

Integration and Governance Mechanisms: A Multilevel Analysis of Knowledge Adoption in MNCs*

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ABSTRACT

Purpose: This paper examines employees' adoption of knowledge sourced from other MNC units. From a contingent approach, it analyzes how the fit between the integration mechanisms directed toward the MNC units (i.e., centralization, formalization, and socialization) and three knowledge governance mechanisms directed toward the employees (incentives, networks, and ICT systems) affects knowledge adoption from other organizational units.

Design/methodology/approach: Within one MNC, a multi-level model was developed and tested on 341 individuals nested in 70 departments worldwide. Two sources of information were used: the employees' survey provided information on knowledge adoption and the applied knowledge governance mechanisms, and the department managers' survey provided information about the integration mechanisms at the corporate level.

Findings: The results confirm that integration mechanisms by themselves have no direct effects on knowledge adoption, but they influence the context where this process occurs by affecting the contextual conditions of ambiguity, uncertainty, and flexibility. The applied knowledge governance mechanisms will only lead to increased knowledge adoption if a fit exists between the integration and knowledge governance mechanisms.

Originality/Value: While much of the KBV literature has focused on MNCs' transfer of knowledge across units, this study focuses on the effective adoption or use of the transferred knowledge, known as Knowledge effectiveness. Additionally, the study adopts multi-level modelling and contributes to the Knowledge Governance approach by showing that the effectiveness of knowledge governance mechanisms is contingent on their fit or misfit with the integration mechanisms applied at the corporate level.

Keywords: Knowledge adoption, knowledge governance mechanisms, integration mechanisms, contingency approach, multi-level.

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INTRODUCTION

Implementing knowledge processes across units and borders in multinational companies (MNCs) makes the MNC competitive in the long run and thus needs to be facilitated efficiently and soundly (Ambos and Ambos, 2009). However, managing these processes is challenging and hinges on conditions and mechanisms implemented at multiple levels in the MNC (Foss, Husted, and Michailova, 2010; Foss and Pedersen, 2004; Gaur, Ma, and Ge, 2019; Zeng, Grøgaard, and Steel, 2018). Essential to it are the higher-level integration mechanisms and the lower-level knowledge governance mechanisms.

Higher-level *integration mechanisms* are established to control and coordinate interdependent activities and resources across MNC units (i.e., subsidiaries and departments). In the literature, these integration mechanisms are largely grouped into three well-known areas – centralization, formalization, and socialization (Gupta and Govindarajan, 2000; Kim, Park, and Prescott, 2003). Although they have a more general and strategic purpose directed toward the units rather than the individual employees (Zeng, Grøgaard, and Björkman, 2023), they create various contextual conditions for the knowledge processes among individuals within the organization (Ghoshal and Nohria, 1993; Martinez and Jarillo, 1989). For instance, a higher degree of formalization in the MNC reduces uncertainty among employees and promotes individual knowledge adoption, but it can also hurt the implementation of complex and tacit knowledge (Zeng *et al.*, 2018). Similarly, the promotion of socialization as an integration mechanism can ameliorate contextual conditions for knowledge processes by aligning interpretations and reducing ambiguity related to knowledge adoption on the receiving end (Andersson, Buckley, and Dellestrand, 2015; Björkman, Barner-Rasmussen, and Li, 2004).

The lower-level *knowledge governance mechanisms* are directed toward affecting individual behavior in the knowledge processes. Hence, at lower levels in the MNC, individuals are influenced

and directed by knowledge governance mechanisms such as various kinds of Information and Communication Technology (ICT) support systems, incentive schemes, training, and formal and informal meeting points across sub-units and project groups, to mention a few (Foss, 2007; Grandori, 2001; Hylde *et al.*, 2014). For example, Cabrera, Collins, and Salgado (2006) show how specific types of training promote the sharing of knowledge by employees, and Ciabuschi, Dellestrand, and Kappen (2011) find a positive effect of information technology systems for knowledge transfer in international projects. Hence, we adopt a contingent approach (Burton and Obel, 2018; Drazin and Van de Ven, 1985) and contend that the conditions for deploying knowledge governance mechanisms and promoting knowledge adoption among employees in the organization will vary depending on the type of integration mechanisms applied in the MNC.

The integration mechanisms and the knowledge governance mechanisms have different purposes and work at distinct levels in the MNC. However, the literature has studied them separately and has pointed out that each of them affects the MNC's knowledge processes. In this study, we scrutinize how they interact and work together in the promotion of employees' knowledge adoption in the MNC. Zeng *et al.* (2023) show a relative scarcity of multilevel studies regarding coordination and control processes within MNCs. Despite the obvious multilevel nature of knowledge processes within MNCs, most literature has been conducted at one organizational level without considering the internal complexity of MNCs, where mechanisms applied at the higher level shape the context for the lower-level mechanisms. Further, according to recent studies, empirical research has overlooked the interrelations between the mechanisms applied at different organizational levels (Foss and Pedersen, 2019; Grant and Phene, 2022). The underlying assumption has been that knowledge governance mechanisms work the same way irrespective of the organizational context formed by the knowledge integration mechanisms. Consequently, we need a deeper understanding of how the contingencies -the integration mechanisms- moderate the effect of knowledge governance mechanisms on individuals' knowledge adoption. For example, does the incentives system work the same way in promoting the employees' adoption of knowledge irrespective of whether the organizational context is formed by the integration mechanism of centralization, formalization, or socialization? Previous literature has adopted a contingent approach to understanding the environmental conditions that affect the

effectiveness of knowledge processes (e.g., distance) (López-Sáez *et al.*, 2021; Zeng *et al.*, 2018).

However, the literature provides few clues on the potential fits or misfits between mechanisms deployed at different levels within the MNC and their performance in terms of knowledge adoption. Hence, we adopt a contingency approach focusing on the relationship between the integration and the knowledge governance mechanisms in employees' knowledge adoption from other MNC units.

We study this in a Norwegian MNC with units spread throughout the globe, which transfers a substantial extent of knowledge and best practices across the different units. The data collected in the company involves employees and managers of each department. Two different surveys – one aimed at the employees and one at the department managers- have been conducted. Employees have provided information on knowledge adoption and the applied knowledge governance mechanisms, while department managers have provided information on the integration mechanisms applied at the corporate level. As such, our data are multilevel with a discrete set of informants at both the lower (individual employees) and higher (department managers) organizational levels.

A key result of the study is that the integration mechanisms of control and coordination have no direct effects on knowledge adoption, but they influence the context where these processes occur. Hence, knowledge governance mechanisms are the ones that are effective in promoting the individual's adoption of knowledge from other units. However, such effectiveness is contingent on their fit or misfit with the integration mechanisms applied in the individual's unit.

The study contributes to the Knowledge Governance literature (Foss, 2007; Grandori, 2001) by adopting a contingency approach and a multilevel perspective that outlines the specific contextual conditions that the three high-level integration mechanisms (centralization, formalization, and socialization) impose in terms of ambiguity, uncertainty, and flexibility in the units where the employees adopt knowledge. Hence, they intervene by either strengthening the effect of the knowledge governance mechanisms in case of fit, or by weakening them if there is a misfit. Our study also contributes to the Knowledge-Based View of MNC (Grant and Phene, 2022; Zeng *et al.*, 2018) by moving beyond the transfer of knowledge at the unit level and focusing on the adoption of knowledge at the individual level. As such, we contribute to a more complex view of the MNC that places the individual at the center of the integration of knowledge (Foss and Pedersen, 2019) and recognizes that

such a process is deployed within a multilayered structure of working practices (Grant and Phene, 2022).

THEORETICAL FRAMEWORK

Governance mechanisms in a broader sense relate to the fundamental choice of organizational forms where, according to the knowledge-based view of the firm (Grant, 1996; Kogut and Zander, 1992; 1993), a firm is an organizational form that is particularly efficient in the management of knowledge and knowledge flows. This conceptualization of the firm as a knowledge-processing organization has had a profound impact on international business management (Foss and Pedersen, 2019; Grant and Phene, 2022). Three decades of research have allowed us to understand the complexities of the MNC's knowledge processes related not only to the characteristics of knowledge but also to the specificities of the actors involved, and their relationships (Michailova and Mustaffa, 2012). While a major part of this literature has focused on the efficiency side of sharing knowledge within the MNC (i.e., the cost or speed of transferring knowledge), there has been less attention to the adoption of the transferred knowledge (Ambos and Ambos, 2009; Andersson, *et al.*, 2015a; Ciabuschi, *et al.*, 2011). However, the adoption of knowledge presents additional challenges, as effectively using and applying knowledge from other units involves two supplementary processes i.e., translation and transformation, and requires overcoming specific boundaries that characterize each of them (Carlile, 2004). These are related to the potential lack of shared meanings and common understandings (semantic boundaries) as well as to political frictions (political boundaries) between units that interfere in the successful adoption of the transferred knowledge to the receiver's context (Carlile, 2004; Dasí, *et al.*, 2017). Thus, the extent to which the mechanisms help to ameliorate ambiguity and uncertainty or to increase the goal alignment between units comes into play as contextual conditions for the mitigation of such internal boundaries.

The view of the MNC as a superior organizational vehicle for transferring knowledge across borders (Kogut and Zander, 1993) relies heavily on the assumption that MNCs deploy governance mechanisms in a consistent and aligned manner. However, the conversation about how high-level integration mechanisms and lower-level knowledge governance mechanisms interact to influence

knowledge processes in the MNC has so far remained quite oblivious of each other, despite the different calls for cross-level fertilization (Foss, *et al.*, 2010; Foss and Pedersen, 2019).

At the corporate level, MNCs manage relationships among their units to balance the environmental complexities with the internal resource configuration (Ghoshal and Nohria, 1993). Accordingly, integration mechanisms (i.e., centralization, formalization, and socialization) have been instrumental when studying control and coordination within MNCs (Andrews *et al.*, 2023; Cray, 1984; Kim, *et al.*, 2003) as well as knowledge processes (see Zeng *et al.* (2018) for a comprehensive review of this literature). At the lower levels, the knowledge governance approach has focused on the importance of cognitive, motivational, and knowledge-related factors promoting knowledge processes (see Foss and Pedersen (2019) for a comprehensive literature review of this literature).

In line with previous research (Andersson, *et al.*, 2015a; Haas and Hansen, 2005; Szulanski, 1996), our understanding of knowledge refers to the specific use of knowledge (e.g., technology, organizational routines, and service processes) that “often has a tacit component, embedded partly in individual skills and partly in collaborative social arrangements” (Szulanski, 1996: 28). Like previous studies (Ambos and Ambos, 2009) we adopt a contingency approach (Burton and Obel, 2018; Drazin and Van De Ven, 1985) acknowledging that the degree to which integration mechanisms are employed can vary within the MNC (Nohria and Ghoshal, 1994) and, consequently, such variations imply differences in the proximate context, where knowledge is promoted and adopted. Hence, our basic premise is that *the application of knowledge governance mechanisms has a positive effect on knowledge adoption if there is a fit between the applied integration mechanism and the applied knowledge governance mechanism.*

Knowledge governance mechanisms in MNCs

The knowledge governance approach departs from the principle that knowledge processes can be managed through the deployment of governance mechanisms directed toward employees (Foss, 2007; Grandori, 2001). Thus, knowledge governance mechanisms include both formal and informal aspects of the organization that can be manipulated and therefore are organizational antecedents of knowledge processes. In their literature review, Foss *et al.* (2010) find a rather broad array of potential formal and

informal mechanisms that have been implicitly ranked according to the interest paid by the literature. The knowledge governance mechanisms mainly fall into three overall categories: the incentives, the networks, and the ICT systems (Foss *et al.*, 2010), promoting knowledge processes in different ways. The incentives encourage the individual's motivation to comply with the organization's interests of adopting and sharing knowledge while networks and ICT systems provide the means and opportunities for doing this (Cabrera and Cabrera, 2005; Dasí, *et al.*, 2017; Gooderham, *et al.*, 2011; Mäkelä and Brewster, 2009).

Extant literature has illuminated how the incentives are directed to encourage cross-unit adoption of knowledge (Cabrera *et al.*, 2006; Dasí *et al.*, 2017). First, adopting knowledge from other units is a risky activity for the individual as it incurs added costs (time, errors, etc.) derived from translating the knowledge created in a different context into a specific context (Haas and Hansen, 2007). Second, organizational separation across units might hamper the needed trust in the sourced knowledge and increase the uncertainty in knowledge adoption (Dasí *et al.*, 2017). Incentives are intended to compensate the individual for the additional effort and uncertainty involved in adopting knowledge across units.

Fostering cross-unit networks within MNCs aims to augment knowledge adoption by facilitating individuals' communication and coordination across dispersed units in several ways (Ambos and Ambos, 2009; Haas and Hansen, 2005). First, continuous interaction helps to build trust among the parties and increases the affective social capital, which is a foundation for recognizing the value of knowledge from another source. Additionally, there is a cognitive dimension related to the development of a common understanding and interpretation that eases the assimilation of such knowledge (Gooderham *et al.*, 2011; Mäkelä and Brewster, 2009).

Finally, the ICT systems consist of different platforms and media intended to facilitate the codification, storage, and retrieval of knowledge (Cabrera *et al.*, 2006; Cabrera and Cabrera, 2005). Organizations increasingly rely on technology-based media, differing in their richness, quality of information, or synchronicity, to facilitate internal knowledge flows. ICT systems affect knowledge adoption because they reduce the perceived cost and time devoted to sharing information, thereby making knowledge adoption more effective (Van Alstyne and Brynjolfsson, 2005). Further, they also

have a cognitive dimension by facilitating the enunciation and codification of knowledge needed (Ciabuschi, *et al.*, 2011) which increases the commonalities in the knowledge base of sender and receiver (Ambos and Ambos, 2009) ensuring uniform quality of customer deliverances.

The integration mechanisms

The organizational level literature concerning integration mechanisms is linked to the view of the MNC as a differentiated network (Ghoshal and Bartlett, 1990) and the consequent deployment of integration mechanisms to manage the relationships and interdependences between its dispersed units (Cray, 1984; Ghoshal and Nohria, 1993; Martinez and Jarillo, 1989; 1991). Integration mechanisms (Pugh, *et al.*, 1968; 1969) entail the coordination and control of business activities to reduce asymmetries and align goals across the MNC units (Dasí, Pedersen and Pla, 2024). Integration mechanisms have a broader purpose than facilitating the knowledge processes in the MNC, but they affect the conditions for unfolding knowledge processes as they involve several organizational issues like communication structure, delegation of resources, and decision-making power, as well as entailing compromises between cost and flexibility (Cray, 1984). Therefore, integration mechanisms have been studied in relation to the knowledge processes within MNCs (Zeng *et al.*, 2018) as they create an organizational context and platform for knowledge adoption across the MNC units.

Centralization in the context of relationships within the MNC implies the prevalence of hierarchy when making decisions as a way of aligning the MNC units' behavior (Ghoshal and Nohria, 1989; Kim, *et al.*, 2003). Formalization entails establishing common norms and procedures across units or the codification of decision-making processes in the organization (Victor, 2020). Formalization reduces uncertainty and guides the behaviors of dispersed units by routinizing decision-making. Both centralization and formalization are seen as structural means to obtain integration (Zeng *et al.*, 2018). On the other hand, MNCs can also align goals and coordinate their units through normative integration, such as socialization (Ghoshal and Nohria, 1989). Socialization mechanisms aim to develop shared values and a sense of shared identity among the MNC units.

In the case of knowledge adoption, the three integration mechanisms impose contextual conditions that vary in the levels of ambiguity, uncertainty, and flexibility (Cray, 1984; Gates and

Egelhoff, 1986; Ghoshal and Nohria, 1989). Uncertainty means the absence of the needed information required to perform a specific task (Galbraith, 1977). Ambiguity refers to the potential for multiple and conflicting interpretations, that is the lack of a common understanding (Daft and Lengel, 1986). Flexibility relates to the units' freedom to respond to the different environmental complexities (Cray, 1984) and is more related to the combination and transformation of knowledge from other units. The impact of these integration mechanisms on the knowledge transfer between MNC units has been extensively analyzed since the above-mentioned pioneering studies. Zeng *et al.* (2018) meta-analysis accounts for 89 studies on the use of these integration mechanisms for intra-MNC knowledge transfer at the unit level. According to the review, the direct impact of centralization on knowledge transfer, in general, is found to be weakly negative, and its positive effect is mostly related to vertical knowledge flows from HQs. Conversely, both formalization and socialization have strong positive effects on MNCs' knowledge transfer, where socialization is found to contribute to lateral knowledge flows. As only around 20% of the included articles specify the measure of transfer performance the understanding of the consequences of integration mechanisms for knowledge adoption is still very scarce, leaving room for a better comprehension of the boundary conditions and the workings of these integration mechanisms in interaction with knowledge governance mechanisms at lower organizational levels.

As outlined, previous studies have linked both the integration mechanisms and the knowledge governance mechanisms to the knowledge processes in the MNC, including the knowledge adoption. However, these studies have either focused on the effect of the integration mechanisms on the knowledge processes or the effect of the knowledge governance mechanisms on the knowledge processes (e.g., Zeng *et al.*, 2018). This implies that we lack knowledge on how the fit or lack of fit between the higher-level integration mechanisms and the lower-level knowledge governance mechanisms affect the adoption of knowledge from other units in the MNC. To fill this gap, we adopt a contingency approach where we focus on the adoption of knowledge from other MNC units. The adoption of knowledge sourced from other units has previously been applied as a measure of knowledge transfer effectiveness (Ambos and Ambos, 2009; Andersson *et al.*, 2015b; Ciabuschi *et al.*, 2011). We follow this reasoning and propose that the effect of knowledge governance mechanisms

will depend on the degree of fit with the contextual conditions shaped by the integration mechanisms. We apply multilevel modeling to test the interaction between the higher-level integration mechanisms and the lower-level knowledge governance mechanisms on knowledge adoption. Figure 1 offers a graphical representation of the hypothesized model.

**** Insert Figure 1 here****

In the following, we develop hypotheses on the expected fit or lack of fit between three integration mechanisms (centralization, formalization, and socialization) and three knowledge governance mechanisms (incentives, networks, and ICT systems) on knowledge adoption from other MNC units.

HYPOTHESES DEVELOPMENT

The interaction between centralization and knowledge governance mechanisms

When HQ employs centralized decision-making processes, major decisions must be approved at the HQ before being implemented in the different units (Gates and Egelhoff, 1986). Thus, knowledge processes usually become less ambiguous and more efficient over time (Jansen *et al.*, 2009; Zeng *et al.*, 2018). However, centralization might also hamper the MNC unit's knowledge adoption due to HQ's limited knowledge concerning activities and opportunities in the local unit (Ciabuschi *et al.*, 2011), which results in uniform decisions, and thereby increases the risk of transferring knowledge that is difficult to translate and apply. On the other hand, decentralization changes the locus of authority to the local units, increasing their flexibility but, at the same time, favoring local interests, which might obstruct the adoption of knowledge from other MNC units (Ghoshal and Bartlett, 1988).

Bearing this in mind, we contend that, compared to more decentralized MNC units, those units where decision-making is centralized will offer specific contextual conditions that most certainly will have moderating effects on knowledge adoption, depending on what kind of governance mechanisms are applied at lower levels. First, the incentive system is important in supporting and compensating for the efforts and risks individuals incur when translating and transforming knowledge from other sources to specific local conditions (Andersson *et al.*, 2015b; Dasí *et al.*, 2017). However, such a

system makes less of a difference under centralization, where fiat is the primary mechanism and there is less discretionary power than under conditions of high decentralization, with more scope for deviation and development of local solutions. Decentralized units might be closer and more receptive to local demands (Gates and Egelhoff, 1986), while adopting knowledge from other units needs complementary incentives (Hansen and Nohria, 2004).

Centralization might weaken the effect of networks on knowledge adoption. When decisions are made at a higher level there is more emphasis on the exploitation of central solutions and less scope for local entrepreneurial activities, consequently, the need to find alternative internal solutions for local problems is lower and individuals are less urged to maintain contacts and invest time in networking (Crespo, *et al.*, 2014). However, more decentralized units suffer from higher ambiguity when adopting knowledge from other units and might benefit from fine-grained knowledge adoption through networks.

As for the effectiveness of ICT systems on knowledge adoption, we expect a reinforcing effect of centralization. Cabrera and Cabrera (2005) point to the fact that employees in more decentralized units can resist storing and retrieving information from these systems as they might see them as an intervention and a distortion of their autonomy. Conversely, in centralized units, ICT systems probably reinforce the reduction of information asymmetries and speed up the adoption process. Hence, a reasonable inference is that centralization will reinforce the positive effect of ICT systems on knowledge adoption. Thus, we hypothesize the following:

- H1a. The integration mechanism of centralization weakens the positive effect of incentives on knowledge adoption from other MNC units.
- H1b. The integration mechanism of centralization weakens the positive effect of networks on knowledge adoption from other MNC units.
- H1c. The integration mechanism of centralization reinforces the positive effect of ICT systems on knowledge adoption from other MNC units.

The interaction between formalization and the knowledge governance mechanisms

Formalization can promote cross-unit knowledge adoption through several mechanisms. First, standard unified procedures offer dispersed units with a common platform (Ghoshal and Nohria, 1989), which reduces the levels of uncertainty for the adoption of knowledge (Daft and Lengel, 1986).

Second, the existence of a “common language” (e.g., manuals, explicit procedures) intends to increase the similarity of the knowledge base, thus reducing the costs of adapting the knowledge to the local specific conditions. In addition, formalization limits the scope when interpreting and adopting knowledge and thus increases the effectiveness of the process (Kim *et al.*, 2003; Martinez and Jarillo, 1989).

Regarding its interaction with the incentive system, highly formalized departments provide a clear, explicit, and more transparent environment for employees' evaluation, as their performance can be compared with how well they have applied the standards and formal requirements. Under these conditions, employees might perceive fairness in an incentive system that assesses and promotes their efforts and achievements explicitly and transparently. In this case, incentives are informational for the individuals and are intended to have a positive effect on their motivation to adopt externally sourced knowledge (Foss *et al.*, 2015). Therefore, a high degree of formalization in the organization introduces a context that reinforces the effectiveness of incentives for knowledge adoption by providing a more structured and transparent approach to the evaluation of cross-unit knowledge.

Building and maintaining cross-unit networks demands individual effort that can be compensated by the fact that employees can obtain fine-grained information in an interactive way that helps clarify some issues important for the adoption of externally sourced knowledge (Inkpen and Tsang, 2005; Szulanski, 1996; Tsai, 2002). However, individuals in highly formalized organizations will benefit less from spending time and resources in cross-unit network relations, as activities related to the adoption of knowledge have been routinized and codified (Nobel and Birkinshaw, 1998), which reduces the need for further interaction and consultation. While maintaining intense relationships across units might complement the individual's knowledge base and be beneficial under situations of high uncertainty, such benefits are less clear as uncertainty decreases through formalization.

The effectiveness of ICT systems for knowledge adoption will be higher in formalized organizations than in those less formalized (Newell *et al.*, 2006). Such ICT systems will benefit from the stability and lower uncertainty introduced by the rules, protocols, and routines established through formalization. ICT systems need time to be developed, and their users must invest time to learn them (Lobo and Whyte, 2017). Additionally, the more they are used, the better their refinement and

improvement (Hydle *et al.*, 2014). Such individual and organizational investments can be more beneficial if there are clear and stable rules and procedures, as in the case of high formalization. However, when formalization is low, the level of uncertainty and flexibility is higher, and there might be fewer commonalities in the knowledge base between units, thus reducing the effectiveness of ICT systems as tools for adopting knowledge from other units (Hydle *et al.*, 2014). Accordingly, we hypothesize:

- H2a. The integration mechanism of formalization reinforces the positive effect of incentives on knowledge adoption from other MNC units.
- H2b. The integration mechanism of formalization weakens the positive effect of networks on knowledge adoption from other MNC units.
- H2c. The integration mechanism of formalization reinforces the positive effect of ICT systems on knowledge adoption from other MNC units.

The interaction between socialization and the knowledge governance mechanisms

Applying socialization mechanisms for promoting cross-unit relationships and shared values among dispersed units has been identified as one of the most effective tools for sharing and adopting knowledge within MNCs (Andersson *et al.*, 2015a; Zeng *et al.*, 2018). Socialization increases goal alignment and cohesiveness among units, reducing the salience of political internal boundaries (Gupta and Govindarajan, 2000). Additionally, it enhances communication through more personal and informal channels (Björkman *et al.*, 2004; Gupta and Govindarajan, 2000), which helps reach complementary knowledge, reducing ambiguity, and increasing alignment within the organization. These contextual conditions affect individual behavior through two mechanisms that have a signaling effect: relational capital (trust) and cognitive capital (shared meanings) (Gooderham *et al.*, 2011; Mäkelä and Brewster, 2009).

Individuals working in highly socialized organizations develop a sense of trust and identification with other organizational members, which has a positive effect on their willingness to share knowledge (Gooderham *et al.*, 2011; Minbaeva, 2008; Minbaeva *et al.*, 2012). Additionally, the motivation to adopt externally sourced knowledge is enhanced by the cognitive dimension associated with a high degree of socialization (Ghoshal and Nohria, 1989). This encourages employees to obtain

complementary and fine-grained information that increases the shared understanding of the matters affecting the adoption of knowledge and reduces the interpretation problems that usually happen in these processes (Andersson *et al.*, 2015a; Mäkelä and Brewster, 2009). Thus, the role of incentives will be more noticeable in those units that have lower levels of socialization, as they will become a tool for aligning incentives and compensating for the efforts of adopting knowledge.

As for the role of networks, individuals in highly socialized units are not only offered more opportunities for cross-unit interaction but are also able to assess the value of the knowledge in their network (Minbaeva *et al.*, 2012). Individuals belonging to such units are better positioned to exploit the outcomes of their own network (additional knowledge, contacts, and information beyond the formal channels). They are also used to positive norms of reciprocity, so they will be more inclined to make personal investments in maintaining a cross-unit network as other members appreciate this and can be a source of opportunities for solving problems and future career development (Caimo and Lomi, 2015).

In contrast, organizations with dispersed and isolated units where socialization is low affect individuals' knowledge adoption through the same two mechanisms: lack of reciprocity and lack of communication (Caimo and Lomi, 2015; Hydle *et al.*, 2014; Monteiro *et al.*, 2008). On the one hand, due to the lack of informal channels, the employees have fewer opportunities within their unit to benefit from others' networks. On the other hand, the employees feel less obliged to keep cross-unit relationships, as there is no expectancy of reciprocity across units and personal contacts.

In the case of ICT systems, we expect a negative interaction effect with the degree of socialization (Hydle *et al.*, 2014). Individuals in highly socialized units will find centralized ICT systems rigid and stylized in content, and do not allow for fine-grained interaction and trust building. However, for individuals belonging to less socialized units, ICT systems might make a difference as they are an efficient tool to get access to knowledge that is codified, clarify doubts, and reduce ambiguity in knowledge adoption. Hence, we hypothesize:

- H3a. The integration mechanism of socialization weakens the positive effect of incentives on knowledge adoption from other MNC units.

- H3b. The integration mechanism of socialization reinforces the positive effect of networks on knowledge adoption from other MNC units.
- H3c. The integration mechanism of socialization weakens the positive effect of ICT systems on knowledge adoption from other MNC units.

METHODS

This empirical investigation is based on a cross-sectional research design, investigating the interaction between lower-level knowledge governance mechanisms, intended to affect individual behavior, and higher-level integration mechanisms, aimed at controlling and coordinating departments on knowledge adoption in one MNC providing global consulting and certification services mainly oriented toward the oil and gas industry. The organization has its headquarters in Norway and has 40 locations throughout 24 different countries worldwide.

The MNC is a project-based organization that, like a typical consulting and service company, solves specific problems for customers. The work tasks are usually performed in projects consisting of a team of several individuals. Part of the services (i.e., verification and certification) necessitate common standardized procedures and control routines that are supported by several tailor-made ICT systems to ensure equal quality worldwide. However, many of the services provided to customers are also unique in the sense that they require different competencies and solutions adapted to the specific customer. In this process, the company draws on technical knowledge and expertise from multiple units. Typically, no locations possess all the needed technical knowledge, so collaboration across the MNC units is critical when providing the best solutions to customers. Hence, a crucial capability of this company is to expedite the sharing, transformation, and adoption of knowledge among the scattered parts of the organization. Consequently, the company uses vast resources to promote knowledge transfer and adoption among the different individuals and departments in the organization. The strong focus on knowledge processes in the MNC makes it a particularly suitable case for this study.

Two survey instruments were developed and electronically distributed in the organization among those involved in the knowledge processes – one addressed to 1,586 employees, and the other to 177 department managers. We received 894 answers from the employee group, and 115 out of 177

answers from the managers, which means that we have a response rate of 56% among employees and 65% among managers. However, we did not get answers from all the department managers where we had employee responses, and some responses were incomplete. Overall, we used responses from 341 employees, where we had matching responses from their department managers. The 341 employees are nested in 70 departments (each with one manager) that vary in size from three to 12 employees, but with a mean of 5 employees. In the analysis, we will use this matched sample of employees and department managers to conduct the test of our hypotheses.

Measurements

The measures were developed by following the recommendations given by Gerbing and Anderson (1988). To strengthen the understanding of how the concepts were manifested in the empirical setting, we discussed the measures with reference groups consisting of managers and employees in different units. In addition, a pretest of the questionnaires was conducted among four employees and three department managers (randomly selected and omitted from the final samples).

To reduce possible consistency effects and common method variance problems, we followed the recommendations given by Podsakoff *et al.* (2003); the questions representing the dependent variable were presented after the independent variables in the questionnaire and with other questions in between. In addition, the anchors for some of the scales varied (i.e., between independent and dependent variables, and some of the underlying variables), and some of the items were reversed. Moreover, the dependent variable comes from a different source than the moderating variables (Chang *et al.*, 2010), i.e., the employee survey versus the manager survey. Furthermore, to detect potential common method bias problems in the data, we performed Harman's single-factor test for all dependent and independent variables (Podsakoff *et al.*, 2003). We found no indication of such a bias as the 16 variables (not including dummy variables) generated no less than six factors with an eigenvalue of more than one, and the first two factors explained only 20 and 11 percent of the variance, respectively. Following Podsakoff *et al.* (2003), we also ran a Partial Least Squares (PLS) model, which included a common method factor whose items encompassed all the constructs' items. This PLS model provided information on each item's variances, substantively explained by the

constructs and by the common method factor. The average substantively explained variance of the items is between 0.60 and 0.69 for the different models, while the average method-based variance is around 0.01. The ratio of substantive variance to method variance is, therefore, very high, which indicates that the potential common method bias is relatively small. A related issue is the potential problem of endogeneity, which we have addressed in several ways. Data are collected from two different sources: employees and managers, who have been asked to provide information used for different variables. Managers have provided information on the integration mechanism applied in the corporation, which is their domain, while employees have provided information on the knowledge governance mechanisms applied at the lower level. Accordingly, all the binary correlations between the two sets of key variables, integration mechanisms, and knowledge governance mechanisms, are relatively small and insignificant (spanning from -0.09 to 0.10) as shown in Table I. Since our data have a multilevel structure, we cannot run the classical Hausman test for endogeneity while keeping the multilevel structure. Still, we have conducted robustness checks where we have aggregated data and used instrumental variables methods in 3SLS models (e.g., to test for endogeneity between knowledge adoption and our three knowledge governance mechanisms), and we found no indication of problems of endogeneity. In addition, since our hypotheses are based on moderating effects, it is relatively unlikely that our results emerge exclusively because of such bias (Chang *et al.*, 2010; Siemsen *et al.*, 2010).

All the key variables are measured as multi-item constructs and the exact wording for each item is listed in Appendix 1, which also provides statistics (composite reliability, average variance extracted (AVE), and Cronbach's alpha) of each construct. As shown in Appendix 1, most of the constructs are well above the recommended threshold values for the three reliability measures we are using: 0.70 for composite reliability and Cronbach's alpha (Gerbing and Anderson, 1988; Nunnally and Bernstein, 1994), and 0.50 for AVE (Fornell and Larcker, 1981).

The dependent variable, *knowledge adoption*, is a multi-item measure that is obtained from the employee survey where respondents were asked to rate four statements on a 7-point Likert scale (see Appendix 1 for the wording) (AVE=0.61 and Cronbach's alpha=0.86). This construct captures the adoption and effective use of knowledge in the department, and not just the transfer of knowledge

from other MNC units into the focal unit. The items are adapted from the knowledge flow measures of Persson (2006) and Gupta and Govindarajan (2000). Knowledge adoption is measured by employees' perception, as the individuals are those who are best positioned to assess the adoption and use of the transferred knowledge. As seen in Appendix 1, with the exact wording of the items, the knowledge items deliberately start with "we", as we focus on the collectively adopted and used knowledge in the MNC unit (i.e., among the "we").

The key independent variables are the integration mechanisms (centralization, formalization, and socialization) adapted from Gupta and Govindarajan (2000) and Martinez and Jarillo (1989; 1991), and knowledge governance mechanisms (incentives, networks, and ICT systems) that are adapted from Gupta and Govindarajan (2000), Kim *et al.* (2003), Foss *et al.* (2010) and Orlikowski (2002). The integration mechanisms that refer to the higher organizational level are all multi-item measures based on the survey responses by the managers, where each department has one manager with personal responsibility for the employees in the department. This implies that no department is exposed to only one integration mechanism, but it will be exposed to a mix of the three integration mechanisms (e.g., some decisions are formalized while others might be handled through socialization or centralization). *Centralization* (Kim *et al.*, 2003) is based on four items assessing at what level key decisions are made in the organization. More specifically, department managers are asked to rate the extent of local influence versus headquarters influence in four decision areas (AVE=0.73 and Cronbach's alpha=0.91). *Formalization* (Kim *et al.*, 2003) is a three-item measure that assesses the extent to which common rules, policies, and standard operating procedures are applied to integrate the MNC units (AVE=0.69 and Cronbach's alpha=0.86). *Socialization* (Kim *et al.*, 2003) is formed based on three items related to the level of personal interaction among managers (AVE=0.69 and Cronbach's alpha=0.86).

The knowledge governance mechanisms are all multi-item measures based on the employee survey, capturing the individual's assessment of the extent to which these mechanisms are applied in the department. The construct *networks* is formed based on three items (AVE=0.53 and Cronbach's alpha=0.73), centering on the level of interaction with people in other MNC units. The *incentives* construct is similarly measured by three items (AVE=0.51 and Cronbach's alpha=0.71) reflecting

external appreciation regarding career advancement and rewards. The construct of *ICT systems* is based on three items (AVE=0.50 and Cronbach's alpha=0.69) capturing the extent to which ICT support systems are used for knowledge sharing.

In addition, several control variables are included at different levels. The employee controls are capturing individual heterogeneity (gender, education, tenure). We also control for employees' perception of the organizational identity (based on three items) and the level of training (as a composite index of three items), where all the items, wording, and measures are listed in Appendix 1. For the department, we control for the type of activity (consultancy versus others), host country (16 dummies), acquisition vs. organic growth of department (dummy), the size (number of employees), as well as the age of the department.

Table I depicts means, standard deviations, and bivariate correlations for all variables within and between levels. The table does not suggest that collinearity is an issue, as all pair-wise correlations among the independent variables are below the threshold of 0.4 for detecting multicollinearity.

***** Table I about here*****

All variables are standardized (mean=0 and std.=1) to bring them on the same scale, as we are applying interaction effects.

FINDINGS

The results of the multilevel analysis are listed in Table II, which contains nine models. In Model 1, we present the results of the null model, and both the variance at the lower level ($\beta=1.30$, $p<0.001$) and higher level ($\beta=0.27$, $p=0.002$) are highly significant, which testifies to our claim that knowledge adoption needs a multilevel explanation. The residual variance related to the lower level is 1.30, and 0.27 for the higher level, which implies that 17% of the variation in the knowledge adoption is associated with higher-level integration mechanisms, while the remaining 83% is the residual related to the lower-level knowledge governance mechanisms.

Model 2 introduces employee and department controls, implying a significant drop in the residual variance for the lower-level knowledge governance mechanisms (of 26 percent from 1.30 to 0.96) and

the higher-level integration mechanisms (of 48 percent from 0.27 to 0.14). In Model 3, we add the three types of knowledge governance mechanisms and find that networks and ICT systems are positive and significant as expected (and this result remains throughout all models), while incentives are not significant (which is also consistent in all models). The three integration mechanisms are included in Model 4, and they are all insignificant as main effects affecting knowledge adoption, these results remain in the following models, which confirm our theoretical assumption that the application of integration mechanisms has another primary objective, and therefore mainly affecting knowledge adoption in interaction with different knowledge governance mechanisms. It also supports the results highlighted by Zeng *et al.* (2018) that the integration mechanisms have rather ambiguous effects. It is also striking when comparing Model 3 (with knowledge governance mechanisms) and Model 4 (with interaction mechanisms) that the residual variance for both the lower-level knowledge governance mechanisms (0.78 versus 0.92) and the higher-level integration mechanisms (0.08 versus 0.13) is much lower in Model 3 than in Model 4, which indicate that the knowledge governance mechanisms have a much stronger direct effect on knowledge adoption than the integration mechanisms. Model 5 includes both the knowledge governance mechanisms and the integration mechanisms and none of the results in Model 3 and Model 4 are changed, which implies that we can rule out that there is mediation taking place e.g., that the effect of the integration mechanisms is mediated by the knowledge governance mechanisms or the other way around.

Models 6-8 introduce the interaction effects between the three integration mechanisms and incentives (Model 6), networks (Model 7), and ICT systems (Model 8). Finally, Model 9 is the fully specified model where all the interaction effects between the three integration mechanisms and the three knowledge governance mechanisms are added to test our hypotheses. When looking at the variance explained by the full model (Model 9) we compare it with the residual variance in the null model (Model 1) and no less than 47% of the variance of the lower-level knowledge governance mechanisms (residual variance down from 1.30 to 0.69) and 89% of the variance of the higher-level integration mechanisms (down from 0.27 to 0.03) is explained in our model.

***** Table II about here*****

The coefficients of the interaction effects provided in the full Model 9 are very similar to those obtained in the partial models 6-8, indicating that the integration mechanisms and knowledge governance mechanisms are truly distinct and do not provide issues of multicollinearity. Since the variables are standardized, the size of the coefficients can be directly compared as they are all on the same scale.

When looking at the integration mechanisms separately, it appears that centralization has, as expected, a significant negative moderation effect on the relationship between incentives and knowledge adoption ($\beta = -0.14$, $p = 0.02$), therefore confirming H1a. The interaction effects between centralization and ICT systems ($\beta = -0.07$, $p = 0.23$) as well as networks ($\beta = -0.09$, $p = 0.08$) are both insignificant (rejecting H1b and H1c). This shows that high centralization weakens the effect of incentives as a knowledge governance mechanism promoting knowledge adoption, while we see no interaction with other knowledge governance mechanisms.

As for formalization, we find the expected positive interaction effects with both incentives ($\beta = 0.14$, $p = 0.02$) and ICT systems ($\beta = 0.21$, $p = 0.001$) on knowledge adoption, providing support for hypotheses H2a and H2c. Formalization has, on the other hand, a negative moderation effect on the positive relationship between networks and knowledge adoption ($\beta = -0.19$, $p = 0.001$), which is in line with H2b. All in all, formalization reinforces the effects of the knowledge governance mechanisms of incentives and ICT systems, while weakening the effect of networks on cross-unit knowledge adoption.

Socialization reinforces the relationship between networks and knowledge adoption ($\beta = 0.18$, $p = 0.04$), which supports hypothesis H3b. Socialization has the expected negative interaction effect with incentives on knowledge adoption ($\beta = -0.16$, $p = 0.01$), confirming H3a. The interaction effect with ICT systems ($\beta = -0.04$, $p = 0.52$) is insignificant (rejecting H3c). As such, socialization as a context is strengthening the effect of networks but waning the effect of incentives as a mechanism for promoting knowledge adoption.

While the integration mechanisms have an ambiguous and insignificant direct effect on knowledge adoption (all Models 4-9) they do moderate the effects of the knowledge governance mechanisms (Model 9). This confirms that although the integration mechanisms have other purposes

of coordination and control of the MNC units and are not directed specifically toward facilitating the knowledge process, they still form the organizational context for unfolding the knowledge governance mechanisms.

***** Table III about here *****

We have further conducted slope analyses of the nine interaction effects to test whether the effects are consistent over the range of values for the moderation variables. More specifically, we tested the significance of the interaction effects at three levels for the integration mechanisms (the mean minus one sd., mean, and mean plus one sd.). The results of the slope analyses are shown in Table III, and they provide some additional insights. Interestingly, the interaction between centralization and networks changes from significantly positive with low centralization to significantly negative with high centralization. This is in line with our arguments and indicates that a low centralization (or higher decentralization) contextually aligns with networks in the promotion of knowledge adoption, while high centralization is not. It is also notable that formalization and ICT systems only reinforce each other in promoting knowledge adoption to a certain level of formalization, where the effects flatten out (the effect is insignificant when formalization reaches mean + 1 sd.). All other interaction effects are linear or negligible, as indicated in Table II.

DISCUSSION AND CONCLUSION

Discussion

This study aimed to understand the promotion of cross-unit knowledge adoption within MNCs from a contingency and multilevel perspective. We have analyzed the moderating effects of the higher-level integration mechanisms—centralization, formalization, and socialization—on the direct relationship between the individual-level knowledge governance mechanisms—incentives, networks, and ICT systems—and the cross-unit knowledge adoption by individuals within an MNC. Our theoretical argument is that these integration mechanisms have the potential to ease (or augment) the internal boundaries that affect the translation and transformation of knowledge sourced from other units (Carlile, 2004) by reducing (or increasing) ambiguity and uncertainty or by increasing (or

reducing) the flexibility to cope with local demands. Thus, the integration mechanisms create contextual conditions for the effectiveness of the individual-level knowledge governance mechanisms.

Figure 2 shows the specific cases of fit and misfit between the higher-level integration mechanisms and the lower-level knowledge governance mechanisms, which will be discussed and unfolded in the following.

***** Insert Figure 2 here *****

A first interesting empirical finding is that, unlike the two other knowledge governance mechanisms (ICT systems and networks), incentives per se have no direct effect on the adoption of knowledge from other units, but their effect is contingent on the degree of centralization, formalization, and socialization. The knowledge governance literature has found mixed results on the direct effect of the incentives system (Cabrera *et al.*, 2006), while it has confirmed the importance of motivation and organizational support mechanisms for sharing knowledge across units (Dasí *et al.*, 2017; Minbaeva *et al.*, 2012). Our results indicate that the incentives can be a powerful tool to promote knowledge adoption to the extent that they compensate for overcoming internal boundaries. However, integration mechanisms can ameliorate or worsen such internal boundaries at a higher level. Hence, employees working in more decentralized departments or less socialized environments will encounter higher internal boundaries - in terms of semantic and political boundaries (Carlile, 2004), and thereby benefit more from incentive systems that are compensating for the additional costs incurred when adopting knowledge from other units (Dasí *et al.*, 2017). On the other hand, formalization affects the context where individuals adopt knowledge through reducing uncertainty and guiding behavior (Kim *et al.*, 2003; Martinez and Jarillo, 1989). Therefore, incentives become informational and help adopt knowledge from other units (Foss *et al.*, 2015).

Notable results are the opposite interactions of formalization and socialization with the knowledge governance mechanisms. Compared with highly formalized departments, the less formalized ones have more flexibility to respond to uncertain situations, like adopting knowledge from other units, and searching for solutions through channels that allow for nuanced information to be interactively exchanged. Thus, networking becomes a more effective tool for adopting knowledge as formalization decreases. Additionally, we have confirmed the opposite relationship regarding the

moderating effect of socialization, where employees in less socialized environments gain less from networking regarding knowledge adoption. Zeng *et al.* (2018) suggest that there could be a substitution effect of formalization and socialization for knowledge transfer. Along similar lines, our study shows that the contextual effects of socialization and formalization go in the opposite direction for the case of incentives and networks; however, we could not confirm this effect in the case of ICT systems.

ICT systems have become an important tool for cross-unit knowledge adoption because of their efficiency and the benefits of increasing the commonalities in the knowledge base between actors. Ambos and Ambos (2009) find technology-based mechanisms to be insensitive to distance-based moderating effects, that is, to be more context-free and to remain equally effective for knowledge adoption, independently of spatial and contextual differences. Similarly, our data show a direct and significant positive effect of ICT systems on knowledge adoption. Additionally, apart from formalization, ICT systems are also relatively oblivious to the contextual conditions promoted by centralization and socialization. As expected, the effectiveness of ICT systems for the promotion of knowledge adoption is enhanced by the extent to which there are formal rules and clear procedures that homogenize and guide behavior, i.e., less uncertainty. Conversely, the location of decision rights and the level of socialization do not affect the effectiveness of ICT systems. A potential explanation relies on the distinction between ambiguity and uncertainty (Daft and Lengel, 1986) and the codified nature of ICT systems which means that those integration mechanisms that mitigate the level of ambiguity or equivocality -centralization and socialization- (Daft and Lengel, 1986) are not interacting with a mechanism that mostly works for codified and easy to store knowledge, and helps in reducing uncertainty. Thus, knowledge adopters - irrespective of the level of centralization or socialization can still benefit from efficiently applying ICT systems.

Theoretical contributions

By adopting a contingency approach (Drazin and Van De Ven, 1995) and a multilevel perspective, our study contributes to the knowledge governance (Foss, 2007; Grandori, 2001) and the knowledge-based view of the MNC (Kogut and Zander, 1993; Grant and Phene, 2022) in three ways: 1) by focusing on the adoption of knowledge at the individual level, 2) by theorizing on the contextual conditions that

each integration mechanism introduces for individuals action, and 3) by applying a multilevel modelling that disentangles the dynamics of alignment or misalignment of mechanisms deployed at different levels. In the following, we discuss these three contributions.

First, as Zeng *et al.* (2018) meta-analysis demonstrates, there is a paucity of studies that measure the effective adoption of knowledge (knowledge effectiveness) in MNCs and even fewer that measure the adoption among individuals at the individual level in these firms. However, such a measure is of extreme relevance to grasp the intricacies of the real advantage of MNCs according to the Knowledge-Based view (Kogut and Zander, 1993; Grant and Phene, 2022). That is, its superiority as a knowledge-processing institution, with the capacity to integrate and deploy knowledge across space. Integrating knowledge goes beyond its sheer transfer (Grant, 1996) and forces one to consider the mechanisms through which individuals are willing to make the extra effort of translating and transforming knowledge sourced from other units. As Grant and Phene (2022, p. 21) pose, “individuals’ knowledge and how it is deployed is determined by the localized and geographically distributed communities within which practices and cognition are embedded”. By focusing on the adoption of knowledge, instead of its transfer, and by analyzing the interactive role of mechanisms at different levels, we respond to Grant and Phene’s (2022) call for a more complex view of the MNC that recognizes that individuals’ knowledge is deployed within a structure of working practices.

Second, while our dependent variable is at the individual level, we analyze this “structure of working practices” at two levels, the individual and the unit level. In doing so, we recognize the complexity of the MNC and the need to contextualize (Piekkari, Welch and Westney, 2022). We have integrated previous literature and theorized about the contextual effects that the integration mechanisms applied at a higher level within the MNC have on the effects of knowledge governance mechanisms on knowledge adoption (Foss *et al.*, 2010). Thus, the integration mechanisms can create a context with lower ambiguity and uncertainty, or with increased flexibility and shared meanings, that affect the workings of the knowledge governance mechanisms.

Specifically, centralization and socialization both reduce ambiguity in the organization, but in different ways, as centralization entails hierarchical decision-making (e.g., on what knowledge to disseminate), while socialization allows for aligning goals and developing a common understanding

(e.g., of the knowledge diversity) (Ghoshal and Bartlett, 1988; Ghoshal, *et al.*, 1994). Formalization reduces uncertainty by providing rules and protocols guiding behavior and by supporting the development of a common language that eases the articulation of knowledge. While formalization and centralization constrain local units' flexibility to respond to environmental pressures like variation in customer needs, socialization creates room for considering the environmental conditions in an aligned manner by promoting integrative bargaining and trust (Ghoshal and Nohria, 1989; 1993). These differences in context become the conditions of action for individuals within a unit in such a way that they can reinforce the effectiveness of the knowledge governance mechanisms in case of alignment, but they can also counteract or weaken interventions done at the individual level in case of misalignment. Hence, by applying a contingency perspective, we contribute to the knowledge governance approach (Foss, 2007; Grandori, 2001).

Third, in line with recent calls (Foss and Pedersen, 2019; Kunisch, *et al.*, 2020; Zeng *et al.*, 2023) our multilevel modeling and empirical results have moved beyond analyzing direct and single-level effects and permitted a more fine-grained comprehension of the complexity of managing knowledge within MNCs, where there are interventions at different levels. Our results confirmed that integration mechanisms, by themselves, do not have a direct effect on the individuals' adoption of knowledge, but that they influence the context where this process occurs. Hence, while integration mechanisms constitute a powerful tool to promote knowledge flows across MNCs' units (Zeng *et al.*, 2018), their effect on the actual use of knowledge is more indirect and nuanced. MNCs are multilayered and complex organizations whose management demands the deployment of different organizational mechanisms at various levels (Ghoshal and Bartlett, 1990; Ghoshal and Nohria, 1989). Our multilevel approach sheds light on the management of MNCs by showing that knowledge governance mechanisms are effective for adopting knowledge from other units, but such effectiveness is contingent on the degree to which centralization, formalization, and socialization are applied in the unit.

Managerial implications

Our study provides a more refined understanding of the consequences of organizational design in MNCs for knowledge adoption, allowing us to derive some interesting managerial implications. First,

our paper raises managers' awareness of the interactions of integration mechanisms designed for broader purposes but still have effects across levels and become contextual conditions for the more operative knowledge governance mechanisms. Thus, the recommendation is to be aware of the main internal boundaries that knowledge adopters need to overcome when applying knowledge sourced from other units and to what extent the integration mechanisms might counteract (or reinforce) the lower-level knowledge process mechanisms by affecting ambiguity, uncertainty, and flexibility conditions. MNCs must align the mechanisms applied at different levels to achieve effective knowledge adoption across their units. More specifically, incentives and ICT systems as knowledge governance mechanisms only fit positively in promoting individuals' cross-unit knowledge adoption with formalization as an integration mechanism, while supporting network building fits positively with socialization. All other interactions among integration mechanisms and knowledge governance mechanisms are either insignificant or have a negative and hindering effect on knowledge adoption across units in the MNC.

Concluding remarks and future research

This study has examined when higher-level integration mechanisms (centralization, formalization, socialization) and lower-level knowledge governance mechanisms work in concert to support employees' adoption of knowledge sourced from other MNC units, and when they do not. In this way, the study contributes to the literature on knowledge governance mechanisms by pointing out under which organizational conditions the different mechanisms will work as intended and when this might not be the case.

Some limitations in this study should be noted. First, our data originate from one MNC and rely on cross-sectional data; therefore, we cannot derive causality but associations. Additionally, while we have included controls at different levels, we cannot disregard other effects like the type of knowledge (e.g., codified versus tacit knowledge) or the kind of relationships between MNC units (e.g., mandates or hierarchical relationships). Consequently, these are potential avenues for future research. Finally, while the model presented is relatively broad regarding knowledge governance mechanisms, it is not exhaustive, and future research could enlarge the understanding of the effect of knowledge governance mechanisms on knowledge adoption by analyzing other mechanisms.

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Figure 1. Hypotheses on moderation and fit between integration mechanism and knowledge governance mechanism (KGM)

Integration Mechanisms

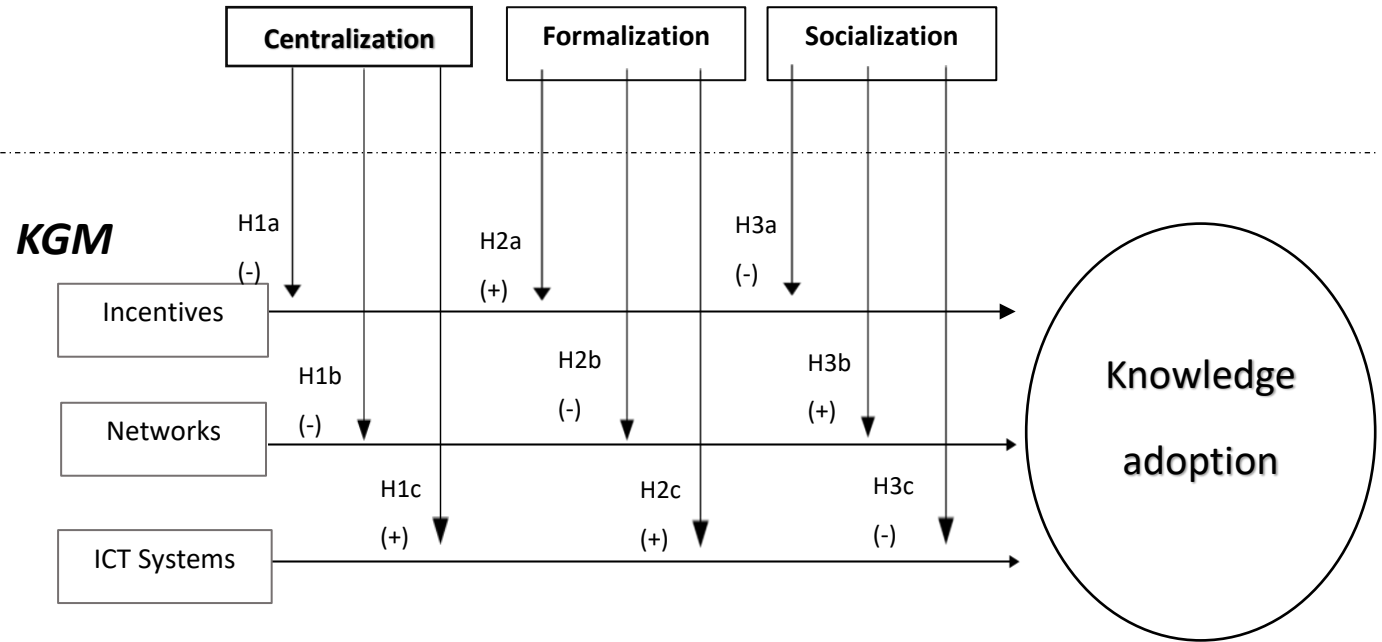


Figure 2. The results are shown graphically (bold lines indicate significance at < 5%)

Integration Mechanisms

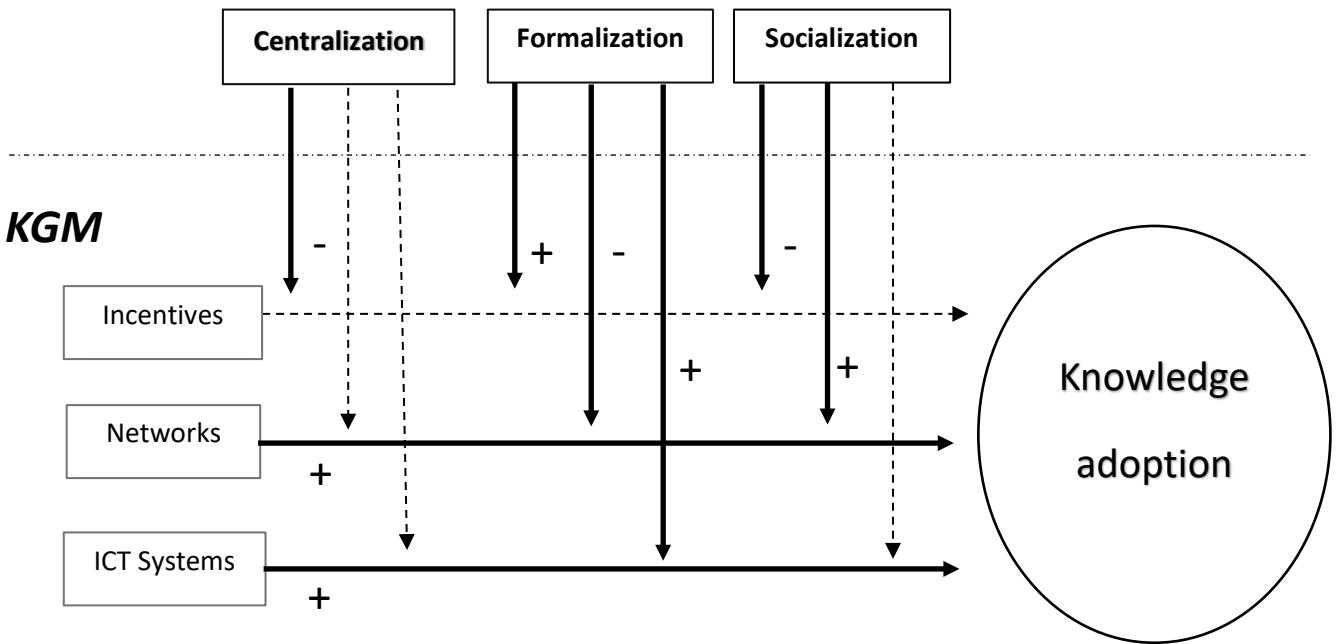


Table I. Correlation matrix (n=341) – all variables except the 16 country dummies

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1) Knowledge adoption	1															
2) Socialization	-0.02	1														
3) Formalization	0.02	0.16	1													
4) Centralization	0.05	0.04	0.24	1												
5) Incentives	0.43	-0.06	0.01	-0.09	1											
6) Networks	0.49	-0.06	-0.02	0.07	0.33	1										
7) Training	0.58	-0.04	0.01	-0.02	0.32	0.31	1									
8) ICT systems	0.57	0.02	0.10	-0.04	0.32	0.37	0.39	1								
9) Gender	-0.06	-0.06	-0.03	0.05	-0.09	0.04	-0.15	-0.03	1							
10) Tenure	-0.03	-0.02	-0.03	0.08	-0.18	0.10	-0.08	-0.08	0.05	1						
11) Education	-0.01	-0.09	-0.04	-0.04	-0.02	0.01	-0.10	-0.06	0.20	-0.15	1					
12) Organizational identity	0.53	-0.11	0.08	0.03	0.50	0.35	0.28	0.33	-0.07	-0.01	0.02	1				
13) Consultancy	-0.11	-0.01	-0.06	-0.09	-0.11	-0.07	-0.10	-0.16	0.12	0.01	0.13	-0.07	1			
14) Organic growth	-0.14	0.03	0.01	0.01	-0.13	0.01	-0.07	-0.10	0.10	0.11	0.06	-0.11	0.10	1		
15) Size of department	-0.15	0.19	0.01	0.28	-0.23	0.01	-0.16	-0.15	-0.02	0.04	0.02	-0.11	0.01	0.13	1	
16) Age of department	-0.14	0.08	0.04	0.27	-0.19	-0.07	-0.15	-0.17	0.05	0.02	-0.02	-0.17	-0.01	0.26	0.36	1
Mean	4.01	4.68	5.52	2.40	3.97	4.08	4.31	2.85	0.70	6.25	4.58	4.99	0.52	0.81	213	31
Standard deviation	1.27	1.38	1.21	1.08	1.52	1.21	1.38	1.23	0.46	7.53	1.25	0.98	0.50	0.40	440	45
Min values	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1
Max values	7	7	7	6.5	7	7	7	7	1	38	7	7	1	1	1800	143

All values above |0.15| are significant at 5% level of significance

Table II. Knowledge adoption as dependent variable in multilevel analyses (n=341) – p-values listed in parentheses

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	4.01 (.001)	3.64 (.001)	4.03 (.001)	3.76 (.001)	4.09 (.001)	3.79 (.001)	3.96 (.001)	3.98 (.001)	4.10 (.001)
Employee controls									
- Gender		0.07 (.23)	0.05 (.37)	0.07 (.26)	0.04 (.39)	0.06 (.33)	0.04 (.49)	0.07 (.20)	0.04 (.44)
- Tenure		-0.01 (.97)	-0.02 (.65)	-0.01 (.97)	-0.02 (.68)	0.02 (.67)	-0.06 (.28)	0.02 (.75)	-0.02 (.62)
- Education level		-0.01 (.93)	-0.01 (.71)	0.01 (.98)	-0.01 (.79)	0.01 (.80)	-0.03 (.62)	0.02 (.78)	-0.01 (.94)
- Training		0.47 (.001)	0.25 (.001)	0.48 (.001)	0.26 (.001)	0.40 (.001)	0.42 (.001)	0.32 (.001)	0.23 (.001)
- Organizational identity		0.26 (.001)	0.18 (.004)	0.26 (.001)	0.18 (.003)	0.23 (.001)	0.23 (.001)	0.24 (.001)	0.21 (.001)
Department controls									
- Consultancy		0.14 (.26)	-0.01 (.96)	0.13 (.30)	-0.01 (.93)	0.11 (.35)	0.11 (.35)	0.02 (.84)	0.02 (.87)
- Organic growth		0.20 (.33)	0.22 (.19)	0.17 (.40)	0.21 (.20)	0.15 (.44)	0.18 (.32)	0.19 (.29)	0.25 (.14)
- Size of department		-0.10 (.16)	-0.11 (.07)	-0.13 (.08)	-0.12 (.04)	-0.07 (.31)	-0.19 (.003)	-0.07 (.29)	-0.07 (.22)
- Age of department		0.02 (.77)	0.10 (.13)	0.01 (.98)	-0.08 (.25)	0.04 (.61)	0.04 (.54)	0.02 (.76)	0.07 (.30)
- Country (16 dummies)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Knowledge governance mechanism									
- Incentives			0.08 (.26)		0.08 (.26)	0.13 (.09)			0.06 (.37)
- Networks			0.31 (.001)		0.31 (.001)		0.37 (.001)		0.33 (.001)
- ICT system			0.47 (.001)		0.47 (.001)			0.52 (.001)	0.50 (.001)
Integration mechanism									
- Centralization				0.09 (.22)	0.05 (.40)	0.09 (.19)	0.07 (.27)	0.09 (.17)	0.09 (.13)
- Formalization				0.01 (.98)	0.01 (.85)	0.01 (.91)	0.01 (.91)	-0.01 (.86)	-0.06 (.37)
- Socialization				0.08 (.36)	0.07 (.33)	0.08 (.33)	0.12 (.14)	0.06 (.43)	0.13 (.08)
Interaction effects									
- Centralization * Incentives (H1a)						-0.14 (.01)			-0.14 (.02)
- Centralization * Networks (H1b)							-0.08 (.14)		-0.09 (.08)
- Centralization * ICT systems (H1c)								0.01 (.99)	-0.07 (.23)
- Formalization * Incentives (H2a)						0.18 (.005)			0.14 (.02)
- Formalization * Networks (H2b)							-0.13 (.04)		-0.19 (.001)
- Formalization * ICT systems (H2c)								0.15 (.02)	0.21 (.001)
- Socialization * Incentives (H3a)						-0.12 (.02)			-0.16 (.01)
- Socialization * Networks (H3b)							0.19 (.01)		0.18 (.004)
- Socialization * ICT systems (H3c)								0.03 (.059)	-0.04 (.52)
Residual variance									
- Department (lower) level	1.30 (.001)	0.96 (.001)	0.78 (.001)	0.92 (.001)	0.75 (.001)	0.94 (.001)	0.87 (.001)	0.81 (.001)	0.69 (.001)
- Corporate (higher) level	0.27 (.002)	0.14 (.04)	0.08 (.17)	0.13 (.06)	0.06 (.21)	0.08 (1.87)	0.04 (1.19)	0.06 (.42)	0.03 (.64)
Model fit									
- 2 Log Likelihood	1.094	974	949	973	925	954	918	884	835
- AIC	1.100	1.002	987	999	968	986	960	926	917

Table III. Slope analysis of the interaction effects at three levels (mean – 1 sd., mean, and mean + 1sd.). of the respective integration mechanism (marked in bold). The significance level is provided in parentheses.

	Mean – 1 standard deviation	Mean	Mean + 1 standard deviation
Centralization * Incentives	-0.25* (0.02)	-0.41** (0.01)	-0.56** (0.01)
Centralization * Networks	0.11* (0.04)	-0.02 (0.92)	-0.21** (0.01)
Centralization * ICT systems	0.06 (0.31)	-0.08 (0.42)	-0.26 (0.21)
Formalization * Incentives	0.53* (0.04)	0.70* (0.03)	0.86* (0.03)
Formalization * Networks	-0.36** (0.01)	-0.59** (0.01)	-0.72** (0.01)
Formalization * ICT systems	0.58* (0.02)	0.60* (0.04)	0.62 (0.14)
Socialization * Incentives	-0.47* (0.03)	-0.69* (0.02)	-0.91** (0.01)
Socialization * Networks	0.53** (0.01)	0.78** (0.01)	0.93** (0.01)
Socialization * ICT systems	0.03 (0.78)	-0.07 (0.46)	-0.14 (0.21)

* and ** indicate 0.05 and 0.01 levels of significance, respectively

Appendix I. Measurement of variables (scales for constructs shown in parentheses) - the source (i.e., employee vs. manager survey) is shown in the first column.

		Composite reliability	AVE	Cronbach's alpha
Knowledge adoption (Employee)	- We adopt technology from other organizational units - We adopt technology developed by a unit at the headquarters - We adopt documents and reports containing new knowledge about services/products or production processes produced by other organizational units - We adopt organizational practices and routines developed in other organizational units <i>(Scale: 1=very seldom and 7=very frequent)</i>	0.86	0.61	0.86
Centralization (Managers)	- Who makes decisions on project budget? - Who makes project priorities? - Who makes decisions on project organization? - Who makes decisions on resource allocation? <i>(Scale: 1=only HQ and 7=only local)</i> Reverse coded	0.92	0.73	0.91
Formalization (Managers)	- We have well-specified worldwide common rules and policies - We have well-specified worldwide standard operating procedures and common manuals - We monitor to ensure that internationally common rules, policies, and procedures are not violated <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.87	0.69	0.86
Socialization (Managers)	- We have meetings where managers from different international locations meet - There is personal contact between managers from different international locations - Committee meets regularly to plan and integrate activities internationally <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.86	0.68	0.85
Incentives (Employee)	- I get reward for effort - I get advices on how to advance my career in the company - Your advance depending on your initiative and ability <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.73	0.51	0.71
Networks (Employee)	- I have regularly contact with people in other subsidiaries - I have regularly contact with people at the headquarters - I usually work with people from other organizational units <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.75	0.53	0.73
ICT systems (Employee)	- My organization has a formal system to share ideas with other project teams - Intelligent support systems as a tool for knowledge sharing and collaboration - Web-services for automated collaboration across the enterprise <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.73	0.50	0.69
Organizational identity (Employee)	- People are loyal to the organization - We share the common goal of working toward the organization's success - We encourage a strong feeling of belonging <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.71	0.49	0.71
Training (Employee)	- Training is provided when we implement a new work practice - We know what skills and resources we need in order to implement a new work practice - I get development of my individual knowledge and skills through ongoing training <i>(Scale: 1=strongly disagree and 7=strongly agree)</i>	0.80	0.58	0.78