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A Longitudinal Case Study on the Calibration of Management Control Elements in a Global Manufacturing Company

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Published in:
9TH CONFERENCE ON PERFORMANCE MEASUREMENT AND MANAGEMENT CONTROL

Publication date:
2017

Document Version
Accepted author manuscript, peer reviewed version

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Abstract
To adjust to changes in the environment, organizations are sometimes urged to make changes to the management control (MC) elements they use. Some MC elements, however, are 'slower' to change than others, i.e. they have a higher viscosity (resistance), which implies that they cannot be changed as quickly as other elements with a lower viscosity. Such a difference in viscosities may create situations of incoherence in a MC package used. To date, however, we know little about what managers can do to mitigate the MC package's incoherence or its negative consequences. Drawing on a longitudinal case study in a global manufacturing company that was confronted with a change in the environment, this paper studies managers' roles in the process of 'calibration' after an external change urged internal MC elements, with different viscosities, to change. We find that managers use the performance measurement system less diagnostically and more interactively in an effort to smoothen the process of change towards a new configuration of the MC package used and the new demands from the environment.

Keywords
Calibrating, Congruence, Management Control, Manufacturing, Performance management

1. Introduction

Businesses are confronted with changes on a very regular basis, for instance in the areas of new technological developments, customer requirements, supply chain possibilities or new regulations. Consequently, businesses rarely reach a 'steady-state', instead they continuously evolve from one state to another (see Harrington et al., 2011). Operational and strategic adjustments to different states likely involve or affect the management control (MC) elements used, because they have to fit the new state in order to be effective. Such changes may take time, resulting in periods in which parts of the 'MC package' are already in line with the new state, while others are still adjusting, which may jeopardize the functionality of the total package of MC elements (Abernethy and Chua, 1996). The interplay and configuration of MC elements has already received quite some attention in the recent literature, studying for instance the configuration of MC package at one state (e.g. Grady et al., 2016), or two different states in different moments in time (e.g. Sandelin, 2008), a cross section of MC package configurations (e.g. Bedford and Malmi, 2015) or the interplay between MC elements (e.g. Friis et al., 2015). Such studies, however, did not focus on the development of an MC package over time from a more dynamic perspective, leaving unanswered important questions regarding changes in an MC package. We therefore employ a longitudinal case study in which we examine the dynamics of change within an MC package, and how different MC elements with different 'speeds of change' may increase incoherence in an MC package. In our analysis, we particularly pay attention to the change of one part of an MC package, which led to incoherence with other parts of the MC package, and we focus on the role of managers who try to mitigate this incoherence and its effects.

Previous studies that focused on the interaction between MC elements looked at the change of one individual MC element and its effects on the MC package as a whole. For instance, Østergren & Stensaker (2011) found that 'cybernetic' and 'administrative' MC elements interacted with one another. More specifically, they show how after the removal of budgets, planning MC elements started to incorporate more (long-term) value-creating goals, and became a vehicle for strategic orientation instead of only organizing the operational (short-term) cost targets. O'Grady & Akroyd (2016) also demonstrated how a company's MC package functioned without budgeting-related MC elements, which in their case led to prominent roles for 'administrative' and 'cultural' MC elements. The extant studies on MC packages in the literature all seem to acknowledge that a choice for one type of MC element will affect how (and even sometimes whether) other MC elements are used. In the current study, we want to focus

on the process that starts after the change of an MC element: the literature assumes that changes will come to other MC elements, but we do not yet know how this exactly works. Furthermore, previous studies suggested that different MC elements might have different 'time perspectives' for changes: some studies stated for instance that socio-ideological controls or cultural controls are relatively 'slow to change', as these controls relates to core organizational values which can be changed through, for instance, symbols and socialization processes (Alvesson and Kärreman, 2004). Malmi and Brown (2008) also suggest that some MC elements may be slower to change than others by stating that cultural control is slower to change, and administrative control, e.g. procedures and policies, is relatively 'quick-to-change'. To our knowledge, this idea of MC elements with different 'change speeds' is not developed in the MC literature, although the organizational ecology literature uses the term 'viscosity' to describe an element's ability to change. In this paper, we therefore first develop an analytical framework based on earlier work on management control and organizational ecology, after which we present a longitudinal case study on a change process in a large multinational firm. This paper's research question is; How can differences between MC elements' viscosity, i.e. their resistance to change, affect the coherence of an MC package, and how do managers respond to such changes?

We contribute to the literature, first by bringing in a time dimension to assess an MC element's ability to change, which we coin an MC element's 'viscosity'. MC elements with different viscosities may be a source of incoherence of an MC package, indicating a situation in which some parts of the package may be already adjusted to a new situation while other parts are lagging behind, each providing contradicting directions. Second, our study points to actions that managers can engage in when trying to mitigate the incoherence of an MC package and its effects. We show that a possible way for managers to do this is not by changing the design of an MC package, but rather by using the existing MC elements in a different way.

The paper is structured as follows; the next section reviews the literature on MC and organizational change. Section three discusses the research methods and in section four the case will be introduced. In section five we will situate our findings in the extant literature, reflect on the meaning and significance of our findings and conclude our study.

2. Literature review

2.1 Management control and coherence

MC is an important function in organizations as it aims to direct employee behavior in line with the organizational goals (Merchant and Stede, 2007; Simons, 1995a). 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 and Brown, 2008). Prior research stated that MC elements should be studied in their 'context', because relations between an MC element and other MC elements may affect their effectiveness (Flamholtz et al., 1985; Malmi and Brown, 2008; Merchant and Stede, 2007; Otley, 1980; Simons, 2005, 1995a). Henri (2006), for instance, showed that interactive and diagnostic use of MC elements can complement one another to achieve higher effectiveness, and Widener (2007) found that beliefs systems complement most other types of MC elements.

Because of the interplay of MC elements, the 'coherence' of the MC package as a whole is important for its well-functioning (Flamholtz, 1983). Coherence refers to the strength of the linkages between the individual MC elements and the extent to which the MC elements are aimed at the same goals (Ferreira and Otley, 2009). Different coherences can be found when focusing on different levels of analysis: in line with Graebner and Moers (2013) we distinguish between MC systems and MC packages. An MC system is a group of MC elements that are designed together, aimed at the same goal and thus coherent. MC packages are the sum of all MC elements and MC systems used in an organization or department, intended and unintended, which are not necessarily coherent as such. The more coherent an MC package is, the better it helps to set out clear directions for employees in line with the organizational goals (Abernethy and Chua, 1996).

The MC literature already examined a wide range of relations and 'dichotomies' that have to be 'balanced' to prevent incoherence from occurring. Such dichotomies are for instance, Simons' (1995a) interactive/diagnostic dichotomy, the constraining/facilitating dichotomy (van der Kolk et al., 2015), and the financial/nonfinancial dichotomy (Kaplan and Norton, 2000, 1992). It is the responsibility of managers to engage in a delicate 'balancing act' to maintain the coherence of the MC elements used. However, as argued above, when MC elements are indeed connected, a change to one element may affect other elements, which may in turn also have an effect on other MC elements. This complicates the 'balancing act' because such subsequent changes are difficult to predict upfront and are only to witness

once they surface. In addition, some MC elements may be changed or implemented 'more easily' than others: for instance, whereas rules can be changed overnight, it takes a long time to change values that are embedded in an organization. This highlights the importance of an additional dimension, namely that of the MC element's ability to change. Given the importance for businesses to quickly adjust to a rapidly changing environment and the consequent requirement of adjusting the use or design of MC elements, it is important to enhance the understanding of the MC elements' ability to change. Prior literature also acknowledged, albeit somewhat implicitly, that some MC elements may be 'quicker' to change than others. For instance, Malmi and Brown (2008) stated that socio-ideological controls "are assumed to be slow to change, thus, providing a contextual frame for other controls" (Malmi and Brown, 2008, p. 295). Their claim - which rests on the assumption that socialization processes and the embedding of values in organizations usually take time - is however, not empirically supported or further developed. In this paper, we want to address this issue by providing empirical evidence and a further theoretical development of MC elements with high or low ability to change and the incoherence such different 'speeds of change' this may cause (temporarily) in organizations. Furthermore, we will examine how managers deal with such incoherence in a calibration process.

We resort to the organizational ecology literature to theorize about such change processes of MC elements, more specifically to the 'cascading effects of change' (Hannan et al., 2003a) and the notion of 'viscosity', which denotes an MC element's ability to change. This literature provides us with precise and appropriate analytical terms to bring further ideas about the interplay of MC elements.

2.2 Organizational inertia, cascading effects and viscosity

Organizational change relates to the transformation of an organization between various points in time, and such a change usually happens when a manager, or any person with a mandate of authority, decides on the change (Barnett and Carroll, 1995; Hannan et al., 2003a). The literature identifies two types of repercussion effects organizational change; content and process effects (Barnett and Carroll, 1995). A content effect relates to differences in organizational design (i.e., which objects did actually change when comparing the pre- and post-change situations). Process effects are more uncertain as they encompass behavioral effects of the change (i.e., how did the transformation process take place), paying attention to the communication of change, speed of change and the encountered resistance (Barnett and Carroll, 1995). This paper focuses on the 'content effect' of change, while simultaneously paying attention to the

dynamics of the change and the way in which organizational members deal with change.

Theories in organizational ecology argue that most organizations can be typified by 'structural inertia toward change': if it is not absolutely necessary, organizations are not likely or willing to change (Hannan and Freeman, 1984). As a consequence, real organizational changes only occur 'by force' or as a response to some 'significant crisis' (Hannan and Freeman, 1984). At the same time, however, this literature proposes that an actual organizational change increases the possibility of other changes. This effect is called the 'cascading effect of organizational change', meaning that one change may cause other changes to occur (Hannan et al., 2003a). To put it differently, an organizational change sets the organization's 'inertia clock' back to zero and makes the organization ready or open to more changes (Amburgey et al., 1993).

Following the theory about 'cascading effects of organizational change', when some level of coupling between elements exists an organizational change seldom comes alone: a change to an architectural element leads to change(s) in other element(s). An architectural element is defined in the organizational ecology literature as "a set of values on the relevant organizational features (e.g. form of authority, pattern of control relations, accounting principles, compensation policies)" (Hannan et al., 2003a, p. 466), which closely resembles what is understood as an 'MC element' in the control literature (e.g. Malmi and Brown, 2008; Merchant and Stede, 2007; Simons, 1995a)[1].

Changes to architectural elements do not happen overnight. Usually, an organization spends some time developing and implementing new elements or changes to existing elements. During this period, 'new' elements exist alongside 'old' elements. Potentially, incoherence between such 'old' and 'new' elements causes problems, for instance, when actions directed by the old element are not in line with actions directed by the new element (Hannan and Freeman, 1984). Generally, such incoherence is unforeseen and will first be noted ex-post, that is, during the initial organizational change period. The literature specifically points to the notion of 'structural opacity', when referring to the limited sight (knowledge) that often exists about interconnections between 'new' and 'old' elements, which restricts predictability. For the organization, this means that it cannot know a priori all the required adjustment that need to be done in order to eliminate (temporary) incoherence between elements, thus changes do not occur 'in parallel' but more as a 'sequential process'.

[1] In the remainder of this section, we will use 'architectural elements', to do justice to the ecology literature on which we rely here.

The duration of the incoherence depends on the time it takes to make adjustments to other architectural elements (Hannan et al., 2003a, 2003b). This search-and-adjustment process of corrective actions may take very long time in some situations. The initial change at time t_1 induces a search-and-adjustment process that leads to changes in a second architectural element (second order changes) at t_2, which potentially leads to a search-and-adjustment process and changes in a third element (third order changes) at time t_3 and so forth. The cascade stops when an architectural change does not induce violation with other elements at time t_n (Hannan et al., 2003a).

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 initial change element is strongly connected with other elements (Hannan and Freeman, 1984). Furthermore, the risk of conflicts with other architectural elements is enhanced if the changes challenge or contradict previous ways of doing things, labelled cultural asperity, instead of complementing such current practices (Hannan et al., 2003b). Changes create uncertainty[2] in organizations (Rafferty and Griffin, 2006). Additionally, during the temporal span, potentially various incompatible elements are situated within the organization, which further generate anxiety and uncertainty about proper cause of action and generally the organizations future direction (Barnett and Carroll, 1995). Consequently, such incoherence further adds to the uncertainty caused by organizational change. In conclusion, Hannan et al. (2003a) argue that studies on change in organizations should not limit themselves to a single change, but rather should examine change in the context of the other changes they cause, i.e. the cascade of changes. This conclusion resembles ideas about the interplay of MC elements in 'packages', which also should not be studied 'in isolation' (Chenhall, 2006; Malmi and Brown, 2008).

Each step in the adjustment process has different time perspective, which means that changes to some elements are easier than others. Hannan et al. (2003a) refer to this as the 'viscosity' of the elements. In the natural sciences 'viscosity' describes the 'thickness' or 'resistance' of a material; for instance, water has a low viscosity, while honey as a higher viscosity (thickness). Translated to an organizational context, this means that elements with low viscosity are 'quicker to change' than elements with high viscosity, which are more resistant to change. The more resistance to change, the longer it takes for an element to change. Therefore, the 'duration time' of an element's change relates to its viscosity (Hannan et al.,

[2] Uncertainty refers to a state of doubt about proper action due to lack of the information (Otley, 2014), for instance caused by quantitative lack of information or discrepant inputs into the decision making process.

2003b), and all the sequential change times of the elements involved make up the temporal span of the total adjustment process (Hannan et al., 2003a).

2.3 Analytical framework

In the previous sections, we addressed three notions that are central to our study: the coherence of an MC package, the cascading effect of change and the viscosity of MC elements. By bringing these notions together in an analytical framework, we identify what is still to explore empirically and to develop theoretically.

To adjust to changes in the environment, organizations are sometimes urged to change an MC element. To make sure that the other parts of the MC package are *coherent* with this changed MC element, other MC elements may need to change as well, which we coin the *cascade effect*. Some MC elements, however, are 'easier' to change than others, i.e. they have a lower *viscosity* (resistance), which implies that they can be changed 'quicker' than other elements with a higher viscosity. The difference in viscosities may create new situations of incoherence. How managers may lower the incoherence or mitigate the negative consequences in situations where some MC elements have a different viscosity than other MC elements is not known yet, and it is one of the aims of this paper to further explore this issue.

To further explore the 'how' question, we investigate the MC related change in a case study, and how that change led to incoherence between the different parts of the MC package, which than triggered other changes. In the case study, we will pay close attention to how managers deal with the incoherence, in order to learn how the incoherence can be lowered or how its unintended consequences can be mitigated.

3. Research method

As we explicated above, the objective of this study is to empirically inform the situations in which the cascade effect and the different viscosities of MC elements cause incoherence, and how managers deal with such a situation. Since this concerns a why question studying dynamics over time, and because this is an exploratory objective, we choose to conduct a longitudinal in-depth case study. Longitudinal case studies are powerful to examine processes over time and form "the most consistent way of analyzing

developments" (Flick, 2009, p. 138). Below, we further elaborate on our research design choices and data analysis.

3.1 Case selection

This study is conducted in a Danish Manufacturing Company that operates in various countries: 'DENCOMP'. We selected this organization for a number of reasons. First, we wanted to study a company that strongly relied on its MC package in order to be able to study it. Operating in multiple countries increases the operational and geographical complexity of an organization, and prior literature suggested that this would enhance the organization's reliance on MC elements (Galbraith, 1973). Second, we wanted to study an organization that dealt with organizational and MC change. Through conversations with institutional colleagues who previously studied the organization, we learned that the DENCOMP was changing part of its MC package at the moment of the study. Third, previous studies at DENCOMP have created goodwill between the organization and the research institution one of the authors is part of, which secured good accessibility and support from top management. Such accessibility and support is of crucial importance for a case study, as lack of top management support can potentially obstruct the required access or end the access prematurely (Baxter and Chua, 1998).

DENCOMP was established in 1945 and currently employs approximately 18,000 people worldwide and has a yearly turnover of just over 3 billion euros. This study only focuses on the manufacturing part of the company, which means that the interviewed organizational members are restricted to this part of the company. The organizational structure bears clear characteristics or matrix structure and can be depicted as follows:

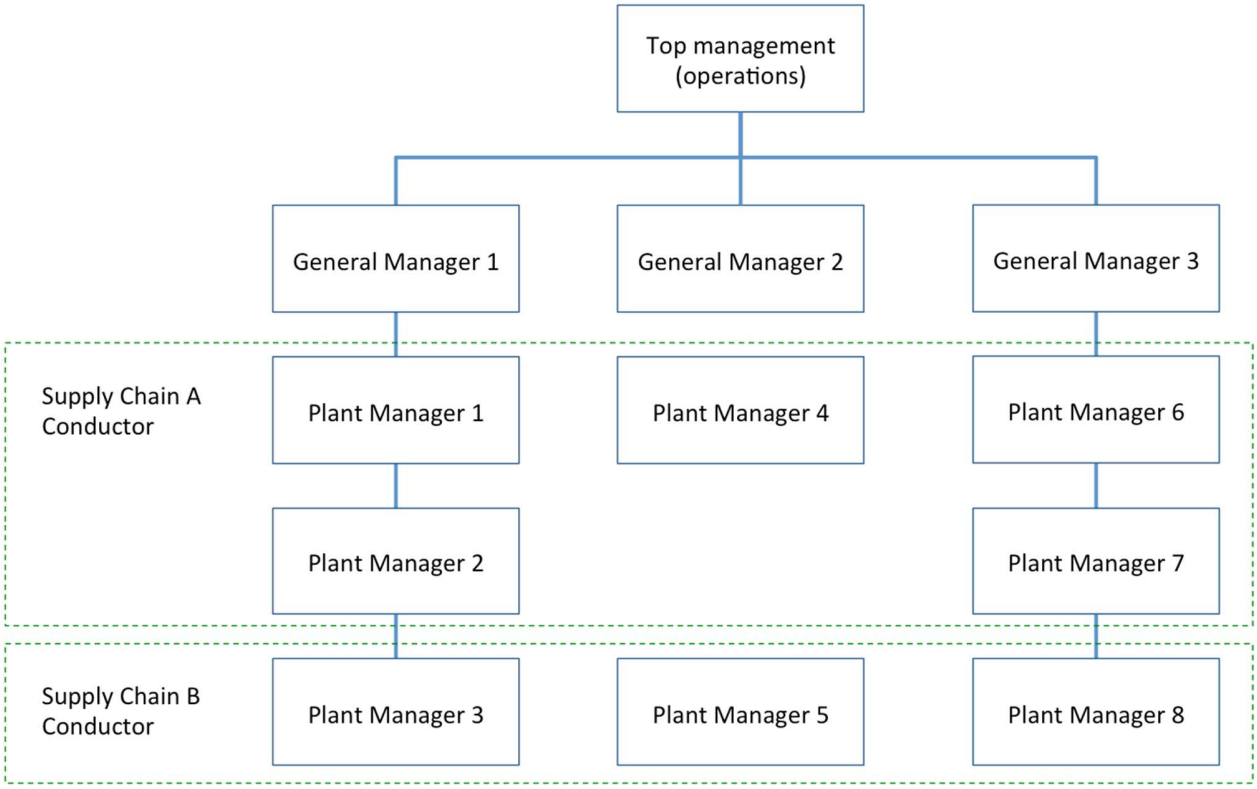

Figure 1 – Simplified organizational chart of DENCOMP's operations unit

The focus on the manufacturing function is based on the fact that since the late 1980s, manufacturing activities have especially felt the internationalization process, and in most countries investment in manufacturing has been the largest type of foreign direct investments (Ferdows, 1997). Consequently, for the last decades manufacturing has become more international with a shift from one-plant manufacturing to a multi-plant enterprise, and companies develop global manufacturing strategies to take advantage of the opportunities presented by economic globalization. Hence manufacturing has changed from supplying domestic markets via supplying international markets through exports, to supplying international markets through local manufacturing (Rudberg and Olhager, 2003). The global spread of manufacturing activities means that it functions as rich research field for this study, as dispersion of operations are found to require more reliance on MC (Moores and Yuen, 2001).

3.2 Interviews and data analysis

The primary data source in this study is a series of semi-structured interviews with relevant actors in

DENCOMP where the overall theme of the interview is defined beforehand, but within this theme the respondent can discuss freely. The interviewees are both members of the top management team of Operations (henceforward "top management) as well as their direct subordinates, which are entitled *general manager* and their direct subordinates, titled *plant manager*. A plant manager is the top manager of a single plant, whereas a general manager is the top manager of a production company, which includes multiple plants (see figure 1 for a simplified organizational chart). Confirmation or disconfirmation of individual opinions is controlled by asking similar questions to multiple respondents (Baxter and Chua, 1998). All interviews are conducted in Danish and recorded to enable the following analysis. 33 interviews have been conducted with 26 different organizational members for a total of approximately 37 hours of recordings. The interviews are conducted from 2011 to 2017 (see appendix A for more details).

The article also utilizes other sources of data such as, management reports, performance reports, agenda and minutes from meetings. Furthermore, a researcher has been present at four performance meetings, which provides us a first-hand experience regarding the performance management system, instead of only relying on the descriptions provided by participants. During the meetings, notes were taken and summarized after each meeting. Combined, these data sources allow data triangulation (Eisenhardt, 1989), which maximization of authenticity and credibility of the findings (Baxter and Chua, 1998; Golden-Biddle and Locke, 1993). We stopped collecting data when data saturation was found adequate (Eisenhardt, 1989).

To enable analysis, data is fitted into common nodes, which centers around the articles main concepts. This allows a pattern-matching process (Yin, 2009) that cross-references statements and explanations from the different interviewees towards the objectives of the article. The nodes align with the themes in the following analysis sections, which covers; MC change, MC stability, incoherence, recalibration, and mitigation of incoherence (interactive use). The categorization of data provides an extensive overview of each of the main themes of the article, which the following sections report.

4. The Case of DENCOMP

4.1 The 'old' situation: Autonomy, decentralization and output measures

DENCOMP's focus from the early 1990's and onwards was on growth. To succeed with the strategy the company sought to enhance the entrepreneurial spirit of general managers and plant managers by 'handing them the keys'[3] to their specific unit, requiring local mangers to take ownership of their unit and utilize local information to autonomously develop the unit. This self-governing culture, and the derived autonomy of individual units, trumped comprehensive companywide control practices and the autonomy further shaped this culture. This self-governing culture served the company well for years, and was seen as an important success factor that created DENCOMP's high growth rates from the early 1990's.

In line with the philosophy of handing over 'the keys', the general managers and plant managers were themselves responsible for developing their control practices. Consequently, each unit developed and maintained their own MC elements – e.g. operational planning and control and organizational structure – resulting in a myriad of MC practices that varied strongly per plant. In addition, the company did have a forecasting process, where the sales function estimated expected demand levels, but local managers did not integrate those forecasts into the planning process, as they held 'the keys' to their own units and 'knew better'[4] what was required. In general, the MC practices at DENCOMP were very fragmented and localized.

Contrary, to the above examples, DENCOMP works with a structured and formalized performance management system. The performance measurement system included 24 measures, 12 of which related to operations and the other 12 related to support functions related to operations, e.g. quality and production planning. The operations 12 measures included both financial and non-financial measures, and are grouped in five categories: safety, quality, delivery, cost, and employees. In line with the historical functional focus, the design of the performance measurement system focused on monitoring performance levels of the globally dispersed individual units and accountability for the measures rested on individual plant managers and general managers. This is easy to recognize in the formalized performance measurement system, where each measure appoints the specific plant or general manager accountable for the measures. The label of the third column in the spreadsheet type of layout was 'responsible', which always declared an individual plant manager and general manager as being

[3] Sales and operational planning manager (ID 2) used this expression

[4] Supply Chain Conductor who before the Sales and operational planning and supply chain council initiatives had multiple years of experience as PM

responsible for specific measure. Besides accountability, a number of dimensions define the measures (table 1 provides an example). The performance measurement system that is used assumes that individual units are structured as profit centers.

Performance measure:	*First time through percentage*
Purpose:	Provide an overview of the stability of the process quality on production lines
Approach:	Measuring scrap and rework
Scope:	All manufacturing plants in operations
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:	(Amount of produced parts – (scraped + rework))/(amounts of parts produced) *100

Table 1 – Example of one performance measure

DENCOMP's IT infrastructure facilitates the formalized performance reporting, which brings performance information to various managers at a fixed time interval. The information is accessible in real time, but managers at various levels have different needs for reviewing performance data. The IT generated performance reports functioned as a foundation in formalized performance review meetings. Dependent on the management level the timespan for performance reviews spanned from daily to weekly meetings. For instance, a plant manager held daily performance review meetings with his direct subordinates and on a weekly basis a general manager gathered all the plant managers under his direct supervision for performance review meetings. At such meetings, the plant manager and all his direct subordinates, as well as some functional specialists, were required to attend. Before such a meeting, reports stated actual performance levels, so people could look at it before or after the meeting with the general manager.

4.2 Crisis and changes to the MC package

When the financial crisis hit in 2008, the event functioned as a catalyst that revealed significant shortcomings in DENCOMP's MC package that overly relied on principles of self-governance of

decentralized units. The sudden drop in demand exposed a problem with the philosophy of decentralizing decision rights to local managers, especially regarding the coordination between sales and operations. The sales and operational planning manager (ID 2) explained:

> "We stopped billing customers, but it took almost six months before we stopped [scaled down] production"

The repercussions of the financial crisis in 2008 made this lack of integration visible and this functioned as an eye-opener that initiated changes to DENCOMP's way of exercising and delegating MC (Hannan and Freeman, 1984). The company's search for growth through inciting the entrepreneurial spirit of general managers and plant managers had largely ignored efficiency and coordination between the autonomous units. Inevitable this led the company to rethink its current controls practices and how to avoid similar undesirable situations in the future. This led to changes that should facilitate cross-functional integration.

In 2011, under the header of "Integrated Demand and Supply" the company initiated several changes to the way in which they exercised control. The two central initiatives for the change of the MC package were 1) a new, centralized sales and operational planning and 2) the installation of supply chain councils. Together these two initiatives hold characteristics that enhance the likelihood of cascading changes to other MC elements. First, both initiatives signaled a clear break with the company's historical functional and self-governing way of organizing control and expressed a new control focus, namely the value chain. Combined, these two changes contradicts the previous way of doing things and led to a novel way of formulating short-term plans (namely: very centralized and structured), which meant that 'the keys' were taken away from the local managers. This significantly departures from previous approach to MC of autonomy of units and enhances the risk that the new elements would be incompatible with other, already present, MC elements, which could possibly trigger a cascading effect (Hannan et al., 2003b). Second, action planning must be considered a core MC practice in operations and highly intertwined with other elements (Daft and Macintosh, 1984) and substantial changes to core elements enhances the risk of having cascading effects on other elements (Hannan et al., 2003a).

Below these two new initiatives are discussed, after which we discuss how these new initiatives caused problems regarding incoherence within the MC package and how the company dealt with the

incoherence.

4.2.1 Centralized sales and operational planning

The main goal of the centralized sales and operational planning is to get 'one set of numbers'[5] 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 cascades down to the individual plants.

On the seventh workday of every month, a demand planner releases the forecast, which DENCOMP labels *internal delivery plan*. This plan defines in weekly intervals the output requirements for the coming month. The company has a seven level product hierarchy, and the internal delivery plan describes output requirements for the seventh level, which is a product family (for instance alpha1, alpha2 and alpha3). The plan sets the output requirements for alpha1, alpha2, and alpha3, but to handle daily operations for product families, some of which are multi variant, the production line(s) must also know the specific, required variant of alpha1, alpha2, and alpha3. Consequently, each plant has a *master planner* and for those product families that consist of more than one variant, the master planner conducts a variant breakdown analysis based on historical sales mix analysis through the company's ERP system. Furthermore, when assessing the internal delivery plan together with one of the master planners, we saw that the production numbers for each variant could vary significantly with the weekly intervals. We saw for instance that 26,000 units had to be produced in the first week, 84,000 units the directly following week, and 73,000 units in the week thereafter. Weekly deviations that are so large are of course not practical for production execution, thus the master planner also levels out weekly output deviations in the internal delivery plan, and the level capacity plan sets the ultimate output requirements. However, the weekly outputs produced by the master planner must always sum up to the monthly requirements from the internal delivery plan. As expressed by a master planner (ID 12):

> "The task is to decompose the forecast [internal delivery plan] that comes from central function to some numbers that we can use to run our production. So that is the primary job; to make sure that the monthly roll is executed… to make sure that there are the needed orders in regards to the

[5] Multiple respondents referenced this vision, for instance sales and operational planning manager (ID 2), Mater Planner2 (ID 14), and Supply Chain Conductor1 (ID 21)

> forecast [internal delivery plan] we receive… We must take the demand plan [internal delivery plan] and set up production to execute it"

When the master planner has finished the job, the weekly output requirements are handed to a production planner, who decomposes to the daily production schedules and individual production orders. As expressed by a master planner (ID 12):

> "My job stops when I took the forecast [internal delivery plan] and examined whether we need one or two shifts, how many units of output per week we should produce and so on. After that I can talk to the individual planners and tell them for instance that they have to produce 20,000 units per week. That's then their plan."

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 sum up to the weekly output requirements that the master planner establishes. This extra decomposition is necessary as a production site contains multiple production lines and the master planner does not always have all the necessary information to execute the production on a daily and hourly manner. For instance, specific machines or tools might be in maintenance on a specific date, meaning that no production orders can be executed that day or production workers might be scheduled to participate in course on a specific date, which will limit the number of production orders that can be executed on that specific date. Therefore, the production planner has to consider these very local contingencies when decomposing the weekly output requirements from the master planner and make up for lost production on other days of the week, as the production lines must produce the required output set by the master planner. 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 (see figure 2 for a schematic overview of the process).

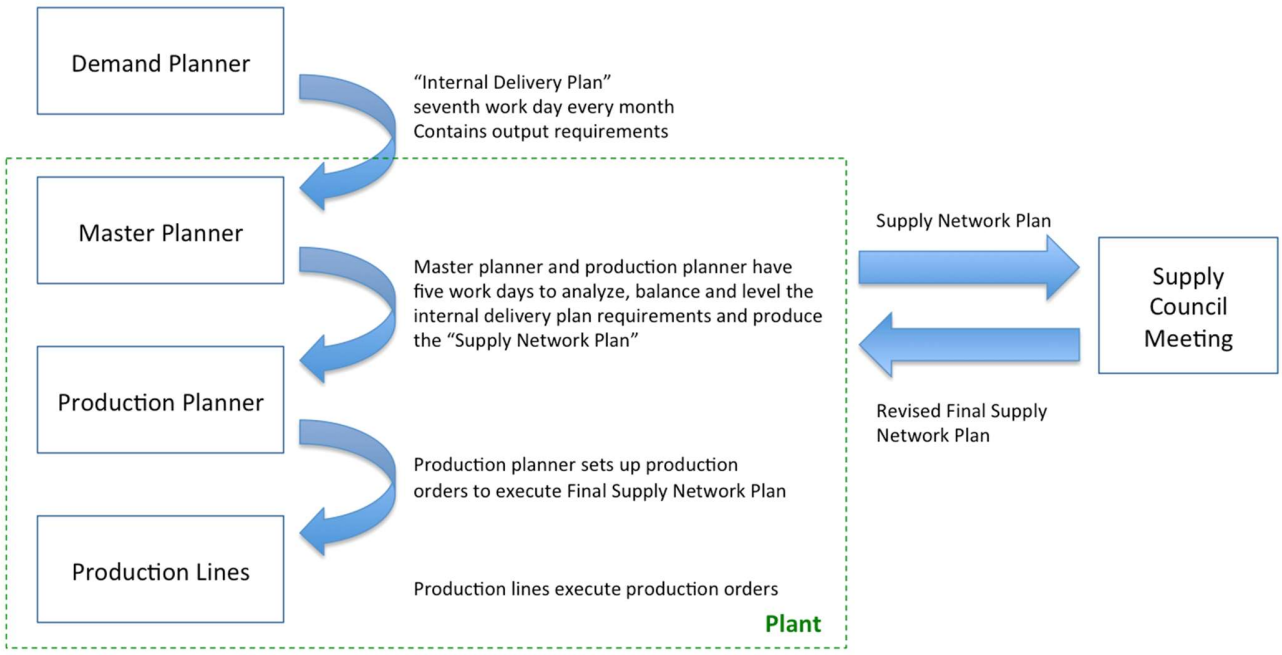

Figure 2 – Sales and operational planning and the role of the supply chain council

4.2.2 The supply chain council

Another structural change regarded the organization of so-called '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*, i.e. the executive manager of the specific supply chain (see also figure 1). The supply chain council also includes a planning manager, a representative from finance department, and sourcing department.

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 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 council meeting. Either the supply network plan is accepted and approved with only some 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 repeatedly quality issues etc. This would mean that such 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 chains' compliance with the overall internal delivery program lies with the supply chain conductor, who also has the final say in a council meeting. Decisions made by the supply council meeting can have large consequences, 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 and defines short-term output requirements for the plants in the supply chain and controls the extent to which plants 'deliver'. 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 is not possible to give 30 units in a [supply] chain that task individually."

The supply chain council is a manifestation of a movement away from a decentralized, functional focus on individual units, where general and plant managers held 'the keys' and had full decision autonomy. This signaled a movement towards a supply chain focus where the objective is to optimize the individual supply chain.

To break down the functionally fragmentized culture, DENCOMP saw a need for establishing these supply chain councils, primarily because the coordination of such a complex supply chain, which includes somewhere between 10 and 30 distinct units, is too complex for local managers to grasp. They saw no other option then to 'force them to talk to each other [in the supply chain council], otherwise it would not happen'[6]. 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 27) elaborated:

> "A plant manager was used to making all his own decisions. He controlled his own budget and many other things. 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 from units that once held that

[6] Sales and Operations plan manager (ID 2)

power. Instead, [a plant manager][7] now must become extremely effective in executing the plans [made by others]"

Combined, the centralized sales and operating plans and the supply chain councils form a rigorous process, that induce cultural asperity as it clearly violates previous ways of doing things, thus enhancing the risk of cascading effects (Hannan et al., 2003b). The sales and operations planning and supply chain councils are significant alterations to the way in which DENCOMP's operations division exercises control. However, DENCOMP's other MC practices have not seen similar level of change, which is described in the following section.

4.3 The MC element with high viscosity: the performance measurement system

Even though the changes listed above limited the decisions that could be taken at the unit-level, production companies and plants were still viewed as profit centers in the performance measurement system. Various interviewees emphasized that profit is still viewed as an important performance measure for the assessment of the individual managers, for instance corporate manufacturing and supply chain manager (ID 3):

"Top management still emphasizes profit… We want to make money"

This demonstrates that financial performance and specifically profit are still an important performance measure for general and plant managers. This documents that the current performance measurement system still tracked performance of individuals and isolated units, and thus – implicitly and explicitly – holds individual managers accountable for performance levels. In the timespan of implementing the two new initiatives, the performance measurement system had not seen similar significant level of changes, as expressed by the operational excellence manager (ID 1):

"Their [i.e. the general and plant managers] KPIs [key performance indicators] are still the same."

[7] The respondent used the name of a specific plant manager. To keep confidentiality, our interviewees are anonymized.

A sales and operating plans manager (ID 2) added:

> "Responsibility for operating performance lies in the individual [operational] companies only."

Together this means that an MC element remained very stable and still holds the characteristics of a system designed towards the company's historical functional focus. The performance measurement system does not document the horizontal focus manifested by sales and operational planning and supply chain council initiatives, thus demonstrating higher *viscosity* than the previous mentioned MC practices (Hannan et al., 2003a). This increases the probability that managers will take action consistent with the end of optimizing their own performance (Abernethy and Chua, 1996).

4.4 Incoherence in the MC package

In the previous sections, we examined the 'old' situation, the impact of the crisis, the implementation of two new MC elements (the centralized sales and operational plan and the supply chain council) and the 'unchanged' MC element (the performance measurement system). The partial change of the MC package caused incoherence in the control of managers at different organizational levels. On the one hand, they lost autonomy and decision rights regarding production choices, however, they were still responsible for the performance of their respective units by the performance measurement system.

The lack of changes to the performance measurement system was not because the company did not acknowledge the need for changes: DENCOMP recognised that the change caused by the sales and operational planning and supply chain council induced a need for changes to the performance measurement system as well. For instance, the profit center structure underlining the current system was found to be incompatible with the newly implemented centralized sales and operational plan and the role of the supply chain council. In relation to this, the sales and operational planning manager (ID 2) stated:

> "[A general manager or plant manager has to] deliver the highest profit, but we're slowly moving away from that, because he actually doesn't control profit!"

In general terms, the company was debating and considering the need for more drastic alterations to the

performance measurement system and, as expressed by the operational excellence manager (ID 1):

> "We need to get all these performance measures integrated [in the remainder of the MC package]."

A plant manager (ID 7; PM1) also elaborated on the need for changes:

> "In this [our new strategic plan[8]], 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 DENCOMP thus recognized that the new initiatives affected the role of the performance measurement system, and that the change of some MC elements triggered the need for changes to another MC element. The interconnections have been illustrated previously (Becker, 2014; Henttu-aho and Järvinen, 2013; Østergren and Stensaker, 2011), where changes to one element triggers a (need for) change(s) to other MC element(s). However, these studies did not acknowledge that changes to various elements is a sequential, not a parallel, process (Hannan et al., 2003a, 2003b), causing different timespans for change (Malmi and Brown, 2008), as demonstrated by the simultaneously stable and changing MC elements. The sales and operational planning manager (ID 2) added to this:

> "I don't think a large company like [DENCOMP] dramatically changes course just because someone like me believes it's a good idea to look at the supply chain... Currently, we have some goodwill because it's a strategic project for the company to make this new structure… It took us almost a year before we could show better results… So we have full management support, but we have these control challenges we have to live with almost every work day. So, this [control challenge] is one of the things we are right in the middle of."

So, the changes made to the MC elements are accepted by some because they are part of a larger strategic

[8] Responded named the title of the current strategy that has spawned the MC alterations mentioned in previous sections. To ensure anonymity we removed the name of the strategy.

plan. To not lose the 'goodwill' this created, DENCOMP wants to document the advantages of the new initiatives before making further changes to the remaining MC elements. The corporate manufacturing and supply chain manager (ID 3) elaborated on their considerations and on the need to change:

> "We have decided that all this performance management should be more integrated than currently, because the performance management system should align with all our other systems... We can't afford a world that's not in harmony, but there's so much stuff that we already gave up! Or to put it differently, we just wait a little longer [with changing the performance measurement system]"

The new sales and operational planning and supply chain council was initiated to enhance cross-unit coordination. However, these initiatives created incoherence in DENCOMP's MC package, which urged the need for changes to other parts of the MC package, i.e. the performance measurement system. Consequently, this started a search-and-adjustment process, thus initiating a cascading effect (Hannan et al., 2003a). However, because redesigning the performance measurement system was believed to be a difficult task that would need a careful design (which measures to include and which to exclude, who is accountable for which part of the performance), which potentially could trigger resistance, DENCOMP decided to wait 'a little longer' with these changes.

The sequential process of MC change and the various viscosities of MC practices left DENCOMP in a situation characterized by the coexistence of old and new elements, causing some incoherence (Hannan et al., 2003a). This period of incoherence of the MC elements within the MC package during which the managers try to mitigate the incoherence and its effects is what we call the period of 'recalibration'.

4.5 Period of recalibration

The period of recalibration started immediately after the new MC elements were introduced, and the sales and operational planning manager (ID 2) acknowledged the problem with the different 'viscosities' of MC elements, and put it like this:

> "It is a challenge in the current structure [performance measurement system] to get people to

think horizontally… we are right in the middle of that issue."

The part of the MC package with lower viscosity rendered the (slower-to-change) performance measurement system 'obsolete' for the current and future control ends. This led to a discrepancy in control ends between individual MC practices and consequently incoherence within the MC package (Abernethy and Chua, 1996). The incoherence between MC elements created a 'conflict' for managers, as different MC elements simultaneously encouraged contradicting actions, as expressed by a plant manager (ID 7):

> "The decisions made in the councils can… conflict with my own boss [a general manager] in regards to the performance measures, because we might reach some decisions that in general are good for the value chain, but not so good for the Danish production and that foster some disarrangements"

In other words, the incoherence consists of the fact that the performance measurement system was designed towards measuring and evaluating the performance of isolated units, rather than the unit's net contribution to performance in the integrated value chain. This incoherence has the potential to obstruct organizational action (Hannan and Freeman, 1984). The current performance regime used for evaluation gives no impetus for cross-unit collaboration, as the system specifies unit performance as the 'control end'. If individual managers focus strictly on 'looking good' in the formalized performance management reports they will undermine the horizontal end of the current strategy, manifested by the sales and operational planning and supply chain councils' initiatives. The performance measurement system incentivizes local managers make decisions that are optimal for their unit, but not in the best interest of the value chain. The 'silo' thinking currently embedded in the performance measurement system obstructs cross-unit collaboration in the value chain and seems ineffective in anchoring common goals across the value chain, as it is neither fit with contemporary and future controls ends defined in company's strategy nor coherent with other MC elements within the contemporary MC package (Abernethy and Chua, 1996; Sandelin, 2008).

The MC package fails to provide uniform directives, as newly implemented or changed MC elements establish a new direction of action, but 'old' MC elements persevere the 'old' direction of

action. Consequently, the period of recalibration captures managers in a state of flux, where uncertainty levels increases, spawning 'control uncertainty' that continuously leaves managers uncertain about what to do (Barnett and Carroll, 1995).

As an exemplification of the control uncertainty, the placement of inventory was mentioned by some interviewees. One value chain found it optimal that a specific plant carried an additional inventory, with a net worth of approximately 15 million Euro. However, this would lower the inventory turnover in this specific plant, thus hampering the performance levels captured in 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 cause of action because different MC elements dictated different actions.

The incoherence within the MC package was not intended or predicted as such by DENCOMP's managers. Different corporate functions were responsible for developing, maintaining, and implementing the different MC elements, demonstrating that the interaction between MC elements was not planned but emerged as the sales and operational plan and supply chain council initiatives were implemented. This exemplifies 'structural opacity', where managers' limited foresight regarding the interplay of MC elements causes incoherence (Hannan et al., 2003b). The discrepancies during the period of recalibration (Hannan et al., 2003a) increased uncertainty about proper cause of actions (Abernethy and Chua, 1996; Barnett and Carroll, 1995). Managers, however, tried to mitigate the incoherence caused by the different MC elements in the period of recalibration.

4.6 Mitigating incoherence during the recalibration period

Now that the incoherence in the MC package is discussed, we examine how managers dealt with the incoherence. As a response to a question about how he would resolve a conflict that emerged because of incoherent MC elements, a general manager (ID 6) noted:

> "If there is anything performance management related we talk about it."

A plant manager (ID 7) further explained:

> "Sometimes there are some embedded conflicts. Nothing major, because my boss is well aware

> of that perspective. Consequently, we have a dialog about it and debate how it all ties together so he is informed about it. Nevertheless, he will hold me accountable for the numbers in this unit that is how it is [in the current performance management system]."

Interviewees seem to acknowledge the conflict caused by the incoherent MC elements. When they would encounter such a conflict, they indicated, someone should 'talk about it' or 'have a conversation about it'. The general manager (ID 6) elaborated:

> "What it basically all boils down to is that we must be different managers than previously. That is what it's basically about. At the end of the day that is what it is all about and that requires a lot of managerial resources… The first thing we did was massive investment in educating our managers and to stimulate a more interactive and coaching management style. It is more a dialog than command, because at the same time you have to change as a manager… You have to talk *with* them [subordinates], not talk *to* them."

A plant manager (ID 7) also elaborated on what he meant with 'have a dialog about it':

> "It means that the individual managers are much closer to the subordinates… Display much more support and interest for problems and are present to help solve the problems that hampers production and continuous improvements. That is the difference."

So, the incoherence could also lead to a further discussion about the incoherent MC elements, for instance via face-to-face conversations and debates between various managers, resembling what the literature identifies as an interactive use of the performance measurement system (Bisbe et al., 2007). The incoherence and the derived control uncertainty led to a change in the use of the performance management system. As the company became aware of conflicts caused by MC elements varying directions, its managers realized that the system did not fulfill its role of scorekeeping in relation to the new control end, as it is a poor indicator of managers' decision-making capabilities. Because the company did not think it was the right moment to make changes to the performance measurement system to enhance the coherence of the MC elements, they saw the need for a change in their use of the

misaligned performance management system. The descriptions of the change in management style or how the system is used bears clear characteristics that resembles the non-invasive, facilitating, and inspirational management involvement that characterize interactive use of the performance measurement system (Bisbe et al., 2007).

Regarding the meetings in which the performance measures were discussed, something was changing in line with the developments above. Normally, the structure of these meetings within plants followed a standard order. First, the performance measures were presented in great detail, comparing actual performance to standards. Second, direct attention was given to potential improvements. During our observations of some of these meetings we found that the first part was plenary, chaired by the plant manager of general manager depended on the organizational level of the meeting. In the second part of the meeting the group (almost automatically) broke into smaller groups centered on specific shared issues between members of the group, to come up with solutions on how to deal with these particular problems. In the observed meetings, the time spent on the second session was significantly longer then the first session. In some instances, the executive manager (either plant or general manager) did not even discuss the performance measures but directly steered the group into the second part for dialogue on solving problems, thus spending no time on actual performance levels and variance analysis.

Contrary to having functional specialist responsible for operating the performance management system, managers throughout the organization used a lot of managerial resources on the performance management system and performance review meetings, demonstrating intensive use of the system as well as personal involvement from managers, indicating an 'interactive' use of the control system (Bisbe et al., 2007; Marginson, 2002; Simons, 1995b). The system created opportunities for bottom-up communication and cooperation and facilitate dialogue-based problem solving and learning between various managers to solve complex and unclear problems before the problem seriously materialize and escalate. Consequently, the performance measurement system fulfills more roles than only the traditional diagnostic scorekeeping, performance-review role and became an important source for dialogue to address conflicting interests throughout the organization, as long as the performance measures themselves were not updated and aligned with the newly implemented MC elements.

5. Discussion

This paper examines how MC elements with different 'change speeds' may cause incoherence in an MC package, and how this incoherence and its effects can be partly mitigated when managers use MC elements in a more interactive way. In this section, we situate our findings in the MC literature.

By conducting a longitudinal case study to examine changes to MC elements and their interplay over time, we respond to the call for empirical research studying MC packages (e.g. Malmi and Brown, 2008; Malmi and Granlund, 2009; Otley, 1980). Previous studies pointed to the (potential) interplay of MC elements in situations in which a change in one subset of an MC package could lead to other changes (Becker, 2014; Friis et al., 2015; Henttu-aho and Järvinen, 2013; Østergren and Stensaker, 2011). Our study extends this literature by bringing in the notion of the 'cascade effect' of change that, in the case of MC elements with different 'viscosities' (Libby and Waterhouse, 1996; Malmi and Brown, 2008), can lead to an increased incoherence within an MC package.

The new MC elements were developed by a subset of the organization and towards a quiet specific objective, namely to solve the lack of coordination between sales and operations and within operations. The employees who came up with the new MC elements were not responsible for the performance management system, hence they designed MC practices to solve the specific problem, within the mandate they possessed. This caused structural opacity (Hannan et al., 2003b), as the interplay between the new MC elements and the performance management system was not anticipated. This caused the increased incoherence of the MC package, because the old and the new MC elements were not coherent with one another.

Connections between uncertainty and an interactive use of controls have been proposed in the literature. For instance, Simons (1991) conceptualized the interconnection between "strategic uncertainties" and interactive use, implying that organizations that encounter more uncertainty tend to use their MC elements in a more 'interactive' manner (see also Kominis and Dudau, 2012; Marginson, 2002). Furthermore, Widener (2007) found that an interactive use of MCSs is driven by competitive uncertainties, implying that interactive systems are used to examine the external environment. The evidence presented in our paper extends this literature by pointing to the role of incoherence, which can *create* control uncertainty. And in our case, this control uncertainty subsequently formed the reason for managers to use the performance measurement system more interactively. Our case shows how managers

try to alleviate the uncertainty triggered by a MC package that holds incoherent design characteristics (Abernethy and Chua, 1996; Sandelin, 2008), by using the performance measurement system as a tool for face-to-face debates and knowledge sharing, while the importance of the calculative practices and actual performance levels faded into the background. Consequently, the design of specific MC practices can drive interactive use of other MC practices. Exemplified in the case, where the "sales and operational planning" and "supply chain council" initiatives drive interactive use of the performance management system. Specifically, the "control" uncertainty generated by an incoherent MC package drives interactive use of the MC element(s) that do not fit into the contemporary and future MC package.

The way in which managers may mitigate the MC package's incoherence and its effects resembles ideas about the interactive use of controls, proposed by Simons (1995a). Even though in our case some managers had limited possibilities to influence the 'design' of the MC elements they used, they had more discretion when it came to the 'use' of these MC elements. Our case illustrate that sometimes a manager, in order to reduce the incoherence of the MC package, uses the MC elements in a different way than the way in which it was initially intended, which mitigates the incoherence of the MC package. When we compare our findings to Bisbe et al. (2007), who conducted an in-depth study of the interactive use of MC elements, we see that the way in which managers in the new situation mitigated the incoherence is in line with an interactive use of control, which requires: 1) an intensive use by top management, 2) an intensive use by operating managers, 3) a pervasiveness of face-to-face challenges and debates, 4) a focus on strategic uncertainties and 5) a non-invasive, facilitating and inspirational involvement. The intensiveness refers to the amount of attention (top or operational) managers direct towards the specific MC elements. The use can be labeled interactive if managers regularly direct their attention to it, as opposed to management-by-exception, i.e. when MC elements function solely as a performance feedback system, which can be considered a 'diagnostic use'(Simons, 1991). Furthermore, to qualify as 'interactive use', managers should organize and participate in discussions regarding the information provided by the MC elements and focus on identifying strategic uncertainties, i.e. contingencies that potentially form threats and opportunities (Simons, 1991), which also happened in our case findings. This way of mitigating an MC package's incoherence may be costly however, because by including such intensive debates, interactive use can be more time consuming than diagnostic use (Simons, 1991).

On a more general note, our findings suggest that the way in which an MC element, for instance

a performance measurement system, is used (diagnostically or interactively) may increase or decrease the coherence of the MC package. For instance, in an MC package that is aimed at facilitating and enabling employees, and providing them with learning and training possibilities leaving them with a high level of autonomy, the introduction of a performance measurement system that is used strictly diagnostically might lead to a less coherent MC package. However, when the same performance measurement system is used interactively, that might lead to a more coherent MC package, because such a use of performance measurement system is more in line with the other characteristics of the MC package.

6. Conclusions

This paper examined how MC elements with different 'change speeds' may cause incoherence in an MC package, and how this incoherence and its effects can be partly mitigated when managers use MC elements in a more interactive way. We make two contributions to the literature. First, we bring in a notion of 'viscosity' to assess an MC element's ability to change. Having MC elements in an organization with different viscosities can be a source of incoherence of an MC package, which may lead to control uncertainty. In such a situation, some parts of the MC package may be already adjusted to a new situation while other parts are lagging behind, which potentially obstructs organizational action. Second, our study points to actions that managers can engage in when trying to mitigate the incoherence of an MC package and its effects. We show that a possible way for managers to do this is not by changing the design of an MC package, but rather by using the existing MC elements in a different way.

Although our study provided useful insights in the way in which accounting and control elements operate in their 'contexts' (Hopwood, 1983), there are some limitations to our study that are inherent to the case method approach we adopted. We only studied one part of one organization: an operations department in a Danish multinational firm. Although our study identified some mechanisms that managers may use to mitigate an MC package's incoherence, doing so by interactively using performance measurement systems may only work in some settings, while other situations may ask for a different managerial approach. A study that would take our finding on managerial actions further could for instance compare how MC package incoherence in different settings (for instance different departments, organizations, sectors) is dealt with by different managers. In addition, it can be studied how managers

with different backgrounds (e.g. those with a financial background and those without such a background) would treat MC elements differently. Another limitation regards the time frame of our study; although we studied the organization for several years in our longitudinal case study, we also refer to events – such as the crisis – that happened well before we entered the case organization. Therefore, we had to rely for some parts of the case study on retrospective interviewees regarding the events that happened before we conducted our study, which may have biased some answers from respondents (Flick, 2009, p. 136). However, because we were able to triangulate our interview data with company documentation from that period, we were able to crosscheck and validate information we obtained in this manner.

Regarding managerial implications, we believe this paper provides some valuable insights regarding MC change, managerial attention, coherence and possible mitigating actions. The extant literature already pointed to the importance of focusing managerial attention and resources to the implementation of new MC elements (Bourne et al., 2000; Hannan and Freeman, 1984), but our study shows that such managerial attention and resources should also be allocated to MC elements that did not change (yet). Because of the interplay of MC elements managers should be aware of the potential incoherence of newly implemented elements with existing MC elements. Managers can (partly) overcome the control uncertainties caused by an MC package's incoherence by using MC elements in another manner, in our case by using performance measures interactively. However, an interactive use also requires more managerial resources than then traditional diagnostic use (Simons, 1991), as managers must be involved in time-consuming debates with others about performance measurement. Accordingly, a change to an MC element has a double effect: managers should use resources to implement the new MC element (or change an existing one), but should also be aware of a potential cascading effect on other MC elements and attempt to mitigate derived unwanted effects. That is not to say, of course, that managers should not be involved in changing MC elements when it is required, but it may to some extent explain the high levels of stress encountered in relation to organizational change (Dahl, 2011).

Appendix A

Semi-str. Interview	*Date**	*Length*	*Person ID*	*Position interviewee*	*Category interviewee*
S_1	09-10-12	85	1	Operation Excellence manager	MC specialist
S_2	09-10-12	95	2	S&OP manager	MC specialist
S_3	17-10-12	85	3	Corporate manufacturing and supply-chain manager	Top management level
S_4	18-06-13	80	4	General Manager 1	General Manager level
S_5	02-09-13	75	1	Operation Excellence manager	MC specialist
S_6	24-10-13	75	5	General Manager 2	General Manager level
S_7	29-10-13	80	6	Plant Manager 1	Plant manager level
S_8	04-11-13	65	7	Plant Manager 2	Plant manager level
S_9	11-11-13	65	2	S&OP manager	MC specialist
S_10	07-04-14	90	1	Operation Excellence manager	MC specialist
S_11	09-02-15	70	6	Plant Manager 1	Plant manager level
S_12	09-02-15	90	8	Plant Manager 3	Plant manager level
S_13	18-02-15	60	9	General Manager 3	General Manager level
S_14	18-02-15	75	10 & 11	Process Consultant 1 and Process Consultant 2	MC specialist
S_15	20-03-15	70	12	Master Planner 1	Plant manager level
S_16	20-03-15	30	1	Operation Excellence manager	MC specialist
S_17	25-03-15	70	5	General Manager 2	General Manager level
S_18	31-03-15	60	13	Chief Project Manager (Corporate Manufacturing)	MC specialist
S_19	10-04-15	30	4	General Manager 1	General Manager level
S_20	14-04-15	70	14	Master Planner 2	Plant manager level
S_21	16-04-15	60	15	Production planner 1	Plant manager level
S_22	20-04-15	65	16	New Product Introduction Director	General manager level
S_23	04-05-15	60	17	Plant Manager 4	Plant manager level
S_24	05-05-15	55	18	Production planner 1	Plant manager level
S_25	08-05-15	50	19	Senior Engineer (SPT)	MC specialist
S_26	29-05-15	65	20	Vice President production technology and Innovation	Top management
S_27	10-06-15	65	21	Supply Chain Conductor 1	MC specialist
S_28	10-06-15	70	22	Demand Planner	MC specialist
S_29	16-06-15	45	13	Chief Project Manager (Corporate Manufacturing)	MC specialist
S_30	08-07-15	50	23	Senior Engineer (SPT)	MC specialist
S 31	25-04-17	75	24	Director of Supply Chain Excellence	MC specialist
S 32	24-05-17	40	17	General Manager 4 (former	General Manager level

				plant manager 4)	
S 33	29-05-17	75	21, 25, and 26	Supply Chain Conductor 1, Supply Chain Conductor 2, and Supply Chain Conductor 3	MC specialists

* The interviews in this table are presented chronologically. Length is in minutes.

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