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Flourish or flounder: Do trust-centric management controls encourage knowledge sharing and team performance?

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ABSTRACT

We examine whether combinations of trust-centric controls promote knowledge sharing behavior, and, in turn, team performance. Using multi-source data from 138 business unit management teams (534 total respondents), we find that in-team clan control and in-team monitoring are positively associated with team performance via knowledge sharing, while the relative emphasis on team-based incentives is not. We also find that team-based incentives and in-team clan control are substitutes, while in-team monitoring complements both team-based incentives and in-team clan control. These results show that trust-centric controls can encourage knowledge sharing; moreover, in-team monitoring is important to getting the most benefit from using team-based incentives or in-team clan control. However, firms can make substitution choices between in-team clan control and team-based incentives as they both encourage a shared purpose.

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1. INTRODUCTION

Knowledge has become one of the main drivers of company performance, and knowledge sharing between employees can serve as a valuable source of competitive advantage for the firm (Ditillo, 2004; Haesebrouck, Cools, & Van den Abbeele, 2018; Haesebrouck, Van den Abbeele, & Williamson, 2021; Vera-Muñoz, Ho, & Chow, 2006). However, employees who share private knowledge risk giving up their personal source of competitive advantage. Thus, an important question to ask is what are the factors that motivate employees to engage in an activity that potentially carries high personal costs? Accounting research has begun to examine this question, thus far primarily focusing its attention on incentives as one component of a management control system (e.g., Cheng & Coyte, 2014; Haesebrouck et al., 2018; Haesebrouck et al., 2021; Hwang, Erkens, & Evans, 2009; Kelly, 2010). The management literature provides additional evidence on the relationship between incentives and knowledge sharing, broadening the perspective by taking in other controls (e.g., Foss, Husted, & Michailova, 2010; Turner & Makhija, 2006). This literature notes the distinction between formal and informal controls and pushes for research that simultaneously examines both types of controls (Foss et al., 2010). This suggestion aligns well with one of the major themes in current management control research, that is, the examination of how control practices are interrelated to affect each other's value (Chapman, Grabner, & Moers, 2020; Speklé & Widener, 2020). The purpose of this paper is to expand on these literature streams in two ways. First, we examine a broader set of formal and informal controls and determine which influence team performance via their effect on team members' willingness to share their knowledge with other team members.[1] Second, we acknowledge that the functioning of individual practices of control may be affected by the larger structure of which they are part, and examine whether combinations of these formal and informal controls act as complements or substitutes in encouraging knowledge sharing.

Team members make themselves vulnerable by offering valuable knowledge to other team members and helping others improve their contributions to team performance. This vulnerability arises in terms of time and effort or through weakening of an individual's position of power (Vera-Muñoz et al., 2006) as people engaged in knowledge exchange give other people access to

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[1] Note that we use "willingness to share knowledge" and "knowledge sharing" interchangeably.

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something that may be at the very heart of their personal value to the organization. Knowledge sharing, thus, requires substantial trust between parties to the exchange (e.g., Blau, 1964). Accordingly, we identify three trust-centric controls[2] that are likely to affect the willingness to share knowledge, 1) in-team clan control (e.g., shared values, norms, and beliefs to guide team members' behavior), 2) in-team mutual monitoring (i.e., mutual assessment of performance among team members), and 3) the relative emphasis on team-based incentives (i.e., the proportion of team-based to individual incentives). In-team clan control and in-team monitoring are informal controls that are organic and emerge within the team while the emphasis on relative team-based incentives is a formal control which is explicit and purposefully designed.

Our setting is knowledge sharing within teams because of the increasing importance teams have on organizational success. A recent study by Deloitte based on responses from more than 7,000 business and human resource leaders in 130 countries (Kaplan, Dollar, Melian, Van Durme, & Wong, 2016) concluded that team-oriented organizational design is one of the most prominent human capital management trends in today's businesses. Ninety-seven percent of their survey respondents answered that the rise of teams is a critical development in organizational redesign, rating this as either important or very important, making it a key issue for organizational leaders (Bersin, 2016). The Deloitte study concluded that organizations are redesigning themselves to function as a network of teams instead of individuals and, accordingly, must figure out how to encourage and help employees to share information within their teams effectively (Bersin, 2016).

We gather a unique data set consisting of multi-source data from multiple members of each team. Using responses from 138 business unit management teams (534 individual respondents), we find that in-team clan control and in-team monitoring are positively associated with team performance via knowledge sharing. However, unexpectedly, we find that the relative emphasis on team-based incentives is not associated with knowledge sharing. Interestingly, though, we find that team-based incentives and in-team clan control are substitutes, consistent with our argumentation that a sense of shared understanding is created either informally through clan control or formally through a purposefully designed incentive system. Further, the results show that in-team monitoring complements both in-team clan control and team-based rewards. Overall, we conclude that informal trust-centric controls are associated with increased willingness to share knowledge by team members, and subsequently with team performance. However, firms can gain increasing benefits by pairing in-team monitoring with either in-team clan control (an informal control) or with team-based rewards (a formal control).

Our results extend the literature stream that examines knowledge sharing and management control practices (e.g., Berger, Fiolleau, & MacTavish, 2019; Bol & Leiby, 2022; Cheng & Coyte, 2014; Haesebrouck et al., 2018, 2021; Kelly, 2010; Taylor, 2006; Vera-Muñoz et al., 2006; Wolfe & Loraas, 2008). Moving beyond a primary focus on singular controls, we show that in-team clan control and in-team monitoring incrementally facilitate knowledge sharing and are positively related to team performance via knowledge sharing. We further show that these trust-centric controls work in combination, either as complements or as substitutes.

These results make an important contribution to the literature in several ways. First, the results reveal that different insights arise when looking at singular controls versus multiple controls. Although team-based incentives are associated with knowledge sharing in a bivariate analysis, the main effect is no longer observed after controlling for in-team clan control and in-team monitoring. This finding suggests that informal trust-centric controls that emerge organically within teams are effective at promoting knowledge sharing rather than the purposefully designed formal team-based rewards. Controls that emerge organically within the team appear better able to reassure team members that their teammates will not act opportunistically and thus, signal to them that it is beneficial to share knowledge.

Second, the results indicate that the controls work together as a system to affect knowledge sharing. Importantly, the results reveal that team-based rewards and in-team clan control are substitutes, consistent with our argumentation that both provide team members with a sense of shared purpose. Team-based rewards are purposefully designed to instill a team orientation and to motivate team members to work together to achieve team performance, while in-team clan control emerges more organically to develop a common purpose. Moreover, this broad sense of shared purpose conveyed by either team-based rewards or in-team clan control is made actionable through in-team monitoring that highlights specific behaviors that are desirable to the functioning of the team, as evidenced by the complementary effect between in-team monitoring and both team-based rewards and in-team clan control. These results respond to the Foss et al. (2010) call for more research into the interaction between informal and formal controls that are likely to affect the willingness to share knowledge, and more fully develop our theoretical understanding of control and knowledge sharing, showing that research should broaden its scope to consider the interrelatedness of both formal and informal controls. Providing evidence on the systemic effects of controls and their relationship with knowledge sharing also adds to our understanding of control systems, which has become a central theme in the current management control literature (see e.g., Chapman et al., 2020; Speklé & Widener, 2020).

Third, Lunkes, Naranjo-Gil, and Lopez-Valeiras (2018) suggest that team-based controls are critical when cooperation among team members is necessary for organizational success. This suggestion is supported by Haesebrouck et al. (2021), who document that implicit incentives are more effective in supporting knowledge sharing when they are operated by the parties directly involved in the exchange as opposed to a distant supervisor. In a related vein, Towry (2003) finds that in a cooperative setting, horizontal, peer-level control is more effective than a system with hierarchical involvement in performance evaluation. We add to and extend this literature stream by showing that trust-centric, team-based controls are associated with knowledge sharing, singularly and in combination, while more hierarchical controls are not. Our results also speak to practice since they provide managers with insights into the trust-centric, team-based control practices they can use to encourage knowledge sharing within their teams.

Knowledge sharing in teams is of critical interest to both practice and theory. Vera-Muñoz et al. (2006, p. 133) summarize this interest as follows: "[t]his attention reflects an increased recognition that sharing knowledge among employees is the primary intangible source of sustained competitive advantage, economic growth, and corporate value." Thus, we focus on an important research question since increased knowledge sharing helps firms flourish while those firms that have trouble in sharing knowledge are left to flounder.

The rest of our paper is organized as follows. In the next section, we present our research setting, background information, and

[2] We coin the term "trust-centric" for usage in our study specifically due to our setting of knowledge sharing. Given the established prerequisite of trust for knowledge sharing, we believe each of the controls we investigate is deeply rooted in trust. The term "centric" means "in or at the center; central" and thus is an apt descriptor for these controls in a knowledge sharing setting.

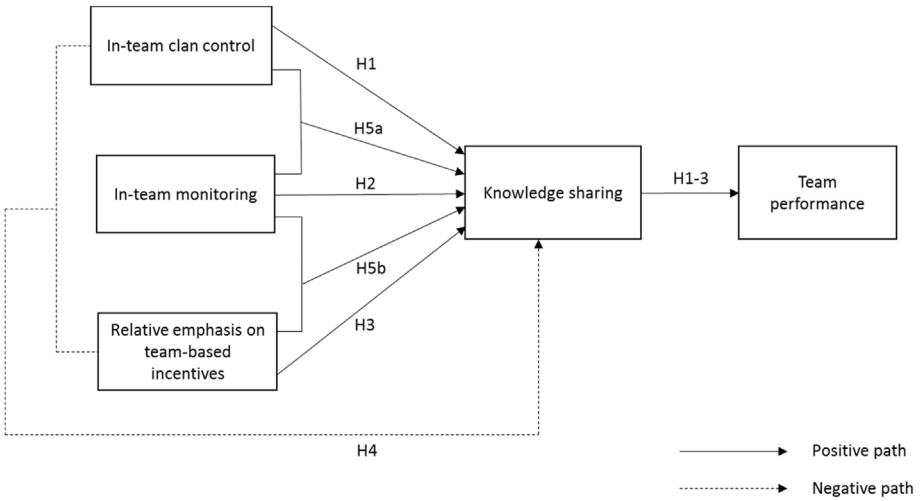

Fig. 1. Conceptual model.

develop our hypotheses. Following that, we discuss research methods, results, and then lastly, provide our conclusions, limitations, and thoughts on future research.

2. Research setting, background literature, and development of hypotheses

2.1. Research setting

We study performance effects of management controls via knowledge sharing within business unit (BU) management teams. These teams comprise the BU manager and at least two other managers. The BU manager is the formal leader of the team while the team members have different functional responsibilities and report to the BU manager. Although formally, the BU manager is in charge of the team, he or she is also part of the team and operates as "first among equals," at least in our research setting.[3] Team members share a joint responsibility for the success of the team (i.e., the BU) and to be successful, the team members must work together in a coordinated and cooperative fashion, combining insights from their respective areas of expertise. In such management teams, task and reward interdependence are likely quite high; a condition which research has found to be associated with high levels of cooperative behavior and information sharing (Wageman & Baker, 1997). Therefore, our setting is suitable to examine our research question.

Since we are interested in determining which controls influence team performance because of the team members' willingness to share their knowledge with other team members, we now turn our attention to discussing the link between knowledge sharing and team performance. Following that, we develop our hypotheses about the singular and joint effects of the three trust-centric controls on knowledge sharing. Our hypotheses are summarized in Fig. 1.

2.2. Knowledge sharing and team performance

"Knowledge sharing concerns the willingness of individuals in an organization to share with others the knowledge they have acquired or created" (Bock, Zmud, & Kim, 2005, p. 88). Knowledge sharing via employee interactions is valuable to receivers because the knowledge allows them to make better decisions and, more generally, because it improves collective performance, which also reflects on individual team members. Strategy research has long theorized the positive effects of knowledge on firm performance (Grant, 1996; Kogut & Zander, 1992). Similarly large streams of research exist with respect to knowledge sharing across organizations and business units (e.g., Cummings, 2004; Darr, Argote, & Epple, 1995; Hansen, 2002). However, we adopt a more granular approach and study in-team knowledge sharing and its relationship with team performance. This relationship has been studied less well; however, there is some related research. For instance, Faraj and Sproull (2000) find that "expertise coordination" (in terms of sharing knowledge and specialized skills) significantly impacts team performance, beyond the traditional factors of presence of expertise, administrative coordination, and team input characteristics. Srivastava, Bartol, and Locke (2006) utilize a heuristic model of team effectiveness and find that empowering leadership is positively related to knowledge sharing, which in turn is positively related to team performance. Choi, Lee, and Yoo (2010) survey teams to investigate the transactive memory system, which is the specialized division of cognitive labor among team members relating to the encoding, storage, and retrieval of knowledge. Their results show that knowledge sharing has a positive effect on knowledge application, which subsequently impacts team performance.

There is often a personal cost to individuals sharing the knowledge (Vera-Muñoz et al., 2006) in terms of time and effort or weakening of their position of power. While the sharing of knowledge between team members will generate improved unit performance, the sharers will experience a loss of time as they engage in informal and/or formal interactions to share the knowledge (Vera-Muñoz et al., 2006). Moreover, sharers may fear they will become replaceable because they no longer exclusively possess the specific knowledge that may have been the very basis for their position on the team or be concerned that other team members will act opportunistically. Thus, within a team setting, trust is a critical component to precipitate knowledge sharing (Blau, 1964); a claim that has gathered substantial empirical backing (e.g., Lin & Huang, 2020; Park, Lee, & Lee, 2015; Staples & Webster, 2008; Wang, Yen, & Tseng, 2015). We seek to extend this literature by investigating which specific trust-centric controls spur team members to

[3] We collected our data in the Netherlands, which has a distinctly egalitarian culture.

overcome their reluctance to share private knowledge. We turn to this theme next as we develop our hypotheses.

2.3. In-team clan control and knowledge sharing

Ouchi (1980, p. 136) defines a clan as "any occupational group which has organic solidarity" which Wilkens and Ouchi (1983) suggest can occur in any social or organizational setting. While the organization as a whole can make up a clan, our focus is on the clan that develops in a team setting. Clans rely on a common agreement between members on what constitutes proper behavior and require a high level of commitment from each individual to these socially prescribed behaviors (Ouchi, 1979). Within a clan, desired individual behaviors are reinforced through the common set of values, norms, and broad behavioral expectations of the clan (Kirsch, Ko, & Haney, 2010; Ströbele & Wentges, 2018). When individuals act in accordance with the shared values and norms of the clan, they are "rewarded" by being accepted as a member. Thus, the clan's behavioral expectations provide guidance to clan members in their cost-benefit trade-offs. Importantly, clan members engage in such interactions even when the benefit is implicit (e.g., Haesebrouck et al., 2021). In sum, these shared values and beliefs that 'set the rules of the game' allow a clan to serve as a mechanism of control.

Since clan members have internalized the clan's goals and share common values and purpose, they trust that all clan members will behave for the betterment of the clan (Ouchi, 1979, 1980). This trust is based on a set of mutual expectations or anticipations regarding each other's behavior (Madhok, 2006). Members in a clan witness repeated interactions within the clan and anticipate that members will behave as expected, aiming to achieve the clan's goals as opposed to individuals' goals (Ouchi, 1980). Bock et al. (2005) contend that feelings of affiliation that come with being part of the clan, along with a sense of fairness based on shared beliefs and norms, enable exchange relationships and helping behavior such as knowledge sharing. This is consistent with Ouchi (1980), who argues that the workings of the clan allow it to satisfy the requirement of equity or fairness needed to facilitate successful exchange relationships. Since clan members have trust in each other, they are willing to participate in an exchange relationship that involves giving up their knowledge, believing that opportunistic behavior will not occur (Ouchi, 1980). According to Ströbele and Wentges (2018), clan control aims to minimize goal incongruence by focusing on cooperative behavior, shared values and norms, and loyalty to the clan. In support of this claim, Li, Lee, Li, and Liu (2010) suggest that the shared understanding within a clan enhances both sharing and transfer of knowledge among employees.

In sum, we expect in-team clan control to contribute to the functioning of the team via its positive effect on knowledge sharing and formally hypothesize the following.

H1. In-team clan control is positively related to team performance through its positive association with knowledge sharing.

2.4. In-team monitoring and knowledge sharing

Members of a management team operate within a nexus of interdependent relationships in which the output of the exchange relations depends on the coordination and combination of the parties' efforts. With such intertwined interests, it is in the best interest of all parties to interact and work toward their common goal. Such interaction, however, requires some form of control (e.g., Welbourne, Balkin, & Gomez-Mejia, 1995). Consistent with existing literature (e.g., Fama & Jensen, 1983; Loughry & Tosi, 2008; Welbourne et al., 1995; Widener, Shackell, & Demers, 2008), we suggest that when team members have a stake in the contributions of their peers, they will actively engage in in-team monitoring. We define in-team monitoring[4] as the mutual assessment of performance among peers working towards a common goal; it consists of observing peer behaviors and communicating feedback on such behaviors and thus provides specificity on desired behaviors.[5]

To enact in-team monitoring, team members must know what the other team members should be doing and be able to coordinate activities (Marks & Panzer, 2004; Towry, 2003). Team members are then able to notice and respond to their peers' behaviors. Some literature holds that monitoring can be viewed with distrust if individuals perceive it as being negative or "controlling" (see e.g., De Jong & Elfring, 2010). If monitoring in the team is perceived as an opportunity for team members to keep tabs on each other rather than a norm intended to support team performance, a climate emerges in which team members are likely to respond critically and defensively to feedback, especially if that feedback is negative (Salas, Sims, & Burke, 2005). It follows, then, that individuals would not be willing to be vulnerable and share their personal knowledge when this is the case.

De Jong and Elfring (2010), however, argue that teams carry a deeper mutual trust as teammates engage in repeated interactions that allow for observation of behaviors and compare those behaviors to their expectations. Through these repeated interactions, team members have the opportunity to experience and witness the benevolence of their peers (De Jong & Elfring, 2010). Teammates come to believe that their peers are fair and acting in accordance with expectations (Khalid & Ali, 2017) and that their individual behaviors will be judged fairly and consistently. Thus, in teams where members must coordinate to complete tasks, they are more willing to provide feedback to their teammates and ensure their actions are aligned with team performance. Accordingly, trust and in-team monitoring are intertwined. Indeed, mutual trust is described as a coordinating mechanism for the functioning of teams, suggesting that it is a foundation for mutual monitoring (Salas et al., 2005). De Jong and Elfring (2010) provide empirical support for this suggestion, finding that monitoring mediates the relationship between trust and team performance. They argue that this is because monitoring reduces inefficiencies in team processes as the team strives for performance (De Jong & Elfring, 2010). Consistent with this argument, team members will be willing to give up their knowledge and share it because their vulnerability is reduced; they trust that their peers will not act opportunistically and take credit for the knowledge being shared, but rather they will work towards improved team performance (De Jong & Elfring, 2010).

In sum, in-team monitoring places control in the hands of peers, capitalizing on the information advantages peers have in observing collaborative behavior from their fellow team members (Fama & Jensen, 1983; Welbourne et al., 1995) and the trust that exists in the team (De Jong & Elfring, 2010; Salas et al., 2005). Thus, team members are willing to share knowledge in order to reduce process losses and achieve team goals. Accordingly, we hypothesize the following.

[4] Towry (2003, 1069) defines mutual monitoring as "the ability of team members to observe each other's actions". We label our construct "in-team monitoring" rather than "mutual monitoring" to emphasize our focus on interactions within the team.

[5] It should be noted that our conceptualization captures not just the ability to observe behavior but also includes the responses to the observations (e.g., recognition of good performance, criticism if performance does not meet expectations). This is consistent with the conceptualizations of Welbourne et al. (1995), Loughry and Tosi (2008), and De Jong and Elfring (2010), and extends the experimental literature that has tended to define the concept only in terms of the ability to observe peer behavior (see for instance Towry, 2003; Hannan et al., 2013).

H2. In-team monitoring is positively related to team performance through its positive association with knowledge sharing.

2.5. Relative emphasis on team-based incentives and knowledge sharing

Team-based incentives promote cooperation among team members (Bartol & Srivastava, 2002; Wageman & Baker, 1997) because if everyone cooperates, team members will receive greater rewards. Thus, team-based incentives create a spirit of collaboration and reciprocity (Bartol & Srivastava, 2002; Wageman & Baker, 1997). Based on this spirit of cooperation, Coletti, Sedatole, and Towry (2005) show that formal controls, when used in a collaborative setting, result in higher trust among the collaborators. They theorize that this is because the controls mitigate the risk of opportunistic behavior, since rewards will accrue to those collaborators who do not engage in opportunistic behavior but who instead work together to achieve the joint goal. Thus, these controls engender trust within the team because they create the conditions in which each member can expect the other members to act appropriately (Coletti et al., 2005). Therefore, team-based incentives make cooperation within the team more important because team members must rely on their teammates' contributions to reach higher team performance and earn their resultant rewards, but simultaneously promotes trust in teammates because it aligns individuals' goals.

Many accounting studies have investigated the effects of incentives on knowledge sharing (Berger et al., 2019; Cheng & Coyte, 2014; Haesebrouck et al., 2018, 2021; Taylor, 2006; Wolfe & Loraas, 2008). This research generally shows that group financial incentives promote more knowledge sharing than individual incentives. Accordingly, based on these results and the discussion above, we expect that team-based incentives, relative to individual incentives, are conducive to team performance as they support knowledge sharing within the team. Accordingly, we formally hypothesize.

H3. A relative emphasis on team-based incentives (team-based versus individual-based incentives) is positively related to team performance via knowledge sharing.

2.6. Joint effects of the trust-centric controls

Apart from the main effects hypothesized in H1-3, we also theorize the existence of interrelatedness among the three trust-centric controls. Particularly, in connection to knowledge sharing, we expect to find a substitutive relationship between in-team clan control and the relative emphasis on team-based incentives, while we expect in-team mutual monitoring to complement both other control practices (Che & Yoo, 2001). Various studies advocate investigating the interdependence among informal and formal control mechanisms (Foss et al., 2010; Luft, 2016; Rijsdijk & van den Ende, 2011). For example, Rijsdijk and van den Ende (2011) conclude that clan control acts in concert with outcome and process controls (see also Sihag & Rijsdijk, 2019). Thus, we believe investigating potential substitutive and complementary relationships among the three trust-centric controls in the current study is critical. We first address the substitution effect and then turn our attention to the complementary effects.

In successful teams, teammates share a sense of common purpose and goals wherein individual teammates' outcomes are interrelated (Johnson & Johnson, 1995, 1999). This shared understanding of what the team should achieve and how it contributes to organizational performance is essential for effective cooperation and knowledge sharing (Salas et al., 2005). We propose that such a shared understanding can be associated with either a reliance on in-team clan control or team-based incentives. In-team clan control carries a broad sense of common purpose in terms of social norms and a shared commitment to the high-level raison d'être of the clan as opposed to the individual (e.g., Ouchi, 1980), while team-based incentives specify team objectives and motivate team members to cooperate on interdependent tasks that contribute to team performance, instead of being self-interested (e.g., Wageman & Baker, 1997).

Rijsdijk and van den Ende (2011) and Li, Xie, Hock-Hai, and Peng (2010) suggest that formal and informal controls may act as substitutes, based on the notion that either can foster cooperative team behavior. In our setting, the relative emphasis on team-based incentives is a formal control that uses information and outcome measurement to reward cooperative behaviors such as knowledge sharing within the team. In-team clan control is an informal control that relies on the strength of the bonds within the team to motivate its members to share knowledge to enhance team performance. Thus, in-team clan control and the reliance on team-based incentives are alternative, distinct ways to enact a sense of common purpose, and depending on the circumstances, either may be effective in achieving that purpose. However, both alternatives are also costly, so organizations will either bank on one or the other.[6]

H4. In-team clan control and team-based incentives are substitutes in relation to knowledge sharing.

The common sense of purpose provided by either in-team clan control or team-based incentives gives direction to collective and individual endeavors, but the guidance is broad and unspecific with little focus on the means of achievement. These controls, therefore, have limited direct relevance to inform day-to-day decision-making on concrete action choices. Moreover, they do not provide specific clues to coordinate collaborative behavior and to focus knowledge sharing. Thus, they need to be made more concrete to be fully effective. Further specification of the overall, generic purpose of the team does not require formal control or hierarchical intervention, but can be left to the team members themselves, capitalizing on the information advantage these individuals have on account of them being part of the cooperative process and being direct observers of each other's contributions (Loughry & Tosi, 2008; Welbourne et al., 1995). In the process of mutual monitoring, team members collectively define more specific rules to guide actions, to set standards, and to ensure that individual effort is aligned with a common understanding of how to do things (Barker, 1993; Loughry & Tosi, 2008). Mutual monitoring also helps team members to acquire a deeper understanding of each other's roles in the team and what they can do to support one another to ensure the team is working towards team performance rather than their maximizing their own self-interest (Welbourne et al., 1995). In sum, this reasoning implies that in-team monitoring complements in-team clan control and team-based incentives[7]: in-team clan control or team-based incentives are required to charge the team

[6] It is beyond the scope of this paper to theorize when which practice will prevail, but it seems plausible to assume that the preference depends on output measurability and knowledge of transformation processes (Ouchi, 1979) as well as on costs. Team-based incentives incur implementation and fulfillment costs. In-team clan controls are costly to the individual employee (and hence to the organization) as he/she must submit to the team's goals and values; they also carry direct organizational costs as they reduce diversity of thought from individuals to a team. Moreover, the common values and shared beliefs associated with clan control may be relatively inert, limiting a flexible response to changing circumstances.

[7] Our argument supporting the complementary effect of in-team monitoring and team-based incentives is also consistent with a large literature in economics that argues that monitoring helps reduce the free-rider effects that accompany team-based incentives (see e.g., Che & Yoo, 2001; Wageman & Baker, 1997).

with a shared sense of being in it together, but peer monitoring is necessary to release that energy in purposeful action. The reverse is also true: in-team monitoring becomes more effective in the presence of a generic and shared agreement of what the team is trying to achieve (Salas et al., 2005), as brought about by in-team clan control or team-based incentives. Accordingly.

H5a. In-team monitoring and in-team clan control are complements in relation to knowledge sharing.

H5b. In-team monitoring and team-based incentives are complements in relation to knowledge sharing.

3. Methods and constructs

3.1. Research design and sample

Our study uses survey data from a total of 138 BU management teams. Per team, we had access to the BU manager as the formal leader of the team, his or her superior (i.e., higher management), and one (n = 18) or two team members (n = 120), also managers, reporting to the BU manager. The total number of respondents equals 534 (18 teams with 3 respondents and 120 teams with 4 respondents per team). At least in our Dutch research setting, the hierarchical distance between the BU manager and the other members of the BU team is very small; BU managers tend to be "primus inter pares," acting as part of the team rather than as authoritarian principals.

We approached potential respondents through the personal networks of students in a management accounting and control class taught by one of the authors. Reliance on these networks allowed us to connect with and gain commitment from relevant respondents and to avoid respondent identification issues. We provided students with the questionnaire instrument as well as an introduction letter explaining the purpose of the questionnaire so they could contact potential respondents in their organization or broader network. We gave the students very specific instructions as to the criteria for respondent selection. We defined a BU as an operating unit of a larger company that serves a specific, well-defined part of the market for the organization's products or services, holding responsibility for production/service delivery as well as sales tasks. We identified the BU manager as the person in charge of this unit. To qualify for inclusion in our sample, BU managers had to have full profit and loss accountability for their unit and oversee a cross-functional management team of at least three people (including him or herself). We stressed that participation in the study was voluntary, and we carefully instructed the students not to put any undue pressure on potential respondents in their efforts to persuade them to participate. We also made sure that students understood that there were no repercussions for them should they be unable to provide suitable respondents. Once the management team and its superior agreed to participate, the students gave the participants the appropriate version of the questionnaire and a pre-stamped return envelope so they could return their answers directly to the research team. Additionally, the students supplied us with sector information and data on the size of the organization and the unit.

Reliance on students' networks implies that we use a convenience sample. Since our study's goal is not to provide generalizable descriptive insights that apply to a larger population but rather to test theory, a convenience sample is suitable and commonly used in the management accounting literature (Van der Stede, Young, & Chen, 2005). For theory testing purposes, sample relevance is the key criterion (Landers & Behrend, 2015; Speklé & Widener, 2018), along with ensuring that coverage bias is minimized. Our theory addresses knowledge sharing within teams and the trust-centric controls applied and managed within those teams. Thus, our use of three levels of respondents at the level of the (1) BU manager as the team leader, (2) his or her superior, and (3) one or two members of the BU team, provides a relevant sample with which to test our theory. As the students come from different organizations and operate in different networks, our approach is likely to lead to a diverse sample of respondents that contains the required variation in the variables of interest, thus, minimizing the potential for coverage bias. Respondent teams come from a variety of sectors, including manufacturing (26 percent), finance, insurance, and real estate (24 percent), and services (21 percent). The average BU has 196 employees[8] and is part of a larger organization that employs 8,860 individuals on average. Additional detail on the sample is in Table 1.

3.2. Construct measurement

To measure the constructs of interest in this study, we largely rely on instruments from prior literature. We subjected the draft questionnaires to an academic pretest by three expert survey researchers, followed by an initial review of their wording by three students who have substantial practical experience as management accountants and, thus, are familiar with the vocabulary commonly used in organizations. We subsequently invited two managers (not included in our final sample) to complete the questionnaires in our presence, asking them to articulate their thoughts in the process. This "thinking aloud" allowed us to observe the interaction between the questionnaires and respondents (Hak, van der Veer, & Jansen, 2008), providing us with relevant information to further assess the questionnaires' clarity. This series of tests led to some minor adjustments in the wording of the questions but supported the overall quality of the questionnaires.

The data about team performance stem from the superior's questionnaire. We obtain information on the trust-centric controls (in-team monitoring, in-team clan control, and the relative emphasis on team-based incentives) and some of the control variables from the team members. Other control variables are based on information from the BU manager questionnaire. For 120 of the 138 teams, we had two team member respondents per team; we average their scores to objectify measurement. For the 18 teams for which we had only one team member respondent, we rely on the information provided by this respondent.

Our reliance on multiple-source data should alleviate concerns as to common method bias. In addition, we followed the advice from Podsakoff, MacKenzie, Lee, and Podsakoff (2003) to further mitigate this potential problem. Specifically, we (1) targeted respondents with the knowledge needed to answer the questionnaires, (2) took care during the pre-test phase to ensure the questionnaires' clarity and understandability, (3) used questions with different response formats to measure the constructs (e.g., assignment of percentages, 5-point scales, 7-point scales), (4) informed respondents that there were no right or wrong answers, and (5) provided for strict anonymity.

Except for the dimensions of team performance, all first-order constructs in our analysis are measured reflectively (Jarvis, MacKenzie, & Podsakoff, 2003). As a first step to examine the dimensionality in the data, we perform an exploratory factor analysis, using principal axis factoring with oblique rotation. To assess convergent validity, we examine item loadings, using 0.5 as the cut-off point for item retention, and average variance extracted,

[8] Some units in our sample are quite small. An untabulated analysis, however, shows that removal of units with less than 10 employees (n = 7) and of unknown size (n = 5) does not affect our inferences.

Table 1
Sample composition.

Panel A: Respondents		
138 BU management teams, each consisting of:		Individual respondents:
• A superior		138
• A BU manager		138
• One (for 18 teams) or two (for 120 teams) team members		258
Total		534
Panel B: Industries		
Construction	11	(8%)
Financial services, Insurance, and Real Estate	33	(24%)
Manufacturing	36	(26%)
Wholesale & Retail Trade	10	(7%)
Services	29	(21%)
Transportation, Communications, Electric, Gas, and Sanitary Services	11	(8%)
Other	4	(3%)
Unknown	4	(3%)
Total	138	(100%)
Panel C: Size		
	Mean	Range
Organizational size (Fulltime employees)	8,860	20 - 113,678
Unit size (Fulltime employees)	196	4 - 2,824

using 0.5 as the threshold value (Fornell & Larcker, 1981; Henseler, Ringle, & Sinkovics, 2009). To buttress the results of the exploratory factor analysis, we apply confirmatory factor analysis in AMOS 27, including all reflectively measured first-order constructs from our base model. We find a well-fitting model, with $\chi^2/df = 1.267$, TLI = 0.905, NNCP = 0.918, and RMSEA = 0.044 (pclose = 0.877).[9] We use item weights obtained from the factor analysis to calculate scores for the multi-item reflective constructs and check scale reliability using Cronbach's alpha. To examine discriminant validity, we assess the square root of average variance extracted (AVE) in relation with bivariate correlations (Fornell & Larcker, 1981). We also examine criterion validity and/or construct-level convergent validity for all key constructs in our model. We describe these results in the following sections that discuss the measurement of individual constructs.

Table 2 reports descriptive statistics, including validity and reliability statistics for the multi-item constructs, while Appendix A reproduces the relevant parts of the questionnaires and provides information on factor analyses outcomes and associated item selection decisions, as well as descriptive statistics using the original scaling.

3.2.1. Team performance

Information to measure performance comes from the team's superior questionnaire (i.e., higher management). Knowledge sharing can potentially help a team perform more efficiently and reliably, enhancing team dependability. It may, however, also affect the team's creativity and ability to learn, contributing to team innovativeness. To pick up on these different aspects of performance, we model team performance as a multidimensional second-order aggregate construct, defined by two formative indicators corresponding to the two dimensions of the construct. These dimensions, in turn, are also measured formatively. We base items for team dependability on Choi et al. (2010). We self-develop items for team innovativeness for this research project. We construct a linear composite of each dimension's indicators, evaluate the significance of indicator weights, and check variance inflation factors to eliminate multicollinearity concerns (Bedford & Speklé, 2018; Petter, Straub, & Rai, 2007). We then compute the scores for both first-order constructs, using the indicator weights to calculate the composite's scores. We use the same procedure to form the second-order aggregate composite, again evaluating significance of item weights and variance inflation factors.

To establish construct-level convergent validity, we examine the correlation of the team performance composite and the scores on a question asking the superior to rate overall team performance on a ten-point scale. In support of the construct, we find a significant positive correlation ($r = 0.613$, $p < 0.01$).

3.2.2. Knowledge sharing

To measure knowledge sharing, we rely on information from the team members' questionnaires. We take items from Faraj and Sproull (2000), which load on a single factor. To assess construct-level convergent validity of the knowledge sharing construct, we examine bivariate correlations with an alternative measure of knowledge sharing (based on a single question asking team members to rate knowledge sharing between team members on a ten-point scale), and with a multi-item construct based on Evans, Hendron, and Oldroyd (2014) that captures the distinct but related concept of knowledge hoarding. Both correlation coefficients are significant and in the expected direction ($r = 0.547$, $p < 0.01$; $r = -0.347$, $p < 0.01$, respectively).

We expect that the value of knowledge drives knowledge sharing; that is, if knowledge is more valuable, more intensive sharing of knowledge is likely to occur. Accordingly, we examine the association between knowledge sharing and a multi-item construct based on Widener (2004) that measures the value of knowledge. We find a positive and significant correlation ($r = 0.266$, $p < 0.01$), supporting our measure's criterion validity.

3.2.3. In-team clan control

To measure team-based clan control, we use two items from the instrument of Kirsch et al. (2010). Their third item did not load properly in our analysis, so we discarded this item. We collect this information in the team member questionnaire.

Team-based clan control, with its emphasis on behaving according to the norms and values that are common to team members, implies a certain level of attachment to the team and a sense

[9] In the selection of fit statistics, we follow Sharma et al. (2005). To evaluate fit, we apply common cutoff values, i.e., ≤2 for χ2/df; ≥0.90 for TLI and NNCP; ≤0.08 for RMSEA.

Table 2
Descriptive statistics.

	Min	Max	Mean	Standard deviation	Cronbach's alpha	AVE
Team performance	−2.330	2.144	.000	1.000	–	–
Team dependability	−2.420	1.808	.000	1.000	–	–
Team innovativeness	−2.394	2.036	.000	1.000	–	–
Knowledge sharing	−3.317	2.251	.000	.921	.840	.571
In-team clan control	−2.439	2.273	.000	.834	.697	.533
In-team monitoring	−2.899	2.465	.000	.924	.818	.608
Relative emphasis on team-based incentives	−2.054	2.465	.000	.922	.829	.500
Intensity of use LoC	−2.278	1.831	.000	.873	–	–
Beliefs	−2.703	1.950	.000	.918	.826	.555
Boundaries	−2.567	1.081	.000	.926	.834	.567
Diagnostic use	−3.562	1.327	.000	.951	.875	.658
Interactive use	−2.495	2.380	.000	1.000	–	–
Debate & inspiration	−2.755	2.141	.000	.925	.845	.482
Strategic focus	−2.953	1.838	.000	.916	.789	.573
Involvement higher management	−1.933	1.231	.000	.770	.593	.421
Within-unit involvement	−2.546	1.785	.000	.884	.772	.540
Objective evaluation	−2.729	1.956	.000	.882	.780	.638
Subjective evaluation	−2.961	2.143	.000	.914	.835	.718

of belonging. Accordingly, we examine the correlation between clan control and a measure of team commitment adapted from Allen and Meyer (1990). The data show a positive and significant association ($r = 0.544$, $p < 0.01$), confirming criterion validity.

3.2.4. In-team monitoring

We measure in-team monitoring with an instrument developed by Welbourne et al. (1995, p. 888) that captures the extent to which employees' respond to co-workers' behaviors "as the co-workers reach, exceed, or fail to meet expectations." The original instrument has four items, but we dropped one item because its factor loading is too low.[10] Information for this construct comes from the team member questionnaire.

In-team monitoring presumes close cooperation between team members, allowing them to observe and evaluate each other's functioning. In the questionnaire, we collected information on "teamness," which captures the quality of members' interactions and the extent to which members form a "real team." The items for this teamness construct have been used by Boone and Hendriks (2009). We use this construct to proxy for the closeness of cooperation, which we subsequently use to examine criterion validity of the in-team monitoring measure. As expected, we find a positive and significant correlation between the two constructs ($r = 0.388$, $p < 0.01$).

3.2.5. Relative emphasis on team-based incentives

The relative emphasis placed on team-based incentives is measured using information collected via the team member questionnaire. The items are based on Hartmann and Slapničar (2009) and Bouwens and Van Lent (2007), adapted to fit the specific purposes of our research. The items ask respondents to indicate the extent to which the evaluation of their performance, financial compensation, promotion, and rank advancement are based on team achievements rather than individual accomplishments.[11] We discard the information on bonus determination, because 40 of the 138 teams (29%) in our sample indicated that they were not on a variable compensation scheme. The remaining five items load on a single construct.

Team incentives contribute to a culture in which people become less focused on their individual self-interest as they motivate a shared understanding of the team goals. Our questionnaire provides information on the extent to which team members perceive others in the team are preoccupied with their personal benefit and the degree of self-centeredness in decision making, using an instrument adapted from Arnaud and Schminke (2012) and Victor and Cullen (1988) to capture a self-focused work climate. A negative correlation between the measure for the relative emphasis on team-based incentives and this work climate construct would buttress criterion validity. The data support this expectation ($r = -0.175$, $p < 0.05$).

3.2.6. Control variables

Our construct for the relative emphasis on team-based incentives holds no information on which dimensions are being considered in performance appraisals. Because the relationships in our model may also be affected by the contents of performance measurement, we control for the importance of objective and subjective performance measures in performance evaluation. Previous studies have associated the reliance on subjective measures with aspects of employee performance that are difficult to define and measure (e.g., Gibbs, Merchant, Van der Stede, & Vargus, 2004; Grabner, 2014; Moers, 2005) such as knowledge sharing, whereas an emphasis on objective measures could contribute to short-term performance. The constructs are based on two items each, asking team members to indicate the importance of objective and subjective measures in the evaluation of and periodic discussions about their performance. To assess criterion validity, we correlate the constructs with a series of questions asking about the importance of three objectifiable performance dimensions in performance evaluation (i.e., meeting deadlines, time management, and the quality of the team's deliverables). In support of our measures, we find positive correlations between these dimensions and objective performance evaluation (r-values ranging from 0.222 to 0.298; all p-values <0.01), and non-significant correlations between these dimensions and the importance of subjective performance evaluation.

Although our focus is on trust-centric controls that require interaction and coordination among team members, controls imposed on the team by senior management may still be relevant since they provide the organizational background for team behavior and may affect the conditions that stimulate knowledge

[10] It should be noted that the item dropped from analysis is the only negative statement, referring to a team member admonishing another team member for doing a poor job. Thus, our measure empirically picks up only on positive manifestations of monitoring. As this may influence our findings, we address the potential consequences of this narrow operationalization in a robustness check reported in Section 4.2.

[11] Note that this includes both monetary and non-monetary incentives. This is consistent with Haesebrouck et al. (2021), who conclude that incentives in a knowledge sharing setting can also be implicit.

Table 3
Correlations.

	1	2	3	4	5	6	7	8	9	10	11	12
1: Team performance	–											
2: Knowledge sharing	.256***	.756										
3: In-Team clan control	.100	.413***	.730									
4: In-Team monitoring	0.044	.390***	.430***	.780								
5: Relative emphasis on team-based incentives	.027	.160**	.270***	.077	.707							
6: Intensity of use of LoC	.254***	.059	.143*	.079	−.026	–						
7: Objective evaluation	.117	−.008	.115	.066	−.039	.200**	.799					
8: Subjective evaluation	.090	.098	−.029	−.039	−.079	.158*	.269***	.847				
9: Size organization (ln)	.105	−.005	.026	.170**	.012	.162*	.099	.157*	–			
10: Size unit (ln)	.115	−.137	.061	.094	.149*	.054	.146*	.080	.504***	–		
11: Manufacturing	.082	−.088	.112	−.021	.029	.058	.003	.010	.101	.334***	–	
12: Finance/insurance/real estate	.019	.003	.076	.016	.001	−.009	−.027	.155*	.005	−.080	−.333***	–
13: Other services	−.024	.139	.109	.189**	−.082	.056	.087	−.006	−.116	−.205**	−.306***	−.289***

Off-diagonal elements are Pearson correlations, diagonal numbers (underlined) are square roots of AVE.
*p < 0.10, **p < 0.05, ***p < 0.01; two-tailed.

sharing. Therefore, we include a broad, encompassing construct in our analysis to control for this setting in its different facets and manifestations. The Levers of Control (LoC) framework from Simons (1995) provides such a broad construct contending that control exerted by senior management is captured in four levers (i.e., beliefs control, boundary control, diagnostic control, and interactive control). Simons (1995) argues that these four levers work together to support both predictable goal achievement and adaptation and strategic renewal. To measure the intensity of higher management's use of the LoC as a system, we follow recent developments in the literature (Nielsen, Kristensen, & Grasso, 2018; Speklé, Van Elten, & Widener, 2017; Speklé, Verbeeten, & Widener, 2022; Tanriverdi & Venkatraman, 2005) and estimate the variance that is shared by the four levers. This common variance represents the extent to which variables are interrelated in an internally consistent pattern of behavior, reflecting the extent to which the four levers move together in a systematic way. Accordingly, we operationalize the intensity of use of the LoC system as a higher-order superordinate construct with the individual control levers as reflective indicators.[12]

We collect the data to measure the reliance on the individual levers in the BU manager questionnaire. Questionnaire items are adapted from Henri (2006) and Widener (2007), with the addition of a few items from Kruis, Speklé, and Widener (2016) to better pick up on some facets of the interactive use of controls. We measure beliefs, boundaries, and the diagnostic use of control reflectively. All items load on their respective construct, except for one diagnostic use item, which has a high cross loading with a component of interactive use. We drop that item from further analyses. Interactive use of control, however, is measured formatively, following Bisbe, Batista-Foguet, and Chenhall (2007).

To assess criterion validity of the LoC system construct, we examine its association with the type of decisions the management team makes. Our expectation is that if the team's involvement in decisions of a strategic nature grows (as opposed to operational decisions on internal processes and human resources), their impact increases, and top management is likely to intensify vertical control exerted on the team. Consistent with this expectation, we find a positive correlation between the intensity of use of the LoC system and the relative importance of strategic, marketing, and investment issues in decision making within the management team ($r = 0.279, p < 0.01$).

We furthermore control for potential effects of organizational and unit size, both measured as the natural log of the number of full-time equivalents to mitigate distributional issues. Organizational and unit size are potentially important because they may make knowledge sharing more challenging. Also, size may affect the feasibility of investment in various control practices. Finally, we control for industry effects to pick up on potential differences in knowledge dependence across various sectors of the economy, using three dummies for the three largest industry groups in the sample: manufacturing, financial services (including insurance and real estate), and other services.

4. Results

4.1. Base model analysis and results

Table 3 presents the correlation matrix and reports the square root of AVE for each reflectively measured construct. We find that, for every construct, the square root of AVE is higher than the bivariate correlations of that construct with the other exogenous constructs in the analysis, providing evidence of discriminant validity (Fornell & Larcker, 1981). We also observe that correlations are low enough not to prompt multicollinearity concerns. For the multivariate analysis, we estimate a path model in AMOS 27.

Considering our sample size of 138 observations, we treat the first-order reflectively measured constructs and the (first- and second-order) formatively specified constructs as manifest variables.[13] We model the hypothesized complementarities and substitutes between the team-based controls as interaction effects, including product terms in the analysis to capture these.[14]

In the analysis, we initially include all control variables discussed in Section 3.2.6, but subsequently trim our model to arrive at a more parsimonious base model. In this trimming procedure, we delete insignificant paths from the control variables to the endogenous constructs in the structural model, one at a time. However, to ensure a proper interpretation of the findings regarding hypothesized constructs, we retain all control paths from the constructs that are part of our theory, even if they are insignificant. In Table 4, we report the standardized path coefficients for the trimmed base

[12] It should be noted that the usual standards to evaluate convergent validity of factor analysis outcomes do not apply when using them to proxy for a system of control practices (Speklé et al. 2017, Speklé, Verbeeten, & Widener, 2022). Therefore, we do not report AVE and Cronbach's alpha in Table 2.

[13] As a robustness check, we also run the analysis with a full measurement model. The (untabulated) results are qualitatively similar to those reported in Table 4.

[14] As an additional but untabulated analysis, we also run the model including the (not theoretically substantiated) three-way interaction between the three team-based controls. In this model, we find no effect for the three-way interaction, while all other results hold.

Table 4
Base model results (standardized).

Path to:	Knowledge sharing	Team performance
Path from:		
Hypothesized direct paths		
Knowledge sharing		.270***
In-team clan control	.271***	
In-team monitoring	.319***	
Relative emphasis on team-based incentives	.081	
H4: In-team clan control * Team-based incentives	−.187**	
H5a: In-team clan control * In-team monitoring	.134*	
H5b: Team-based incentives * In-team monitoring	.152*	
Control Paths		
In-team clan control		−.032
In-team monitoring		−.063
Relative emphasis on team-based incentives		−.026
In-team clan control * Team-based incentives		−.091
In-team clan control * In-team monitoring		.105
Team-based incentives * In-team monitoring		.112
Control variables		
Subjective evaluation	.162**	
Size unit	−.191***	.154*
Intensity of use LoC		.305***
Theory-relevant indirect paths:		
H1: In-team clan control → Knowledge sharing → Team performance		.073***
H2: In-team monitoring → Knowledge sharing → Team performance		.086***
H3: Relative emphasis on team-based incentives → Knowledge sharing → Team performance		.022
In-team clan control * team-based incentives → Knowledge sharing → Team performance		−.050**
In-team clan control * in-team monitoring → Knowledge sharing → Team performance		.036**
Team-based incentives * in-team monitoring → Knowledge sharing → Team performance		.041**
Model fit:		**Statistics**
R^2 Knowledge Sharing		.339
R^2 Team Performance		.206
χ^2 (p)		27.092 (.794)
χ^2/df		.797
TLI		1.075
NNCP		1.000
RMSEA (pclose)		.000 (.975)

*p < 0.10, **p < 0.05, ***p < 0.01; two-tailed.

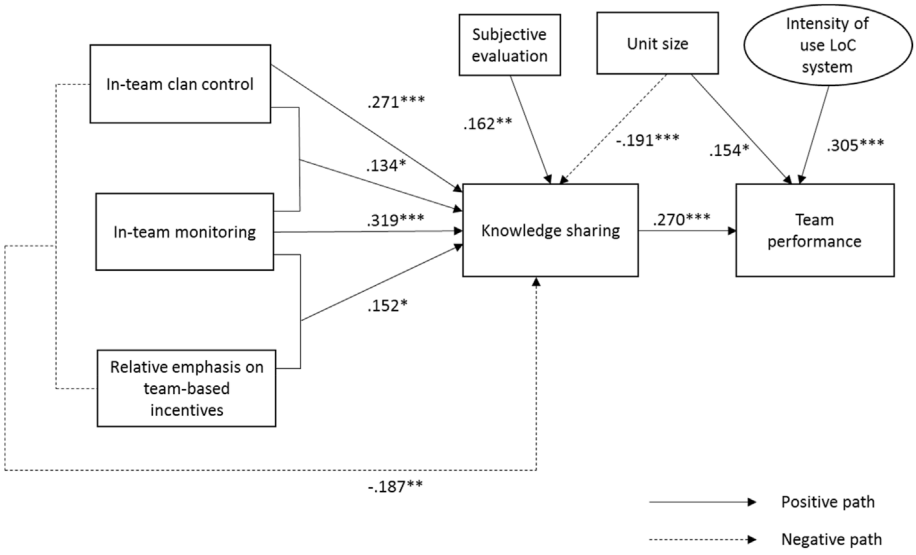

Fig. 2. Base model results.
Note: Fig. 2 shows significant paths only. Model fit statistics: χ^2 (p) = 27.092 (0.794); χ^2/df = 0.797; TLI = 1.075; NNCP = 1.000; RMSEA (pclose) = 0.000 (0.975).

model and model fit statistics. This model fits the data quite well. We find an insignificant χ^2 and all other fit indices comfortably beat common thresholds (Sharma, Mukherjee, Kumar, & Dillon, 2005). Fig. 2 summarizes the significant paths in the base model.

We find support for two of our hypotheses on the direct effects of the trust-centric controls. Both in-team clan control and in-team

Table 5
Results alternative model (standardized).

Path to:	Teamness	Knowledge sharing	Team performance
Path from:			
Hypothesized direct paths			
Knowledge sharing			.212*
Teamness			.119
In-team clan control	.319***	.271***	
In-team monitoring	.259***	.319***	
Relative emphasis on team-based incentives	.092	.081	
H4: In-team clan control * Team-based incentives	−.299***	−.187**	
H5a: In-team clan control * In-team monitoring	.008	.134*	
H5b: Team-based incentives * In-team monitoring	.158**	.152*	
Control Paths			
In-team clan control			−.054
In-team monitoring			−.075
Relative emphasis on team-based incentives			−.033
In-team clan control * Team-based incentives			−.067
In-team clan control * In-team monitoring			.111
Team-based incentives * In-team monitoring			.103
Control variables			
Subjective evaluation	.117**	.162**	
Size unit	−.181**	−.191***	.164*
Intensity of use LoC			.301**

Indirect paths to Team performance from:	**Via Teamness**	**Via Knowledge sharing**
H1: In-team clan control	.046	.069**
H2: In-team monitoring	.034	.073**
H3: Relative emphasis on team-based incentives	.012	.019
In-team clan control * team-based incentives	−.057	−.063**
In-team clan control * in-team monitoring	.001	H5a: .032*
Team-based incentives * in-team monitoring	.021	H5b: .036**

Model fit:	**Statistics**
R^2 Knowledge Sharing	.339
R^2 Teamness	.388
R^2 Team Performance	.213
χ^2 (p)	28.604 (.837)
χ^2/df	.773
TLI	1.070
NNCP	1.000
RMSEA (pclose)	.000 (.984)

*p < 0.10, **p < 0.05, ***p < 0.01; two-tailed.

monitoring are positively and significantly associated with knowledge sharing (β-values are 0.271 and 0.319, respectively; both p-values <0.01) and, indirectly, with team performance (indirect path coefficients are 0.073 and 0.086; p-values are both <0.01), consistent with H1 and H2. Interestingly, the direct effects of these two controls on team performance are not significant, suggesting that they only contribute to team performance via their effect on knowledge sharing. However, we do not find that the relative emphasis on team-based incentives is associated with team performance, neither directly nor indirectly via knowledge sharing. This finding is remarkable because it is precisely this control that has attracted the most attention in prior accounting literature (e.g., Cheng & Coyte, 2014; Hwang et al., 2009; Kelly, 2010). It is also the control practice that seems most directly tied to the cost-benefit trade-off involved in knowledge sharing as teammates weigh the potential for opportunistic behavior by other team members against the potential for larger team-based incentives. Nevertheless, our results indicate that when the relative emphasis on team-based incentives is examined as part of a broader control arrangement, a different picture emerges. More specifically, we find that the emphasis on team-based incentives and in-team clan control negatively affect each other's contribution to knowledge sharing ($\beta = -0.187$; $p < 0.05$. This finding is consistent with the theorized substitution effect as per H4. As hypothesized in H5b, we find that in-team monitoring complements team-based incentives to support knowledge sharing ($\beta = -0.152$; $p < 0.10$). Collectively, these results suggest that the effects of team-based incentives depend on the broader management control setting of which they are part, underscoring the importance of research moving beyond an examination of singular control practices. We furthermore find support for H5a, stating that in-team clan control and in-team monitoring are complements ($\beta = 0.134$; $p < 0.10$). Although not hypothesized, the results show that the substitution effect of in-team clan control and team-based incentives, and the complementary effects of in-team clan control and in-team monitoring, and team-based incentives and in-team monitoring are associated with team performance via knowledge sharing (indirect path coefficients are −0.050; $p < 0.05$; 0.036; $p < 0.05$; 0.041; $p < 0.05$; respectively).

Some of the results related to the control variables are also worth noting. We find that knowledge sharing is positively associated with the importance of subjective measures in performance evaluation ($\beta = 0.162$; $p < 0.05$), but not with the reliance on objective performance information. This finding is consistent with the argument from prior literature that subjective performance evaluation may help to elicit cooperative behaviors that defy objective measurement (e.g., Gibbs et al., 2004; Grabner, 2014; Moers, 2005). We further find that the intensity of use of the LOC system does not affect knowledge sharing but is positively associated with team performance ($\beta = 0.305$; $p < 0.01$). This finding is consistent with the notion from prior research that cooperative behavior like knowledge sharing is more affected by controls that

are enacted within the group of collaborators than by controls that involve a higher level of management (Haesebrouck et al., 2021; Towry, 2003). This finding also suggests that formal controls imposed by senior management are nonetheless relevant for team performance, perhaps because they make the individual team members work harder. Finally, the analysis indicates a negative association between the size of the organizational unit and knowledge sharing ($\beta = -0.191$; $p < 0.01$), but a positive relationship with team performance ($\beta = 0.154$; $p < 0.10$), leading to an insignificant total effect of this variable.

4.2. Robustness test

In the base model, we measure team performance as a formative construct with team dependability and team innovativeness as underlying dimensions. In an additional but untabulated analysis, we re-estimate the base model for each of these dimensions separately. Our substantive results do not change in these additional analyses.

In Section 3.2.4, we reported that in constructing the measure for in-team monitoring, we had to drop the only negative statement (i.e., the one referring to team members admonishing another team member for doing a poor job). Consequently, our measure empirically picks up only on positive manifestations of monitoring. This is narrower than the initial conceptualization, which also includes peers noticing and responding to substandard performance. To examine whether this narrow operationalization affects our findings, we rerun the base model with a composite second-order construct for in-team monitoring that includes the negative item. In this untabulated analysis, we find no support for the hypothesized complementarity between in-team monitoring and the relative emphasis on team-based evaluation and rewards. Although we do not have data to further analyze this result, it could be that the negative component of in-team monitoring provides information to team members on what not to do, but does not provide the specificity in direction needed to make the effort motivated by incentives more actionable. All other substantive findings, however, remain qualitatively the same, including the positive association between in-team monitoring and knowledge sharing.

To gain additional confidence in the conclusion that the effects of in-team clan control and in-team monitoring are in fact mediated by knowledge sharing and not by some other manifestation of within-team cooperation that happens to be associated with knowledge sharing, we rerun our model, now including teamness as an additional mediator. Teamness is a very broad indicator of the closeness of cooperation within the team, capturing the quality of members' interactions and the extent to which members form a "real team."[15] In this analysis, which we report in Table 5, we find that teamness is affected by the same factors as knowledge sharing, that is, we find positive associations with in-team clan control ($\beta = 0.319$; $p < 0.01$) and in-team monitoring ($\beta = 0.259$; $p < 0.01$), but not with the relative emphasis on team-based incentives. We also find evidence to suggest a complementary effect of team-based incentives and in-team monitoring on teamness ($\beta = 0.158$; $p < 0.05$) and a substitutive effect of clan control and team-based incentives ($\beta = -0.299$; $p < 0.01$), but we do not observe a synergetic effect of the joint reliance on in-team clan control and in-team monitoring on teamness. Moreover, we find no association between teamness and team performance, and no evidence for any indirect effects of the trust-centric controls (individually or in combination) on team performance via teamness. More importantly, however, we find that all our substantive results for knowledge sharing continue to hold, even after controlling for teamness as an additional mediator.

[15] In section 3, we used this construct to validate the measure of in-team monitoring.

5. Conclusions

For firms to flourish in today's business environment, knowledge sharing among their organizational members is critical (e.g., Grant, 1996; Kogut & Zander, 1992). Firms are increasingly interested in understanding how they can support performance by better promoting knowledge sharing, while research is increasingly taking up this topic and developing better theory, insights, and implications (Vera-Muñoz et al., 2006). The purpose of this study is to advance insights regarding which trust-centric management controls encourage team members to share knowledge with other members of their team.

This study is subject to several potential limitations. We use perceptual survey data to answer our research question. This type of data can be associated with measurement noise and common method bias. To mitigate this limitation, we provide a correlational analysis supporting the existence of criterion validity and/or construct-level convergent validity for all constructs in our analysis. Furthermore, a strength of this study is that we gather survey data from multiple informants of the team, thus mitigating much of the potential for common method bias and further strengthening the validity of our results. Our study is set in the Netherlands and uses a convenience sample of informants from personal networks. While caution should be used in generalizing our results to other populations, our sample is relevant for the purpose of this study, which is a test of theory. Moreover, by using personal networks, we can ensure that we know the identity and suitability of respondents. It is still true, though, that our findings may not easily transfer to other settings. For instance, the relationships may be different in less egalitarian societies in which the hierarchical distance between the BU manager and the other management team members may lead to different dynamics within the team.

We acknowledge that our empirical model is incomplete. Much of our theoretical development rests on concepts such as fairness or trust; however, they are not included in our empirical model as either antecedents of the three trust-centric controls or as mediators in the relationship between the controls and knowledge sharing. Although the exclusion of these variables should not affect our empirical results, including these variables would further unpack the results found in this study and is a viable direction for future research. In this context, it is worth noting that our theoretical development is somewhat different from the interpretation in Haesebrouck et al. (2021). An important finding of their study is that (non-enforceable) rewards have a larger impact on knowledge sharing than on helping behavior that does not involve the helper giving up something of value such as knowledge. Their interpretation of this finding is that if people give up something of value by sharing knowledge to help others, a stronger bond between the helper and the helpee is created, and this stronger bond facilitates trust so the helper will trust that a reward will be forthcoming. In this reasoning, knowledge sharing *creates* trust. Another plausible interpretation, however, is that rewards motivate helpers to provide more help that involves knowledge sharing because they trust that the helpee will understand the costs the helpers incurred when giving up their knowledge and will thus provide a higher reward to reciprocate. In that reasoning, knowledge sharing *requires* trust (e.g., Blau, 1964). In our theory, we follow this latter interpretation. While either interpretation is consistent with the results of Haesebrouck et al. (2021), current literature cannot conclusively rule out either and more fine-grained research to unpack the relationships among control, trust, and knowledge

sharing would be welcome. Such studies would help to establish the direction of causality.

Despite these limitations, this study contributes to both theory and practice. Existing literature has primarily focused on understanding how singular controls, most notably the design of incentive systems, affect knowledge sharing. However, accounting literature clearly acknowledges that incentive systems are only one component of a larger set of control practices (e.g., Widener et al., 2008). Thus, by going to the field and surveying BU team members about the trust-centric controls that apply within their team, we can shed light on a broader set of controls that operate in real firms and which real organizational members are subject to.

The results show that the two informal controls we consider, in-team clan control and in-team monitoring, are positively associated with knowledge sharing and indirectly with team performance. We find no evidence that the relative emphasis on team-based incentives, a formal control, is directly associated with either knowledge sharing or team performance. However, we find evidence of complementarities and substitution effects within the trust-centric controls we considered, and team-based incentives are implicated in these. The relative emphasis on team-based incentives and in-team clan control are substitutes, as these two controls negatively affect each other's contribution to knowledge sharing. Furthermore, in-team monitoring appears to increase both the relative emphasis on team-based incentives and in-team clan control (and vice versa), suggesting a complementary relationship in both cases.

These results extend the underlying literature that associates management control practices with knowledge sharing by showing that it is not only about incentives (e.g., Cheng & Coyte, 2014; Haesebrouck et al., 2018), but rather about the broader control environment. Importantly, our results show that except for the relative emphasis on team-based incentives, trust-centric controls encourage knowledge sharing *incremental* to each other. Additionally, they also show that the controls are interrelated and affect each other's functioning. Thus, our results extend our knowledge of the benefits of in-team clan control (e.g., Chua, Lim, Soh, & Sia, 2012; Kirsch et al., 2010) and in-team monitoring (e.g., Hannan, Towry, & Zhang, 2013; Towry, 2003). Moreover, these findings extend the literature on formal and informal controls and their interrelatedness (Foss et al., 2010; Li, Xie, et al., 2010; Luft, 2016; Rijsdijk & van den Ende, 2011), as well as the literature that studies systemic effects of control practices more generally. Finally, recent literature holds that team-based controls are more effective to support collaboration between peers than controls that involve hierarchical intervention (e.g., Haesebrouck et al., 2021; Lunkes et al., 2018; Towry, 2003). Our study provides new evidence to support and extend this contention by showing that formal control imposed by senior management (operationalized as the intensity of use of the levers of control) contributes to team performance, but not via knowledge sharing as one very important manifestation of collaboration.

Overall, our results provide new insights into the intricate complexities of how multiple trust-centric controls can provide multi-faceted benefits for organizations. The implication for practice is that firms know that they have additional control practices with which to encourage knowledge sharing within their teams, but they need to look beyond these control practices in isolation to fully exploit the benefits of management control. Firms that take this broader perspective will flourish as knowledge sharing increases because of their reliance on trust-centric controls. Firms that do not implement a broader set of trust-centric controls may be left to flounder.

Data availability

The data are proprietary and cannot be shared freely.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.aos.2022.101429.

Appendix A. Survey instrument (abridged)

FROM SUPERIOR (HIGHER MANGEMENT) SURVEY

Team Performance

Please indicate the extent to which you agree with the statements (1 = completely disagree; 7 = completely agree)	Min	Max	Mean	s.d.	Factor weight
Team dependability					.588
The team's deliverables are of excellent quality	3.0	7.0	5.196	.966	.397
The team manages time effectively	2.0	7.0	4.887	1.082	.432
The team meets important deadlines on time	3.0	7.0	5.431	1.048	.415
Team innovativeness					.588
The team is innovative	1.0	7.0	4.862	1.215	.439
The team is creative	1.0	7.0	5.033	1.159	.460
The team is able to learn from experience	1.0	7.0	5.489	.990	.317

Validation question Team Performance

Overall, how would you rate the performance of the management team? Please indicate your assessment on a scale of 1–10 (where 10 is the top score)	Min	Max	Mean	s.d
Management team performance	3.0	9.0	7.111	1.123

FROM TEAM MEMBER SURVEY

Knowledge Sharing

To what extent do the following statements apply to your management team (1 = very small extent; 5 = very large extent)	Min	Max	Mean	s.d.	Factor loading
Managers in my team share their expertise with one another	2.0	5.0	3.551	.564	.779
If a team member has some special knowledge about how to perform the team task, he/she is likely to tell the other members about it	2.0	5.0	3.821	.594	.794
There is an exchange of information among team members	1.0	5.0	3.617	.596	.777
More knowledgeable team members freely provide other members with hard-to-find knowledge	2.0	5.0	3.569	.673	.665

Validation question Knowledge Sharing: Knowledge Hoarding

To what extent do you agree with the following statements about you and your colleagues in the management team (1 = completely disagree; 7 = completely agree)	Min	Max	Mean	s.d.	Factor loading
Team members keep news about what they are doing secret from others until the appropriate time	1.0	7.0	2.810	1.244	.699
Team members avoid releasing information to others in order to maintain control	1.0	5.0	2.755	1.106	.888
Team members control the release of information to others in order to maintain control	1.0	7.0	3.259	1.253	.773
Team members view information as a resource that needs to be carefully guarded	1.0	7.0	3.620	1.224	.530

Validation question Knowledge Sharing: Value of Knowledge

Please indicate your view on the following statements on knowledge in the management team (1 = completely disagree; 7 = completely agree)	Min	Max	Mean	s.d.	Factor loading
The knowledge held by team members is viewed as the most important element to team performance (dropped)	2.0	7.0	4.478	.934	–
The knowledge held by team members enables them to be more efficient performers	3.0	6.0	4.971	.785	.839
The knowledge held by team members enables them to be more effective performers	2.0	7.0	5.131	.868	.839

In-Team Clan Control

To what extent do the following statements accurately describe the relationships in your management team (1 = very small extent; 5 = very large extent)	Min	Max	Mean	s.d.	Factor loading
Shared norms and values among the team members influence team-related behaviors	2.0	5.0	3.553	.563	.730
A common vision of the team's responsibilities influences how the team members behave	1.0	5.0	3.587	.641	.730
All team members attempt to be "regular" members of the team (dropped)	1.0	5.0	3.665	.633	–

Validation question In-Team Clan Control: Team Commitment

To what extent do the following statements describe the feelings of team members (1 = very small extent; 5 = very large extent)	Min	Max	Mean	s.d.	Factor loading
Team members feel emotionally attached to their team	1.0	5.0	3.292	.709	.781
Team members feel a strong sense of belonging to their team	2.0	5.0	3.482	.671	.816
Team members feel as if the team's problems are their own	1.0	5.0	3.248	.697	.715
Team members feel like part of the family in their team	1.0	5.0	3.042	.709	.753

In-Team Monitoring

To what extent do the following statements apply to your management team (1 = very small extent; 5 = very large extent)	Min	Max	Mean	s.d.	Factor loading
Team members congratulate other team members when it is noticed that they are doing an outstanding job	1.0	5.0	3.620	.680	.728
When a team member is working at an acceptable level, other team members somehow communicate that to the team member	1.0	4.0	2.985	.595	.714
When someone does good work, team members let everyone in the team know	1.0	5.0	3.228	.733	.886
If team members notice other team members doing a poor job, they let the person know right away (dropped)	1.0	5.0	2.803	.772	–

Validation question In-Team Monitoring: Teamness

Do you agree with the following statements (1 = completely disagree; 5 = completely agree)	Min	Max	Mean	s.d.	Factor loading
There is fruitful, rewarding cooperation within this team	1.0	5.0	3.696	.721	.927
It is easy to ask advice from any member of this team	2.0	5.0	4.322	.556	.702
The management team of this business unit operates as a "real" team	1.0	5.0	3.412	.877	.775

Relative Emphasis on Team-based Incentives

Please indicate the relative importance of individual versus team performance in the following decisions (1=(almost) fully based on individual achievements; 7=(almost) fully based on team achievements)	Min	Max	Mean	s.d.	Factor loading
The evaluation of your performance	1.0	6.0	3.475	1.095	.776
Periodic discussions with you about your performance	1.0	6.0	3.161	1.073	.723
Determining your salary increases	1.0	6.0	2.953	.966	.635
Determining your annual bonus (dropped)	1.0	7.0	3.366	1.474	–
Increasing your chance of promotion	1.0	6.0	2.962	1.052	.803
Increasing your authority within the organization	1.0	6.0	3.147	1.012	.574

Validation question Relative Emphasis on Team-based Incentives: Self-focused Work Climate

Do you agree with the following statements (1 = completely disagree; 5 = completely agree)	Min	Max	Mean	s.d.	Factor loading
In my management team, team members' primary concern is their personal benefit	1.0	4.5	2.284	.750	.850
Managers in my management team think of their own welfare first when faced with a difficult decision	1.0	4.0	2.330	.755	.843
Members of my management team are mostly out for themselves	1.0	4.0	2.092	.744	.826

Control variables: Objective and Subjective Performance Evaluation

	Min	Max	Mean	s.d.	Factor loading
How important are objective performance measures in: (1 = not at all important; 5 = very important)					
a. The evaluation of your performance	2.0	5.0	3.736	.670	.799
b. Periodic discussions about your performance	1.5	5.0	3.551	.682	.799
How important are subjective performance measures in: (1 = not at all important; 5 = very important)					
a. The evaluation of your performance	1.5	5.0	3.591	.710	.847
b. Periodic discussions about your performance	1.0	5.0	3.458	..652	.847

Validation question Objective and Subjective Performance Evaluation: Scope of Evaluation

Which aspects does your team leader (the business unit manager) take into consideration when evaluating the team's performance? Please indicate the importance of the following performance dimensions: (1 = not at all important; 5 = very important)	Min	Max	Mean	s.d.
a. Meeting deadlines	1.5	5.0	3.891	.704
b. Managing time effectively	2.0	5.0	3.399	.670
c. Quality of team's deliverables	2.0	5.0	4.216	.550

FROM BUSINESS UNIT MANAGER SURVEY

Beliefs

The following questions are about your organization and higher management. We like to learn about the core values (or: norms & values) of your organization first. Please indicate the extent to which the following items describe your organization as a whole (1 = not descriptive; 7 = very descriptive)	Min	Max	Mean	s.d.	Factor loading
Our mission statement clearly communicates the organization's core values to our workforce	2.0	7.0	5.303	1.136	.622
Higher management communicates core values to our workforce	1.0	7.0	5.109	1.218	.715
Our workforce is aware of the organization's core values	1.0	7.0	4.803	1.201	.826
Our mission statement inspires our workforce	2.0	7.0	4.650	1.194	.786

Boundaries

This question addresses your organization's code of business conduct. For example, the code of business conduct can describe appropriate business practices, ethical behaviors, and policies. Please rate the extent to which you agree with the following (1 = completely disagree; 5 = completely agree)	Min	Max	Mean	s.d.	Factor loading
Our organization relies on a code of business conduct to define appropriate behavior for our workforce	2.0	5.0	4.154	.887	.804
Our code of business conduct informs our workforce about behaviors that are off-limits	2.0	5.0	4.213	.875	.839
Our organization communicates to our workforce risks that should be avoided	1.0	5.0	4.059	.926	.617
Our workforce is aware of the organization's code of business conduct	1.0	5.0	3.860	.983	.731

Diagnostic Use of Controls

Please rate the extent to which higher management (including your supervisor) currently relies on your business unit performance measures (e.g., KPIs) to (1 = to a small extent; 7 = to a large extent)	Min	Max	Mean	s.d.	Factor loading
Track progress towards goals	1.0	7.0	5.482	1.215	.822
Monitor results	2.0	7.0	5.672	1.102	.888
Compare outcomes to expectations	1.0	7.0	5.584	1.157	.867
Evaluate performance on key measures (KPIs)	1.0	7.0	5.277	1.305	.646
Enable the organization to focus on critical success factors (dropped)	2.0	7.0	4.934	1.096	–

Interactive Use of Controls: 1st order constructs

	Min	Max	Mean	s.d.	Factor loading
Debate & Inspiration: Please rate the extent to which higher management (including your supervisor) currently relies on your business unit performance measures (e.g. KPIs) to: (1 = to a small extent; 7 = to a large extent)					
Enable discussion in meetings of supervisors, subordinates and peers	1.0	7.0	5.124	1.193	.632
Enable continual challenge and debate of underlying data, assumptions, and action plans	1.0	7.0	4.993	1.097	.576
Provide a shared view of the organization	1.0	7.0	5.073	1.098	.773
Tie the organization together	1.0	7.0	4.745	1.267	.761
Enable the organization to focus on common issues	1.0	7.0	4.839	1.135	.724
Develop a common vocabulary in the organization	1.0	7.0	4.774	1.279	.676
Strategic Focus					
Signal key strategic areas for improvement	1.0	5.0	3.613	.873	.611
Signal new strategic challenges we need to face	1.0	5.0	3.398	.898	.876
Discuss the impact of potential changes in our competitive environment	1.0	5.0	3.518	.820	.760
Involvement Higher Management: To what extent do you agree with the following statements concerning your business unit's performance measures? (1 = completely disagree; 5 = completely agree)					
Higher management devotes considerable time to the information from your unit's performance measurement system (dropped)	1.0	5.0	3.615	.888	–
Higher management is personally involved in discussing your unit's performance with you (dropped)	2.0	5.0	4.257	.764	–
Information on the performance of your unit is high on the agenda of higher management	2.0	5.0	3.960	.842	.649
Higher management uses information from your unit's performance measurement system to get involved in your business decisions	1.0	5.0	3.699	.891	.649
Within-unit Involvement: To what extent do you agree with the following statements concerning your business unit's performance measures? (1 = completely disagree; 5 = completely agree)					
You spend a substantial amount of time working with the information generated by your unit's performance measurement system (dropped)	1.0	5.0	3.463	.887	–
You work with the information from your performance measurement system on a daily basis	1.0	5.0	3.235	1.116	.687
You base important business decisions largely on information from your performance measurement system	1.0	5.0	3.437	.941	.755
Within your unit, people rely extensively on information from your unit's performance measurement system in their daily work	1.0	5.0	3.338	.930	.760

Interactive Use of Controls: 2nd order construct

	Min	Max	Mean	s.d.	Factor weight
Debate & Inspiration	−2.755	2.141	.000	.925	.330
Strategic Focus	−2.953	1.838	.000	.916	.333
Involvement Higher Management	−1.933	1.231	.000	.770	.332
Within-unit Involvement	−2.546	1.785	.000	.884	.362

Intensity of Use of the LoC System: higher-order construct

	Min	Max	Mean	s.d.	Factor loading
Beliefs	−2.703	1.950	.000	.918	.710
Boundaries	−2.567	1.081	.000	.926	.560
Diagnostic Use of Controls	−3.562	1.327	.000	.951	.580
Interactive Use of Controls	−2.495	2.380	.000	1.000	.710

Validation question Intensity of Use LoC: Relative Importance of Strategic Decision-Making

What types of decisions does your management team make? Please indicate for the following decisions their relative importance by dividing 100 points	Min	Max	Mean	s.d.
d. Strategic decisions regarding your unit (examples: business unit strategy, new product development)	0	60	23.920	12.364
e. Decisions on internal processes (examples: setting production/sales priorities, inputs used and/or processes employed to fill orders) (not used: indicative of operational decision-making)	0	90	28.620	15.413
f. Marketing decisions (examples: campaigns, pricing)	0	50	14.974	11.269
g. Investment decisions (examples: acquiring new assets and financing investment projects, information systems)	0	40	12.901	8.039
h. Human resource decisions (examples: hiring/firing, compensation) (not used: indicative of operational decision-making)	0	70	19.401	11.590

Measure for relative importance of strategic decision-making calculated by summing the scores on items a, c, and d.

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