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Cascading Control Changes, Incoherence, and Dialogue: Insights from a Longitudinal Case Study

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Abstract

Environmental shifts regularly urge organizations to adapt, which may entail management control (MC) changes. Changes to an MC element such as a performance measurement system, however, may in turn create incoherence with other, non-changed elements, generating a need for more changes, and thus trigger a cascade effect. To date, however, we know little about how this sequential process unfolds and what managers can do to deal with incoherence. This paper contributes by enhancing the understanding of sequential changes, drawing on the organizational ecology literature, and we empirically inform our research with a five-year longitudinal case study. Our data illustrates in detail how initial MC changes, to cope with an environmental shift, trigger a cascade effect. This sequential process results in an extensive change period, during which various incoherent MC elements coexist. Our study acknowledges that incoherence among MC elements can decrease control effectiveness by creating intra-organizational frictions, yet we highlight the role of managers in mitigating such negative effects. Specifically, we show how managers can alleviate the unfavorable effects of incoherence by changing their use of performance measures in order to better facilitate organizational dialogue, learning and problem solving.

Keywords

Change, Management Control, Organizational Ecology, Performance Measurement

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1. Introduction

Organizations are regularly confronted with environmental changes, for instance related to demand, innovation and regulation. To thrive, they continuously need to adapt to the new circumstances and consequently they rarely reach a steady state, as they keep evolving from one state to another (Harrington, Boyson, & Corsi, 2011). Changes in operational and strategic objectives likely involve or affect the management control (MC) elements used, because they also have to fit the new state in order to be effective (Marginson, 2002). Therefore, the configuration of MC elements used by the organization is frequently subject to change. The MC change literature has argued that change is only successful if an MC element fits the existing structure of the organization (Burns & Vaivio, 2001; Scapens, 1994), if the change process is skillfully managed (Jansen, 2011; Malmi, 1997), and if the change process in general overcomes a set of barriers embedded in the actual change process (Kasurinen, 2002). Research on MC change often focuses on the change process of the design² of one MC element, such as the performance measurement system (Busco, Quattrone, & Riccaboni, 2007; Jansen, 2011; Kasurinen, 2002), the cost accounting system (Ashraf & Uddin, 2015; Granlund, 2001; Malmi, 1997) or a budget (Collier, 2001). Recent research, however, points to the interplay among MC elements, highlighting that changes to the design of one MC element may influence the effectiveness and presence of other MC elements and may subsequently require MC redesign (Friis, Hansen, & Vámosi, 2015; Henttu-aho & Järvinen, 2013; Østergren & Stensaker, 2011). Despite this, whether, when and how this interplay among MC elements takes place is an under researched issue in the literature. Scholars have therefore called for more holistic approaches that take multiple MC elements (as a system or package) and changes into account, preferably at different moments in time (Grabner & Moers, 2013; Malmi, 2013; Malmi & Brown, 2008; Sandelin, 2008; van der Kolk, 2019). Our study addresses such calls by adopting a process perspective (cf. Langley, Smallman, Tsoukas, & Van de Ven, 2013) that allows us to examine cascading changes of MC elements in a longitudinal case study. We theoretically underpin our study with the organizational ecology literature and we particularly focus on the interplay between MC elements in the years following a significant change to a core MC element. In addition, we show how managers can cope with these changes in effective ways.

² In this study, we distinguish between *design* and *use* of MC elements, in line with prior MC literature (Merchant & Van der Stede, 2007; Naranjo-Gil & Hartmann, 2007; Tessier & Otley, 2012). In general, *design* refers to the content (e.g. *what* is measured) and the specific qualities of the MC element (e.g. *what* is the target, *how many* performance indicators are included) as they are developed. *Use* refers to how the MC element is actually used by managers (e.g. *how* do managers use the MC element to exercise control).

Although coherence in its purest form is not likely to be found in empirical settings, various MC studies implicitly or explicitly suggest that organizations should strive for coherence of MC elements in order to be effective (cf. Bedford, Malmi, & Sandelin, 2016; Friis et al., 2015; Fullerton, Kennedy, & Widener, 2013; Kristensen & Israelsen, 2014; Widener, 2007). The MC change literature adds that if a change has revolutionary characteristics, that change is probably *not coherent* with the existing MC practices and structure of the organization (Scapens, 1994). This poses a challenge for organizations that are frequently confronted with change and still want to exercise effective control. To address this conundrum, we mobilize the organizational ecology literature (cf. Hannan & Freeman, 1984; Hannan, Pólos, & Carroll, 2003a), which acknowledges that engagement with revolutionary types of change complicates the aspiration for coherence.

The organizational ecology literature poses that change often starts with an external and/or internal crisis, which triggers an initial organizational change as a first response to deal with the new situation. Subsequently, other changes may be required to align with the changed objectives, leaving a period during which organizations employ incoherent MC elements. Organizational ecology states that incoherence may be more present in situations of high cultural asperity (i.e. strong differences between the existing and the new MC elements) and structural opacity (i.e. the difficulty to predict a change's consequences), which in turn require purposeful managerial interventions. What such managerial interventions mean, in terms of the use of MC elements, and whether and how such interventions 'flow back' to affect the design of MC elements, has, however, received scant attention in prior MC literature (Burns & Vaivio, 2001; Hall, 2016). This paper addresses these issues and studies how changes related to MC design can cause incoherence, and how managers can use this situation to create organizational dialogue through a different *use* of MC elements. We empirically inform our analysis with a five-year longitudinal case study of a multinational company. The case reveals how the formalization and centralization of a planning process (via two new MC elements: an integrated planning system and a supply chain council) created incoherence and triggered further changes to the MC elements that were in place. In particular, we discuss the incoherence of the new MC elements with the extant performance measurement system. We show how managers first tried to mitigate the unfavorable effects of the incoherence by changing their *use* of the performance measurement system, and later (formally) changed the *design* of that system.

This paper makes two contributions to the literature. First, this paper complements the MC

literature (cf. Friis et al., 2015; Henttu-aho & Järvinen, 2013; Østergren & Stensaker, 2011) by showing when and whether a specific MC change will spread and cascade to other MC elements. In particular, organizational ecology's (cf. Hannan & Freeman, 1984; Hannan et al., 2003a) relevant analytical terms, such as cultural asperity and structural opacity, enhance our understanding of interactions among MC elements. Second, we highlight how incoherent MC elements can yield positive outcomes through constructive managerial actions, which mitigate the negative effects of incoherence on control effectiveness. MC change does not just require skillful management of the specific change, but also managerial interventions outside the intended change locus. Our study contributes to the MC change literature by showing in a longitudinal case study how existing MC elements can adjust to new MC elements, extending previous research that focused on how new MC elements should fit existing ones (Burns & Vaivio, 2001; Scapens, 1994).

The following section explores coherence among MC elements and introduces relevant notions from the MC change literature and the organizational ecology literature. Section three discusses the research methods and section four presents the case of cascading changes, incoherence and managerial interventions at MULTICORP. In section five, we reflect on the meaning and significance of our findings and situate our contributions in the extant literature. Section six includes conclusions, limitations of our study and avenues for further research.

2. Literature Review

2.1 Management control and coherence

MC is about motivating employees to behave in line with organizational objectives and is, therefore, considered to be a crucial function in any organization (Merchant, 1982; Merchant & Van der Stede, 2007; Simons, 1995). In order to obtain goal congruency throughout the organization, managers can design and use a broad range of MC elements, such as values, work rules, and performance measures (Malmi & Brown, 2008). Prior research stated that MC elements should not be studied 'in isolation,' but rather as a package or system, because MC elements may influence each other's effectiveness (Flamholtz, Das, & Angeles, 1985; Malmi et al., 2020; Malmi & Brown, 2008; Merchant & Van der Stede, 2007; D. T. Otley, 1980; Simons, 1995, 2005; van der Kolk, 2019). The simultaneous application of various MC elements implies that the control effectiveness of a specific MC element can (partly) be determined by another MC elements. Henri (2006), for instance, showed that interactive and diagnostic

uses of MC elements can complement one another to achieve higher effectiveness. Widener (2007) found that belief systems complement most other types of MC elements. Because of the potential interplay between MC elements (they might strengthen, but can also hinder, each other's effectiveness), the coherence among MC elements seems important for the way they function (Flamholtz, 1983). Coherence refers to the extent to which the MC elements form a unified whole that is designed to achieve similar ends, which requires "alignment and coordination" (Ferreira & Otley, 2009, p. 275). Prior research stated that MC *systems* are coherent, while this is not necessarily the case for MC *packages*, which may consist of elements that were "designed and implemented by different people, in different parts of an organization, at different times" (Ferreira & Otley, 2009, p. 276; and see also Otley, 1980; Malmi & Brown, 2008). Coherence among MC elements implies that they compatibly work together and motivate employees to act in line with the organizational goals.

The control literature has pointed out that different MC elements can be incoherent, i.e. aimed at achieving different, or even opposing, goals, which may give rise to tensions (Curtis & Sweeney, 2017; Mundy, 2010; Simons, 1995; van der Kolk et al., 2020). Some tensions may be persistent, needed or even appreciated in organizations, for instance to facilitate learning and change, or to deal with conflicting stakeholder interests. Van der Kolk et al. (2020, p. 12) suggest that in such cases managers can play an active and important role in balancing such tensions, for instance by "sometimes emphasizing and sometimes downplaying one of the MC elements when that fitted the departmental needs." We acknowledge that, in this context, *perfect* coherence or *perfect* incoherence are theoretical constructs that are not likely to be found in their pure form in empirical settings. At the same time, we consider the notions of coherence and incoherence to be useful here, since control combinations can be closer to coherence or closer to incoherence. More coherent MC elements, argues the extant MC literature, are helpful in setting out clear directions for employees. Thus, when one MC element is changed, other elements might also have to change in order to reduce incoherence among the MC elements.

Change processes have been under the attention of accounting scholars for a long time. Previous research examined, for instance, the process of replacing an existing cost system with an activity-based costing system (Malmi, 1997) and the implementation of control elements related to total quality management (Sharma, Lawrence, & Lowe, 2010). Various calls have been made to examine the changes to MC elements in relation to other MC elements that operate in the organizational setting (Grabner & Moers, 2013; Malmi, 2013; Malmi & Brown, 2008; Van der Kolk, 2019), while traditionally, the focus

was often on one newly implemented or changing control element. This approach to MC change receives increasing attention in the literature and a key challenge for such studies is to theorize empirical findings and further advance the MC literature to support better organizational performance (cf. Malmi & Brown, 2008, p. 288). In the following section, we introduce the organizational ecology literature and explore how it can theoretically inform the study of the interplay of MC elements.

2.2 Organizational ecology

The organizational ecology literature is concerned with change. It argues that an organization's reluctance to change, or its failure to adapt more rapidly to change than its competitors, can lead to organizational mortality (Hannan et al., 2003a). An underlying assumption of the ecology literature is that organizations may become victims of a 'Darwinistic' selection process – survival of the fittest – if they do not respond rapidly to changes. In our study, we are not so much interested in this organizational mortality aspect, but more in the question what effective MC change in organizations constitutes, which is also analyzed in detail by this stream of literature. The organizational ecology literature uses the term *architectural element*, which is defined as “a set of values on the relevant organizational features (e.g., forms of authority, patterns of control relations, accounting principles, compensation policies)” (Hannan et al., 2003a, p. 466). This definition closely resembles that of MC elements, described as “systems, rules, practices, values and other activities management put in place in order to direct employee behavior” (Malmi & Brown, 2008, p. 290). It seems that the organizational ecology literature and the MC literature both have an interest in governance and control mechanisms and assume that these are central to the well-functioning of organizations. As such, the ecology literature has much to offer to the MC literature that is focused on issues that arise following changes in the *design* of MC elements. We will draw on three key notions from the organizational ecology literature: the cascade effect of change, cultural asperity and structural opacity. Below, we explore how they can inform ongoing discussions in the MC literature on interrelations among MC elements.

The organizational ecology literature acknowledges that changes in organizations often come as a response to internal or external threats or opportunities (Hannan et al., 2003a; Hannan & Freeman, 1984). Initially, organizations may be reluctant to change, which is coined “inertia” in this literature. An initial response to an internal or external threat or opportunity, however, reduces inertia and fosters the possibility of more changes. This idea that one change may cause a chain of new changes (Amburgey,

Kelly & Barnett, 1993) is also called the cascading effect of organizational change (Hannan et al., 2003a). This means that organizational change seldom appears as an *isolated* event, which resonates with the claim by Malmi & Brown (2008, p. 287) that MC elements should not be studied *in isolation*.

Not all changes to architectural elements cause a cascading effect. The cascading effect is more likely to materialize if the initial change relates to a *core* architectural element than a *peripheral* element, and if the element that is changed is strongly connected with other elements (cf. Hannan & Freeman, 1984). In addition, a cascading effect is also more likely to occur if the changes challenge or contradict previous ways of doing things. The organizational ecology literature uses the term *cultural asperity* for changes that entail significant differences and challenge the current practices, instead of complementing them.³ The reasoning behind this is that an existing (micro)culture puts limitations on the extent to which a new MC element can be easily embedded. Hence, cultural asperity emanates if new MC elements break with the status quo, for instance, when they clash with extant norms or do not align with the organizational identity. A strong departmental or organizational culture can thus create inertia, which renders changes to the MC elements more difficult and potentially problematic. To illustrate this with an MC-related example, it has been argued that introducing private-sector MC elements such as financial incentives into a public-sector culture can create problems (cf. Frey, Homberg, & Osterloh, 2013), because such a practice significantly deviates from the existing norms and values in that (micro)culture. This would be a situation of high cultural asperity. Contrastingly, in a strong performance culture, the introduction of financial incentives will probably *complement* the existing culture. This would be a situation of low cultural asperity (Hannan, Pólos & Carroll, 2003b). High cultural asperity between an old and a new element enhances the likelihood that such a change will trigger other changes according to the organizational ecology literature. High cultural asperity enhances the incoherence between elements, which may necessitate changes to other elements to reduce the incoherence again. Such subsequent changes to existing architectural elements do not happen overnight as organizations need time to adjust, develop and implement elements. Organizations probably first evaluate the (potential)

³ The notion of cultural asperity partly resembles the idea of fit or misfit from contingency theory. Contingency theory's notion of fit or misfit is often used when examining a relationship between an (internal) MC element and an external contingency variable at one moment in time (i.e., a *snapshot*), for example environmental uncertainty. Furthermore, a contingency approach greatly benefits from particular theories that can provide predictions and/or explanations of a specific phenomenon (Chenhall, 2003; Gerdin & Greve, 2004; Otley, 2016). In this study, we apply organizational ecology and its concepts allow us to understand a purely intra-organizational phenomenon from a *dynamic* perspective, namely how a change to a specific MC element aligns with existing, stable MC elements. This enables a more *dynamic* and *local* view compared to how fit and misfit have been operationalized in the contingency literature (cf. Chenhall, 2003).

benefits of new architectural elements before changing other architectural elements in such a way that they are coherent with the new elements (Denis, Lamothe, & Langley, 2001; Hannan et al., 2003a). Consequently, when new elements are implemented, they probably coexist, at least for some time, with old elements.

The coexistence of ‘new’ and ‘old’ MC elements can create incoherence, because the objective of the new MC elements may differ from the objective of the old (Hannan & Freeman, 1984). Incoherence based on diverging or opposing objectives can be difficult to foresee and will probably first be noted *ex-post*, i.e., after the initial change. The organizational ecology literature introduces the notion of *structural opacity*, which relates to the lack of ex-ante knowledge about the possible interplay among new and old elements. To clarify what this means, consider a situation in which initial change A triggers or requires another change B. Hannan et al. (2003b) use the notion of structural opacity to describe situations in which: (1) B cannot be foreseen; (2) the characteristics of B cannot be defined at the time of the initial change (A); or (3) actors cannot undertake all these adjustments (A+B) in parallel. A high degree of structural opacity thus limits the predictability of future events, which means that the organization cannot know *a priori* which adjustments will be needed in order to mitigate or reduce incoherence. Therefore, changes often occur as a *sequential* search-and-adjustment process instead of as a *parallel* process (Hannan et al., 2003b). In the context of MC, this notion may help to explain why in situations of structural opacity changes to one MC element may trigger *sequential* changes to other MC elements, that may span a long period of time. Furthermore, if the initial change is the response to a crisis, the newly implemented or changed elements are designed *only* to respond to that crisis within the specific organizational entity that is affected. A manager is given a mandate to make specific changes to address the crisis, but an assessment of the fit of these changes with other architectural elements is often not part of the initial change process. If this is the case, inter-architectural connections are disregarded and, as a consequence, the old and new architectural elements coexist, causing incoherence (Barnett & Carroll, 1995; Hannan et al., 2003a). This resonates with observations from the control literature that MC elements should be studied in the context of the ‘package’ or ‘system’ in which they operate (cf. Malmi & Brown, 2008), and that managers should have “a good understanding of the MC package configuration within their organization [...] before deciding to add new MC elements.” (Van der Kolk, 2019, p. 519)

To summarize, the organizational ecology literature can theoretically inform our investigation of

control changes and (in)coherence, yet it received very limited attention in the MC literature. Specifically, we identified three notions from the organizational ecology literature that are helpful to examine MC change, namely the cascading effect (i.e., the idea that one change may cause a chain of new changes), cultural asperity (i.e., significant differences that challenge and/or contradict the current practices) and structural opacity (i.e., the lack of ex ante knowledge about the possible interplay between ‘old’ and ‘new’ MC elements). In the following section, we discuss our research methods.

3. Research Methods

We adopt a longitudinal case study for two reasons. First, Hannan et al. (2003a) argue that studies on change in organizations should not be limited to a single change at one moment in time but rather should examine change in the context of other, related changes. Change is a *process* that takes time, and ignoring the temporal dimensions can result in an incomplete or distorted understanding of organizational processes (cf. Langley et al., 2013). Therefore, we situate the changes of interest within the context of related changes using a longitudinal perspective, which allows us to pay particular attention to the dimension of time, addressing prior calls (Baines & Langfield-Smith, 2003; Beaubien, 2013; Granlund, 2001; Jansen, 2011). Second, we conduct a qualitative case study to examine “how” and “why” questions related to MC change. This approach seems most suitable to scrutinize complex relations among MC elements “in order to guarantee data quality” (Malmi & Brown, 2008, p. 298). Furthermore, a longitudinal case study is “the most consistent way of analyzing developments” (Flick, 2009, p. 138) and therefore forms a powerful method for examining MC change processes over time.

3.1 Case Selection

This study was conducted in a global Manufacturing Company (MULTICORP), because we wanted to study a large organization that was embarking on an MC change. Through conversations with researchers who were familiar with MULTICORP, we learned that MULTICORP met these requirements. Furthermore, we wanted to study an organization that strongly relied on MC elements to direct employee behavior in order for the changes and effects to be more pronounced and observable. MULTICORP operates in multiple countries and prior research has stated that this enhances an organization’s reliance on MC elements (Moores & Yuen, 2001), because of the increased operational and geographical complexity that is involved in operating internationally (Chenhall, 2006; Galbraith, 1973).

To give further depth to our analysis and to focus our empirical work, we studied the part of the company that is responsible for operations (manufacturing). The focus on a specific part of the organization is also in line with our theoretical foundation; changes to MC elements yield the most significant effect within the part of the organization where the change is situated (Hannan & Freeman, 1984; Hannan et al., 2003a). Our level of analysis is the senior management level, specifically the interaction between top management and plant managers. The interviewed members of the organization (see Appendix A) were all working in this part of the company and the documents we used and analyzed were either about the company as a whole or about the operations part of the organization.

In the 15 years before this study, the company experienced exponential growth and more than tripled its revenue. This growth was rooted in a global expansion; MULTICORP historically manufactured and sold its products within Europe, but at the beginning of this millennium, the company started to manufacture and sell products globally. Simultaneously, the company expanded its product portfolio, which allowed it to sell to a much broader array of segments. The expansion came from internal development of new technology and various investments, where operations had to be built from the ground up. Furthermore, MULTICORP took part in the market consolidation that characterized the early 2000s, which allowed them to acquire competitors within their historical core market segment(s). This helped MULTICORP to acquire new technologies that enabled further expansion. At the time of our study, MULTICORP operated more than 60 manufacturing units in 18 different countries across all continents and employed between 18,000 and 20,000 employees worldwide. MULTICORP's turnover amounted up to approximately three billion euros, and individual plants were highly differentiated and took on diverse roles. For instance, some units were highly nested in their own geographical market and supplied that market with their finished products. Other organizational units were worldwide suppliers of a specific sub-assembly, implying that the specific unit was only produced at that specific plant and would be shipped to other plants that also needed it in their processes. This variety of activities and attention on plants can be related to MULTICORP's expansion period and the fact that many plants were acquired by MULTICORP at a given moment. Consequently, the company evolved into a complex organization with many local variations but also with global interdependencies.

3.2 Data and Data Analysis

As outlined by Langley et al. (2013) and Kouamé & Langley (2018), process studies follow an inductive

methodology where the connection between data and theory unfolds during the process. In some of the first interviews in 2012 and 2013, we learned that the initial MC changes had effects on the coherence among the MC elements and that some changes triggered or demanded changes to other MC elements. To theorize these observations, we went back to the theory to search for terminology and theoretical models that could help us to make sense of the *messy* process data (Langley, 1999). We found that the ecology literature could theoretically inform our observations. Consequently, our theoretical foundation and research question evolved throughout the research process (cf. Langley et al., 2013).

Initial contact with MULTICORP was established via researchers who had carried out research projects within the company before. The data collection for our longitudinal research took place between 2012 and 2017. This allowed us to study the organization before the initial MC change and during the period in which the organization experienced incoherence. Furthermore, we were able to discuss the MC changes and the managerial interventions with key informants directly after these events occurred, which increases the reliability of their recollection of these events and, hence, the reliability of our data. We partly rely on retrospective insights from our interviewees, and although this may potentially lead to biases and imperfect reflections on the process, we followed rigorous methods to mitigate this and protect data quality (Flick, 2009). Interview data is inadequate as a sole data source (Kouamé & Langley, 2018; Yin, 2009), which is why we also examined other data sources (see table 1). For instance, to increase the reliability of the collected evidence, we requested interviewees to back up their stories with company documents. Furthermore, we triangulated the interview data by asking similar questions to different interviewees that had detailed knowledge and first-hand experience about the processes we were interested in, such as interviewees who were involved in developing the new MC elements or experimented with the new MC elements in MULTICORP's trial setting (see section 4.3). This allowed us to search for consensus between different interviewees on important issues and events presented in this study. We use quotes from these interviews throughout the forthcoming analysis sections. Furthermore, following Pratt (2008, 2009), we present additional quotes in appendix B to demonstrate the consensus-making process.

The primary data source in this study is a series of semi-structured interviews with relevant actors in MULTICORP, complemented by observations of organizational events and desk research. The themes that were discussed in the interviews were defined beforehand, but within these themes the respondents had the possibility to elaborate. Interviewees were selected based on their knowledge of MC elements

under investigation and can be divided into two groups. First, we interviewed those involved in the manager-subordinate relationships, i.e., members of the top management team of Operations and their direct subordinates, titled *general managers*, and their direct subordinates titled *plant managers*. A plant manager is the manager of a single plant, whereas a general manager is in charge of group of plants within a defined geographical area. Second, we interviewed people who were seen as MC specialists in MULTICORP, such as the Director of Supply Chain Excellence and a Demand planner (see last column, appendix A). The first group was selected because they provide insights into how various controls functioned in practice between various hierarchical levels in the firm. The second group of interviewees has profound knowledge about specific management controls, for example the performance measurement system. Combined, this provided us with a representative sample, enabling us to gain control-related insights from both subordinates and managers (Tessier & Otley, 2012), and from different organizational entities within operations. Interviews were conducted in Danish and were recorded to enable an in-depth analysis of the interview responses. In total, 33 interviews were conducted with 26 unique organizational members for a total of approximately 37 hours. All interviewees were of Danish nationality and most interviewees worked in Denmark.⁴

NVivo was used to organize the qualitative data. We coded interviews into nodes equivalent to the theoretical underpinning of this paper, such as *incoherence* and *cultural asperity*. Quotes were assigned to the *cultural asperity* node, when interviewees used (Danish words equivalent to) “massive,” “huge” or “significant” when discussing changes or differences among MC elements or practices. In addition, quotes were assigned to the *incoherent* node when interviewees used words equivalent to “problem,” “conflict” or “dispute,” when referring to the relationship between new and old MC elements.

Due to the confidentially agreement with the case company, some of the documents were made available with confidentiality restrictions and cannot be quoted here, but they helped nevertheless to interpret and validate information we obtained elsewhere. One of the authors passively observed four performance meetings, i.e., without intervening with ongoing processes. These observations allowed witnessing the real use of the performance measurement system. During these meetings, field notes were made, which allowed data triangulation with other data sources. We used pattern matching and cross-

⁴ Only two interviewees (ID 4 and 9) had their main responsibility outside Denmark – in Australia and Germany. Although it is too strong to say that we “control” for culture in our study, we believe that potential cultural differences did not play a significant role in the phenomena studied in this paper.

referencing of statements and explanations from various data sources in order to get a better understanding of the data. Also, informal observations and talks during, for instance, coffee breaks and lunches served as important sources to better understand the change processes at MULTICORP.

Combined, these data sources allowed data triangulation (Eisenhardt, 1989), which enhanced the authenticity and credibility of the findings (Baxter & Chua, 1998; Golden-Biddle & Locke, 1993). We stopped collecting data when we reached adequate theoretical saturation (Eisenhardt, 1989). Table 1 provides an overview of our case data.

<<<INSERT TABLE 1 ABOUT HERE>>>

The data collection and analysis described above allowed us to scrutinize the sequential change process at MULTICORP (see figure 1), which we divide into the following sections: MULTICORP and its MC package before the control crisis (section 4.1), the control crisis, initial MC changes and incoherence (section 4.2), phase one of the cascade process: changing the *use* of the performance measurement system (section 4.3), and phase two of the cascade process: adjusting the *design* of the performance measurement system (section 4.4).

4. The Case of MULTICORP

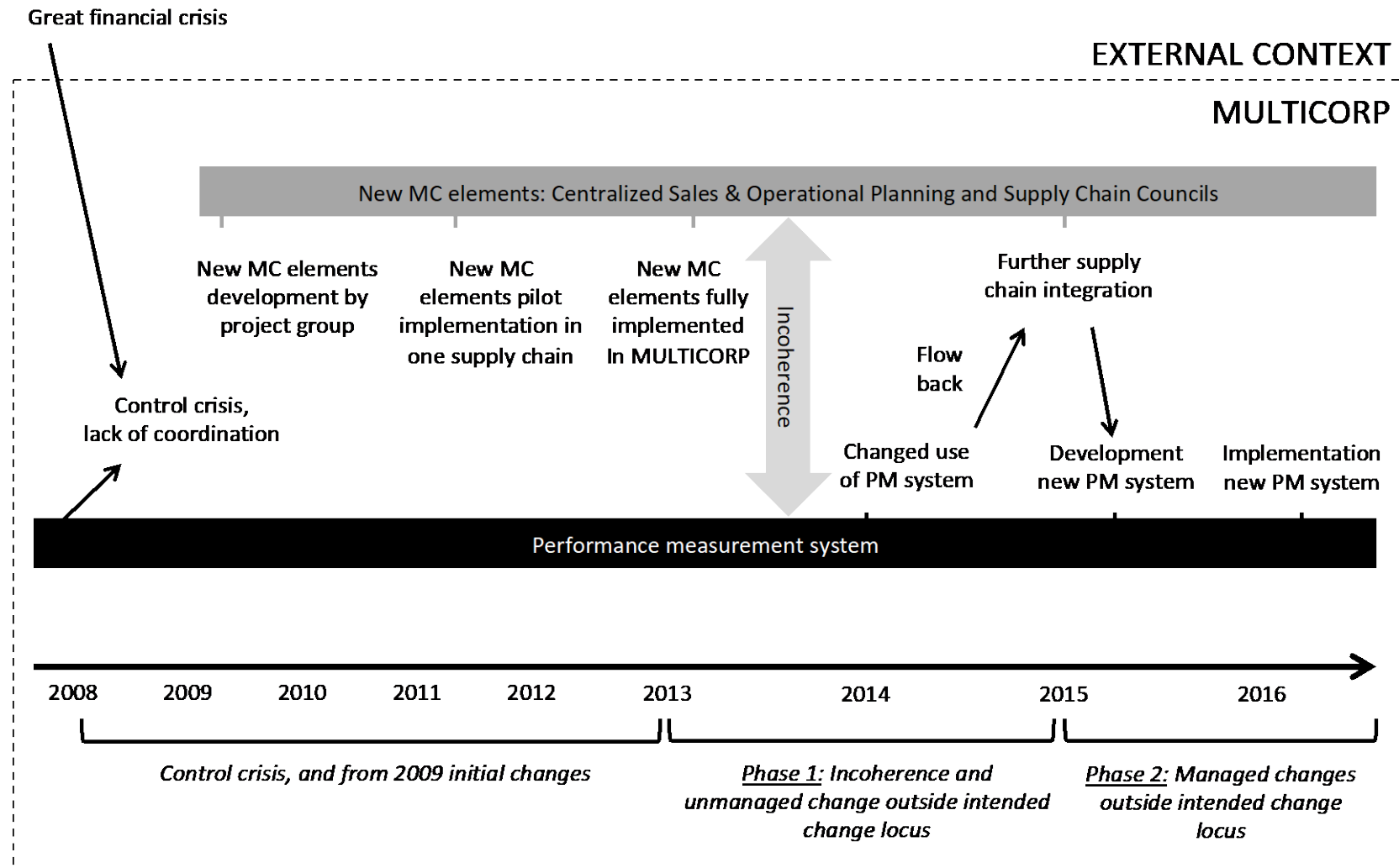


Figure 1 - A timeline highlighting the key changes at MULTICORP. Performance measurement system is abbreviated here (PM system).

4.1 Before the Control Crisis: Autonomy and Decentralization

MULTICORP's focus from the early 1990s onwards was on growth. To achieve its growth objectives, the organization's strategy was to enhance the entrepreneurial spirit of general managers and plant managers by "handing them the keys" to their specific unit. With this, they meant that local managers could operate their unit autonomously (either a plant or a group of plants, depending on the managerial level) and use (local) information to let it grow and further develop it. This self-governing culture and the autonomy of individual plant managers was one of the most important aspects of MULTICORP's MC package before the great financial crisis surfaced in 2008. The sales and operational planning manager (ID 2) explained the situation:

It had a lot of advantages that for many years [in the 1990s and early 2000s], in [a specific country], we handed over the keys to that country's general manager, so only he decided everything that should happen in that country. No one else would be interfering with what was happening in that country. This local performance accountability caused a great spirit of entrepreneurship and ownership.

In line with the philosophy of "handing over the keys," the general managers and plant managers were responsible for developing their own control practices. Consequently, each unit developed and maintained their own MC elements (related to, for instance, operational planning and organizational structure), which resulted in a myriad of MC practices that varied locally. To exemplify this, a company-wide forecasting process existed in which the sales function estimated expected demand levels, but local managers did not integrate these forecasts into their own planning process. As an explanation for not using the company-wide planning data, local managers indicated that they "knew better"⁵ what was required to be a successful, growth-oriented unit. Such local interventions would affect the performance of the individual unit, for which these managers would eventually be held accountable. In general, the MC practices at MULTICORP were very fragmented, diverse and differentiated across local MULTICORP units.

At this time, however, one element within MULTICORP's MC package was strongly centralized and formalized: the performance measurement system. The performance measurement system included 12 (financial and non-financial) operations-related performance measures, addressing topics such as

⁵ According to Supply Chain Conductor 1 (ID 21) who had multiple years of experience as a plant manager.

safety, quality, delivery, costs and staff. The performance measurement system monitored performance levels of the globally dispersed individual units and individual general managers or plant managers were accountable for these performance measures. In line with the philosophy of “handing over the keys,” local managers were held accountable for the performance of their own unit, and were given high levels of decision authority to achieve their performance goals. For example, several interviewees (e.g., ID 2, 3 and 21) mentioned that local managers took great pride in documenting “superior performance” of their units, which was seen as a possibility to help advance careers within the firm. All performance measures were standardized and well defined, while targets could vary among units within MULTICORP. Table 2 is an example of a definition of one the measures, the “first time through percentage”, taken from the internal document *Performance Management – KPI definitions*. The formula used to calculate the performance indicator is made very explicit (i.e. the amount of produced parts – [scrap + rework], divided by the total amount of parts produced). The other information that is given per performance indicator explains, amongst other things, its purpose and to which part of MULTICORP it applies (Scope). Based on this information, this measure is used to estimate one dimension of performance for each individual manufacturing unit.

<<<INSERT TABLE 2 ABOUT HERE>>>

4.2 The Control Crisis, Initial MC Changes and Incoherence

For many years, MULTICORP’s MC philosophy was characterized by the self-governance of decentralized units. However, as MULTICORP went through a period of rapid growth by acquiring several other companies, its internal structure became more complex. The great financial crisis that surfaced in 2008 exposed a problem with this self-governing philosophy and the increased complexity. The sales and operational planning manager (ID 2) explained:

The basis was the [great financial] crisis. Suddenly, we stopped billing customers, but it took almost six months before we stopped [scaled down] production. That’s what happens in a company when there is a lack of coordination between sales and production departments. Therefore, we wanted to create a new [MC] element, which we called *Demand and Supply Integration*. This is basically about having one set of numbers and a transparent process from sales planning to operational planning [...] We didn’t have a forecasting process that worked

well, so we had to establish that first.

This quote points out that the repercussions of the great financial crisis in 2008 made this lack of internal integration visible. As argued by Galbraith (1973), increased complexity requires more integrating mechanisms, yet this need became more salient to managers after MULTICORP demonstrated a lack of response to the sudden drop in demand, caused by the financial crisis. In effect, the great financial crisis functioned as an eye-opener that led MULTICORP's top management to search for ways to avoid similar problems in the future. MULTICORP had outgrown their old approaches to MC and needed a more structured MC approach. During an early interview in 2012, the sales and operational planning manager (ID 2) commented on the development of new MC elements in the period after the great financial crisis:

We have developed these [MC] elements [to address the mismatch between internal supply and demand] over, more or less, the last three years. We have applied them for about one year in one of our supply chains, and in 2013-2014 it will be implemented in all MULTICORP's supply chains [...] What we did was to gather some of our highly skilled logistical engineers and others alike in a project room [...] It was fun to go down to the project room [located in the building's basement] and sense the activity and be part of the discussions, [for instance] about how to set a reorder point optimally, [how to calculate] stock levels and so on?

As captured in the quote, the MC changes were developed 'in isolation' (literally, as the project room was located in the basement) by supply chain specialists to respond to the problems caused by the lack of coordination. The scope of the project was to solve the specific problem at hand, i.e., the lack of coordination between internal supply and demand. Consequently, the discussions in the room were oriented toward this (narrow) area of aligning supply and demand better, without considering existing MC elements, such as the performance measurement system. It was not the great financial crisis per se that triggered the need for more integration, but it rendered the need salient. This process resonates well with the organizational ecology literature in that a significant crisis can catalyze changes to MC elements as a first response to deal with the crisis (Hannan & Freeman, 1984; Hannan et al., 2003a). In the case of MULTICORP, it was a sequence of crises that initiated the MC change; an external (the great financial) crisis exposed the internal control issues and triggered the control crisis (see figure 1).

In 2011, MULTICORP pre-tested the new MC elements in one of their supply chains and, in 2013, MULTICORP fully implemented the new MC system to solve the lack of coordination and titled this change program "Integrated Demand and Supply." The MC system consisted of two related MC

elements: 1) a new, centralized sales and operational planning department would issue forecasts for the whole company; and 2) “supply chain councils” would be organized frequently to discuss and fine-tune MULTICORP’s planning for the next period. We will describe both initiatives in more detail below. These descriptions form the basis for our analysis and discussion of why and how the MC changes enhanced incoherence among MC elements and triggered new changes to MC elements.

4.2.1 Centralized Sales and Operational Planning

The main goal of centralized sales and operational planning is to obtain “one set of numbers”⁶ derived from both qualitative and quantitative forecasting methods. Subsequently, this one set of numbers should be used for the action plan in each of the supply chains, which then flows down to the individual plants.

As part of this new MC element, on the seventh workday of every month, demand planners released forecasts for each of MULTICORP’s supply chains. These forecasts are called the *internal delivery plans*. These internal delivery plans define the output requirements for every week in the upcoming month based on the projected sales. Master planners have to ‘translate’ the internal delivery plan to numbers that can be used to schedule the production in the local plants. When the master planner has finished this job, the weekly output requirements are handed to a production planner, who translates it to the daily production schedules and individual production orders. Just as the master planner decomposes the output requirements from the internal delivery plan, the production planner decomposes the weekly output requirements from the master planner and sets up production orders to execute the level output production plan. The production orders they send to the production lines must correspond to the weekly output requirements that the master planner established. The plan that the master planner and the production planner produce is labelled the “supply network plan”, which is communicated to the supply chain council.

This description outlines one of the essential new practices: a new way of planning, which implies a novel way of formulating short-term plans – very centralized and structured. This means that autonomy and self-regulation, which were central to the MC philosophy before the control crisis manifested (see section 4.1), were strongly suppressed. In the words of our interviewees: “the keys” were essentially taken away from the local plant managers and general managers.

⁶ Multiple respondents referenced this vision, for instance sales and operational planning manager (ID 2), Master Planner 2 (ID 14) and Supply Chain Conductor 1 (ID 21)

4.2.2 The Supply Chain Council

Another structural change regarded the organization of supply chain councils. A supply chain council is a cross-organizational council that groups the supply chain's main stakeholders – either general managers or plant managers from various business units – and is chaired by the *supply chain conductor*,⁷ i.e., the executive manager of the specific supply chain.

After the master planner and production planner have drafted the supply network plan, the planning manager presents the plan to the supply chain council at their monthly meeting. Before the supply chain council meeting takes place, the individual supply plans from each individual plant in the supply chain are aggregated to a supply network plan for the full supply chain, which is approved at the supply chain council meeting. Either the supply network plan is accepted and approved with only small changes, or a major constraint somewhere in the supply chain urges the council to alter the plan. A major constraint occurs, for instance, when a specific plant cannot operate at normal capacity because of scheduled maintenance, local holidays or repetitive quality issues. This means that in such a situation, a plant cannot deliver the amounts required by the “internal delivery plan”. In this case, it is the responsibility of the council to solve the constraint, while the responsibility for the supply chain's compliance with the overall “internal delivery plan” lies with the supply chain conductor, who also has the final say in the council meeting. Decisions made by the supply council can have a big impact, such as the reallocation of output requirements to other plants in the supply chain that hold similar manufacturing capabilities and have excess capacity. Ultimately, the supply chain conductor is responsible for, and defines, short-term output requirements for the plants in the supply chain. A supply chain conductor (ID 27) summarized his role as follows:

To improve lead time to customers, while reducing inventory and cost. That is what I am supposed to do. That's my most important task [...] and it's not possible to give 30 units in a [supply] chain that task individually.

The supply chain council can be seen as another manifestation of a shift away from the decentralized MC philosophy in which general managers and plant managers held “the keys” and had

⁷ Initially there was only one supply chain conductor, but later this number increased to four for MULTICORP.

full decision autonomy. The objective for the newly implemented MC elements now seemed to be to optimize the full supply chain, rather than to maximize the returns from individual plants or countries.

To break down the functionally fragmented culture and align internal operations better, MULTICORP's top management established the supply chain councils. The coordination of a complex supply chain with between 10 and 30 distinct units is, they argued, too complex for local managers to grasp. So, top management saw no other option than to “force them [the individual plant managers and general managers] to talk to each other [in the supply chain council], otherwise it wouldn't happen” (sales and operational planning manager, ID 2). Consequently, they needed a person to take on that role and hold total responsibility and decision rights for the supply chain.

Regarding the joint changes that the newly implemented centralized sales and operational planning and the supply chain council caused, a Supply Chain Conductor (ID 21) elaborated:

A plant manager was accustomed to make his own decisions. He was in charge of his own planning and many other things. Now he doesn't have that anymore, I mean, he can't even decide what he wants to produce anymore [...] There's a lot of power that has been moved away from units that once held that power. Instead, [the plant manager]⁸ now must become extremely effective in executing a plan [made by others].

According to the Supply Chain Conductor, the new MC elements formed a clear break with the company's historical functional and self-governing way of organizing control, since the control focus shifted from the plants to the broader value chain. As part of this process, local manufacturing units also changed from what resembled a profit center to a cost center structure, which severely affected their autonomy on variables that in turn affect their unit's financial performance. For instance, transfer prices were not up to local negotiations anymore, but defined by the corporate finance department and as described above, output levels were defined via these new structures. This reduced their autonomy over variables that affected their performance. The fact that they now had to “execute [action] plans” made by others decreased their autonomy significantly. For instance, they had no (or very little) influence anymore on the operational rate, i.e., the level of utilized production capacity compared to total available production capacity.⁹ The fact that they are handed an output requirement means that they cannot affect

⁸ To respect the confidentiality agreement with the interviewees, our interviewees are anonymized.

⁹ This specific example is based on the internal document *Performance Management – KPI definitions*.

the utilization of production capacity anymore. In effect, local units lost large parts of their sovereignty and autonomy to influence their own performance outcome.

Through the theoretical lens of organizational ecology, this exemplifies the notion of cultural asperity, as planning controls are a core architectural element in operations (Daft & Macintosh, 1984). These new MC elements do not complement the entrepreneurial spirit that MULTICORP historically was built on where local units had high degrees of autonomy to manage their own unit. On the contrary, they clashed with the existing entrepreneurial culture at MULTICORP. To illustrate this, one interviewee (ID 6) used the term “disempowering of local managers” to describe the effects of these new MC elements. In other interviews, adjectives such as “massive” and “huge” were used to describe how these new MC elements deviated from status quo, signaling *cultural asperity* (Hannan et al., 2003b).

MULTICORP's top management wanted to dismantle the historical focus on *individual units* and shift the focus to the well-functioning of the total supply chain. This change in focus led to the development of the new MC elements that significantly deviated from the previous approach to MC. This high degree of *cultural asperity* raises, according to the literature, the risk that new MC elements are incoherent with old MC elements, which may urge an organization to make further changes to MC elements, hence triggering a cascade effect (Hannan et al., 2003a, 2003b). In the next section, we address how the two new MC elements were incoherent with MULTICORP's performance measurement system.

4.2.3 Incoherence and Cascading Changes

MULTICORP implemented the internal delivery plan and the supply chain council first only in one of their supply chains in 2011. During the introduction of these new MC elements, the performance measurement system (that was used to assess the performance of MULTICORP's units) remained unchanged. The operational excellence manager (ID 1) indicated that “their [i.e., the general and plant managers] KPIs [key performance indicators] are still the same.” Therefore, the period after implementing the new MC elements left this specific supply chain in a situation characterized by the coexistence of ‘old’ and ‘new’ MC elements, each focused on a different objective. Already in 2012, the sales and operational planning manager (ID 2) acknowledged that the coexistence of these ‘old’ and ‘new’ MC elements caused problems:

Responsibility for operating performance lies only with the individual plant or group of plants

[...] Each unit is measured on its *own* productivity and results, but no units are measured on the contribution to the [performance of the] supply chain [... Consequently,] you can't get anyone to give anything away [for instance, output levels], because that affects their performance [measures]. In addition, you cannot take anything away from them without them complaining [...] It inspires suboptimization. That's the nature of this [...] It's a challenge in the current structure [with the performance measurement system still in place] to get people to think "horizontally." We are right in the middle of that issue. This performance [measurement] system has been there for historical reasons, but it absolutely doesn't fit anymore.

The performance measurement system was designed for evaluating the performance of isolated units and was directed at the company's old control objective and functional focus. This MC element still motivates individual managers to optimize their local performance levels by holding them accountable for unit performance instead of giving them a "supply chain perspective". According to the sales and operational planning manager, one of the effects of this "silo thinking" is that it inspires "suboptimization". Consequently, it is "a challenge [...] to get people to think horizontally" because the performance measurement system does not communicate common goals across the value chain. In effect, it gives no impetus for cross-unit collaboration. A plant manager (ID 7) further elaborated on the effects of coexistence of old and new MC elements:

The decisions made in the supply chain council can conflict with my own supervisor [a general manager] with respect to the performance measures, because we might make some decisions that are good for the value chain as a whole but not so good for our production plant, and that gives rise to conflicts.

According to this interviewee, the coexistence of old and new MC elements fueled a conflict, as the different MC elements simultaneously encouraged contradictory objectives. The performance measurement system did not fit the horizontal objective stimulated by the new MC elements, in other words, the old and new MC elements were incoherent. Some interviewees mentioned the placement of inventory as an illustration of a conflict related to the two contradictory objectives. One supply chain found it optimal that a specific plant carried an additional inventory with a net worth of approximately 15 million euros. However, this would lower the inventory turnover in this specific plant, thus hampering the performance levels captured by the performance measurement system. The plant manager therefore found himself in a conflict of interest with the general manager, while the plant manager remained uncertain about the proper course of action because different MC elements dictated different actions,

aimed at different objectives. MULTICORP's employees acknowledged the incoherence of the MC elements and the conflicts that resulted from the contradictory objectives, a plant manager (ID 8) explained:

[The new MC elements] can create conflicts. For instance, our CFO [Chief Financial Officer] and finance department recently indicated that we're having too much working capital. They may have a point. [They say] '*You must be able to free up some capital*', yet in the council we optimize while focusing on minimum delivery time, availability and a lot of other things, and only after that we look at our capacity and investments. That is a conflict [...] So, I often talk with our COO [Chief Operations Officer] and supply chain director and ask them if they can please agree on the [prioritization of the] tasks, [but] there's this form of pressure [The pressure from the vertical focused performance measurement system and the horizontal focus of the new MC elements ...] I can't navigate freely when I feel this pressure from the supply chain and from my local boss, while our performance measures dictate local parameters that [for example] imply having a lower working capital [in my unit], but that does not make sense if you look at the [supply] chain.

The new MC elements have a clear focus on the full supply chain, while the performance measurement system still focuses on the individual units, prompting 'tasks' intended to optimize performance for the individual, local units. When these different MC elements are juxtaposed, a *conflict* emerges. The different MC elements inspire achieving different performance goals and are thus incoherent (Abernethy & Chua, 1996).

MULTICORP was debating and considering the need for more drastic adjustments to the performance measurement system, as expressed by the operational excellence manager (ID 1):

We need to get all these performance measures integrated [with the new MC elements].

A plant manager (ID 7) also elaborated on the need for changes:

We're about to take some of the performance measures, for instance delivery performance, away from general managers. We're going to make it a matter of the [supply chain] council.

Senior managers at MULTICORP thus recognized that the new MC elements affected the functioning of the performance measurement system, and vice versa, and that the arrival of the new MC elements triggered a need for changes to other, existing MC elements. However, the performance measurement system had not yet changed, while the new MC elements were already in place. When

asked why the performance measurement system had not changed yet, the sales and operational planning manager (ID 2) explained:

Changing takes time. We are slowly convincing our managers of the usefulness of these [new MC elements] [...] It took us almost a year before we could show better results, which probably also is the time it takes from implementation to the moment you can see the results. [...] We believe in it [the new MC elements] because they have improved performance, but they have not been operational for, let's say, three years, so we can't be certain on whether the results are sustainable. It's a long process [and] we have these control challenges we have to live with almost every day [...] There is a need to rethink that setup [so] we discuss performance measurement: 'Do we use the correct measures?' and 'How should we structure them?' [But] we have not yet figured out how to measure the performance of units across [the supply chain].

This quote points to some of the central notions of organizational ecology. As captured in the first part of the quote, managers at MULTICORP did not know whether the new MC elements would actually solve this control crisis. Therefore, they wanted to document the advantages of the new MC elements before implementing further changes to other MC elements. This trial period is central in organizational ecology literature, because organizations need time to develop and implement new elements, during which they document the benefits before making additional changes to realign old elements with new ones (Denis et al., 2001; Hannan et al., 2003a). The last part of the quote resembles what is coined structural opacity in the organizational ecology literature (Hannan et al., 2003b). As outlined by an interviewee (ID 2), managers at MULTICORP acknowledged that, indeed, the implementation of the new MC elements had some unintended consequences and that changes to the performance measurement system were also necessary. Yet, as indicated in the above quote, they did not know exactly "how to structure" a performance measurement system that would be coherent with these new MC elements. Therefore, MULTICORP could not specify upfront which performance measurement design changes would be needed to reduce incoherence between the old performance measurement system and the new MC elements (i.e., structural opacity). In 2012, the corporate manufacturing and supply chain manager (ID 3) also reflected on the need for design changes to the performance measurement system and why MULTICORP had not changed it yet:

We've deduced that the performance measurement system should be better integrated than currently is the case, because the performance measurement system should align with all our new systems [...] We cannot have a situation where they [the MC elements] are not in harmony. But,

there are already so many new things going on that we had to give up! Or to put it differently, we just wait a little longer [with adjusting the performance measurement system to the new situation].

This quote indicates that there were “already so many new things going on” that they decided to delay the adjustment of the performance measurement system. MULTICORP did not have the resources to develop and implement these changes parallel with the development and implementation of the new MC elements. This resonates with one of the aspects of structural opacity, namely that adjustments cannot take place in parallel. Furthermore, another interviewee (ID 2) argued that MULTICORP seemed not able to define what the design changes should entail, resembling another aspect of structural opacity from the organizational ecology literature.

The combined notions of cultural asperity and structural opacity allow us to understand two issues. First, they explain in which situations the initial changes may be a catalyst triggering further changes. Specifically, the high level of asperity means that existing MC elements also have to change, because they severely deviate from the new MC elements. Second, these notions help to explain why the need for further changes only follows subsequently and not in parallel. The structural opacity at the time of the initial change gave that they could not define the required changes at that time and did not have the resources to take on these additional changes at the same time of implementing the new MC elements. Accordingly, when the new MC elements were fully implemented in 2013, the following period in MULTICORP was characterized by incoherence among MC elements. This led to conflicting objectives (Hannan et al., 2003a) and increased uncertainty about the proper cause of action related to different tasks demanded by the incoherent MC elements (Abernethy & Chua, 1996; Barnett & Carroll, 1995). Managers, seemingly aware of the conflicting objectives and the risk of organizational impasse, tried to mitigate the negative effects of incoherence, which we will further detail in the following section.

4.3 Phase One of the Cascade Process: Changing the Use of the Performance Measurement System

The previous section highlights the incoherence between the old performance measurement system and the new, supply chain-focused control objective. Because MULTICORP’s top management did not want to make changes to the performance measurement system (yet), local managers started to explore ways to deal with the incoherence. They often indicated that, if there were any conflicts related to MC, they would discuss it with those involved. For example, the general manager (ID 6) indicated that “if there’s

anything related to performance management, we talk about it” and elaborated:

What it basically all boils down to, is that we must manage differently than before. That is what it’s basically all about at the end of the day, and that requires a lot of managerial resources [...] Today managers are much more “out there”, in touch with their subordinates, which was not the case before. Now they have a more interactive and coaching management style. It’s more a “dialogue” than a “command;” so, you’ve got to change as a manager [...] You have to talk *with* each other, not talk *to* each other.

A plant manager (ID 7) acknowledged that this was indeed the case and highlighted how the new style of management was more supportive:

This means that the individual managers are much closer to the subordinates [...] They offer much more support and attention when there are conflicts, and they’re present to help solve conflicts that hamper production and continuous improvements. That’s the difference.

These quotes suggest that a dialogue-oriented style of managing was gaining momentum at MULTICORP, as managers are more often “out there” among employees and peers “talk[ing] with each other”. Yet the same plant manager also acknowledged that, in the end, he would still be held accountable for the performance measures – from the ‘old’ unchanged performance measurement system – because it was still in place:

Sometimes there are embedded conflicts. Consequently, we have a dialogue about it and debate how it all ties together, so that he is informed about it. Nevertheless, he will hold me accountable for this unit’s numbers [in the performance measurement system], and that’s how it is.

Depending on the managerial level, the output from the performance measurement system is discussed in the monthly or weekly performance review meetings. Before the new supply-chain oriented MC elements, the structure of performance review meetings followed a fixed order. First, the performance measures were presented in detail, while actual performance would be compared to the standards that were set in the beginning of the period, applying basic variance analysis methods. Second, attention would be given to potential ways to improve the performance. The first part of the meeting was a plenary session, chaired by the plant manager or general manager and the second part of the meeting was in

smaller subgroups. The goal of the second part of the meeting was to come up with solutions for how to deal with specific problems relevant for that (sub)group, so the group composition depended on the problem at hand. For instance, two plant managers experienced quality issues and formed a group together with a quality engineer to discuss how they could deal with these quality issues. Another group reviewed problems related to delivery performance and potential solutions were discussed within that group. In meetings that took place after the new coordination-related MC elements were implemented, the focus was shifted. The time spent on the second part of the meeting had significantly increased at the expense of the time spent on the first part. A general manager (ID 17), for instance, explained the change in the structure of the performance review meetings:

It's uninteresting to go through the numbers [as we did before]; we already know them now, before we arrive at the meeting. What is of interest, however, is that we have a *discussion* [...] To have a good meeting means to have a good *dialogue*. This is where we meet and where we have a dialogue across functions and factories and discuss issues with respect to, for instance, productivity. Unit A [for instance] has this issue, so now the "fire" is there. We [Unit B] also have had the same issue in our unit, so we should try to get together [and help one another...] I might have some useful knowledge [for them]. It is this sort of collaboration that is of interest, not the numbers.

This quote highlights that the first part of the meeting had become "uninteresting". Instead, the increased room for discussion enabled opportunities for communication and discussion, as managers from similar levels now worked to solve complex problems and conflicts, sometimes even before they materialized and escalated. In retrospect, a number of interviewees confirmed that this was different before, when the emphasis of the meeting was more on the first part, discussing performance levels and variances. A general manager (ID 5) further explained:

The essence is, we measure performance, but that is not what we are really interested in [...] So we don't look at performance levels per se. [Instead] they provide, I don't want to say an *excuse*, but an *opportunity* to discuss issues [...] It [the performance review meeting] is a place where you share problems. [For instance], "I have had a similar problem and I solved it is this way, and I have an employee that knows about this. I will ask him to call you." [...] No one is being yelled at if they don't achieve their [performance] objective, but they *will be* yelled at if they don't want to *engage* in the dialogue [...] That's the whole point [...] It's the behavior at the [performance] meetings that is important. [...] You have to be very consistent in the way you manage [the meeting]. Actually, it has to be a kind of business philosophy [to have a dialogue] some things need to fall in place and then it immediately provided results [...] I cannot imagine going back.

Therefore, managers did not participate in performance review meetings to actually review performance. Instead, we observed that the performance review meetings turned into a time and space to discuss and solve problems. In some cases, managers did not even discuss the performance measures and variance analyses that used to be discussed in the first part, but instead started with the ‘second part,’ i.e., organizing small work groups to focus on solving particular tasks. Consequently, the performance measurement system became an important starting point for dialogue, while the performance measures themselves were still the same. The so-called performance review meetings created a space where individuals could share experiences and gain new insights. As a result, the performance review meetings functioned as a forum for cross-unit interaction and knowledge sharing.

Our case study shows how incoherence among MC elements inspired MULTICORP’s managers to spot new opportunities and start using the performance review meetings in a novel way that made more sense to them, given the new supply chain focus. Managers effectively created a safe space in which open communication was encouraged, allowing organizational members to engage in discussions and find solutions.

As this style became more common, positive results of the improved cross-unit interaction could be observed. As an illustration, a general manager (ID 5) stated in 2015:

What happened – and I still find this very exceptional because production managers are intelligent people who want to deliver results – is that they really started to embrace it [the dialogue with other organizational members], when they realized that this gave them the opportunity to deliver the performance they were never able to deliver before.

To illustrate how the changing use of the performance measurement information affected performance, a plant manager (ID 6) provided us with an example of the operationalization of new equipment in 2015. While before it would take at least two years to make new equipment operational, the knowledge he gained from the performance review meetings enabled him to achieve very high productivity and an uptime of 80 percent within four months after he started to use the new equipment. The plant manager (ID 6) put the results into context and made the following comment when explaining the success:

That was a new internal ‘world record’ in MULTICORP [...] What made the difference is this different managerial approach. We now follow measures and directly involve employees in continuously improving and analyzing performance; that’s the cornerstone.

The new style of the performance review meetings was highly appreciated by the employees and managers; interviewees particularly appreciated the new emphasis on dialogue and learning and the structure of problem-oriented discussions in smaller, knowledgeable teams. In other words, the interactions and the knowledge sharing in the meetings were perceived to be an important element in achieving the “new internal world record”.

This section shows that the original changes indeed cascaded. First, as a result of the introduction of the new MC elements, managers changed their *use* of the (old) performance measurement system (but not the design itself), which was already outside the original locus of the initial changes, to respond to the initial control crisis. The design features, such as the “scope” dimension of the performance measurement system, remained unchanged in this phase of the cascade process.

4.4 Phase Two of the Cascade Process: Adjusting the Performance Measurement System Design

Although managers were able to deal with the incoherence among the MC elements by adjusting their use of the performance measurement system, various interviewees also acknowledged that the system itself (eventually) had to change. In 2015, MULTICORP started to develop a new performance measurement system that would be more in line with the new supply chain objective. In 2017, a supply chain conductor (ID 21) commented on the new performance measures, highlighting the shift from the individual units to the supply chain as a whole:

I now have some measures that I am responsible for. Now, strictly speaking, we do not really look at the *individual* unit's performance, but only how they affect the *supply chain* [...] So, now I run the performance review meeting every week. This means that I follow up on the measures and performance.

Also, in 2017 the director of supply chain excellence (ID 24) seemed content about the changes and particularly highlighted the commitment to supply-chain-related goals that the new performance measures fueled:

[The supply chain conductors] are now responsible for these measures and for supply chain performance. [...] This has changed [...] The performance measures are now measuring the [performance of the] supply chains [...] The reason for this shift is that we wanted more

commitment to these [new MC elements] and to emphasize that all units are part of a supply chain.

Contrary to the old performance measurement system, which focused on local unit performance (see “scope” dimension in table 2), the new system focuses on supply chain performance. Besides this change, the performance measures for which the supply chain conductor was responsible also included a few adapted measures from the old performance measurement system. The new performance measurement template covered financial measures (revenue and cost measures), purchasing (supplier delivery time and quality), distribution (stock ratios and delivery performance), customer service (lead time to customer) and internal quality measures. As expressed by the director of supply chain excellence in the quote above, the new supply chain focus was an attempt by MULTICORP’s top management to generate further commitment to the supply chain objective. This made the performance measurement system more coherent with the new MC elements (i.e., the centralized sales and operational planning and supply chain councils).

Summarizing, the cascade effect in the first phase entailed a change in the *use* of the performance measurement system, while in the second phase the change was manifested by intended changes to the *design* of the performance measurement system. The two phases thus included different processes, which became more visible by distinguishing between the use and design aspects of the performance measurement system.

5. Discussion

We began this paper by posing the question how sequential MC changes affect incoherence among MC elements, and how managers can deal with this. We make two contributions, and below we discuss how these contributions can be situated in the relevant literatures.

First, by mobilizing the notions of cascade effect (including the idea of sequential change and ‘old’ and ‘new’ elements), cultural asperity and structural opacity from organizational ecology (cf. Hannan & Freeman, 1984; Hannan et al., 2003a) we extend the analytical lenses available to the MC change literature. Our analysis shows how a control crisis triggers cascading MC changes, which subsequently create incoherence among MC elements. This finding speaks to MC research interested in the interactions among MC elements within a package or system (cf. Malmi & Brown, 2008; Grabner & Moers, 2013; Friis et al., 2015; Henttu-aho & Järvinen, 2013; Østergren & Stensaker, 2011; Van der

Kolk, 2019).

As demonstrated in the case study, the notions of cultural asperity and structural opacity help to explain whether and when MC design changes will likely spread outside the locus of the intended change – cascading to other MC loci. In our empirical material, we observed that high levels of cultural asperity, i.e., strong differences between ‘old’ and ‘new’ MC elements, created incoherence between MC elements. This triggered a cascade effect, where the original design changes required a design reconfiguration of other MC elements in order to reinstate coherence.

Cultural asperity facilitates further theorizing on the question when new or changed MC elements cause incoherence with ‘old’ MC elements, and may form a starting point for a cascade of changes. In a situation of cultural asperity, an MC change is not likely to be an isolated event, but will likely become a catalyst for further MC change. Cultural asperity thus informs when and why some ‘new’ MC elements affect ‘old’ MC elements. Hence, to understand change well, studying one change to a specific MC element is *only the starting point*, and observations about the magnitude of MC change (e.g. radical vs. incremental, see Burns, 2000; Scapens, 1994) should not only focus on the initial MC change, but *also* take cultural asperity and possible subsequent changes into account. Thus, asperity allows us to understand when the initial change likely has effects outside the intended change locus on other elements in the MC package or system (cf. Malmi and Brown, 2008; Van der Kolk, 2019). In other words, what initially may seem to be an incremental MC change, might cascade to a more radical change, when the initial change is characterized by high cultural asperity.

While asperity allows us to understand when and why a MC change cascades, it provides little insights into how this process unfolds. However, the concept of structural opacity (Hannan et al., 2003b) can also help to contextualize our findings. In our case, interplay between the ‘new’ and ‘old’ MC elements was not part of original change mandate. Furthermore, at the time of the initial changes, MULTICORP did not know how to redesign the performance measurement system in such a way that it aligned with the new supply chain focus. Lastly, the cultural asperity between ‘new’ and ‘old’ MC elements means that it brings multiple unknowns, both regarding how to make the ‘new’ MC elements work and which other changes are needed to ‘old’ MC elements. The search and adjustment process required to align the ‘old’ performance system would demand significant resources, yet those resources were already engaged with implementing the ‘new’ MC elements. This exemplifies organizational ecology’s concept of structural opacity, where lack of *a priori* knowledge and scarce resources generate

sequential (rather than a parallel) change. This causes a period in which incoherent ‘old’ and ‘new’ MC elements co-exist. The notion of structural opacity allows the MC domain to understand how the cascade unfolds. That is, if the initial change is structurally opaque, the cascade will likely be sequential and protracted. Although our findings do not include a situation that is not structurally opaque, the organizational ecology literature would argue that in such situations the cascade process could be parallel and relatively swift, because organizational members would know which further changes would be needed and would have the organizational resources to initiate these changes (Hannan et al., 2003b, 2003a).

Together, the notions of cultural asperity and structural opacity enhance our understanding of cascading MC changes and when, why and how incoherence between MC elements is more likely to emerge and exist for longer periods of time. When a ‘new’ MC element breaks the status quo of ‘old’ MC element (i.e. cultural asperity) it creates incoherence between ‘new’ and ‘old’ MC elements. This initiates a cascade of subsequent MC change(s) to realign ‘old’ and ‘new’ MC elements. Our longitudinal case study does not allow any generalizations about a specific timeframe for MC changes and cascade effects. Conceptually, however, the presented theorized narrative points to the potential of cultural asperity and structural opacity to impact the severity of the changes needed and the length of the period, although it would also be too simplistic to suggest any linear relationships on the basis of our study alone. Some may even argue that - from an economics perspective - very high levels of cultural asperity can be dealt with rather sooner than later, as high levels of incoherence may jeopardize organizational effectiveness and likely receive immediate attention (Bedford et al., 2016; Friis et al., 2015; Kristensen & Israelsen, 2014). However, based on the organizational ecology literature and our case insights, we argue the contrary. When the initial change significantly breaks status quo (i.e. cultural asperity), it can make the need for subsequent changes more difficult to predict (i.e. structural opacity). Hannan et al. (2003b) call this *the fog of change*. While the resulting search-and-adjustment process requires more organizational resources to analyze and define further changes, organizational resources are scarce and may already be reserved for implementing the initial change. Thus, the change becomes sequential and protracted, and incoherent ‘old’ and ‘new’ MC elements co-exist for a longer period of time, in our case multiple years. The combined insights from these concepts contribute to theory building on the interplay among MC elements (cf. Friis et al., 2015; Henttu-aho & Järvinen, 2013; Østergren & Stensaker, 2011; Malmi & Brown, 2008).

The idea of a cascade effect challenges current conceptualizations of MC change as a process within the locus of a specific MC element (e.g. Busco et al., 2007; Kasurinen, 2002; Malmi, 1997). Our longitudinal study incorporates the element of time and focuses more on the change process, hence, complementing earlier research that predominantly used a variance perspective (cf. Baines & Langfield-Smith, 2003; Beaubien, 2013; Granlund, 2001; Jansen, 2011). In line with prior research that argued that *MC elements* should not be studied in isolation (Malmi & Brown, 2008), we argue that *changes to MC elements* should also not be studied in isolation - particularly in situations of cultural asperity and structural opacity. Our analysis shows how existing structures can adapt to ‘new’ MC elements in two different phases. The first phase entailed the response by managers, related to the *use* of the MC elements outside the intended change locus, and in the second phase – in our case years after the initial MC change – the *design* features of the existing MC elements changed. This finding nuances the MC literature that proposes that a significant change to a specific MC element should align with the existing structures (Burns, 2000; Burns & Vaivio, 2001; Scapens, 1994), by showing how the existing MC elements can also adapt to a newly implemented MC element. What might not seem as a “radical” change at first can cascade to other MC loci and cause multiple other MC changes, rendering the total *change process* more radical than originally intended. Together, the notions from the ecology literature theoretically inform a more holistic understanding of MC change in the context of an MC package or system (cf. Malmi & Brown, 2008; Grabner & Moers, 2013; Van der Kolk, 2019), and help to understand why incoherence may exist for extended periods of time.

The second contribution relates to how managerial actions can flow back to the design of MC elements and how this affects the functionality of incoherent MC elements (cf. Hall, 2016). Previous research on coherence maintained that managers should strive for coherence among MC elements in order to achieve higher levels of control effectiveness (Abernethy & Chua, 1996; Bedford et al., 2016; Friis et al., 2015; Fullerton et al., 2013; Kristensen & Israelsen, 2014; Scapens, 1994; Widener, 2007). We nuance this position by highlighting that there may also be positive (side) effects of incoherence. Our data suggest that if managers are indeed aware of the existence of incoherence, this can motivate them to take action. More specifically, in the case of MULTICORP, it inspired managers to use the current performance measurement system differently – the first phase of the cascade effect. In essence, managers changed their use of it from a basic ‘variance analysis’ tool into a platform for learning and sharing knowledge about potential solutions, more in line with MULTICORP’s new supply chain objectives (cf.

Melnyk, Bititci, Platts, Tobias & Andersen, 2014; Pinheiro De Lima, Gouvea da Costa, Angelis & Munik, 2013). Thus, the initial incoherence triggered positive outcomes through the managers' choices, such as generating more organizational dialogue about alignment issues within the supply chain. This finding resembles research that studied how the imperfections of a performance measurement system "helped to provide a fertile arena for productive dialogue and discussion" (Chenhall, Hall & Smith, 2013, p. 282). Our findings can also initiate a more in-depth discussion on the concept of coherence, and whether striving for coherent MC elements is indeed necessary. Prior literature has already pointed to tensions among MC elements that need managerial attention (Simons, 1995; Mundy, 2010; Curtis and Sweeney, 2017; Van der Kolk et al., 2020), and in line with such studies we find that incoherence in itself does not per se produce organizational impasse, i.e., when handled well by managers. Thus, discussions related to (in)coherence must also grasp how specific MC elements are *used* and not just whether MC elements are *designed* (Abernethy & Chua, 1996; Ferreira & Otley, 2009). Specifically, we show that incoherence can create the need for more dialogue, which allows organization members to 'sort things out' and get to the root(s) of problems, hence stimulating innovative problem solving. The use of the performance measurement system changed into serving as a learning platform, and to a lesser extent as a device for feedback and monitoring. For such situations to materialize it is essential that managers encourage open communication and that members of the organization can engage constructively in such discussions. A sole focus on the negative implications of incoherence would have obscured its potential to trigger positive (side) effects.

The observation that skillful management is required also speaks to the MC change literature. While the MC change literature acknowledges that MC change requires skillful management *within* that locus (Malmi, 1997), we add that it also requires skillful management *outside* this locus. Specifically, managerial actions outside the original change locus are needed to support the original MC change and ensure implementation of the 'new' MC elements. Although we cannot derive this directly from our study, it seems that if managers would not have smoothened the change process by adjusting their use of the 'old' MC elements (i.e. the performance system), tensions and conflicts could have increased as this would have made the incoherence more clear. The resulting organizational dialogue facilitated higher levels of performance at MULTICORP. This finding extends the literature by highlighting how incoherence, triggered by cascading MC changes, does not per se have to result in organizational impasse through ineffective and dysfunctional control. On the contrary, the incoherent MC elements can trigger

managerial actions that eventually resulted in positive organizational outcomes.

6. Conclusions

This paper examines how MC change can create incoherence, which may subsequently trigger other MC changes, and how managers can use this situation to facilitate dialogues among organization members. We introduced notions from organizational ecology - cascading change, cultural asperity and structural opacity - that allow a better understanding of the relationship between MC and incoherence. The case of MULTICORP demonstrates that it can take years before the effects of an initial change become visible and result in new changes. During this time span, new and old MC elements coexisted - even though they were incoherent. Yet, the incoherent MC elements did not result in an organizational impasse, but instead, managers saw a possibility to change their use of the performance measurement system, in an effort to facilitate a dialogue among organizational members. Our paper extends the MC change literature and helps to explain why not only the study of MC *elements*, but also the study of MC *change*, benefits from a more holistic approach that takes the wider organizational context into account (cf. Malmi & Brown, 2008).

Although our longitudinal case study provided in-depth insights into the ways in which accounting and control elements operate in their contexts (Hopwood, 1983), the findings and conclusions of our study should be seen in the light of the limitations of the used research method. One limitation regards the study's timeframe; although the organization was studied for a long time, we also refer to events such as the great financial crises that happened before the start of this study. Therefore, we also had to rely on retrospective interviews and company documents regarding (the effects of) these events before we entered the case organization. As suggested by Golden-Biddle and Locke (1993), people may imperfectly recall their actions or what exactly led them from one action to the next. To address this potential retrospective bias, we followed established and robust methods to triangulate the obtained data with other sources, such as company documents, notes from meetings and corroboration of certain aspects with other interviewees. We studied one part of one organization for five years, which allowed us to examine managerial responses in detail and identify mechanisms that managers used to mitigate incoherence between MC elements. It may, however, be the case that some of (the effects of) the observed mechanisms are contingent on organizational factors, which is why we provided a detailed description

of MULTICORP's characteristics and the relevant organizational events.

Future research may further investigate the role of managers in the MC change process and examine and compare the cascade effect across different settings (e.g., different departments, organizations, or sectors). Such a study would enable a more robust identification of the factors (e.g., a manager's educational or cultural background or an organization's financial history or prospects) that affect the choice to use specific MC elements differently. Furthermore, our case illustrated how a change process unfolds when cultural asperity between MC elements is high and where structural opacity limits the a priori knowledge about changes. Future research could further explore how, for instance, change processes take shape if cultural asperity high, while structural opacity is relatively low. Under such circumstances, managers know which changes are required to deal with the incoherence. It would particularly be interesting to learn about tradeoffs that managers face in such situations, addressing questions such as: 'Would managers make all the MC changes simultaneously?' and 'Is (part of) the reconfiguration process still sequential?'. Although there are reasons to assume that the answer to the latter question would be positive – for instance, because of the high level of stress associated with impactful organizational changes that are made at the same time (Dahl, 2011) – more in-depth research in this area has the potential to enhance our understanding of the effects of managerial (micro) interventions and improve MC-related decisions in the future.

Appendix A

<i>IV*</i>	<i>Date</i>	<i>Length</i>	<i>ID</i>	<i>Position interviewee</i>	<i>Category interviewee</i>
S_1	09/10/2012	85	1	Operation Excellence manager	MC specialist
S_2	09/10/2012	95	2	S&OP manager	MC specialist
S_3	17/10/2012	85	3	Corporate manufacturing and supply-chain manager	Top management level
S_4	18/06/2013	80	4	General Manager 1	General Manager level
S_5	02/09/2013	75	1	Operation Excellence manager	MC specialist
S_6	24/10/2013	75	5	General Manager 2	General Manager level
S_7	29/10/2013	80	6	Plant Manager 1	Plant manager level
S_8	04/11/2013	65	7	Plant Manager 2	Plant manager level
S_9	11/11/2013	65	2	S&OP manager	MC specialist
S_10	07/04/2014	90	1	Operation Excellence manager	MC specialist
S_11	09/02/2015	70	6	Plant Manager 1	Plant manager level
S_12	09/02/2015	90	8	Plant Manager 3	Plant manager level
S_13	18/02/2015	60	9	General Manager 3	General Manager level
S_14	18/02/2015	75	10, 11	Process Consultant 1 and Process Consultant 2	MC specialist
S_15	20/03/2015	70	12	Master Planner 1	Plant manager level
S_16	20/03/2015	30	1	Operation Excellence manager	MC specialist
S_17	25/03/2015	70	5	General Manager 2	General Manager level
S_18	31/03/2015	60	13	Chief Project Manager (Corporate Manufacturing)	MC specialist
S_19	10/04/2015	30	4	General Manager 1	General Manager level
S_20	14/04/2015	70	14	Master Planner 2	Plant manager level
S_21	16/04/2015	60	15	Production planner 1	Plant manager level
S_22	20/04/2015	65	16	New Product Introduction Director	General manager level
S_23	04/05/2015	60	17	Plant Manager 4	Plant manager level
S_24	05/05/2015	55	18	Production planner 1	Plant manager level
S_25	08/05/2015	50	19	Senior Engineer (SPT)	MC specialist
S_26	29/05/2015	65	20	Vice President production technology and Innovation	Top management
S_27	10/06/2015	65	21	Supply Chain Conductor 1	MC specialist
S_28	10/06/2015	70	22	Demand Planner	MC specialist
S_29	16/06/2015	45	13	Chief Project Manager (Corporate Manufacturing)	MC specialist
S_30	08/07/2015	50	23	Senior Engineer (SPT)	MC specialist
S_31	25/04/2017	75	24	Director of Supply Chain Excellence	MC specialist
S_32	24/05/2017	40	17	General Manager 4 (former plant manager 4)	General Manager level
S_33	29/05/2017	75	21, 25, 26	Supply Chain Conductor 1, Supply Chain Conductor 2, and Supply Chain Conductor 3	MC specialists

* IV = Interview number. ID = Number unique employee. Length is in minutes. Interviews ordered chronologically.

Appendix B

ID	Quotes	Theoretical construct
17	“We did not have a supply chain focus before. We had plant management and inventory management based on what we [plant managers] thought was best [...] it was the production planner from one plant together with a production planner from another plant that made those decisions, so it was decided at a much lower level in the organization. Now, those decisions reside in a different organizational entity.”	Asperity
24	“We previously did scenario planning, for instance if Asia increases by 10%, can we manage that or do we what to manage that? But such decisions are no longer made by the local sales manager and plant manager [...] So it is a huge step away from decentral decision making. Units were previously very autonomous, where the plant manager basically had responsibility for everything [...] it certainly strips some local decision rights. In that way you can say that it is major step towards centralization. It has not previously been part of our DNA to have such a centrally-driven process.”	Asperity
4	“[The new MC elements] present a unique opportunity to plan across [plants], but if you still prefer self-government [of plants], then you have a problem.”	Asperity
2	“Now we have a structured process, while previously it did not matter what was presented in our forecast, because everybody had his or her own opinion. Now, we convert our forecast into which unit should produce a specific component to [for instance] the motor and deliver it to unit x [...] Capacity management was also a decentral decision, [for example] when to expand capacity. Now, I decide how busy he [the plant manager] is.”	Asperity
7	“[The new MC elements] are a massive change, because previously we might have a sales forecast that did not include sales of a specific product, yet our experience [in the plant] was that they always sold something anyway. That gave two set of numbers, which we wanted to eliminate [...] We have introduced this idea about one set of numbers, so now we have one set of production orders all the way through [our supply chain]. Now it is much more centralized and the main message from us is that it requires a lot of adjustments before it works.”	Asperity
21	“Previously, planning was much more isolated in the individual units [...] sales was not involved. We received some sales forecasts, but we knew better. In 2011 when we implemented the new [management] control forms, we needed someone to be responsible for the [supply] chain, instead of the current silo orientation. At that time [MULTICORP] was not ready for such a change, because there was a very strong culture to have an entrepreneurial spirit surrounding autonomous managers and units.”	Asperity
1	“We would like to develop our performance system to make it more purposeful [...] we are still working on designing our performance [system] to make it more purposeful [...] Later in the spring, we launch a second version [of the performance system...] so we will probably run the next two years before we make a version two and three. When we make, for instance, a second version it mainly reflect that we have learned something in the last couple of years.”	Opacity
6	“[When launching the new MC elements] there are a lot of inconvenience that they did not consider, because it is not within their scope and line of thought.”	Opacity
5	“I am not sure that we have the correct measures. I think are 80% of the way, yet in some instances we are not quite there yet, because [the measures] do not reflect whether we can deliver our new overriding objective [supply chain focus]. So we are still considering whether we have the right [performance measurement] system.”	Opacity
17	“We are trying to loop the [performance measurement] system back to fit it [new MC elements] and how should it [the performance measurement system] be structured? [I think] that is two or three years down the road.”	Opacity

2	“We are currently talking to our finance people on whether we can develop a supply chain cost model, is it possible to develop a cost model on our internal supply chain in MULTICORP?”	Opacity
4	“The measures relate to our region and are consolidated into the region. Our measures cascade from [our regional headquarters] to my unit, [so] we share budget and performance targets with [our regional headquarters...So,] I know precisely how my unit is expected to perform for the following month and year, [but] I believe our [performance] logic is wrong and [top management] do not disagree.”	Performance measurement stability and/or incoherence
3	“Soon we should be able to report on the [supply] chains, which should be interesting because our current [performance] system reports on the individual units [... for instance] how much working capital, what is its inventory level, what kind of output and service levels. [...] Via our ERP system we should be able to see the financial and non-financial output of a specific [supply] chain. At that time, it becomes a kind of business unit yet in a supply chain thinking. [...]”	Performance measurement stability and/or incoherence
1	“The measures on the operational scorecards are [still] the same. [...] this is a pre-target letter that we address to the individual general manager and plant manager. [...] This is essentially what they receive; a scorecard and some further details. [...] When you decompose the [performance measurement] system, then it includes a scorecard for each of the individual plant managers. So it relates to the individual plants.”	Performance measurement stability and/or incoherence
7	“In the development of our performance measurement [system], we are working on incorporating a point of view that focus on what has most effect on the [supply] chain. That is the final goal.”	Performance measurement stability and/or incoherence
21	“General managers still have their [performance system] and that causes some conflicts. [...] We cannot measure, for example, supply chain cost today, but intent is that I should be accountable for some measures [...] We would like to know what are the measures and targets for the [supply] chain. We are not there yet. [...] So one of my tasks will be to [develop and] implement [supply] chain performance perspective, which we have not historically been good at.”	Performance measurement stability and/or incoherence
17	“We have a challenge, because we have a set of [performance] metrics here [in my unit] and different set of objectives over here [in the supply chain]. Therefore, [the discussions at the meetings] are crucial. I just had a session from 8 to 10 o'clock where I meet with one of my subordinates. She was frustrated that she was measured on our [performance] indicators. [I told her] I know that it does not make sense, so we have to collaborate and work together on these things. There is a set [performance] metrics here and a set of goals [in the supply chain setting] and these do not align, so there are conflicting objectives. The [performance] metric do not inspire collaboration across units [in the supply chain. Yet] I know that they have to work together [across the supply chain] to make things work, so we have to be very aware of how to carry that dialogue throughout the organization, because the further you get down in the organizational hierarchy the more literally they take the [performance] indicators. Thus, it is crucial that management engage in the dialogue [and] it is that atmosphere that is critical, not the [performance] indicators per se [...] It has difficult as an engineer to realize that [the quantification] cannot stand-alone. It is really uncomfortable [but] by no means does it bring us the whole way [...] That is a difficult task and it requires the correct managerial interventions to inspire them to work together.”	Dialogue
5	“We actually structured our dialogue [at the performance review meetings]. What is important is that we first contain [a lack of performance] and subsequently find it's causes, so we can find the underlying causes of the problem and remove it. We work hard on that, but that is the mindset we attempt to infuse into the [performance review] meetings. It is a place where you share problems. [...] The most important thing is that we structure our discussion in this [performance review] setting. What is presented at the [performance review] meetings is, what	Dialogue

	are you working on, what do you attempt to do about it, do we need to take further actions et cetera [...] So, we really do not look at performance levels per se, but what caused those the performance. It is more so we get a perspective on improvements. It boils down to that we must manage it [the performance review meetings] differently than we did previously. It requires a lot from the individual manager. We have attempted to change our approach to the [performance review] meeting completely, so now I chair the meeting once a week. Here I meet with my management group and attempt to assist the managers at the plants that actually has the ungrateful task of making things work. That is a completely different approach than previously.”	
4	“It [the performance review meeting] is all about cross function participation, where people from different functions participate, discuss and solve problems. A manager should not just push aside a problem to his subordinates, but also actively participate in the dialogue and be helpful with suggested solutions [...] We aspire to create a dialogue. We say it repeatedly, we must create interaction and dialogue at the performance [review] meetings. [...] The [performance review] meetings is a forum for us [management] to help others, both peers and subordinates. [...] I definitely think there is a lot of communication back and forth [...] and] it is such considerations that we want to foster at the [performance review] meeting.”	Dialogue
8	“The managerial approach [at the performance review meeting] is to ask the right questions and at the right time, so we can get to the core. If they reach a conclusion that they cannot solve the specific [performance] problem [for example], they do not have the needed competences, than I assist them in taking action and get in touch with people that can help them. [...] I might also call for people if we need more in-depth assistance, so there are different ways to assist. [...] It is a place where we challenge each other. We attempt not to dwell too much on the numbers [...] Strictly speaking and a bit provocative, I do not need our Performance [measurement] system. Maybe, top management needs it, because they need a place to get information, but that does not mean that I spend any time looking at its metrics.”	Dialogue
6	“Therefore, we look at our performance, but what is equally important is that we in a systematic way [at the performance review meetings] work on the underlying causes and solve those with an adequate rate. What I mostly look at when I take a tour around to the plant’s performance [review] meetings is ensure that the dialogue and coaching approach is in place.”	Dialogue
17	“This is a difficult task. [Previously] we would get lost in details, [for example the KPI] is 93.4 and the target is 96, why is that? We would spend the entire meeting working through the KPI status and listen to different explanations about why it is as it is. That is uninteresting. It is much more interesting to just briefly look at the numbers and then spend [most of] the meeting on the required actions that we need to put in place and how can we together on fixing it. [Thus,] it is all about what is <i>between the numbers</i> . It is the managerial task between the numbers and ask about what they want to do and what they have done to get back on track [...] I participate in the [performance review] meetings so that I can engage in a dialogue with my subordinates and observe how they carry out the meetings. It gives me a sense of is going on in the organization. Nevertheless, mostly my job [at the meetings] is to provide support if my subordinates need help with anything, [for example] escalate a problem to me. [.. Basically] our [actual] performance is not of interest. What is of interest is how we engage and discuss how to become better.”	Dialogue

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Tables

TABLE 1

Datatype	Description
Interviews	33 interviews with 26 organizational members (approximately 37 hours of interview data)
Observations	Observed four performance review meetings
Archival data	Performance Measurement template, including KPI definitions and calculations (<i>Performance Management – KPI definitions</i>)
	Four performance measurement reports from four different manufacturing units
	The action planning module in SAP and four-unit specific action plans
	The “sales and operational planning” template that outlines this process (see section 4.2)
	Their online process management system

Table 1 – Case data

TABLE 2

<i>Performance measure:</i>	<i>First time through percentage</i>
Purpose:	Provide an overview of the stability of the process quality on production lines
Approach:	Measuring scrap and rework
Scope:	All manufacturing plants in operation
Impact:	Primary: delivery. Secondary: productivity, cost, and capacity
Definition:	% of produced parts with no defects on first pass compared to total amount of parts produced
Metric:	%
Aggregation:	Number of plants not on target divided by number of plants on target
Formula:	$100\% * (\text{Amount of produced parts} - [\text{scrap} + \text{rework}]) / (\text{total amount of parts produced})$

Table 2 - Example of one of the 12 standardized performance measures