting Research*, 10(4), 363-382.
70. Pidgeon, N. (1998). Risk assessment, risk values and the social science programme: why we do need risk perception research. *Reliability Engineering & System Safety*, 59(1), 5-15.
71. Preyssl, C. (1995). Safety risk assessment and management - The ESA approach. *Reliability Engineering & System Safety*, 49(3), 303-309.
72. Roslender, R., & Hart, S. J. (2010). Taking the customer into account: transcending the construction of the customer through the promotion of self-accounting. *Critical Perspectives on Accounting*, 21(8), 739-753.
73. Ross, S., & Westerfield, R. (2015). *Fundamentals of Corporate Finance* (11th ed.). New York, NY: McGraw-Hill.
74. Ryan, D., & Wentzel, K. (2000). The influence of attributions and budget emphasis on framing and risk preferences under conditions of unfavorable budget variances *Advances in Accounting Behavioral Research* (pp. 133-152): Emerald Group Publishing Limited.
75. Schatzki, T. R. (1996). *Social practices: A Wittgensteinian approach to human activity and the social*. Cambridge Univ Press.
76. Seal, W. (2012). Some proposals for impactful management control research. *Qualitative Research in Accounting & Management*, 9(3), 228-244.
77. Seal, W., & Mattimoe, R. (2014). Controlling strategy through dialectical management. *Management Accounting Research*, 25(3), 230-243.
78. Simons, R. (1990). The role of management control systems in creating competitive advantage: New perspectives. *Accounting, Organizations and Society*, 15(1-2), 127-143.
79. Smith, P. G., & Merritt, G. M. (2002). *Proactive risk management: Controlling uncertainty in product development*. New York, NY: Productivity Press.
80. Turner, K. L., & Makhija, M. V. (2006). The role of organizational controls in managing knowledge. *Academy of management review*, 31(1), 197-217.
81. Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: cumulative representation of uncertainty. *Journal of Risk and uncertainty*, 5(4), 297-323.
82. Vandenbosch, B. (1999). An empirical analysis of the association between the use of executive support systems and perceived organizational competitiveness. *Accounting, Organizations and Society*, 24(1), 77-92.
83. Vaara, E., & Whittington, R. (2012). Strategy-as-practice: taking social practices seriously. *The Academy of Management Annals*, 6(1), 285-336.
84. Whittington, R. (2006). Completing the practice turn in strategy research. *Organization Studies*, 27(5), 613-634.
85. Whittle, A., & Mueller, F. (2010). Strategy, enrolment and accounting: the politics of strategic ideas. *Accounting, Auditing & Accountability Journal*, 23(5), 626-646.