Conceptual and empirical issues in understanding management control combinations

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Abstract
This paper discusses several conceptual and empirical issues related to understanding combinations of management control (MC) practices. First, the paper clarifies the meaning of MC packages and systems. Second, the paper considers how researchers can improve theory development concerning the effects of MC combinations by explicating the causal mechanisms through which they arise. Third, the paper discusses whether loose coupling provides an informative perspective for understanding MC combinations, particularly in relation to how organizations adapt MC practices to contextual changes. Finally, the paper comments on the main empirical approaches for investigating MC packages and systems. Recent studies, especially those in this special issue, are drawn upon to illustrate how these issues relate to MC research.

Keywords: Management control, complementarity, configuration theory, packages, systems

1. Conceptual issues

1.1 The distinction between MC packages and systems

Management control (MC) packages and systems are two distinct perspectives for approaching the analysis of multiple MC practices (Grabner & Moers, 2013). In a thought-provoking discussion, Demartini and Otley (in press) (hereafter D&O) problematise these perspectives, which they depict as an irreconcilable dichotomy. Viewing MC packages and systems in this way, however, results in some of their conceptual richness being missed. Four points of clarification follow.

First, the two perspectives are not conceptually inconsistent. Researchers do tend to draw upon different theories – those taking a package perspective build upon configuration theory (e.g. Bedford & Malmi, 2015), whereas those taking a systems perspective adopt complementarity theory (e.g. Grabner, 2014). Yet the theories are largely compatible as they are both based on the notion of interdependence. Although complementarity theory provides a more rigorous treatment of the concept, interdependence is also central to configuration theory – organizations are expected to cluster around a limited range of temporally stable configurations as "piecemeal changes will often destroy the complementarities among many elements of configuration" (Miller, 1986, p. 263).

Second, the perspectives do not make *ex-ante* assumptions about either the overall extent of interdependence between MC practices or whether decision-makers have taken interdependencies

into account. Adopting a systems perspective means that the focus is on understanding whether specific MC practices operate interdependently in relation to a given control problem. If MC practices operate interdependently, and decision-makers take these into account, then they form a system. Conversely, a package perspective does not imply that the design and use of MC practices is entirely uncoordinated. Rather, it means that the focus is on examining how all MC practices for a given unit of analysis (e.g. organization, subunit), irrespective of whether they operate interdependently or independently, combine to resolve one or more control problems.

Third, MC systems are not separate from MC packages. Each illustration in Fig. 1 represents a MC package, where circles represent MC practices and the lines connecting them indicating interdependence (i.e. joint effects). Packages may be comprised of one or more sets of interdependent practices (MC packages B through D) or may contain MC practices that function entirely independently of one another (MC package A).[1]

<Insert Fig. 1 about here>

Finally, while the literature tends to make a sharp distinction between independent and interdependent MC practices, the conceptual differences are more nuanced. One point is that MC practices can simultaneously have both independent and interdependent effects. This can occur in relation to either a single control problem or multiple control problems. For instance, a practice can have independent effects on one control problem while for another the effects may be jointly determined with one or more other MC practices. MC practices can also vary in terms of the magnitude of their interdependent effects with another MC practice, as well as their overall connectedness within a package.[2] In Fig. 1, the thickness of the lines between MC practices reflects the magnitude of the joint effect on a control problem, whereas the size of the circles indicates the degree of connectedness or interaction with other practices in the package. Larger circles represent MC practices that are more *core* to the MC package, while smaller circles indicate *peripheral* practices. The more core a MC practice is, the more dependent the overall effectiveness of the MC package is on that practice.

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[1] Note that the number of systems does not equate to the extent of overall interdependence – MC package C has three systems, whereas MC package D has just two – as a system can be comprised of more than two interdependent practices.

[2] For convenience, Fig. 1 represents variation only in complementary interdependencies, but substitution effects can also exist. Additionally, MC practices may be complements in relation to one control problem but operate independently or act as substitutes in relation to another problem.

1.2 Theorizing MC effects

Developing theory about how and why combinations of MC practices contribute to, or hinder, addressing control problems should be the primary aim of functionalist MC research regardless of the perspective taken. This is particularly important when considering interdependencies, as neither configuration theory nor complementarity theory stipulate the causal mechanisms through which interdependencies arise. To develop more precise theory, a useful starting point is to specify the general causal form(s) through which MC practices produce either complementary or substitutable effects (Huber et al., 2013). An initial classification is outlined in Panel A of Table 1.[3]

<Insert Table 1 about here>

There are at least three causal forms through which complementary effects are generated. The most common in the MC literature are *compensating* effects, which occur when a MC practice counteracts the weaknesses or limitations of another MC practice, thereby increasing its capacity to resolve a control problem. *Reinforcing* effects arise when one MC practice increases the effectiveness of another MC practice by enhancing one or more of its attributes. *Enabling* effects stem from one MC practice providing the conditions for another MC practice to contribute to resolving a control problem. That is, if the first MC practice is absent, the other would not have a significant effect on the outcome.

The causal forms of substitutes are the opposite to that of complements. *Inhibiting* effects are the result of one MC practice hindering or attenuating the effectiveness of another MC practice, whereas *exacerbating* effects occur when one MC practice accentuates the detrimental effects of another. Finally, *instigating* effects are the converse to enabling effects – instead of generating the conditions that activate beneficial effects from another MC practice, they create the conditions that trigger another practice to negatively affect an outcome. This may reduce the ability of the firm to resolve the control problem or lead to the control problem becoming more severe.

There are several considerations when specifying causal forms. First, the causal forms are not mutually exclusive, in that a MC practice may influence the effectiveness of another practice through multiple mechanisms. For instance, in discussing how diagnostic and interactive uses of accounting practices increase performance in ambidextrous firms, Bedford (2015) posits both compensating

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[3] Choi (in press) also draws attention to the importance of specifying causal relationships when developing theory about MC interdependencies. Although the terminology varies, the causal relationships outlined by Choi (in press) are analogous to four of the six causal forms outlined in Panel A of Table 1.

effects (by reducing the tendency for managers to neglect certain strategic priorities) and enabling effects (by creating a dynamic tension that leads to new strategic options). Second, the arguments for each side of the interdependency between MC practices need not be symmetrical – that is, they can be based on different causal mechanisms. Malmi et al. (in press) argue that delegation of authority reinforces the shared norms and values created by socialisation, while socialisation acts to compensate for the increased risk that subordinates use their discretion opportunistically.

Third, for MC practices to be interdependent, the dependency must go both ways.[4] If the effects of one MC practice are dependent on another, but not vice versa, then it cannot be claimed that the MC practices are interdependent. This issue arises in the study by Lill (in press). He argues that compensation interdependence (the relative use of group-based versus individual pay) and monitoring distance "act as substitutes whereby compensation interdependence attenuates the effect of monitoring distance on misreporting" (p. XX). However, as monitoring distance does not influence the effect of compensation interdependence on the level of misreporting, the two practices cannot be substitutes.

A moderation effect is explicitly hypothesized by Schedlinsky, Schmidt, and Wöhrmann (in press) between relative performance information (RPI) and video surveillance. They argue that video surveillance is often implemented to deter behaviours such as theft, but it can also have the unintended consequence of reducing perceived task autonomy. By changing how employees view their task environment, video surveillance conditions the motivational effect of RPI. While persuasive, they omit reasoning for why the effect of video surveillance is independent of RPI. This may be due to the assumption that behaviour controls do not have a direct effect on task performance. However, absence of a main effect does not imply the absence of a conditional effect. For instance, employees who perceive having greater autonomy may be more likely to experiment with how they conduct tasks. RPI could increase the benefits of autonomy by enabling more timely and relevant information for task adjustments. Such competing explanations need to be ruled out if moderation is hypothesized or otherwise incorporated into an argument for interdependency. In the case where it is expected that the moderator has a direct effect on the dependent variable, the

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[4] However, the interdependency does not have to be symmetrical. This implies that the effect of one MC practice on an outcome can be relatively more dependent on another MC practice than vice versa. See Johansson (2018) for a discussion on how asymmetrical effects can be empirically examined.

causal mechanism behind the direct effect must also be theoretically differentiated from the mechanism explaining the interaction effect.[5]

Fourth, the control problem must be clearly specified. This informs the choice of empirical setting to observe variations in the magnitude of the problem and, if required, the appropriate outcome variable. Studies incorporating performance outcomes often do so at an aggregate level. But although a measure such as profitability captures the ultimate objective of many firms, it leaves untested the behavioural processes that MC practices affect. Papers by Lill (in press), Schedlinskey et al. (in press), and Speckbacher and Wabnegg (in press), provide more incisive assessments of MC practice effects. Theoretically specifying and empirically testing the direct behavioural consequences of MC practices not only enhances theoretical understanding, but also has practical implications – managers who observe certain control problems will be better guided as to which MC practices they should attend to.

Fifth, causal mechanisms are also important for understanding the independent effects of MC practices. As all empirical papers in this special issue examine pairs of interdependent practices, the arguments of Grabner and Moers (2013) may have been interpreted as an implicit preference for the systems perspective. But not all control problems necessarily need to be, or perhaps even can be, addressed by interdependent MC practices. Panel B of Table 1 details four causal forms representing independent effects of MC practices.

Supplementary effects occur when a MC practice makes an incremental contribution to resolving a control problem in addition to one or more other MC practices. MC practices with *conflicting* effects have beneficial effects for one control problem, but detrimental consequences for another. These effects are observed either because of non-optimal choices or because the MC practices are necessary for one of the control problems to be resolved. If a firm adopts MC practices beyond what are necessary to resolve a control problem, then there are *redundant* effects – whether or not the practices are implemented has no significant consequence for achieving the desired outcome (Fiss, 2011).[6] This occurs when the MC practice provides no benefit for resolving a particular control problem, or provides incremental benefit beyond the level of performance required by the firm. MC

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[5] A moderator only needs to be theoretically unrelated to the independent variable, not the dependent variable (Baron & Kenny, 1986).
[6] In organizations with complex and risky technology, the presence of redundant practices can be a necessity because of the occurrence of 'normal accidents' (Perrow, 1984) or low-probability but high-consequence events (e.g. in a nuclear power plant).

practices may also exhibit *interchangeable* effects when one MC practice can be replaced or exchanged with one or more other MC practices to achieve the same outcome. Interchangeable MC practices are functional equivalents, representing equally effective alternate solutions to the control problem.[7]

1.3 Loose coupling as an alternate perspective

Researchers are not limited to configuration and complementarity perspectives when developing theory about MC packages and systems. D&O present loose coupling as one alternative, arguing that it provides a more fine-grained perspective for understanding interrelationships between MC practices. One ambiguity in their framework is that they do not make clear whether coupling represents an elaboration of interdependence or an entirely different way of conceptualizing how MC practices are related. While they contend that there is a parallel between the degree of interdependence and the degree of coupling, their explanation of coupling types suggests that they are quite distinct concepts.

Different coupling types (i.e. noncoupled, decoupled, tightly coupled, loosely coupled) arise depending on the degree of responsiveness (the degree of covariation to internal and external factors) and distinctiveness (the extent to which they share common control attributes) between MC practices. Yet neither responsiveness nor distinctiveness determine whether MC practices will have joint effects. Responsiveness may mean that MC practices simply have common determinants, which need to be controlled for to make valid claims of interdependence (Grabner and Moers, 2013). Distinctiveness also does not directly relate to interdependence. For instance, studies have empirically shown interdependencies between performance-based pay and both subjective evaluation of non-task-related performance (Grabner, 2014) and managerial selection (Abernethy, Dekker & Schulz, 2015). However, the type of coupling varies as the control attributes are not the same – as the former pair of practices are both ex-post controls they are relatively less distinct than the latter pair as managerial selection is an ex-ante control.[8]

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[7] Redundant and interchangeable effects are distinct from substitution effects in that the MC practices do not negatively impact the effectiveness of one another. This can occur when firms seek satisficing, rather than optimal, solutions. In the case of interchangeable effects, adopting both alternatives would provide greater overall benefit. However, high adoption costs and long payback periods may limit investments into more than one alternative.

[8] Loose coupling also does not speak to whether MC practices function as complements or substitutes. For instance, the nature of interdependence between two MC practices can vary depending on contextual conditions, even though the degree or type of coupling remains invariant. This is the case in Abernethy et al. (2015), who find that in firms committed to organizational learning, performance-based pay and selection can operate as either complements or substitutes, depending on the degree of environmental volatility.

D&O point out that coupling types are associated with different outcomes (e.g. efficiency, flexibility). However, these outcomes and the logic of why they occur are not specific to MC practices but are derived from research on organizational structure. This research demonstrates that firms comprised of loosely coupled subunits exhibit some degree of coordination while retaining enough flexibility for independent adaptation and experimentation. When coupling is tight, changes in one area quickly ramify throughout the firm. What determines whether structural couplings are loose or tight are 'coupling mechanisms' – the practices or processes that enable coordination between structural units (Beekun & Glick, 2001). This implies that MC practices are mechanisms which determine the extent of coupling. What it means for coupling mechanisms to then be tightly or loosely coupled is not entirely clear.

As an example, Henri and Wouters (in press) demonstrate that cost accounting and non-financial performance measures jointly contribute to innovation outcomes for firms facing high uncertainty. In contrast, the arguments of D&O suggest that a tight coupling between these practices will inhibit creativity and flexibility. The difference arises because D&O focus on describing the characteristics that determine the type of coupling *between* MC practices rather than how variations in coupling shape the *effect* of those practices. Perhaps more pertinent than how MC practices are coupled to each other is whether they are tightly or loosely coupled to behaviours.

1.4 MC practices and adaptation
Loose coupling has clearer implications for how MC combinations adapt to contextual changes, an area in which there is currently limited research. D&O explain that tight coupling makes coordinated adjustments more difficult, as changing one MC practice will affect other MC practices with potentially unintended consequences, whereas loose coupling allows for greater flexibility and local adaptation to contextual variations. These same insights are, however, already well established by complementarity theory (Brynjolfsson & Milgrom, 2013) and configuration theory (Meyer, Tsui & Hinings, 1993). Both theories indicate that the more interdependent MC practices are, the more challenging incremental adjustment becomes. For instance, attempts to better align individual practices to changes in the external environment may come at the cost of internal fit. This occurs when alignment to contextual changes requires a MC practice to be adjusted in a manner that is inconsistent with the interdependencies it has with other MC practices. Firms may retain existing MC practice arrangements, rather than make incremental adjustments, if the benefits of internal

consistency outweigh those from external alignment.[9] Minor or transient contextual variations are also likely to have little effect on firms with a highly interdependent MC package. For more significant and permanent shifts, the least costly approach might be a coordinated change of all interdependent practices simultaneously.

Furthermore, organizational research drawing from complementarity and configuration theories provides a rich source of insights that are likely to be informative for investigating the dynamics of MC combinations. For instance, Siggelkow (2002) develops a conceptual language that may help researchers explain how MC packages evolve. For core practices, which have a high degree of interdependency with other practices, there are four change processes: *thickening* (strengthening of an existing core MC practice with new elaborating or peripheral practices), *patching* (adoption of a new core MC practice along with new elaborating practices), *coasting* (no further elaboration of existing core MC practices), and *trimming* (removal of a core MC practice and its elaborating practices). It would be particularly insightful to identify under what circumstances different modes of adaptation are effective. Even if the MC practices adopted are optimal, the process through which they are integrated may be just as important for achieving performance outcomes.

Simulation analyses have also shed light on the complexities involved in adapting interdependent systems (Siggelkow, 2011). These typically model firms as making incremental adjustments to their configuration of practices through local (i.e. close to existing choices) and random search processes. Search occurs in 'rugged landscapes' that have multiple local performance peaks and a single global optimum (Levinthal, 1997). The general expectation is that most firms will tend to stabilise around choices that represent local performance peaks. However, Rivkin and Siggelkow (2003) demonstrate how organizational design choices can lead to firms settling on a configuration that is locally sub-optimal.

Central to this result are the processes by which adaptation takes place. In outlining the systems perspective, Grabner and Moers (2013) assume that there is a single decision-maker that coordinates MC practice choices within the firm. This assumption is criticized by D&O as being divorced from reality. But even if it is not often the case in practice, it does not invalidate the expectation that some degree of centralized coordination is needed to maximize performance outcomes in the presence of interdependencies (Stieglitz & Heine, 2007). This is because local

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[9] Siggelkow (2001) presents an informative model distinguishing between fit-destroying and fit-conserving changes in the external environment, and the consequences for firm adaptation.

decision-makers may not have knowledge of, or be able to observe, interdependencies that occur across the organization.[10]

Another consideration is the sequence of MC practice adoption and use. As noted, theory specifying a unidirectional effect of one MC practice on another is conceptually different to interdependence. However, the sequence of adoption may be important for maximizing benefits from complementarity (Kim & Tiwana, 2016). This can be illustrated with the levers of control framework, which suggests that there is a 'logical progression' in applying each lever (Mundy, 2010). Widener (2007) argues that by engendering a higher level of shared values and expectations, belief systems contribute to developing the conditions necessary for an effective use of interactive control. Other researchers have posited that interactive control use and belief systems have joint effects (in certain contexts) because belief systems encourage novel and creative initiatives, while interactive systems enable resources to be directed to those initiatives with the greatest potential (Bedford, 2015). However, unless belief systems are in place for enough time to affect change in organizational values, the complementarity between the two control levers may not occur.

2. Empirical issues

2.1 Examining MC systems

Researchers investigating MC systems typically follow one of two empirical approaches – the demand specification or the performance (or productivity) specification. Grabner and Moers (2013) contend that the appropriate specification is determined by the extent to which firms deviate from optimal MC choices. Masschelein and Moers (in press) (hereafter M&M) probe this assumption by testing the robustness of each specification to variations in the level of optimality. Their simulation analysis provides the intriguing result that the demand specification is generally preferable, except in the atypical situation where many firms have adopted MC practices that are the opposite of the optimal arrangement.

Most of the assumptions made by M&M are fair in that they will not favour one specification over the other. However, those concerning the process of adaptation may bias results towards the demand specification. This is because the adaptation process in practice is likely to be more protracted than what M&M assume, meaning there will be a greater prevalence of firms observed with sub-optimal (closer to random) choices. First, they assume that firms continually adapt MC

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[10] If decision-makers ignore interdependencies, then they will miss out on the potential benefits from using MC practices jointly (in the case of complements) or incur negative effects (in the case of substitutes).

practices until they reach the optimal configuration. As noted, simulation studies find that firms often reach 'sticking points' whereby no further adaptation occurs, and these points can be well below local, let alone global, levels of maximum performance. Additionally, they assume firms adjust MC practices only if the choice leads to higher performance. But in practice, firms will experience the lagged negative effect before making further changes. Finally, they assume that external conditions are invariant over time. However, conditions can continue to shift as changes are made to existing MC practices. In such cases, observed performance outcomes will be influenced by contextual shifts. If these shifts are not correctly perceived, then decision-makers will be misinformed about the consequences of MC practice changes.

M&M also exclude method concerns. While this decision is appropriate, certain method concerns may not bias the two specifications uniformly. One that is particularly relevant to MC research, given the typical reliance on single source survey data, is common method bias (CMB). Presence of CMB will tend to increase the Type I error rate as well as reduce the power of the demand specification. However, only the power of the performance specification will be affected, as CMB does not upwardly bias interaction terms (Siemsen et al., 2010). When using the demand specification, the potential effect of CMB can be alleviated by examining the contextual conditions in which the interdependency is expected to vary (i.e. due to the presence or absence, or magnitude, of the control problem) (see e.g. Grabner, 2014). Demonstrating theoretically expected variation helps to mitigate the concern that the MC interdependency is an artefact of method bias.

Another consideration is that the performance specification can provide information additional to the demand specification that might be necessary to test a hypothesis.[11] First, it allows for the assessment of performance effects, which can indicate whether the interdependency has non-trivial consequences. If the interdependency is observed in a sample of firms that are close to optimal then it can be assumed that it does, otherwise decision-makers would not have taken the interdependency into account. However, this is not necessarily the case when firms deviate from optimality. When using the demand specification, two MC practices can be observed to be interdependent, but this may be trivial relative to either their independent effects or effects conditional on context.

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[11] M&M do explicitly acknowledge this as justification for why the performance specification can be conducted. However, they see the performance specification as providing supplementary evidence only, rather than being the primary hypothesis test.

Second, the performance specification can reveal how MC interdependencies influence intermediate outcomes. Outside of experimental settings, it is difficult to isolate the occurrence of specific control problems. In the field, multiple control problems are likely to be present in any given setting, and MC practices may be implemented to address more than one problem. Distinguishing between intermediate outcomes is therefore necessary to assess the varying capacity of MC practices to address different control problems.[12]

These considerations suggest that it would be hasty to dismiss the performance specification as a primary means for examining MC interdependencies. However, until there is further evidence available, the results of M&M are enough to recommend that researchers using the performance specification should also report the demand specification as a robustness test.

An additional issue raised by M&M are the consequences of performance function misspecification. One common error is inadequately controlling for the effects of contingency factors. The bias arises not from excluding the independent effects of contingency factors, but from excluding the conditional effects of MC practices that are dependent on those factors. For example, Henri and Wouters (in press) include a reasonably comprehensive set of contingency factors in their structural equation model. They model the covariance between contingency factors and MC practices, which accounts for covariation between these variables when determining their independent effects on the performance outcome. But this does not control for the context dependent effects of MC practices – this requires the inclusion of interaction terms between MC practices and contingency factors.

A second error is excluding the quadratic terms of the MC practice variables. Without these, the implicit assumption is that, depending on the sign of the coefficients, either more or less of a MC practice is always better. This situation is more likely to be the exception rather than the norm (Pierce & Aguinis, 2013). It seems plausible that in most instances there will be a point at which the benefits of MC practices begin to decrease. This is known as the 'too-much-of-a-good-thing' (TMGT) effect (Pierce & Aguinis, 2013). The TMGT effect occurs when at lower levels of the MC practice the marginal benefits outweigh the marginal costs, while at higher levels the net benefit decreases, even to the point where the MC practice has negative returns (Busse, Mahlendorf & Bode, 2016).

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[12] Examining intermediate effects may also be preferable when the researcher is interested in the unintended consequences of using a MC practice (e.g. spillovers, externalities, side-effects), as firms are more likely to be distributed 'closer to random' with regard to these outcomes.

Including quadratic terms not only removes the potential for parameter bias, but also provides empirical insights into how the MC practices are related to the performance outcome. For instance, Henri and Wouters (in press) argue that cost information and non-financial performance measures may act as substitutes because of the potential for information overload. While they explain that the presence of both sources of information compounds the problem, too much of either type can independently cause information overload to occur. In relation to non-financial performance measures, they assume that firms will adopt a 'reasonable' number of indicators. Inclusion of the quadratic term would enable an empirical assessment of whether there are in fact negative consequences of having a 'too diverse' set of performance measures or not.

2.2 Examining MC packages

It is unfortunate that no papers in the special issue empirically investigate MC packages – while challenging, it is a necessary endeavour if we are to develop a more comprehensive understanding of MC combinations. While there are numerous methods for examining packages, two methods that present distinct opportunities for MC researchers are briefly discussed here. The first, fuzzy set qualitative comparative analysis (fsQCA), is typically used to assess the combinations of attributes that achieve an outcome. Yet there are other ways to employ this method that have yet to be exploited.

One is to examine the contextual factors that lead to the adoption or non-adoption of MC practices. For example, theory suggests that firms will rely primarily on clan control or cultural MC practices when there is low outcome measurability and low task programmability. Additionally, firms need to be relatively mature, small in size, and have a long period of stable membership, in order to develop the social cohesion and intense commitment to collective values necessary for clan control to be effective (Alvesson & Lindkvist, 1993). An empirical test would involve incorporating these factors into fsQCA as attributes, with the outcome representing a MC package which preferences cultural controls.

Another prospect is to examine temporality. As mentioned, theory might suggest that in a certain context, MC effectiveness is higher when belief systems are adopted prior to initiating an interactive control use. To empirically analyse whether the sequence of adoption is important for effective MC, an attribute can be included to represent whether belief systems were adopted prior to more intensive interactive control use (see Ragin & Strand, 2008). Temporality can also be coded into the outcome, for example, by indicating whether firms with a certain MC package (e.g. based on input

control) transitioned to a different MC package (e.g. based on behaviour or results control). This analysis could be used to identify the contextual factors that influence fundamental shifts in MC packages.

Analysis of packages should not be limited to quantitative methods. Qualitative approaches are important for unravelling complex interconnections and their consequences. One approach worth considering is process tracing. The central premise is to establish the intervening causal mechanisms between conditions (or causes) and outcomes (Beach & Pedersen, 2013). A mechanism is not, however, an intervening variable in a causal sequence. Rather, it is the process that generates the causal connections between variables – it explains how one or more causes bring about, or prevent, the occurrence of an outcome (Bunge, 2004). Process tracing is likely to be particularly informative for studying how decision-makers adapt MC packages, as it can:

> […] uncover what stimuli the actors attend to; the decision process that makes use of this stimuli to arrive at decisions; the actual behaviour that then occurs […] and the effect of other variables of interest on attention, processing and behaviour (George & McKeown, 1985, p. 35)

Process tracing would also be informative for examining how interdependencies that are not the result of coordinated decisions emerge. The way in which MC packages evolve may be conditioned by earlier decisions and events. Analyses could identify how events unfold over time and the 'critical junctures' that determine how and why certain MC practices produce interdependent effects that are beneficial or dysfunctional for the firm (Blatter & Haverland, 2014). There is also the potential to incorporate both fsQCA and process tracing in a mixed-methods study (Schneider & Rohlfing, 2013). Using process tracing prior to fsQCA helps to develop theory about the set of conditions (e.g. MC practices) that explain a particular outcome, which can then be incorporated into fsQCA on a larger sample of cases. If fsQCA is conducted first, then process tracing can be used to confirm, extend, or modify existing theory by examining cases that exhibit the outcome, with MC combinations consistent with theory (i.e. typical cases) or those observed with quite different combinations (i.e. deviant cases). These are just some of the many opportunities available to researchers to further our understanding of MC combinations.
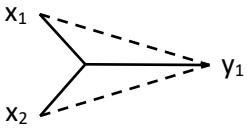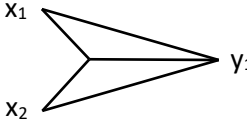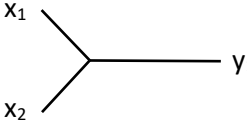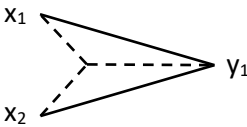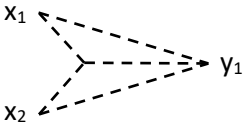
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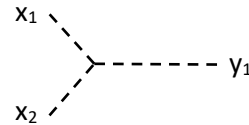
Table 1

Causal forms of MC practice effects

Panel A: Interdependent effects

Causal mechanism	Definition	Causal model form	Example
Complements			
Compensating	The MC practice counteracts the weaknesses or limitations of another MC practice in resolving a control problem.		Henri and Wouters (in press) discussing cost information and non-financial measures: *'Having both kinds of information prevents the ignoring of aspects that one information source does not provide, thereby harming product innovation […] Limitations of the information provided by one management control can be complemented by information from the other management control, allowing the understanding of different aspects of how product development is going and which actions should be taken.'*
Reinforcing	The MC practice enhances the effectiveness of another MC practice in resolving a control problem.		Malmi et al. (in press) discussing delegation and managerial selection processes: *'Delegation is also likely to increase the benefits from selection processes, as it reinforces preferences for autonomy and relational trust, and more efficient coordination through mutual adjustments, based on a shared consensus as to what actions are in the best interests of the collective.'*
Enabling	The MC practice creates the conditions for another MC practice to contribute to resolving a control problem.		Bedford, Bisbe and Sweeney (2019) discussing debate of performance measures (PM) and a balanced set of PM: *'PM balance alone is unlikely to generate cognitive conflict if it is not the object of vigorous debate, as TMT members will not have the opportunity to directly confront different issues and positions.'*
Substitutes			
Inhibiting	The MC practice hinders the effectiveness of another MC practice to resolve a control problem.		Henri and Wouters (in press) discussing cost information and non-financial measures: *' While having more information may be useful, taking full advantage of it may be highly demanding and cause information overload […] Specifically, using diverse and incommensurable information for decisions is challenging because it involves multi-attribute decision-making, which has also been found to distinctly hamper the use of diverse, incommensurable information in the context of balanced scorecards.'*
Exacerbating	The MC practice accentuates the detrimental effects of another MC practice to worsen a control problem.		Bormann (in press) discussing subjective performance evaluation and level of incentive pay: *'Relying on subjectivity also comes with drawbacks, such as measurement uncertainty, rater biases, and favoritism, decreasing the precision and hence the efficacy of subjective performance evaluations. These drawbacks have been found to be stronger when incentives are high suggesting a substitutive relation between subjectivity and incentive intensity.'*

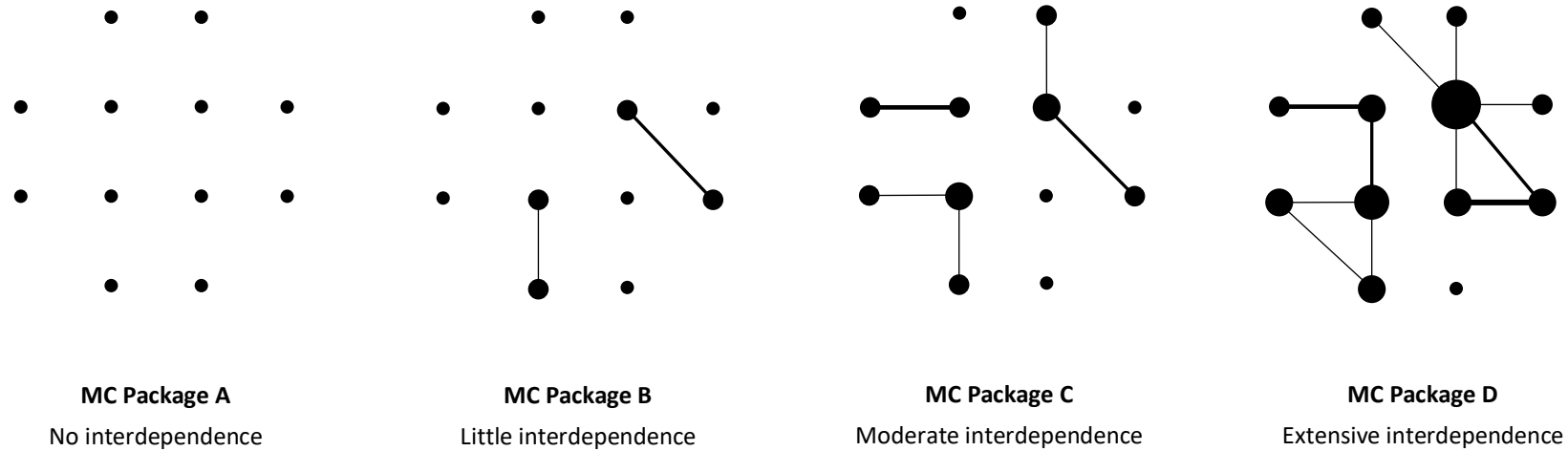|			
Instigating	The MC practice creates the conditions that trigger another MC practice to worsen a control problem.	x_1, x_2 ---- y_1	Schedlinsky, Schmidt, and Wöhrmann (in press) discussing behavioural monitoring and relative performance information (RPI): '*A working environment with a higher degree of perceived behavior control, e.g., stemming from monitoring employees, leads to lower perceived autonomy [...] A lower level of perceived autonomy in the working environment makes the controlling aspect of RPI more salient [...] This affects motivation and makes employees' self-worth less contingent on (relative) performance. Thus, relative performance becomes less relevant for individuals' self-image and effort, and performance declines.*'

Panel B: Independent effects

Causal mechanism	Definition	Causal model form	Example
Supplementary	The MC practice contributes to resolving a control problem in addition to one or more other MC practices.	x_1, x_2 → y_1	Bedford (2015, p. 25) discussing diagnostic control and boundary control: '*For exploitative innovation firms, boundary and diagnostic systems are independently related to performance [...] the effect on performance of one system is not necessarily conditional on the other as they are often spatially and temporally separated.*'
Conflicting	The MC practice contributes to resolving one control problem but hinders the resolution of another.	x_1 → y_1 (solid), y_2 (dashed)	Gerdin, Johansson, and Wennblom (2019, p. 4) discussing results controls: '*[Results controls] provide clarity about the particular responsibilities and requirements of different subunits [...] through specifying subunit goals, thereby making them more salient, they minimize ambiguity concerning what is (not) deemed important and legitimate behaviour within the subunit [...] However, the sole reliance on results control typically also suffers from at least two limitations, namely the reinforcement of self-interest causing low commitment to company-level goals, and a narrow focus on achieving easy-to-measure targets.*'
Redundant[1]	The MC practice (x_3) is unnecessary for a control problem to be effectively resolved.	$x_1 \bullet x_2 + x_1 \bullet x_2 \bullet x_3 \rightarrow y_1$	Bedford, Malmi & Sandelin (2016, p. 18) discussing variation in MC packages for prospector firms: '*The analysis of prospector firms shows that incentive pay is redundant in [one package] while measure diversity is redundant in [another package]. This suggests that finding that a MC practice has incremental benefits in isolation does not imply that the MC practice is always necessary [as part of a package] for a firm to achieve effective control outcomes.*'
Interchangeable[1]	The MC practice (x_3) can be replaced with one or more other MC practices (x_4) to resolve a control problem to equal effect.	$x_1 \bullet x_2 \bullet x_3 + x_1 \bullet x_2 \bullet x_4 \rightarrow y_1$	Bedford, Malmi & Sandelin (2016, p. 18) discussing variation in MC packages for prospector firms: '*[One package] contains a loose application of accounting controls while [another package] includes a tight use [...] this finding suggests that both tight and loose accounting controls can be combined with other MC practices [e.g. subjective determination of incentives] to achieve effective control outcomes in prospector firms.*'

Solid lines represent positive effects. Dashed lines represent negative effects.
[1] Relationships expressed using logical operators where "•" refers to *AND* and "+" refers to *OR*.

Fig. 1
MC packages with varying interdependencies

MC Package A — No interdependence

MC Package B — Little interdependence

MC Package C — Moderate interdependence

MC Package D — Extensive interdependence

Circles represent MC practices within a MC package. Lines connecting MC practices indicate interdependence (i.e. joint effects). Line thickness signifies the degree of interdependence (i.e. magnitude of interdependent effect). Circle diameter represents how 'core' the practice is to the MC package.