Organizational Architecture and the Realization of Competitive Advantages from Multinationality

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The President:

Prof. Dr. Thomas Bieger
Foreword

If I had not met many wonderful and committed people, I might not have been able to write this dissertation. I am indebted to all of them. Unfortunately, it is impossible to address everyone here. I shall therefore restrict this foreword to those that were most directly involved in my doctoral dissertation.

First of all, I would like to thank my supervisor Prof. Dr. Oliver Gassmann for giving me the opportunity to work on this subject. I also thank Prof. Dr. Christoph Lechner for his interest in my work and for assuming the co-supervision. I am grateful to both of my supervisors for the time and effort they have invested to help me improve my manuscripts.

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I would be happy if all of you came to the conclusion that supporting me was worth the effort.

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Maximilian Palmié
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Summary

Today, multinational corporations (MNCs) account for a substantial share of economic activity in most industries and countries. The appeal of a multinational organization can be explained by the associated competitive advantages, which entail prospects of superior performance: MNCs can create knowledge and competence in geographically dispersed subsidiaries, transfer knowledge from a focal subsidiary to other subsidiaries and to the parent firm, and integrate subsidiaries into their intrafirm network. While these advantages from multinationality have been highlighted frequently, many scholars also observed that we know little about the means by which MNCs can actually realize them. This cumulative dissertation addresses these knowledge gaps.

To this end, it focuses on the effects that organizational architecture (OA) exerts on the above advantages. By adopting this focus, it responds to the calls which have identified OA as an important, yet neglected area in this context. Parent firm executives can set elements of OA, especially formal OA (such as subsidiary autonomy and mandates), to realize their intentions.

Besides an introductory chapter, this thesis consists of four manuscripts that examine the influence of selected elements of formal OA on (a) a focal subsidiary’s integration into the MNC’s intrafirm network, (b) the extent to which its knowledge is successfully transferred to other subsidiaries, (c) the extent to which a focal subsidiary transfers knowledge to the parent firm, and (d) the extent to which it creates competence that can be leveraged internationally. Three of these manuscripts test their theoretical predictions empirically by applying both regression analyses and structural equation modeling (SEM) to a sample of 287 subsidiaries. The results strongly support the arguments of this thesis.

Overall, this dissertation suggests that MNCs can realize the competitive advantages from multinationality when an appropriate OA is implemented. Further, by setting the OA appropriately, MNCs should be able to realize several of these advantages simultaneously. These insights do not only help close important gaps in our theoretical understanding. Rather, they can also yield beneficial advice to management practice because so far, many MNCs struggle with realizing these advantages.
Zusammenfassung


Zu diesem Zweck konzentriert sie sich auf die Effekte, die die organisationale Architektur (OA) auf jeden der genannten Vorteile ausübt. Mit diesem Fokus reagiert sie darauf, dass die OA in diesem Kontext als wichtige, jedoch vernachlässigte Forschungsrichtung identifiziert worden ist. Manager in der Unternehmenszentrale können Elemente der OA, insbesondere der formalen OA (z.B. Autonomie oder Mandate), vorgeben, um ihre Intentionen zu realisieren.

Neben einem Einleitungskapitel umfasst diese Arbeit vier Manuskripte. Diese untersuchen den Einfluss ausgewählter Elemente der formalen OA auf (a) die Integration einer fokalen Tochtergesellschaft in das interne MNU-Netzwerk, (b) das Ausmass, zu dem ihr Wissen erfolgreich zu anderen Tochtergesellschaften transferiert wird, (c) das Ausmass, zu dem sie Wissen zur Unternehmenszentrale transferiert, und (d) das Ausmass, zu dem sie international nützliche Kompetenzen erzeugt. Drei dieser Manuskripte überprüfen die theoretischen Vorhersagen mittels Regressionsanalysen und Strukturgleichungsmodellen an 287 Tochtergesellschaften empirisch. Die Ergebnisse unterstützen die vorgebrachten Argumente deutlich.

Insgesamt kommt diese Dissertation zu dem Schluss, dass MNUs die Vorteile der Multinationalität realisieren können, wenn sie eine angemessene OA implementieren. Ausserdem sollten MNUs dank einer angemessenen OA in der Lage sein, mehrere dieser Vorteile gleichzeitig zu erreichen. Diese Erkenntnisse tragen nicht nur dazu bei, wichtige Lücken in unserem theoretischen Verständnis zu schliessen. Vielmehr können sich aus ihnen auch nützliche Ratschläge für die Managementpraxis ergeben, denn viele Unternehmen haben derzeit Probleme, diese Vorteile zu realisieren.
Introduction: Organizational Architecture and the Realization of Competitive Advantages from Multinationality

Maximilian Palmié

Current status (August 2012): Unsubmitted
1. Introduction: Organizational Architecture and the Realization of Competitive Advantages from Multinationality

Abstract
This chapter provides the introduction to my cumulative dissertation and gives an overview of the entire thesis. Building on a definition and description of the concepts that are at the core of my dissertation, this chapter reasons that a multinational organization allows firms to create knowledge and competence in their dispersed subsidiaries, transfer knowledge between units, and integrate subsidiaries into their intrafirm network. This chapter identifies crucial research gaps with regard to these widely acknowledged advantages from multinationality, viz. the means, especially the organizational architecture, by which multinational corporations can realize them. It discusses the contributions that closing these gaps can make from a theoretical perspective and it shows that related efforts should also be of considerable practical relevance. As a consequence, this chapter establishes that examining the influence of organizational architecture on these advantages is the aim of my dissertation. After summarizing each of the subsequent papers, it finally draws an overall conclusion from the thesis as a whole.

Keywords: Multinational Corporation; Organizational Architecture; Parent Firm; Subsidiary Integration; Knowledge Transfer; Competence Creation
1.1. Multinational Corporations and Competitive Advantages from Multinationality

In the decades since World War II, firms increasingly engaged in multiple countries (see, e.g., Dunning, 2009), such that today multinational corporations tend to dominate the economic activities in many industries and countries (OECD, 2010). A multinational corporation (MNC) is a firm, which comprises a group of geographically dispersed organizations (units), including its headquarters (the parent firm) and a number of subsidiaries, of which at least one is located in a different country than the parent firm (Ghoshal and Bartlett, 1990). Key characteristics of an MNC are thus that it consists of several units and that these units are embedded in different and hence heterogeneous local environments (Andersson, Forsgren and Holm, 2002; Ghoshal and Bartlett, 1990; Ghoshal and Nohria, 1997). Consequently, a multinational organization allows firms to create knowledge and competence decentrally in their geographically dispersed subsidiaries (Almeida and Phene, 2004; Cantwell and Mudambi, 2005),

1 transfer knowledge across their units (Gupta and Govindarajan, 2000a; Kogut and Zander, 1993), and integrate the subsidiaries into an intra-firm network (Kim, Park and Prescott, 2003; Martinez and Jarillo, 1989). The literature widely agrees that these abilities constitute major sources of competitive advantage, thus enabling MNCs to improve their performance vis-à-vis other firms (Andersson et al., 2002; Bartlett and Beamish, 2011; Tallman, 2003). The MNC can benefit from such efforts to ‘orchestrate’ its dispersed units and the knowledge and competence processes that occur within and across them because the units are likely to differ in the knowledge and competence they develop; such differences can emerge because the units encounter diverging sets of information, ideas, and opportunities in the heterogeneous local environments, but also because the units can differ in their capability to develop

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1 While a generally accepted definition of ‘knowledge’ has not yet emerged (Schulz, 2003: 443), there is considerable consensus in the literature that knowledge comprises both declarative knowledge (‘know about’ or ‘know what’) and procedural knowledge (‘know-how’) (e.g., Grant, 1996; Hedlund and Nonaka, 1993; Kogut and Zander, 1992; Winter, 1987). ‘Competence’ can be thought of as the ability to perform certain activities by drawing from available assets and resources (McGrath, MacMillan and Venkataraman, 1995: 254; Teece, Pisano and Shuen, 1997: 516). Since knowledge belongs to the strategically most important resources of firms (Grant, 1996: 110), knowledge and competence are tightly interlinked concepts. In fact, many contributions relevant to my dissertation switch between these expressions and the composite term ‘knowledge and competence’ (e.g., Andersson et al., 2002; Björkman et al., 2004; Foss and Pedersen, 2004; Fey and Furu, 2008; Mudambi and Navarra, 2004; Narula and Rugman, 2011; Winter, 1987). My dissertation follows these conventions.

2 ‘Integration’ can be understood to comprise the following three interwoven aspects (cf. Yeniyurt et al., 2005): sharing knowledge developed decentrally across geographically dispersed units; coordinating and integrating activities across such units; and centralizing decision-making authority while maintaining responsiveness to local markets.
knowledge and competence (e.g., Andersson et al., 2002; McEvily and Zaheer, 1999). The decentralized creation of knowledge and competence, the transfer of a subsidiary’s knowledge within the MNC, and the integration of subsidiaries can therefore lead to an international leverage of local strengths, the realization of synergies, the reduction of redundancies and improvements in efficiency as well as a faster and more accurate adaptation to local developments (Yeniyurt, Cavusgil and Hult, 2005; Zou and Cavusgil, 2002).

1.2. Research Gaps: By Which Means – Especially: By Which Organizational Architecture – Can MNCs Realize These Advantages?

However, while the advantages from multinationality are highlighted frequently, we know relatively little about the means by which firms can realize them. Such gaps have been identified repeatedly in the literature and numerous scholars have called for further research on the means that facilitate the integration of subsidiaries, that support the transfer of knowledge from a focal subsidiary to other units of the firm, and that foster the creation of competence in a focal subsidiary (e.g., Ambos and Ambos, 2009; Bouquet and Birkinshaw, 2008; Foss and Pedersen, 2002, 2004; Luo, 2002; Nielsen and Michailova, 2007; Rugman and Verbeke, 2001). The MNC’s organizational architecture is likely to represent particularly promising means to orchestrate the MNC’s dispersed units and the knowledge processes that occur in and across these units (e.g., Foss and Pedersen, 2004; Persaud, 2005) because design choices about the organizational architecture are among ‘the most powerful strategic levers available to the top management of the modern corporation’ (Gulati, Puranam and Tushman, 2009: 575; see also Nadler and Tushman, 1997). Organizational architecture can be defined to comprise both formal and informal organizational structures (Gulati et al., 2009: 575; Nadler and Tushman, 1997: 227). Formal organizational architecture refers to explicitly mandated formal structures such as reward systems and authority relationships, whereas informal architecture refers to emergent structures such as culture, social networks, and communities (Foss, 2007; Gulati et al., 2009). Generally, top managers can set both their firm’s formal and informal structures (Gulati et al., 2009; Nickerson and Zenger, 2002). However, while they can make discrete choices to shape their firm’s formal structure directly, the informal architecture can typically be set rather indirectly (Nickerson and Zenger, 2002). Since informal architecture
emerges over time (Criscuolo and Narula, 2007; Gulati et al., 2009), shaping it may involve inertia and also ambiguity (Foss, Husted and Michailova, 2010). Consequently, formal organizational architecture is of particular relevance as it represents the key elements that top managers set in order to realize their intentions (Ethiraj and Levinthal, 2004). The hypotheses and propositions in my dissertation focus on elements of formal organizational architecture. Several scholars have specifically pointed to the limitations of our understanding regarding the organizational architecture by which managers can foster the creation of competence in subsidiaries, the transfer of subsidiary knowledge within the MNC, and subsidiary integration (e.g., Björkman, Barner-Rasmussen and Li, 2004; Fey and Furu, 2008; Filippaios et al., 2009; Foss and Pedersen, 2004; Persaud, 2005). My dissertation intends to improve our understanding of these topics.

1.3. Contributions and Relevance of Closing These Research Gaps

Studying these topics does not only help close gaps in our theoretical understanding, but can also contribute to a better understanding of empirical observations. First, there could be an inconsistency between our theoretical expectation and empirical observations. Theoretically, one would expect that many MNCs strive to achieve decentralized competence creation, international knowledge transfer, and subsidiary integration to reap the advantages a multinational organization offers. In contrast to this expectation, many MNCs actually seem to (re-)centralize or completely localize activities (Benito, Grogaard and Narula, 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Monteiro, Arvidsson and Birkinshaw, 2008; Pearce, 1990; Piscitello and Rabbiosi, 2006; Rugman, 2005; von Zedtwitz and Gassmann, 2002). Showing which organizational architecture is likely to facilitate subsidiary integration, decentralized competence creation, and international knowledge transfer can help to reconcile this potential inconsistency as it illustrates that firms can realize the theoretically proposed advantages from multinationality when they adopt an appropriate organizational architecture. Second, studying the organizational architecture that MNCs have adopted can yield an explanation for why some MNCs are able to orchestrate their dispersed units and the knowledge processes occurring within and across them successfully (e.g., Goold, 2005; Gupta and Govindarajan,
2000b; Hansen, Nohria and Tierney, 1999; Käser and Miles, 2002), whereas many other MNCs seem to fail in this.

It could be that the empirical observations deviate from our theoretical expectations because many MNCs struggle with the question by which means – especially: by which organizational architecture – they can realize the advantages from multinationality, rather than because they would not want to reap such advantages or than because such advantages would only be realizable in exceptional cases (cf. Mudambi and Navarra, 2004: 391/392). Indeed, Foss and Pedersen (2004: 341) argued in a seminal article that to date, ‘MNC managers are left without much theory-based guidance when it comes to organizational design in knowledge-intensive MNCs’. Studying by which organizational architecture managers can foster subsidiary integration, a decentralized creation of competence, and international knowledge transfer can provide such guidance. Such insights, which point towards avenues for managerial action, are often quite relevant for practicing managers (Foss and Pedersen, 2002), and executives are generally highly interested in findings that show which elements of organizational architecture are linked to organizational outcomes (Foss et al., 2010). Since many MNCs seem to struggle with realizing the advantages from multinationality, the insights and guidance generated by studying these topics should be useful to many firms.

1.4. Aim and Overview of My Dissertation

My cumulative dissertation therefore examines the influence of organizational architecture on subsidiary integration, on the transfer of subsidiary knowledge to other units (i.e., other subsidiaries and the parent firm), and on subsidiary creation of competence that can be leveraged by other units. Since knowledge transfer to other subsidiaries and knowledge transfer to the parent firm are discussed in separate papers, my dissertation comprises the following four papers. Each paper develops hypotheses or propositions that link selected elements of formal organizational architecture to one of the advantages from multinationality specified above. Three papers test the hypotheses they comprise empirically, each by applying both regression analyses and structural equation modeling (SEM) on a sample of 287 foreign subsidiaries. The results strongly support the arguments of each paper.
The first paper (Chapter 2) analyzes the influence of selected elements of formal organizational architecture on a focal subsidiary’s integration into the MNC’s global intra-firm network. This article builds on the resource-based view to argue that subsidiary performance can be an observable criterion to measure the success of this integration. The paper hypothesizes that the encouragement of knowledge transfer, the assignment of a subsidiary mandate to undertake activities on behalf of the corporation as a whole, and the provision of little strategic and much operational autonomy are positively associated with subsidiary performance and hence the subsidiary’s integration. As all hypotheses but the one regarding strategic autonomy are supported in the empirical tests, the study indicates that setting the organizational architecture appropriately allows the parent firm to improve a subsidiary’s performance and hence its integration into the intra-firm network.

The finding that organizational architecture can affect subsidiary performance is not only interesting when performance is taken as a measure of successful integration, but also in itself. The attempts of a parent firm to orchestrate its dispersed units and the knowledge processes that occur within and across them are more likely to be successful when the subsidiaries contribute to their success (e.g., Luo, 2005; Szulanski, 2003). Therefore, it is important whether the orchestration attempts and the measures, which the parent firm employs to realize this orchestration, exert a positive effect on the subsidiaries’ willingness to contribute to their success. The effect on a subsidiary’s performance is likely to be of particular importance because subsidiaries often tend to be more interested in their own ends than in those of the parent firm or the MNC as a whole, and its own financial performance is typically among the primary interests of a subsidiary (Fey and Furu, 2008; Mudambi and Navarra, 2004; Nohria and Ghoshal, 1994). Strong financial performance can offer several advantages to the subsidiary and its staff such as reduced probability of divestment by the parent firm, greater influence on strategic decisions within the MNC, and higher bonus payments for subsidiary managers (Andersson, Forsgren and Holm, 2001; Björkman et al., 2004; Hite, Owers and Rogers, 1987). Despite its relevance, research on the antecedents of subsidiary performance is relatively scarce (Monteiro et al., 2008). By highlighting the influence of organizational architecture on subsidiary performance, the first paper thus illustrates that an appropriately set organizational architecture can stimulate a subsidiary’s willingness to make the parent firm’s orchestration attempts
succeed. This idea is also reflected in particular in two of the subsequent papers (Chapter 3 and Chapter 5).

The second paper (Chapter 3) analyzes the influence of selected elements of formal organizational architecture on inter-subsidiary knowledge transfer. This paper is framed in a (hitherto neglected) perspective of agency theory and argues that by setting the organizational architecture appropriately, the parent firm can create a situation in which it is in the subsidiaries’ self-interest to send knowledge to other subsidiaries and to receive knowledge from them (cf. Eisenhardt, 1989). The manuscript focuses on the success of knowledge transfer thus induced, rather than on transfer per se. Knowledge transfer can be considered successful when the receiving unit accumulates or assimilates new knowledge, integrates it into its context and makes use of it (Bresman, Birkinshaw and Nobel, 1999; Schlegelmilch and Chini, 2003). A focus on success-based measures of knowledge transfer has been strongly recommended since knowledge transfer per se does not necessarily imply positive consequences (Ambos, Ambos and Schlegelmilch, 2006; Haas and Hansen, 2005; Reagans and McEvily, 2003; Szulanski and Jensen, 2006). Realizing the advantage, which international knowledge transfer can provide, is therefore likely to require that the recipient actually makes use of the transferred knowledge (cf. Minbaeva et al., 2003), so that the focus on knowledge transfer success becomes particularly suitable for the topic of my dissertation. The study presented in Chapter 3 thus hypothesizes that the subsidiary’s degree of operational autonomy, the possession of a subsidiary mandate to undertake activities on behalf of the corporation as a whole, the extent to which the focal subsidiary has formal cross-unit interfaces with other subsidiaries, and the extent to which the focal subsidiary has formal interfaces with parties in the local environment of its host country are positively associated with the extent to which the subsidiary’s knowledge is successfully transferred to other subsidiaries, whereas its degree of strategic autonomy is negatively associated with this extent. These hypotheses are unanimously supported by the empirical findings.

The third paper (Chapter 4) analyzes the influence of selected elements of formal organizational architecture on knowledge transfers from a focal subsidiary to the parent firm. Building on the attention-based view (ABV) (Ocasio, 1997), it argues that (a) elements of formal organizational architecture affect the extent to which the focal
subsidiary receives attention from the parent firm, and that (b) the extent of parent firm attention attracted by this subsidiary positively affects the extent of subsidiary-to-parent knowledge transfers. Further, it argues that parent firm attention mediates the relationship between the elements of organizational architecture and these ‘reverse’ knowledge transfers. Thus, this paper highlights the critical role of parent firm attention for the parent firm’s sourcing of subsidiary knowledge, while noticing that many issues and objects compete for this naturally limited attention (Ambos and Birkinshaw, 2010; Bouquet and Birkinshaw, 2008). Organizational architecture is therefore assumed to facilitate reverse knowledge transfers by channeling parent firm attention towards the focal subsidiary. In particular, this purely conceptual paper develops the following propositions regarding the association between organizational architecture and parent firm attention: Holding a mandate for undertaking activities on behalf of the corporation as a whole and the extent to which the focal subsidiary’s mission emphasizes home-base augmenting objectives will be positively associated with the extent to which the subsidiary receives attention from its parent firm, whereas its degree of strategic autonomy will be negatively associated with the extent of parent firm attention. For operational autonomy, this paper proposes a curvilinear (U-shaped) relationship with parent firm attention, i.e., it contends that both low and high levels of operational autonomy will result in comparatively high levels of attention, while a moderate level of autonomy will be associated with little attention received.

The fourth and final paper (Chapter 5) analyzes the influence of selected elements of formal organizational architecture on subsidiary competence creation. Rather than studying the creation of any competence, the paper focuses on competence that is useful to other units inside the MNC. ‘Useful’ designates the effect that competence that a focal subsidiary creates is actively sought and leveraged by the MNC’s other units; other units are likely to leverage the focal subsidiary’s competence if the competence is useful to them (Gupta and Govindarajan, 2000a; Monteiro et al., 2008). While the competence a subsidiary creates can remain isolated and unleveraged by other units, the benefits the MNC can derive from such a competence are probably limited (e.g., Ambos and Ambos, 2009; Haas and Hansen, 2005; Monteiro et al., 2008). Focusing on competence that is leveraged by other units therefore seems to be more suitable for research that deals with the realization of competitive advantages from multinationality, as my dissertation does. This concluding paper thus argues that
an appropriately set organizational architecture stimulates the focal subsidiary’s self-interest to create competence that is useful to other units of the MNC (cf., e.g., Anthony, 1965; Camillus, 1986). Based on this argument, the manuscript hypothesizes that the stronger the subsidiary’s mission emphasizes the subsidiary’s home-base augmenting objectives, the more cross-unit interfaces with other MNC units the subsidiary has, and the lower its degree of strategic and the higher its degree of operational autonomy is, the greater the extent to which it creates such useful competence. The empirical findings unanimously support these hypotheses as well.

1.5. Overall Conclusion

As a whole, my cumulative dissertation thus suggests that the organizational architecture provides parent firm executives with powerful means to orchestrate the MNC’s dispersed units and the knowledge processes occurring within and across these units. This assessment is corroborated by the fact that twelve out of thirteen hypotheses, which are subject to empirical testing in my dissertation, find support. By setting the organizational architecture appropriately, MNCs are therefore likely able to realize the theoretically proposed competitive advantages from multinationality. The theoretical arguments put forward in my dissertation indicate that attempts to realize these advantages should take the subsidiaries’ self-interest and the bounded rationality of managers into account. Further, my dissertation suggests that firms may be able to realize the three competitive advantages simultaneously as those elements of organizational architecture that were featured in more than one of the above papers tend to have a similar effect across the papers. Thus, if they contribute to the realization of one kind of advantage, they will also be likely to facilitate the realization of another kind of advantage, and firms do not have to trade advantages against each other.

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3 A slight exception to the similarity of effects across the papers is represented by operational autonomy. Operational autonomy is hypothesized (and empirically found) to exert a (linear) positive effect on integration, on the success of inter-subsidiary knowledge transfer, and on the creation of useful competence. In contrast, the paper on subsidiary-to-parent knowledge transfers (Chapter 4) argues that operational autonomy has a U-shaped association with the extent to which the focal subsidiary receives parent firm attention.
1.6. References


Chapter 2

Achieving Subsidiary Integration in International Innovation by Managerial “Tools”

Marcus Matthias Keupp, Maximilian Palmié, and Oliver Gassmann


The final publication is available at www.springerlink.com: http://link.springer.com/content/pdf/10.1007%2Fs11575-011-0072-5
2. Achieving Subsidiary Integration in International Innovation by Managerial “Tools”

Abstract

- Our study articulates and empirically tests a theory of how the parent firm of a multinational corporation (MNC) can achieve global integration of subsidiaries into the MNC’s intrafirm network by using managerial “tools” to manipulate the MNC’s formal organizational architecture.
- Taking a subsidiary’s performance as an observable criterion to measure the success of its integration into the global intra-firm network, the model is tested on a unique dataset of 287 international R&D subsidiaries.
- Our findings suggest that the parent firm can actively improve a subsidiary’s performance and hence its integration by encouraging knowledge asset transfer, by granting the subsidiary a mandate for undertaking activities on behalf of the corporation as a whole, and by providing it with more operational autonomy.
- These findings open up a deep perspective of how subsidiary integration can be achieved by appropriate managerial “tools” in the context of international innovation. We discuss the implications of these results for the literature and for managers.

Keywords: Subsidiary Integration; Organizational Architecture; Managerial Tools; Strategic Autonomy; Operational Autonomy; International Innovation
2.1. Introduction

A major reason why multinational corporations (MNCs) exist is their ability to globally leverage dispersed subsidiary-specific advantages and to generate new knowledge through a global synthesis of dispersed knowledge (Almeida and Phene 2004; Andersson et al. 2002; Buckley and Carter 1996; Davis and Meyer 2004; Rugman and Verbeke 2001). These abilities constitute a major source of competitive advantage for MNCs (Andersson et al. 2002; Ghoshal 1986; Ghoshal and Nohria 1989; Rosenzweig and Singh 1991; Yamin and Sinkovics 2009). Over the past two decades, many MNCs have dispersed their knowledge development processes internationally and started to perform an increasing share of their research and development (R&D) activities abroad, attempting to integrate subsidiaries into a global innovation network (Cantwell 1989; Dunning 1994; Granstrand et al. 1992; Hakanson 1995; Serapio and Dalton 1999).

“Integration of subsidiaries” designates the continuous leveraging of each subsidiary’s knowledge base within the MNC (Mudambi 2002, p. 4). Typically, by such integration, MNCs strive to utilize information and other knowledge assets developed by diverse subsidiaries, to coordinate and integrate activities across geographically dispersed subsidiaries, and to centralize decision-making authority while maintaining local responsiveness (Yeniyurt et al. 2005).

While the beneficial effects of global integration have been highlighted in the literature, little attention has been devoted to the question of how (i.e., by which means) it can actually be achieved (Björkman et al. 2004; Foss and Pedersen 2002; Persaud 2005). The study of categorical subsidiary types and roles (e.g., Birkinshaw and Morrison 1995; Frost et al. 2002; Nobel and Birkinshaw 1998) contributes little to our understanding of how integration can be achieved because there might be considerable variation across subsidiaries that are assigned to the same category, and the boundaries between categories may not be clear-cut (Asmussen et al. 2009; Birkinshaw and Hood 1997; Nobel and Birkinshaw 1998). Contributions that focus on antecedents of knowledge transfers by subsidiaries (e.g., Gupta and Govindarajan 2000; Hakanson and Nobel 2001; Hansen 1999; Szulanski 1996; Zander and Kogut 1995) are limited in their ability to analyze whether or not these knowledge transfers ultimately lead to global integration of subsidiaries, since knowledge must be put to
appropriate use after transfer to generate value (Ambos and Ambos 2009; Haas and Hansen 2005; Kotabe and Mudambi 2004; Yamin and Otto 2004).

With very few knowledge-based empirical exemptions (Björkman et al., 2004; Foss and Pedersen, 2002) and the exploratory study of Persaud (2005), a persistent knowledge gap exists regarding how (i.e., by which means) integration can be achieved (Ambos and Ambos 2009; Bouquet and Birkinshaw 2008; Foss and Pedersen 2004; Luo 2002; Wu et al. 2007).

The purpose of this paper is to help close this gap by asking: “How, if at all, do managerial “tools” enhance subsidiary performance and thus contribute to global integration?” By “(managerial) tools”, we understand those means that managers use to create a promising structural context for conducting business (Doz and Prahalad 1984; Melin 1992). We focus on “tools” by which the parent firm can manipulate the MNC’s formal organizational architecture. Thus, the paper contributes to the literature in multiple ways.

First, since we study “tools” on the organizational level of analysis, we can add an organizational-level complement to the individual-level focus of prior studies that have focused on behavioral and social control mechanisms as antecedents of integration (e.g., Björkman et al. 2004; Persaud 2005). Second, using subsidiary performance as an indicator for successful integration, we simultaneously study antecedents of subsidiary performance for which empirical evidence is rare (Monteiro et al. 2008). Third, distinguishing between strategic and operational autonomy as antecedents of integration allows us to address the frequently highlighted conflict between the subsidiary’s freedom to create knowledge assets and the coordination that is necessary to globally integrate these (e.g., Birkinshaw et al. 1998; Persaud 2005; Yamin and Otto 2004) and thus to help resolve inconsistent findings on the influence of autonomy (Ambos and Schlegelmilch 2007; Young and Tavares 2004). Fourth, we contribute to resolving the paradox that many MNCs seem to re-centralize or completely localize activities rather than to achieve effective global integration (Benito et al. 2003; Currie and Kerrin 2004; Doz et al. 2006; Fors 1997; Pearce 1990; Rugman 2005) by studying how global integration can be achieved by deploying appropriate managerial “tools”. Finally, these contributions also create beneficial advice for executives (Foss and Pedersen 2002).
From a theoretical framework anchored in the resource-based view of the firm that links subsidiary performance to successful global integration, we develop hypotheses on three specific “tools”: inter-subsidary knowledge asset transfer, subsidiary mandate, and subsidiary autonomy. We use a unique sample of 287 R&D subsidiaries to test these, finding strong support for our claims. We finally discuss implications for theory, managerial practice, and future research.

2.2. Theoretical Framework and Hypotheses

The successful integration of a subsidiary into the MNC network is more likely when the parent firm’s integration attempts are actively supported by the subsidiary (Luo 2005; Szulanski 2003). Subsidiaries, however, tend to be primarily interested in their own ends and only secondarily in those of the MNC or of the parent firm (Mudambi and Navarra 2004; Nohria and Ghoshal 1994). We therefore expect that subsidiaries are more willing to attend to headquarters’ interests if they believe that headquarters’ and their own interests are compatible (Eisenhardt 1989, p. 62). Among the primary goals of a subsidiary is its interest to increase its own financial performance (Mudambi and Navarra 2004). Increased performance is likely to lead to significant advantages for the subsidiary and its staff, such as a significant reduction of the possibility that the parent firm will divest the subsidiary, greater influence on strategic decisions of the parent firm, or increasing bonus payments for subsidiary managers (Andersson et al. 2001; Björkman et al. 2004; Hite et al. 1987). A subsidiary’s willingness to contribute to global integration is therefore likely to be associated with its expected improvements of its own financial performance.

The resource-based view of the firm (RBV) suggests that superior financial performance is linked to superior resource endowments, superior resource utilization, or both (Amit and Schoemaker 1993; Barney 1991; Crook et al. 2008; Teece et al. 1997; Wernerfelt 1984). It can provide a strong conceptual foundation to analyze the effects of a global integration strategy on MNC performance (Yeniyurt et al. 2005; Zou and Cavusgil 2002). To exploit and improve an organization’s resource base are central motives of an integration strategy, since the resulting superior resource endowments are likely to lead to superior performance in the future (Yeniyurt et al. 2005, p. 3).
Substantial improvements in the resource endowments or resource utilization of the overall MNC network are likely to be associated with substantial improvements of the resource endowments or resource utilization of the involved subunits. Therefore, the parent firm should be interested in improving the subsidiary’s resource base or utilization of resources. For the same reason, subsidiary performance should be positively associated with the extent to which a subsidiary is integrated into the MNC’s global intra-firm network (Tsai 2001). Therefore, the parent firm has an incentive to manipulate its internal organizational structure such that this manipulation is likely to augment the subsidiary’s resource base or resource utilization. Such manipulation can affect the MNC’s formal structure, its informal structure, or both. In this paper, we focus exclusively on “tools” that manipulate the firm’s formal organizational structure, since managers can make discrete choices to shape their firm’s formal structure, whereas the informal organization is typically rather difficult to shape directly (Nickerson and Zenger 2002). While informal architecture merely emerges, formal architecture is explicitly mandated (Gulati et al. 2009, emphasis added). Therefore, manipulating formal structure will likely be key if managers want to change their organization (Ethiraj and Levinthal 2004). We concentrate on three specific formal “tools” for which there is consensus in the literature regarding their importance and relevance: inter-subsidiary knowledge asset transfer (cf. Kogut and Zander 1992; Luo 2002; Szulanski 1996; Townsend et al. 2004; Tsai 2002), subsidiary mandates (cf. Birkinshaw 1996; Birkinshaw et al. 1998; Cantwell and Mudambi 2005; Feinberg 2000; Roth and Morrison 1992), and subsidiary autonomy (cf. Birkinshaw et al. 2005; Gates and Egelhoff 1986; Johnston and Menguc 2007; Nobel and Birkinshaw 1998; Young and Tavares 2004).

The selection of these three particular “tools” also seems appropriate to ensure that each of the three interwoven aspects of Yeniyurt et al.’s (2005) integration framework is addressed: the encouragement of knowledge asset transfers is especially related to the emergence of a globally shared knowledge base; the granting of a mandate to the global exploitation of an individual unit’s strengths (which is the motive behind value-chain coordination); and subsidiary autonomy - especially since we distinguish between strategic and operational autonomy - to balancing central authority and responsiveness to local markets. We now develop specific hypotheses anchored in the RBV that link these “tools” to subsidiary performance by analyzing changes in resource endowments and utilization.
2.2.1. **Hypothesis 1: Association between Knowledge Asset Transfer and Subsidiary Performance**

Knowledge assets comprise information, know-how, practices, capabilities, technologies, and products (Yang et al. 2008, p. 887, p. 889). Subsidiaries that transfer knowledge assets to other subsidiaries may benefit from this transfer because engaging in knowledge transfer creates reciprocity (Gouldner 1960; Monteiro et al. 2008). Thus, knowledge tends to flow to those units that frequently share their knowledge with the rest of the organization. This is likely to end up creating a subgroup of units within the MNC that are frequently exchanging knowledge among themselves, while those units that rarely act as sources of knowledge transfers are also unlikely to receive knowledge from other units (Monteiro et al. 2008).

Subsidiaries with greater knowledge inflows generate a greater knowledge output (Mudambi and Navarra 2004). The recombination of particularly strong competencies from different units may stimulate the further development of these competencies (Kogut and Zander 1992, 2003). Thus, an isolated subsidiary that does not participate in such exchange relationships is likely to perform worse than other subsidiaries (Monteiro et al. 2008; Tsai 2001).

Further, the transfer of knowledge assets to other subsidiaries is also likely to increase the importance of the transferring subsidiary for the MNC group, which should in turn increase its bargaining power and strategic influence within the intrafirm network (Forsgren and Pedersen 2000; Forsgren et al. 2000; Mudambi and Navarra 2004). This greater bargaining power within the MNC gives the focal subsidiary the opportunity to directly appropriate a higher level of the rents that are available within the intra-MNC network (Mudambi and Navarra 2004). Therefore, by encouraging the transfer of knowledge assets between subsidiaries, the parent firm should be able to positively influence the subsidiary’s performance and thus its global integration. Thus, *Hypothesis 1:* Subsidiary performance will be positively associated with inter-subsidiary knowledge asset transfer.

2.2.2. **Hypothesis 2: Association between Mandate Status and Subsidiary Performance**

By a subsidiary mandate, the parent firm gives a subsidiary the responsibility to undertake certain activities on behalf of the corporation as a whole, implying international rather than just local responsibility for these activities (Birkinshaw et al.
We argue that such a “mandate status” should increase subsidiary performance. A subsidiary that is granted a mandate has probably already demonstrated either superior competencies in the past or at least an ability to develop such superior competencies (Andersson et al. 2002; Forsgren et al. 2000), and by conducting the corresponding activities on a larger scale, it should be able to further develop these competencies (Frost et al. 2002). Superior competencies, in turn, are positively related to superior performance (e.g., Delios and Beamish 1999), so that mandate status and superior performance should be positively associated.

Second, a subsidiary that is granted a mandate can probably increase its investments in competence development because assuming an advanced role in the MNC network - for which a mandate is likely to be a signal - is typically accompanied by additional resource investments made by the parent firm in the subsidiary (Birkinshaw and Hood 1998; Frost et al. 2002). Since greater investments stimulate the development of competencies (e.g., Barney 1991; Dierickx and Cool 1989; Frost et al. 2002), mandate status and superior performance should be positively associated.

Third, subsidiaries with a mandate often exhibit highly specialized, hard-to-imitate - and thus, rare - competencies (Birkinshaw et al. 1998; Cantwell and Mudambi 2005). Such rare competencies increase the subsidiary’s power inside the MNC network (Bouquet and Birkinshaw 2008). This increased power should provide the focal subsidiary with an improved bargaining position that enables it to directly appropriate a higher level of the rents that are available within the intra-MNC network (Mudambi and Navarra 2004).

Therefore, by giving the focal subsidiary a mandate, the parent firm should be able to positively influence the subsidiary’s performance and thus its global integration. Thus, **Hypothesis 2: Subsidiary performance will be positively associated with the possession of a subsidiary mandate received from the parent firm.**

### 2.2.3. Hypotheses 3a and 3b: Association between Autonomy and Subsidiary Performance

We model subsidiary autonomy by two distinct categories: *strategic* and *operational* autonomy, following relevant literature that recommends this differentiation (Bartlett and Ghoshal 1989; Birkinshaw 1996; Birkinshaw and Morrison 1995; Nobel and Birkinshaw 1998; Vereecke et al. 2006). We believe this differentiation is important since “autonomy is a rather fuzzy concept unless the distinction is drawn between
strategic autonomy and operational autonomy” (Glaister et al. 2003, p. 320). Strategic autonomy is defined as the subsidiary’s ability to set its own agenda, whereas operational autonomy is defined as the ability to manage designated activities in a way determined by the subsidiary itself (Bailyn 1985; Perlow 1998).

We argue that strategic autonomy will have negative implications for the subsidiary’s performance and its integration in the MNC. Put differently, autonomy can imply a lack of, endanger or actually damage integration of the subsidiary into the intra-firm network (Birkinshaw et al. 1998). This effect is likely to be stronger the more the subsidiary has the power to determine its own agenda, i.e. the more strategic autonomy it has. If the MNC wants to ensure the seamless integration of a specific subsidiary’s capabilities into the intra-MNC network, it is highly likely to endow that subsidiary with less autonomy to determine its own agenda, i.e. to reduce its strategic autonomy (Frost et al. 2002). For example, Ambos and Schlegelmilch (2007) found that the “international creator” type of subsidiary, i.e. one with distinct proprietary competence which the MNC wishes to spread throughout the global organization, had the highest degree of centralization and the least freedom to determine its own agenda. Thus, the more tightly integrated the subsidiary becomes in the corporate system, the more decisions of a truly strategic nature are taken out of the subsidiary’s hand and held at a corporate level (Birkinshaw et al. 2005, p. 235, emphasis added).

The integration of highly autonomous subsidiaries is likely to be lower due to a lack of coordination between the parent firm and the subsidiary which could lead to the subsidiary’s isolation from the rest of the organization; with a high degree of strategic autonomy, “the subsidiary can drop ‘out of the loop’ and weaken its intra-firm position” (Cantwell and Mudambi 2005, p. 1114). With increasing isolation from the rest of the MNC, it becomes less likely that the subsidiary’s capabilities and resources are recognized as being beneficial to the overall MNC network (Birkinshaw et al. 1998) so that the parent company may be less inclined to foster the further development of these capabilities and resources by additional investments (Frost et al. 2002).

Moreover, the capabilities and resources a subsidiary develops and uses in isolation are potentially less compatible with the capability and resource stocks controlled by other units within the MNC. This may limit the subsidiary’s ability to benefit from the capabilities and resources available in the MNC network (Kogut and Zander 1992,
Further, the subsidiary should be interested in promoting such compatibility, since recombinations of capabilities and resources from different locations are especially hard to imitate (McEvily and Chakravarthy 2002). Therefore, if the subsidiary can recombine its own resources and capabilities with those of other organizational units, it may well achieve an improved inimitability of its resource base. This, in turn, may improve its financial performance in the long run since the uniqueness of a resource increases with its inimitability (Barney 1991). Finally, when other units are less able to make use of the capabilities and resources developed by the focal subsidiary, the role of this subsidiary within the MNC is weakened (Forsgren and Pedersen 2000; Forsgren et al. 2000). The financial performance of a subsidiary with high strategic autonomy may therefore be hampered by a reduced ability to influence strategic decisions of the MNC and to appropriate firm-internal rents (Mudambi and Navarra 2004). Therefore, the less a subsidiary can alter its resource base and capabilities independently, the lower should the probability be that such changes will lead to incompatibility. Thus,

**Hypothesis 3a:** Subsidiary performance will be negatively associated with the subsidiary’s level of strategic autonomy.

The degree of operational autonomy a subsidiary possesses designates the range and extent of preset tasks it may address autonomously. One of the areas in which an operationally autonomous subsidiary might make its own decisions is the cooperation with external firms and organizations which is largely an operational, rather than a strategic issue (Nobel and Birkinshaw 1998). Being allowed to collaborate with external partners of its own choice, the subsidiary is probably better able to form favorable linkages with parties in its local environment (Andersson and Forsgren 2000; Birkinshaw et al. 1998). Thus, it can learn more from the local system of innovation and better use and recognize local resources and competencies (Andersson et al. 2002; Pearce 1999; Rugman and Verbeke 2001). Indeed, knowledge about external opportunities can be considered a resource itself (Cyert et al. 1993). Thus, the higher its operational autonomy, the more the subsidiary should be able to learn from external sources and thus to improve its resource base. With its stronger knowledge about external opportunities, a subsidiary with high operational autonomy should also be more responsive to these opportunities which has been found to improve performance (Zahra and Covin 1995).
Additionally, a subsidiary that is granted only little operational autonomy by its parent firm is likely bound to provide its employees with less operational autonomy than it could if it had received more operational autonomy itself. Yet, operational autonomy gives employees the opportunity to “approach problems in ways that make the most of their expertise and creative-thinking skills” (Amabile 1997, p. 82) and thus fosters their intrinsic motivation, creativity, and finally organizational innovation (Amabile 1997; Glynn 1996). Therefore, subsidiaries are likely to create both new knowledge and competencies due to their operational freedom (Ambos and Schlegelmilch 2007, p. 476, emphasis added). Moreover, this knowledge and these competencies should be relevant to the rest of the firm, since the tight control the parent firm is able to exert on the subsidiary’s agenda will likely avoid duplication and irrelevance of any knowledge the subsidiary creates.

Finally, knowledge assets created by the interaction of the subsidiary with its local environment may be hard to imitate for other units within the MNC network. Thus, such knowledge assets can be very attractive to and create a lot of value for these other units. The expected demand for such rare assets may therefore provide the focal subsidiary with a stronger bargaining position within the MNC, allowing it to appropriate more firm-internal rents (Mudambi and Navarra 2004). Therefore,

Hypothesis 3b: Subsidiary performance will be positively associated with the subsidiary’s level of operational autonomy.

2.3. Data and Methods

2.3.1. Population and Sampling Frame

Our sample consisted of subsidiaries with a main responsibility for research and development (R&D). We used the database ThomsonOne to identify Swiss and German firms irrespective of their industry affiliation. We focused on Swiss and German firms because they are characterized by a high degree of R&D internationalization (Serapio and Dalton 1999). The search yielded a list of 1,254 firms (983 German, 271 Swiss).

We only retained those firms that were MNCs and which had deliberately set up an international R&D structure (Bartlett and Ghoshal 1989). We checked these criteria by reading the annual report of every firm and by making additional confirmatory phone calls. This process resulted in the exclusion of 750 firms from the sampling frame. The
remaining 504 firms accounted for an average of 68% of all sales in their respective industry. We then contacted the top management of these remaining firms, explained our research topic and asked for participation in the study. 159 firms (104 German, 55 Swiss) chose to cooperate. Correspondence with corporate-level senior R&D managers of these firms led to the identification of 923 foreign subsidiaries. These constituted the population from which we drew our random sample.

2.3.2. Item Development

Our measurement approach is largely based on the collection of psychometric survey data from individual informants. The use of such shared unit-level constructs (Klein and Kozlowski 2000) is of course an approximation as different individuals have different perceptions about subsidiary characteristics, and thus the projection of individual-level cognition to the organizational level should be considered a heuristic (Schneider and Angelmar 1993). However, the interviews during the item revision phase suggested that a subsidiary’s general or top R&D manager would likely be in a position to make sound assessments. We therefore think our approach is acceptable as it can be presumed that individual top-level employees are most familiar with their subsidiary’s characteristics and its relationships with other units in the firm.

For item generation, we conducted a careful review of the relevant literature and related scales. With the exception of the variable “inter-subsidiary knowledge asset transfer”, all measures were adopted from existing scales. As to the best of our knowledge no scale to measure “inter-subsidiary knowledge asset transfer” is available, we employed a rigorous item creation and validation process for this scale, following recommendations in the measurement literature (Churchill 1979; Schriesheim et al., 1993). This process started with a preliminary item list that we produced based on the literature review and consisted of iterative rounds of discussions with international academics and R&D managers from four MNCs to ensure content, face, and external validity of our emerging construct. To incorporate their feedback, we made substantive changes to the latest list if necessary, and discussed the revised list again with professors and managers until both groups came to the conclusion that no further clarifications and amendments would be necessary. This process enabled us to produce a carefully tested questionnaire instrument.
2.3.3. Measurement

All constructs considered in this investigation refer to the subsidiary as the unit of analysis. Accordingly, all variables were specified on the subsidiary level. The items and scales are reproduced in appendix A. All scales were constructed by adding up individual item scores and dividing the sum by the number of items in the scale (Dess and Davis 1984; Trevor and Nyberg 2008).

2.3.3.1. Dependent Variable

Subsidiary performance was measured by a three item scale that we adapted from Birkinshaw and Morrison (1995). We used seven-point items anchored at “we perform much worse than the parent firm” (1) and “we perform much better than the parent firm” (7). Given the above scale construction method, the scale is conditioned on values between 1 and 7, which is why we prefer Tobit models for analysis (Cronbach’s alpha = 0.8990).

2.3.3.2. Independent Variables

Knowledge asset transfer was measured by a self-developed six item scale anchored at “not at all” (1) and “to a great extent” (7). It measures the extent to which knowledge assets developed by the focal subsidiary were of use in sister units (alpha = 0.9378). Operational autonomy and strategic autonomy were measured by scales that we adapted from Nobel and Birkinshaw’s (1998) “centralization” scale; the items were anchored at “headquarters decide” (1) and “subsidiary decides” (7). “Strategic autonomy” is defined as the subsidiary’s ability to set its own agenda, whereas “operational autonomy” is defined as the ability to deal with designated day-to-day issues autonomously (Bailyn 1985; Perlow 1998) (alpha = 0.6892 for strategic and 0.6862 for operational autonomy). Subsidiary mandate status was measured by a dichotomous indicator originally developed by Birkinshaw et al. (1998). We asked the respondents “Does your subsidiary undertake any R&D activity on behalf of the corporation as a whole?”. This indicator was coded “1” if the subsidiary has received a mandate from the parent firm, and “0” otherwise.

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Nobel and Birkinshaw (1998, p. 495) found that their centralization scale resulted in two different factors which they termed “strategic issue centralization” and “operational issue centralization”, respectively.
2.3.3.3. **Control Variables**

**Tacitness of subsidiary’s knowledge.** By combining items from Zander and Kogut’s (1995) “teachability” and “codifiability” scales, we created the scale for our control variable “tacitness”. It measures how easily the subsidiary’s knowledge can be described and learned; the items were anchored at “strongly disagree” (1) and “strongly agree” (7) (alpha = 0.8312).

**Observability of subsidiary’s knowledge.** We control for observability by including the three-item scale of Birkinshaw et al. (2002). It measures how well the subsidiary’s knowledge can be learned by observation; the items were again anchored at “strongly disagree” (1) and “strongly agree” (7) (alpha = 0.7768).

**Demographic controls.** We control for subsidiary R&D intensity by its R&D expenses relative to its budget, for subsidiary size by the logged number of its employees, for subsidiary age by subtracting the year in which the subsidiary started operations for the parent firm from 2009, for subsidiary location by individual country dummies and for subsidiary industry by individual industry dummies on the two-digit level using the NACE classification.

2.3.4. **Questionnaire, Data Collection Procedure and Post-Hoc Tests**

We produced a fully standardized questionnaire by following validated academic procedures of questionnaire design (Dillman 2000). For data collection, each firm was emailed a copy of the questionnaire together with a cover letter that explained the aims of the study, guaranteed complete confidentiality, and offered the study results as an incentive to cooperate. By short telephone calls we announced the arrival of the questionnaire and asked the subsidiary’s general manager or top R&D manager (our key informants) for cooperation.

We emailed reminder letters to all managers that had not yet responded 14 and 30 days after the original questionnaire had been emailed. From the total of 923 subsidiaries, 290 responded, yielding a favorable response rate of 31.42%. Three observations could not be used due to too much missing data, thus 287 complete observations remained for subsequent analysis. Missing data were few and completely at random.

We then carried out several post-hoc analyses and validation surveys to assure the representativeness of respondent data and to validate responses received from informants. No significant response bias by response vs. non-response, response time, and subsidiary demographic characteristics were detected.
Further, to minimize common method variance, we validated data collection by re-collecting data on the dependent variable “subsidiary performance” from the respective parent firm and by re-collecting the complete questionnaire data from a second manager in the subsidiary six weeks after initial data collection using randomly drawn subsamples. High inter-rater reliability between the original and the confirmation data alleviated common method bias concerns (Nunnally and Bernstein 1994). Further, there was no evidence of a large number of subsidiaries responding from a single MNC, so that our sample is unlikely to be biased by possible cluster effects.

2.3.5. Assessment of Reliability and Validity of Measures

We relied on diverse approaches to test the reliability and validity of both our items and our scales. All applied methods consistently suggest high levels of reliability and validity. To test the reliability of our items, we calculated item-test, item-rest, and average inter-item correlations. On the scale level, we calculated Cronbach’s alpha for each scale (cf. Nunnally and Bernstein 1994).

To examine the convergent and discriminant validity of our measures, we relied on psychometric methods. Convergent validity of our items was established by calculating overlap-corrected correlations between an item and the scale it pertains to (cf. Nunnally and Bernstein 1994) and convergent validity of our scales by applying principal component factor analysis with oblique rotation. Ultimately, 23 items were retained which formed six scales. Table 2.1 reports loadings, cross-loadings, and communalities for these items. The scales capture the subsidiary's performance (Cronbach’s alpha = 0.8990), its operational autonomy (alpha = 0.6862), its strategic autonomy (alpha = 0.6892), its knowledge asset transfer (alpha = 0.9378), the tacitness of its knowledge (alpha = 0.8312) as well as the observability of its knowledge (alpha = 0.7768).

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5 The results of these calculations are not reported here due to limitation of space, they are available from the corresponding author.
6 That is, the scale is calculated without the specific item in question to avoid inflating the correlation.
7 We used oblique rotation because we expected the emerging factors to be theoretically related (Hair et al. 1998).
8 Both the Bartlett test of sphericity ($\chi^2 = 2935.726$ with 253 d.f., $p = 0.000$) and the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA = 0.8016, “meritorious”) indicated the data matrix was eligible for factor analysis. A factor was retained prior to rotation if its eigenvalue was greater than unity (Kaiser-Guttman criterion).
Table 2.1. Final Set of Oblimin-Rotated Factors

<table>
<thead>
<tr>
<th>Item (paraphrased)¹</th>
<th>1 “Knowledge asset transfer”</th>
<th>2 “Tacitness of knowledge”</th>
<th>3 “Subsidiary performance”</th>
<th>4 “Observability of knowledge”</th>
<th>5 “Strategic autonomy”</th>
<th>6 “Operational autonomy”</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERFROI: Return on Investment</td>
<td>0.1586 0.0058</td>
<td>0.8777 0.0610</td>
<td>-0.0371 0.0897</td>
<td>0.8086</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERFFPROFIT: Profit</td>
<td>0.0592 0.0695</td>
<td>0.9229 -0.0273</td>
<td>0.0338 -0.0245</td>
<td>0.8625</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERFPCF: Cashflow</td>
<td>0.1331 -0.0020</td>
<td>0.8966 0.0349</td>
<td>0.0681 0.0217</td>
<td>0.8279</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT1: Product technology</td>
<td>0.8859 -0.0102</td>
<td>0.0095 0.0558</td>
<td>-0.0038 0.0254</td>
<td>0.7888</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT2: Process technology</td>
<td>0.8519 0.0305</td>
<td>0.1094 -0.0188</td>
<td>0.0284 -0.0192</td>
<td>0.7402</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT3: Information and know-how</td>
<td>0.8958 0.0760</td>
<td>0.0693 -0.0397</td>
<td>0.0016 -0.0104</td>
<td>0.8147</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT4: Saving R&amp;D expenditures</td>
<td>0.8415 -0.0420</td>
<td>0.0009 0.0735</td>
<td>-0.0643 0.0667</td>
<td>0.7239</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT5: Competencies useful</td>
<td>0.8711 0.0542</td>
<td>0.0961 -0.0480</td>
<td>0.0643 -0.0423</td>
<td>0.7792</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAT6: Creating value</td>
<td>0.9132 -0.0200</td>
<td>0.0766 0.0444</td>
<td>-0.0489 -0.0252</td>
<td>0.8451</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAUT1: Overall direction of activities</td>
<td>-0.1144 0.0245</td>
<td>0.1198 -0.1186</td>
<td>0.7711 0.1257</td>
<td>0.6526</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAUT2: New projects to pursue</td>
<td>-0.0018 -0.0205</td>
<td>0.0026 0.0455</td>
<td>0.8996 0.0873</td>
<td>0.8195</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAUT3: Product design</td>
<td>0.1296 -0.0585</td>
<td>-0.0286 0.2509</td>
<td>0.6615 0.0917</td>
<td>0.5300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPAUT1: Hiring and firing senior staff</td>
<td>-0.0182 -0.0757</td>
<td>0.1034 -0.0536</td>
<td>0.1909 0.6776</td>
<td>0.5152</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPAUT2: Training programs</td>
<td>0.0773 -0.0136</td>
<td>-0.0339 0.0240</td>
<td>0.0306 0.7729</td>
<td>0.6061</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPAUT3: Salary level</td>
<td>-0.1058 -0.0166</td>
<td>0.0187 -0.0628</td>
<td>0.0683 0.7032</td>
<td>0.5150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPAUT4: Transfer of subsidiary staff</td>
<td>-0.0109 0.0923</td>
<td>0.1544 -0.0845</td>
<td>0.2861 0.6173</td>
<td>0.5025</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAC1: Easily described in manuals</td>
<td>0.0227 0.7766</td>
<td>0.0003 0.1087</td>
<td>0.0134 -0.0429</td>
<td>0.6175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAC2: Talking to staff</td>
<td>0.0661 0.8629</td>
<td>0.0229 0.1174</td>
<td>0.0565 -0.0009</td>
<td>0.7664</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAC3: Training easy and quick</td>
<td>-0.0083 0.8051</td>
<td>0.0074 0.1319</td>
<td>-0.0877 -0.0103</td>
<td>0.6735</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAC4: University graduates</td>
<td>0.0250 0.7762</td>
<td>0.0791 0.1489</td>
<td>-0.0355 0.0277</td>
<td>0.6335</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS1: Observing employees</td>
<td>0.0402 0.2987</td>
<td>0.0520 0.7282</td>
<td>-0.0054 -0.0315</td>
<td>0.6249</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS2: Tour of facilities</td>
<td>0.0213 0.1928</td>
<td>0.0674 0.8435</td>
<td>0.0765 -0.0200</td>
<td>0.7599</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS3: Examining machines</td>
<td>0.0247 0.0918</td>
<td>-0.0266 0.8376</td>
<td>-0.0057 -0.0406</td>
<td>0.7131</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Eigenvalue
Proportion of variance explained
Cumulative variance explained

Note to table 2.1:

a. See the appendix for a full account of each item’s wording.
Together, these six factors explain 70.09% of the variance. Direct factor loadings were high (all above 0.60), while no cross-loading exceeded 0.30, indicating a high degree of convergent validity (Hair et al. 1998). We used Harman’s one-factor test to assess potential common method variance induced by our use of single informants to measure corporate characteristics. The fact that six factors emerged and that the first factor only explained 20.50% of the variance makes it unlikely that common method variance is a major concern (Podsakoff and Organ 1986).

We then examined item *discriminant validity* by using a multitrait and multi-item correlation matrix approach in which the correlation of each item with each scale is examined (Ware and Gandek 1998). We further calculated average variance extracted and compared its square root to the correlation coefficients among the scales (Fornell and Larcker 1981; Staples et al. 1999). Both analyses suggested a high level of discriminant validity.

### 2.4. Results

#### 2.4.1. Descriptive Statistics and Results of Hypothesis Testing

Table 2.2 provides descriptive statistics and correlations for all variables. Since the dependent variable is conditioned on values between 1 and 7, we fit Tobit models to our data. All estimates use robust (Huber-White) standard errors to correct for potential heteroscedasticity. All models were constructed incrementally by first entering only the controls in a baseline model and then adding the covariates of each hypothesis step by step. We compared the respective model fits by calculating Akaike information criteria (AIC); this procedure suggested that the full model which includes all independent variables and controls fits the data best. Since all industry and country dummies, respectively, are perfectly collinear, the machinery industry and Germany serve as the respective baseline categories in all models. Table 2.3 shows estimation results for the different models.

For all hypotheses but one, the found signs match the predicted signs. Three of the four hypotheses are supported at p < 0.05: H1 which posited a positive relationship between knowledge asset transfer and the subsidiary’s performance, H2 which predicted a positive relationship between its mandate status and its performance, and H3b which posited a positive relationship between the subsidiary’s operational
### Table 2.2. Descriptive Statistics and Correlations\textsuperscript{a,\textsuperscript{b}}

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Subsidiary Performance</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Knowledge asset transfer</td>
<td>0.156</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Subsidiary mandate</td>
<td>0.159</td>
<td>0.264</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Strategic autonomy</td>
<td>0.068</td>
<td>0.024</td>
<td>-0.009</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Operational autonomy</td>
<td>0.064</td>
<td>-0.004</td>
<td>-0.009</td>
<td>0.330</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Tacitness of knowledge</td>
<td>0.046</td>
<td>0.036</td>
<td>0.059</td>
<td>-0.024</td>
<td>-0.034</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Observability of knowledge</td>
<td>-0.013</td>
<td>0.019</td>
<td>0.005</td>
<td>0.074</td>
<td>-0.146</td>
<td>0.325</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 R&amp;D intensity</td>
<td>0.011</td>
<td>0.188</td>
<td>0.211</td>
<td>-0.063</td>
<td>0.064</td>
<td>-0.118</td>
<td>-0.201</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Size\textsuperscript{c}</td>
<td>0.081</td>
<td>0.350</td>
<td>0.254</td>
<td>0.115</td>
<td>0.074</td>
<td>-0.068</td>
<td>0.037</td>
<td>-0.056</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>10 Age</td>
<td>0.140</td>
<td>0.298</td>
<td>0.070</td>
<td>-0.002</td>
<td>-0.114</td>
<td>0.002</td>
<td>0.035</td>
<td>-0.084</td>
<td>0.215</td>
<td>1.000</td>
</tr>
<tr>
<td>Mean</td>
<td>4.204</td>
<td>4.148</td>
<td>0.602</td>
<td>4.364</td>
<td>4.924</td>
<td>3.793</td>
<td>3.338</td>
<td>13.781</td>
<td>5.553</td>
<td>20.300</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>1.221</td>
<td>1.749</td>
<td>0.490</td>
<td>1.240</td>
<td>1.091</td>
<td>1.256</td>
<td>1.324</td>
<td>25.729</td>
<td>1.811</td>
<td>21.741</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1.75</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0.693</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>100</td>
<td>10.933</td>
<td>161</td>
</tr>
</tbody>
</table>

\textit{Notes to table 2.2:}

a. Correlations were computed under inclusion of the country and industry dummies as well. However, for the sake of brevity and readability, they are not reported here. These extensive results are available from the corresponding author.

b. Spearman correlations used due to the non-normal distribution of most variables. Correlations above |0.118| are significant at p < 0.05.

c. Logged variable
| Table 2.3. Robust Tobit Estimates for Dependent Var. Subsidiary Performance<sup>a,b</sup> |
|----------------------------------|---------------|---------------|----------------|----------------|
|                                | Model 1       | Model 2       | Model 3        | Model 4        |
| Knowledge asset transfer        | 0.144** (0.056) | 0.123* (0.058) | 0.125* (0.058) | 0.125* (0.058) |
| Subsidiary mandate              | 0.316* (0.158) | 0.307* (0.158) | 0.009 (0.069)  | 0.180* (0.076) |
| Strategic autonomy               | 0.080 (0.044)  | 0.029 (0.047)  | 0.013 (0.045)  | 0.007 (0.045)  |
| Operational autonomy             | 0.003 (0.003)  | 0.001 (0.003)  | 0.002 (0.003)  | 0.003 (0.003)  |
| Tacitness                        | 0.074 (0.073)  | 0.093 (0.076)  | 0.088 (0.076)  | 0.085 (0.074)  |
| Observability                    | -0.028 (0.072) | -0.035 (0.074) | -0.035 (0.073) | -0.022 (0.072) |
| R&D intensity                    | -0.000 (0.003) | -0.002 (0.003) | -0.002 (0.003) | -0.004 (0.003) |
| Size                             | 0.080 (0.044)  | 0.029 (0.047)  | 0.013 (0.045)  | 0.007 (0.045)  |
| Age                              | 0.003 (0.003)  | 0.001 (0.003)  | 0.002 (0.003)  | 0.003 (0.003)  |
| Switzerland                      | 0.734** (0.283) | 0.681* (0.279) | 0.687** (0.274) | 0.636* (0.279) |
| USA                              | 0.203 (0.269)  | 0.227 (0.262)  | 0.232 (0.257)  | 0.203 (0.274)  |
| China                            | -0.092 (0.289) | 0.094 (0.303)  | 0.074 (0.296)  | 0.035 (0.301)  |
| Italy                            | 0.426 (0.521)  | 0.325 (0.526)  | 0.353 (0.531)  | 0.376 (0.516)  |
| France                           | -0.081 (0.417) | -0.183 (0.434) | -0.162 (0.416) | -0.068 (0.401) |
| UK                               | 0.752* (0.352) | 0.667* (0.330) | 0.698* (0.331) | 0.634 (0.347)  |
| Other Western Europe             | 0.068 (0.244)  | 0.044 (0.248)  | 0.049 (0.240)  | -0.023 (0.249) |
| Eastern Europe                   | 0.060 (0.351)  | 0.196 (0.381)  | 0.210 (0.373)  | 0.217 (0.396)  |
| Other America                    | 0.024 (0.570)  | 0.297 (0.567)  | 0.306 (0.579)  | 0.342 (0.586)  |
| Other Asia                       | 0.841* (0.343) | 0.900** (0.326) | 0.896** (0.326) | 0.783* (0.335) |
| Other locations                  | 0.407 (0.335)  | 0.570 (0.346)  | 0.650 (0.314)  | 0.682* (0.326) |
| Electronics                      | -0.014 (0.240) | -0.071 (0.248) | -0.064 (0.244) | -0.019 (0.244) |
| Chemicals                        | -0.011 (0.269) | -0.024 (0.276) | -0.034 (0.270) | 0.037 (0.273)  |
| Pharmaceuticals                  | -0.303 (0.343) | -0.225 (0.340) | -0.262 (0.328) | -0.228 (0.327) |
| Basic metals                     | 0.942* (0.413) | 1.125** (0.411) | 1.179** (0.405) | 1.219** (0.390) |
| Automotive                       | 0.580* (0.271) | 0.512 (0.273)  | 0.502 (0.275)  | 0.623* (0.291) |
| Other transport equip.           | -0.591 (0.383) | -0.528 (0.381) | -0.646 (0.380) | -0.613 (0.395) |
| Electrical equipment             | 0.238 (0.440)  | 0.282 (0.409)  | 0.295 (0.398)  | 0.396 (0.431)  |
| Other industries                 | -0.338 (0.236) | -0.332 (0.243) | -0.316 (0.240) | -0.217 (0.237) |
| Constant                         | 3.272*** (0.369) | 2.959*** (0.387) | 2.950*** (0.387) | 1.984*** (0.559) |
| Log-pseudolikelihood             | -381.102       | -369.516       | -367.564       | -357.151       |
| McFadden's Pseudo R<sup>2</sup>  | 0.046          | 0.057          | 0.062          | 0.069          |
| F statistic (d. f.)              | 2.23*** (24; 223) | 2.63*** (25; 217) | 2.91*** (26; 216) | 2.80*** (28; 208) |
| AIC                              | 814.204        | 793.031        | 791.127        | 774.301        |
| Number of observations           | 247            | 242            | 242            | 236            |

Notes to table 2.3:

a. * p < 0.05; ** p < 0.01; *** p < 0.001 (two-tailed test). Robust standard errors in parentheses.

b. Baseline categories are Germany for the country and Machinery for the industry dummies.

autonomy and its performance. H3a which asserted a negative relationship between the subsidiary’s strategic autonomy and its performance fails to gain support. Additionally, we find some of the control variables are significant: Subsidiaries located in Switzerland, in Non-Chinese Asia, and in “other locations” tend to achieve a significantly higher performance (all at p < 0.05) than subsidiaries located in Germany (our reference category).
2.4.2. Sensitivity Tests and Alternative Specifications

We performed additional analyses to ensure the validity of these results. First, robust OLS regression models\(^9\), standardized normal probability plots, Shapiro-Wilk and Kolmogorov-Smirnov tests all indicated that the Tobit model assumptions were met and the estimated coefficients and standard errors were stable. To assess whether multicollinearity of measures was a problem, we computed variance inflation factor (VIF) indices. Both the maximum (2.16) and the mean VIF (1.54) are well below the threshold of 10, alleviating multicollinearity concerns (Chatterjee et al. 2000). While the magnitude of coefficients reflected the differences of OLS vs. Tobit model metrics, the patterns of significance across all hypothesized coefficients as well as their signs remained stable.

Second, since our measurement approach is largely based on the collection of psychometric survey data from individual informants, we also applied structural equation modeling (SEM) to control for latent variable effects. With the exception of the country dummies, all independent and control variables of our full regression model were entered as exogenous variables and the dependent variable as the endogenous variable into the structural equation model.\(^10\) Covariances between the exogenous variables were modeled if the respective exogenous variables could be theoretically expected to covary and if the corresponding modification index was above 10.0 (cf. Denison et al. 1996; Sabherwal et al. 2006), indicating that including this covariance substantially improves model fit.

Figure 2.1 depicts the structure of the model using maximum likelihood (ML) estimation and reports standardized factor loadings and path coefficients. The model fits the data adequately ($\chi^2 = 686.807$ with 509 d.f., $p < 0.000$; GFI = 0.862; AGFI = 0.829; NFI = 0.812; NNFI = 0.932; CFI = 0.942; RMSEA = 0.039) (e.g., Bollen 1989; Kline 2005). As it can be seen from Figure 2.1, this model, too, supports H1 ($p < 0.01$), H2 ($p < 0.10$), and H3b ($p < 0.05$), whereas H3a fails to gain support. Thus, the Tobit model results are confirmed.

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\(^9\) The results of the robust OLS analyses are available from the corresponding author upon request.

\(^10\) While model fit is still acceptable when country dummies are included as well, we prefer to omit them since their inclusion does not significantly change the pattern in which the SEM supports our hypotheses.
2.5. Discussion

Our study articulated and tested a model of how the parent firm of an MNC can achieve global integration of subsidiaries by using managerial “tools” to manipulate the MNC’s formal organizational architecture. We used subsidiary performance as an observable criterion to measure integration success. The empirical results confirm our theoretical arguments that the parent firm can actively improve a subsidiary’s performance and hence its integration by encouraging inter-subsidiary knowledge transfer.
asset transfer, assigning subsidiary mandates, and providing operational autonomy. These results have implications for the literature and for managers.

First, we extend previous research on how integration can be achieved. Our study is one of the first to provide an unusually detailed account of the links between managerial action by “tools” that manipulate organizational structure and successful integration. It helps close the frequently highlighted knowledge gap concerning the link between managerial action and integration (e.g., Ambos and Ambos 2009; Björkman et al. 2004; Bouquet and Birkinshaw 2008; Foss and Pedersen 2002; Foss and Pedersen 2004; Luo 2002; Persaud 2005; Wu et al. 2007). The mechanisms of managerial “tools” we study allow academics and managers to track how the theoretical benefits of global integration can actually be achieved. This knowledge is in high demand (e.g., Andersson et al. 2002; Ghoshal 1986; Ghoshal and Nohria 1989; Rosenzweig and Singh 1991; Yamin and Sinkovics 2009).

Given the tendency among many MNCs to re-centralize or completely localize activities, the problems with global integration seem overwhelming (Benito et al. 2003; Currie and Kerrin 2004; Doz et al. 2006; Fors 1997; Pearce 1990; Rugman 2005). We could show that successful integration is possible when firms take appropriate actions to induce it, making a case that global integration is possible if appropriate “tools” are used.

By using subsidiary performance as a measure for successful integration, we also contribute to the investigation of antecedents of subsidiary performance on which empirically validated knowledge is very scarce (Monteiro et al. 2008). The finding that by encouraging knowledge asset transfers from the subsidiary to other organizational sub-units, the parent firm can actively promote subsidiary performance extends prior research that analyzes the effect of knowledge sharing on the performance of an individual unit (e.g., Monteiro et al. 2008; Tsai 2001). Whereas these previous observations of a positive association did not account for the extent to which the recipient has actually used the transferred knowledge, our results suggest that the positive association persists when the extent of knowledge use is considered. Moreover, this finding responds to the call that the actual outcomes of knowledge-based production, rather than the transfer of knowledge itself, should be studied (Ambos and Ambos 2009; Haas and Hansen 2005; Kotabe and Mudambi 2004; Yamin
and Otto 2004). Further, our use of subsidiary performance as the dependent construct allows us to extend previous studies that have used knowledge-based perspectives to study global integration (e.g., Björkman et al. 2004; Foss and Pedersen 2002), corroborating theoretical predictions that multidimensional conceptualizations of global integration may be fruitfully employed in large-sample empirical testing (e.g., Persaud 2005; Yeniyurt et al. 2005).

We found no support for the hypothesized negative association between strategic autonomy and subsidiary performance. This could be due to the fact that a subsidiary empowered to decide about strategic issues independently is unlikely to use this freedom to detach itself from the MNC’s global organization. Rather, such a subsidiary is likely to behave such that it can still reap the benefits of intra-firm collaboration while maintaining its relatively high degree of independence (cf. Cantwell and Mudambi 2005; Persaud 2005).

Moreover, our results suggest that strategic and operational autonomy do not have the same effect on successful global integration. We believe that the distinction between strategic and operational autonomy can at least partly explain why the overall findings regarding autonomy are unclear (see Birkinshaw and Morrison 1995; Nobel and Birkinshaw 1998; Vereecke et al. 2006). Thus, our findings answer the repeated call for a better understanding of the autonomy construct (Ambos and Schlegelmilch 2007; Glaister et al. 2003; Young and Tavares 2004). Our study is among the first to explicitly formulate separate hypotheses for strategic and operational autonomy. We believe that our findings and theoretical arguments open up promising paths for future research that can build on our results to deepen the theoretical understanding and nuances of subsidiary autonomy.

By highlighting the association between integration and subsidiary performance, our study complements the literature that stresses the benefits of integration from the parent company’s or the overall MNC’s view (e.g., Bartlett and Ghoshal 1989; Cavusgil et al. 2004; Townsend et al. 2004; Yeniyurt et al. 2005; Zou and Cavusgil 2002). There are basically two ways for a subsidiary to attain superior financial performance – first, by being successful on the external market, and second, by using its bargaining power to appropriate more internal rents (Mudambi and Navarra 2004).
Our hypotheses are built on both arguments, suggesting that the parent firm’s endeavors to integrate the subsidiary more tightly into the MNC’s global network allow the subsidiary to improve both its supply for the external market and its firm-internal bargaining position. We acknowledge the argument that internal rent-seeking by subsidiaries may be inefficient from a parent firm perspective (Mudambi and Navarra 2004, p. 386), implying that superior subsidiary performance does not necessarily entail superior corporate performance.¹¹ Yet, given that the above literature linking integration and overall firm performance consistently suggests that global integration is profitable from the overall firm’s perspective, it seems that the parent company and its subsidiaries have a common interest in a successful global integration of the MNC. This bears an important implication for those future studies that aim to explain why a considerable share of MNCs apparently experiences substantial problems in realizing the prospective benefits of becoming an integrated company: we show that these problems are unlikely to be rooted in categorical subsidiary resistance against the parent’s strategy.

Our findings also have a number of managerial implications. First, parent firm managers can benefit from our explanations of how managerial “tools” are associated with subsidiary performance and integration since they provide managers with relatively straightforward suggestions of how to deploy these “tools” (Foss and Pedersen 2002). Further, they can benefit from our finding that tight integration into the MNC’s global network can be profitable from the subsidiary’s point of view. Thus, parent firm managers may review and adjust monitoring devices and expenditure used in headquarter-subsidiary relationships since the subsidiaries’ self-interest in good performance should motivate them to attend to the parent firm’s goals (cf. Aulakh et al. 1996; Eisenhardt 1989; Osterloh and Frey 2000). At the same time, parent firm managers might consider instruments to counter rent-seeking behavior of subsidiary managers that may thwart this motivation, e.g. by establishing inter-subsidiary teams to build emotional loyalty (Mudambi and Navarra, 2004).

Our study also opens up some paths for future research. First, a more intensive examination of strategic vs. operational autonomy seems desirable. Further, future

¹¹ We are grateful to an anonymous reviewer for pointing our attention to this issue.
research could also extend our study by studying the extent to which the positive association between integration and subsidiary performance can be traced to internal rent appropriation as opposed to external market position. Separating these influences conceptually and empirically would provide an excellent robustness test for our argument that the parent firm and its subsidiaries should have a common interest in achieving successful global integration. It would be particularly instructive to examine the relationship between global integration and strong subsidiary performance after controlling for internal rent-seeking.

We focused on a carefully selected subset of managerial “tools” by which the formal organizational structure can be manipulated. Future research could complement our approach by studying “tools” that can manipulate the informal organizational structure and the interactions (if any) between these two types of “tools”. Further, since our cross-sectional empirical approach only allows us to infer association, not causality, more processual approaches that focus on the micro-processes of integration over time seem desirable. Further, knowledge flows and performance may be self-reinforcing mechanisms since consistent above-average performance may provide a subsidiary with slack resources that can further facilitate knowledge transfers (Monteiro et al. 2008, p. 103). Thus, future research could use endogeneity or simultaneous-equation models to study such recursive paths. Finally, we collected shared-level constructs from individual respondents to operationalize our constructs. While the techniques we used to assert the reliability and validity of our measures suggested the absence of significant subjective bias, future research may complement our work with archival measures to triangulate data sources.
2.6. References


2.7. Appendix to Chapter 2: Questionnaire Items

The following list gives an overview over the items that were synthesized into the respective factor according to the results of the reported factor analysis. All items were measured on Likert scales ranging from 1 to 7.

Subsidiary performance (Cronbach's alpha = 0.8990):
Regarding the following criteria, how does your subsidiary perform compared to your parent company? “1” means “we perform much worse than the parent company”, “4” means “our performance is equal to the parent firm”, and “7” means “we perform much better than the parent firm”.

- PERFROI: Return on Investment
- PERFPROFIT: Profit
- PERFCF: Cash Flow

Inter-subsidiary knowledge asset transfer (alpha = 0.9378):
“1” means “not at all”, “7” “to a great extent”.

- KAT1: Our subsidiary has developed product technology that was also applied in other subsidiaries.
- KAT2: Our subsidiary has developed process technology that was also applied in other subsidiaries.
- KAT3: Our subsidiary has developed information and know-how that was also applied in other subsidiaries.
- KAT4: Technology developed by our subsidiary helped to save R&D expenditure in other subsidiaries.
- KAT5: Our subsidiary created competencies that were useful in other subsidiaries.
- KAT6: By transferring technology developed by our subsidiary, we have created value in other subsidiaries.

Strategic autonomy (alpha = 0.6892):
Who makes the decisions regarding the following points? “1” means “parent alone decides” and “7” means “subsidiary alone decides”.

- STAUT1: Overall direction of the subsidiary’s activities
• STAUT2: Which new projects to pursue
• STAUT3: Product design

Operational autonomy (alpha = 0.6862):
Who makes the decisions regarding the following points? “1” means “parent alone decides” and “7” means “subsidiary alone decides”.
• OPAUT1: Hiring and firing senior staff
• OPAUT2: Training programs for subsidiary staff
• OPAUT3: Salary level of subsidiary employees
• OPAUT4: Transfer of subsidiary staff between units

Tacitness of knowledge (alpha = 0.8312):
“1” means “strongly disagree”, “7” “strongly agree”.
• TAC1: The way our technology works can easily be described in manuals.
• TAC2: New staff can easily learn about our activities by talking to skilled employees.
• TAC3: Training new personnel is typically a quick and easy job for us.
• TAC4: New personnel with a university degree can learn fast about our technology.

Observability of knowledge (alpha = 0.7768):
“1” means “strongly disagree”, “7” “strongly agree”.
• OBS1: Competitors could learn about our technology by observing our employees.
• OBS2: Competitors could learn about our technology by taking a tour of our facilities.
• OBS3: Competitors could learn how to manufacture our products by examining our machines and equipment.
Chapter 3

Organizational Architecture and Knowledge Transfer Success in Multinational Firms: An Agency Theory Perspective

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3. Organizational Architecture and Knowledge Transfer Success in Multinational Firms: An Agency Theory Perspective

Abstract
We offer a theoretical account and empirical test of the influence of organizational architecture on inter-subsidiary knowledge transfer success within a multinational corporation (MNC). Framing our arguments in an agency theory perspective, we suggest that the parent firm, by appropriately setting the MNC's organizational architecture, can harness the subsidiaries' self-interest to make such knowledge transfer succeed. We build hypotheses on four specific elements of formal organizational architecture (strategic and operational autonomy, subsidiary mandate status, cross-unit interfaces, and interfaces with the local environment) and test them with a unique sample of 287 subsidiaries and novel psychometric measures that provide intimate insights into the MNC’s internal structure. We find broad support for the proposed account and discuss the implications of our research for academia and management practice.

Keywords: Organizational Architecture; Knowledge Transfer; Performance; Multinational Firm; Structural Equation Modeling
3.1. Introduction

A major source of the competitive advantage of a multinational corporation (MNC) is its ability to organize knowledge transfer relationships between its internationally dispersed subsidiaries such that the knowledge developed by its subsidiaries can be leveraged globally (Almeida and Phene, 2004; Anand, 2011; Andersson, Forsgren and Holm, 2002; Foss and Pedersen, 2004; Tallman, 2003). However, recent research highlights that we know very little about the means by which the MNC can actually organize such relationships, and we know even less about how successful knowledge transfer can be achieved (Ambos and Ambos, 2009; Foss and Pedersen, 2002, 2004; Nielsen and Michailova, 2007; Yamin and Otto, 2004). Knowledge transfer can be considered successful if the receiving unit assimilates, integrates, and utilizes the transferred knowledge and the knowledge proves useful (Bresman, Birkinshaw and Nobel, 1999; Schlegelmilch and Chini, 2003; Minbaeva et al., 2003).

Some MNCs seem to orchestrate inter-subsidiary knowledge transfer successfully, whereas others are unable to do so (Goold, 2005; Gupta and Govindarajan, 2000b; Hansen, Nohria and Tierney, 1999; Käser and Miles, 2002). Many MNCs even seem to have given up on orchestrating intrafirm knowledge transfer and instead have chosen to (re-)centralize or completely localize activities (e.g., Benito, Grogaard and Narula, 2003; Currie and Kerrin, 2004; Doz et al., 2006; Monteiro, Arvidsson and Birkinshaw, 2008; Pearce, 1990; Rugman, 2005).

These observations point to significant theoretical and empirical uncertainty regarding the organizational means that are likely to be associated with successful inter-subsidiary knowledge transfer. The MNC’s formal organizational architecture comprises particularly promising means by which the parent firm of the MNC can stimulate knowledge transfer between its subsidiaries (Foss and Pedersen, 2002, 2004). Therefore, without an adequate understanding of which elements of formal organizational architecture tend to be associated with knowledge transfer success when inter-subsidiary knowledge transfer is to be organized, many MNCs are probably unable to attain the goal of superior competitive advantage as a result of the global leverage of dispersed subsidiary knowledge. Consequently, the relationship between organizational architecture and inter-unit knowledge transfer has been highlighted as a crucial research gap and source of inconsistencies, particularly so in the context of
MNCs (Björkman, Barner-Rasmussen and Li, 2004; Fey and Furu, 2008; Foss and Pedersen, 2002, 2004), but also in general (e.g., Foss, Husted and Michailova, 2010; Turner and Makhija, 2006).

However, the literature on intra-firm knowledge transfer has primarily focused on characteristics of the transmitted knowledge, attributes of the sender-receiver relationship, and organizational characteristics such as age, size, and absorptive capacity (Foss and Pedersen, 2004; Foss et al., 2010; Monteiro et al., 2008; van Wijk, Jansen and Lyles, 2008). Some studies have also examined aspects of the MNC’s informal organization such as personal networks across subsidiaries (Hansen, 1999, 2002; Tortoriello and Krackhardt, 2010; Tsai, 2002). In contrast, elements of formal organizational architecture that promote knowledge transfer across MNC units have been studied little (Björkman et al., 2004; Fey and Furu, 2008). Moreover, a perspective that would focus on knowledge transfer success (as opposed to transfer as such) is still in its infancy. Despite repeated recommendations in the literature to develop success measures of knowledge transfer (Ambos and Ambos, 2009; Haas and Hansen, 2005; Minbaeva et al., 2003; Yamin and Otto, 2004), to the best of our knowledge with only two exceptions (Ambos and Ambos, 2009; Ciabuschi, Martín and Ståhl, 2010), no empirical articles have so far deployed such measures.

The purpose of our paper is to study the role of the MNC’s formal organizational architecture as a predictor of inter-subsidiary knowledge transfer success. Formal organizational architecture comprises the MNC’s explicitly mandated formal structures (e.g., reward systems, authority relationships, interfaces) (Foss, 2007; Gulati, Puranam and Tushman, 2009: 575; Nadler and Tushman, 1997: 227). We emphasize formal organizational architecture because the question of which elements of organizational architecture the parent firm can set to foster intrafirm knowledge transfer has become one of the key organizational design problems for MNCs (Foss and Pedersen, 2002). Parent firm managers can actively set the MNC’s formal organizational architecture whereas its informal organization emerges over time (Foss et al., 2010; Nickerson and Zenger, 2002; Gulati et al., 2009). Research on elements of formal organizational architecture is only just emerging; only a small subset of these elements has been studied, and even these few studies had conflicting and inconsistent results (Ciabuschi et al., 2010; Fey and Furu, 2008; Noorderhaven and Harzing, 2009; Gupta and Govindarajan, 2000a; Persson, 2006; Reiche, Harzing and Kraimer, 2009).
Thus, key aspects of the research agenda that Foss and Pedersen (2004) have proposed to advance the understanding of the association between organizational architecture and intra-MNC knowledge transfer have either remained unaddressed to date or are still little understood.

In an attempt to resolve these inconsistencies and to close these knowledge gaps, our paper provides a theoretical account and empirical test of the influence of formal organizational architecture on knowledge transfer success within an MNC. Our study is set on the subsidiary level of analysis. In line with previous research (Björkman et al., 2004; Fey and Furu, 2008; Foss and Pedersen, 2002; Frost, Birkinshaw and Ensign, 2002), we adopt the perspective of a focal subsidiary that transfers knowledge to other subsidiaries. Framing our arguments in agency theory, we argue that the parent firm of the MNC (as the principal) can set four specific elements of the focal subsidiary’s formal organizational architecture—subsidiary autonomy, subsidiary mandate status, formal cross-unit interfaces, and formal interfaces with the local environment—such that the focal subsidiary is interested in successfully transferring knowledge to other subsidiaries and that these are interested in receiving and utilizing such knowledge. Using unique survey data on 287 international subsidiaries, we develop and test hypotheses on each of these four elements, finding strong support for all hypotheses.

By this approach our paper makes multiple important contributions that help clarify vital points of Foss and Pedersen’s (2004) research agenda. First, our paper helps resolve inconsistent findings regarding subsidiary autonomy (Ciabuschi et al., 2010; Fey and Furu, 2008; Noorderhaven and Harzing, 2009) by differentiating between strategic and operational autonomy. Second, we consider additional elements of organizational architecture (subsidiary mandate status, cross-unit interfaces, interfaces with the local environment) that have been repeatedly marked as relevant and important paths for further research (e.g., Foss and Pedersen, 2004; Meyer, Mudambi and Narula, 2011). Third, we propose a theoretical focus on knowledge transfer success and present a novel empirical measure of knowledge transfer success. Fourth, since executives are often left without much theory-based guidance when it comes to

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12 Note that we focus on the current organizational architecture, whereas the process and history of how a specific architecture was set is beyond the scope of this paper.
the design of organizational architecture in knowledge-intensive MNCs (Foss and Pedersen, 2004: 341), our paper provides valuable insights for management practice.

3.2. Theoretical Framework and Hypotheses

In a principal-agent relationship, agents (subsidiaries) perform activities on behalf of the principal (the parent firm) such that the success of the principal’s plans and intentions depends on the agents’ behavior. However, agents may pursue their own goals rather than act as their principal would want them to, because principals and agents can have diverging interests and information asymmetry can limit the principal’s knowledge about agents’ behavior (Eisenhardt, 1989; Wiseman, Cuevas-Rodriguez and Gomez-Mejia, 2012).

Parent-subsidiary relations inside MNCs resemble principal-agent relationships (Ghoshal and Bartlett, 1990; Mudambi and Navarra, 2004). An agency perspective seems very appropriate to study inter-subsidiary knowledge transfer since the success of this transfer depends on the subsidiaries’ motivation to send and receive knowledge (Gupta and Govindarajan, 2000a; Szulanski, 1996), particularly so since subsidiaries tend to be primarily interested in their own goals and only secondarily in those of the parent firm or the MNC as a whole (Mudambi and Navarra, 2004; Fey and Furu, 2008). Thus, subsidiaries are not necessarily inclined to engage in knowledge transfer as they have to spend resources and effort to share their knowledge (Reagans and McEvily, 2003; von Hippel and Tyre, 1994). Sending or receiving knowledge to/from other subsidiaries may thus not always be in the best interest of subsidiaries, especially since knowledge transfer per se does not necessarily imply positive consequences for the recipient (Ambos, Ambos and Schlegelmilch, 2006; Gupta and Govindarajan, 2000a; Szulanski, 1996; Szulanski and Jensen, 2006). This problem leads to the question of what measures the parent firm (as the principal) can deploy to induce subsidiaries to engage in knowledge transfer such that this transfer will be successful.

The extant literature has primarily stressed three specific measures parent firms can use to this end: monitoring, financial rewards, and socialization (e.g., Björkman et al., 2004; Fey and Furu, 2008). We focus on a fourth measure that has received little attention in agency theory research to date. With this measure, the principal (parent firm) can make the agents (subsidiaries) contribute inadvertently or unwittingly to the
principal’s goals by following their self-interest and pursuing their own goals (Eisenhardt, 1989). Elements of formal organizational architecture are among the most powerful strategic levers that parent firm managers can use to achieve this (Gulati et al., 2009: 575), since organizational architecture creates incentives and disincentives for organizational members to behave in a manner consistent with firm goals (Anthony, 1965; Camillus, 1986). Manipulating formal architecture will likely be key if managers want to change their organization (Ethiraj and Levinthal, 2004). The extent to which subsidiaries act opportunistically and deviate from their parent firm’s preferences is therefore likely to be sensitive to the formal organizational architecture (Mudambi and Navarra, 2004). Thus, the extent to which knowledge is transferred successfully between subsidiaries is also likely a function of this architecture (Foss, 2007; Foss and Pedersen, 2004; Foss et al., 2010). What remains to be determined, then, are the concrete elements of formal organizational architecture that parent firm managers can set to make the subsidiaries contribute to successful inter-subsidiary knowledge transfer by self-interestedly pursuing their own goals.

The literature suggests that four specific elements of formal organizational architecture are particularly relevant when parent firm managers attempt to influence the actions of subsidiaries and that these represent crucial avenues for further research on inter-subsidiary knowledge transfer: (1) strategic versus operational subsidiary autonomy, (2) subsidiary mandate status, (3) cross-functional interfaces the focal (sending) subsidiary has with other (recipient) subsidiaries, and (4) the subsidiary’s formal interfaces with its environment (Mudambi, 2011; Newburry, 2011; Foss and Pedersen, 2004; Gupta and Govindarajan, 2000a; Persson, 2006; Reiche et al., 2009).

3.2.1. Hypothesis 1: Subsidiary Autonomy and Knowledge Transfer Success
We differentiate the concept of subsidiary autonomy into two separate constructs (strategic and operational autonomy), following recommendations in prior literature that advises such a conceptual separation in order to increase the theoretical and empirical validity of the autonomy construct (Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Glaister, Husan and Buckley, 2003; Nobel and Birkinshaw, 1998).
Strategic autonomy designates the subsidiary’s ability to set its own agenda, operational autonomy its ability to manage selected day-to-day activities
autonomously. A high degree of strategic autonomy allows a subsidiary to independently make strategic business decisions, and to decide about new product development and design projects (Bailyn, 1985; Perlow, 1998; Nobel and Birkinshaw, 1998; Ghoshal, Korine and Szulanski, 1994). In contrast, subsidiaries with a high degree of operational, but not strategic autonomy are free to manage their day-to-day responsibilities while they have very little or no control over their budget and business plan (Birkinshaw, 1996; Glaister et al., 2003).

First, we argue that, the more strategic autonomy the focal subsidiary is granted by the parent firm, the lower the extent will be to which it successfully transfers knowledge to other subsidiaries. The objectives a strategically autonomous subsidiary pursues and the activities it takes in its pursuit can become irrelevant to other subsidiaries (Cantwell and Mudambi, 2005), implying that its knowledge could be incompatible, irrelevant or duplicate to that of the receiving units (Monteiro et al., 2008). Therefore, the focal subsidiary’s strategic autonomy will likely increase time and resources, which other subsidiaries have to invest, and the risk of failure they have to accept if they try to identify opportunities of how the focal subsidiary’s knowledge may be of use to them. As the focal subsidiary’s strategic autonomy increases, growing divergences in the agendas of the focal vis-à-vis the recipient subsidiary should reduce the probability that opportunities for knowledge transfer can be found (Monteiro et al., 2008). Further, even if such opportunities are found, the complex explanation and coordination process associated with integrating the focal subsidiary’s knowledge into that of the recipient tend to increase the transaction and coordination costs of knowledge transfer (Teece, 1977). This is likely to make transferring its knowledge less attractive for the focal subsidiary and to deter recipient subsidiaries from actively seeking the focal subsidiary’s knowledge. Thus,

Hypothesis 1a: The focal subsidiary’s degree of strategic autonomy will be negatively associated with the extent to which its knowledge is transferred successfully to other subsidiaries.

Second, we argue that the more operational autonomy the focal subsidiary is granted by the parent firm, the more likely it will successfully transfer knowledge to other subsidiaries. Typically, subsidiaries tend to create more new knowledge the more their operational autonomy increases (Ambos and Schlegelmilch, 2007: 476; emphasis
added). Additionally, subsidiaries that are operationally autonomous are typically free to liaise with external parties in their local environment (Nobel and Birkinshaw, 1998). They can thus probably learn more from the local system of innovation (Andersson and Forsgren, 2000; Andersson et al., 2002; Rugman and Verbeke, 2001). Therefore, novel knowledge created by operationally autonomous subsidiaries tends to be relatively strong and unique within the MNC (Cantwell and Santangelo, 1999; Lewin, Massini and Peeters, 2009). This implies that other subsidiaries should be highly interested in receiving and integrating this knowledge and in making the necessary efforts and investments to achieve this integration (Ciabuschi et al., 2010), such that the probability of successful knowledge transfer should increase with the focal subsidiary’s degree of operational autonomy. Further, operationally autonomous subsidiaries typically manage many cooperative exchange relationships with other subsidiaries (Nobel and Birkinshaw, 1998), so that the above-discussed danger of a divergence of agendas and the associated risk of a lack of knowledge application and integration opportunities should be greatly reduced. Thus,

\textit{Hypothesis 1b: The focal subsidiary’s degree of operational autonomy will be positively associated with the extent to which its knowledge is transferred successfully to other subsidiaries.}

\textbf{3.2.2. Hypothesis 2: Subsidiary Mandate Status and Knowledge Transfer Success}

Through a subsidiary mandate, the parent firm gives a subsidiary the responsibility to undertake certain activities on behalf of the corporation as a whole, i.e. the focal subsidiary has international rather than just local responsibility for these activities (Birkinshaw, Hood and Jonsson, 1998).\textsuperscript{13} We argue that successful knowledge transfer from the focal to other subsidiaries will occur to a greater extent if the focal subsidiary has such a mandate.

First, a mandate should stimulate the focal subsidiary’s willingness to spend effort on transferring knowledge to other subsidiaries. The parent firm is likely to expect a subsidiary that is granted a mandate to diffuse knowledge within the MNC network (Frost et al., 2002). Subsidiary managers can be expected to comply because ‘they

\textsuperscript{13} Examples of subsidiary mandates include such companies as Siemens, whose Japanese subsidiary has a mandate to produce and market compact magnetic resonance image machines (in partnership with Asahi Medical) for the world market, and Pfizer, whose German subsidiary Mack has worldwide responsibility for a variety of fine chemicals as well as several cardiology and leukemia-based remedies (Birkinshaw et al., 1998; Roth and Morrison, 1992).
know that they will be explicitly or at least implicitly evaluated based on how well the unit performs on this dimension’ (Björkman et al., 2004: 446). Subsidiaries that hold a mandate and comply with these expectations typically receive additional benefits (e.g., investments) from the parent firm (Birkinshaw and Hood, 1998; Frost et al., 2002).

Second, by granting the focal subsidiary a mandate, the parent firm should also be able to stimulate the interest of other subsidiaries in sourcing and applying knowledge from the focal subsidiary. As knowledge is hard to evaluate (Galunic and Rodan, 1998; Szulanski, 1996), subsidiaries that are searching for new knowledge within the MNC may have to spend considerable effort to identify appropriate sources. A subsidiary mandate likely reduces this effort as it can serve as a signal for valuable knowledge and thus provides other subsidiaries with cues of where to find useful knowledge (Cyert and March, 1963; Monteiro et al., 2008). Additionally, other subsidiaries are probably able to improve their financial performance by receiving and applying knowledge from a subsidiary that holds a mandate. When subsidiaries are granted a mandate and thus undertake activities on behalf of the corporation as a whole, a high degree of specialization across subsidiaries and hence a great diversity of subsidiary knowledge is possible (e.g., Birkinshaw et al., 1998; Cantwell and Mudambi, 2005). Consequently, other subsidiaries can strengthen their knowledge stock by sourcing in this specialized knowledge. Thus,

Hypothesis 2: If the focal subsidiary has a mandate, the extent to which its knowledge is transferred successfully to other subsidiaries will increase.

3.2.3. Hypothesis 3: Cross-unit Interfaces and Knowledge Transfer Success

Cross-unit interfaces are formal organizational integration mechanisms that span the boundaries between the focal subsidiary and other MNC units (Jansen et al., 2009). Examples of such interfaces comprise liaison personnel to coordinate the decisions with other units, job rotation programs with other units, and institutionalized meetings that involve managers from the focal subsidiary and from other units. Cross-unit interfaces establish information channels between the focal subsidiary and other subsidiaries and thus allow for a smooth and rich information flow between them (Gupta and Govindarajan, 2000a). Moreover, they typically enhance the subsidiaries’ mutual understanding of their tasks, capabilities, and objectives and improve the coordination among the units (Johnston and Paladino, 2007; Schulz, 2003). Thus, cross-unit interfaces likely help subsidiaries identify opportunities for transferring
knowledge, improve the applicability of the transferred knowledge and reduce the transaction cost of the transfer (e.g., Foss and Pedersen, 2002; Hansen, 2002). Cross-unit interfaces should therefore foster the interest of the focal subsidiary to send knowledge to other subsidiaries and the interest of these other subsidiaries to receive and apply this knowledge. Thus,

_Hypothesis 3: The extent to which the focal subsidiary has cross-unit interfaces with other subsidiaries will be positively associated with the extent to which its knowledge is transferred successfully to other subsidiaries._

3.2.4. **Hypothesis 4: Interfaces with the Local Environment and Knowledge Transfer Success**

Formal interfaces with the local environment comprise formal organizational integration mechanisms that span the boundaries between the focal subsidiary and its local environment, e.g., formal procedures, by which the subsidiary ‘scans’ its local environment to detect relevant developments, or joint ‘open innovation’ activities with local firms (Lichtenthaler, 2011; Volberda, Foss and Lyles, 2010). We argue that successful knowledge transfer from the focal to other subsidiaries will occur to a greater extent, the more formal interfaces with its local environment the focal subsidiary has.

First, formal interfaces facilitate the diffusion of knowledge from external parties into the focal subsidiary (Li et al., 2010). The associated knowledge absorption and recombination effect (Andersson, Forsgren and Holm, 2001) is likely to endow this subsidiary with valuable knowledge that may not be available elsewhere. In order to benefit from knowledge, which is relatively unique in their respective environment, other subsidiaries should therefore be interested in making the transfer of such knowledge succeed. Additionally, the focal subsidiary’s experience from integrating knowledge from its local environment with its own knowledge (during which it has taken the role of the knowledge recipient) may facilitate the further transfer of that knowledge to the recipient subsidiaries (Birkinshaw, Nobel and Ridderstråle, 2002; Reagans and McEvily, 2003). The focal subsidiary is also likely interested in making this knowledge transfer succeed because by making such unique knowledge accessible to other subsidiaries, the focal subsidiary can increase its influence on strategic decisions within the MNC and appropriate more of the rents that are available inside the firm (Mudambi and Navarra, 2004). Thus,
Hypothesis 4: The more interfaces with its local environment the focal subsidiary has, the greater will be the extent to which its knowledge is transferred successfully to other subsidiaries.

3.3. Data and Methods

3.3.1. Population and Sampling Frame

Our sample consisted of subsidiaries that undertake innovation and/or perform research and development (R&D) since these tasks are typically knowledge-intensive and offer opportunities for knowledge sharing and international collaboration between units (Almeida, Song and Grant, 2002; Kotabe et al., 2007; Phene and Almeida, 2008). These subsidiaries may perform other value activities in addition to R&D.

We used the database ThomsonOne to identify Swiss and German firms irrespective of their industry affiliations. This geographic focus was chosen because, first, firms in Switzerland and Germany typically display a high degree of R&D internationalization (Serapio and Dalton, 1999). This setting provides a fruitful context in which inter-subsidiary knowledge transfer and potential problems with such transfer are highly likely to be observable. Second, since Germany and Switzerland are neighboring and culturally highly similar countries (Hofstede, Hofstede and Minkov, 2010), our results are unlikely to be biased by potential effects of geographical and cultural distance between parent firms and subsidiaries once we control for subsidiary location.

Through this process a total of 1,254 firms (983 German, 271 Swiss) were identified. We only included those firms in the sampling frame which were MNCs and controlled at least one subsidiary that meets the above criteria. In order to classify firms according to these criteria, we analyzed each firm’s annual report and made additional confirmatory telephone calls. Consequently, 750 firms had to be excluded from the sampling frame. On average, the 504 remaining firms accounted for 68% of all sales by German and Swiss firms in their respective industries. We contacted the top management of these 504 firms to explain our research topic and to ask for participation in our study. 159 firms (104 German, 55 Swiss) agreed to cooperate. By correspondence with their corporate-level senior R&D managers, 923 foreign subsidiaries were identified. These 923 subsidiaries constitute the population to which we sent out the questionnaire.
3.3.2. Item Development

We adopted a psychometric measurement approach and collected survey data from individual informants. Such shared unit-level constructs (Klein and Kozlowski, 2000) are naturally an approximation since individuals may differ in their perception of subsidiary characteristics. Thus, the projection of individual-level cognition to the organizational level should be deemed a heuristic (Schneider and Angelmar, 1993). Still, the interviews during the item revision phase indicated the subsidiary’s general or top R&D manager would be able to make valid and reliable assessments. Moreover, prior literature has consistently assumed that individual top-level employees are most familiar with the characteristics of their subsidiary and its relationships with other firm units (Björkman et al., 2004; Ciabuschi et al., 2010; Fey and Furu, 2008; Foss and Pedersen, 2002; Gupta and Govindarajan, 2000a; Noorderhaven and Harzing, 2009). Nevertheless we performed multiple precautionary procedures to rule out potential biases.

To generate our items, we carefully reviewed the relevant literature and related scales. The two subsidiary autonomy scales were adapted from Nobel and Birkinshaw’s (1998) ‘centralization’ scale.\footnote{Nobel and Birkinshaw (1998: 495) found that their centralization scale resulted in two different factors which they termed ‘strategic issue centralization’ and ‘operational issue centralization’.} Since product design is likely to be an important decision parameter in the R&D context, we supplemented the ‘centralization’ scale by the item ‘product design’ from Ghoshal et al.’s (1994) scale. The scales we use to control for the codifiability and observability of knowledge are adopted from Zander and Kogut (1995) and Birkinshaw et al. (2002), respectively. In the absence of established scales to measure our other constructs, we employed a rigorous item creation and validation process for these scales, adhering to recommendations in the measurement literature (Churchill, 1979; Schriesheim et al., 1993). The process began with the production of a preliminary item list based on the reviewed literature. Iterative rounds of discussions with international academics and R&D managers from four MNCs followed to ensure the content, face, and external validity of the emerging constructs. If necessary, their feedback yielded substantive changes to the latest list. The revised list was then discussed with professors and managers until both groups agreed that no further clarifications and amendments would be required. Thus, we were able to produce a carefully tested questionnaire instrument.
3.3.3. Measurement

The subsidiary is the unit of analysis used for all constructs in this study. Accordingly, all variables are located at the subsidiary level. The items, the scales, and the question to determine the subsidiary’s mandate status are replicated in Appendix A.

3.3.3.1. Endogenous Variable

Knowledge transfer success was measured by a novel six-item scale (Cronbach’s alpha = 0.932). We used seven-point items anchored at ‘not at all’ (1) and ‘to a great extent’ (7). Knowledge transfer can be considered successful if the receiving unit assimilates, integrates, and utilizes the transferred knowledge and the knowledge proves useful (Bresman et al., 1999; Schlegelmilch and Chini, 2003; Minbaeva et al., 2003).

3.3.3.2. Exogenous Variables

Operational autonomy and strategic autonomy were measured by scales that we adapted from Nobel and Birkinshaw (1998); the items were anchored at ‘headquarters decide’ (1) and ‘subsidiary decides’ (7). ‘Strategic autonomy’ is defined as the ability to set its own agenda, whereas ‘operational autonomy’ is defined as the ability to deal with designated day-to-day issues autonomously (Bailyn, 1985; Perlow, 1998) (alpha = 0.690 for strategic and 0.685 for operational autonomy). Subsidiary mandate status was measured by the dichotomous indicator originally developed by Birkinshaw et al. (1998). It is coded ‘1’ if the subsidiary undertakes any R&D activity on behalf of the corporation as a whole, and ‘0’ otherwise. Cross-unit interfaces were measured by a self-developed scale anchored at ‘never’ (1) and ‘very often’ (7). It measures the extent to which the focal subsidiary has formal interfaces with other subsidiaries (alpha = 0.847). Interfaces with the local environment were measured by a self-developed scale anchored at ‘not at all’ (1) and ‘to a great extent’ (7). It measures the extent to which the focal subsidiary has formal interfaces with parties in the local environment of its host country (alpha = 0.819).

Control variables. We control for the codifiability and observability of the subsidiary’s knowledge by scales that we adopted from Zander and Kogut (1995) and Birkinshaw et al. (2002), respectively (alpha = 0.796 for codifiability and 0.774 for observability of knowledge). Further, we control for subsidiary R&D intensity by the subsidiary’s R&D expenses relative to its budget, for subsidiary size by the logged number of its employees, for subsidiary age by subtracting the year in which the subsidiary started
operations for the parent firm from 2009 and logging the difference, for *subsidiary location* by dummies based on the Triad model (North America, Western Europe, Asia, and other) and for *subsidiary industry* by dummies based on the NACE classification. This set of control variables also allows us to control for the subsidiary’s stock of knowledge since this stock can be proxied by subsidiary size, age, and R&D intensity (Gupta and Govindarajan, 2000a).

3.3.4. **Questionnaire and Data Collection Procedure**

Validated academic procedures of questionnaire design (Dillman, 2000) informed the production of our fully standardized questionnaire. To collect data, we e-mailed a copy of the questionnaire to every subsidiary together with a cover letter explaining the aims of the study, guaranteeing complete confidentiality, and offering the study results as an incentive to cooperate. Short phone calls were made to announce our questionnaire will arrive and to ask the subsidiary’s general manager or top R&D manager (our key informants) for their cooperation. Reminder letters were mailed to all managers who had not yet responded 14 and 30 days after they had received the original questionnaire. Of the total 923 subsidiaries, 290 responded, yielding a favorable response rate of 31.42%. We excluded three of these questionnaires from further analysis because of too much missing data. A raw sample of 287 questionnaires remained with none or few missing data that were completely at random. We follow a conservative estimation strategy by instructing the statistical software to do listwise deletion on cases where information regarding one or more variables in the model is missing; thus, the models use less than 287 observations. Since this procedure defies imputation, it should enhance the robustness of the empirical results (Allison, 2002).

3.3.5. **Post-hoc Tests, Validation Surveys, Single Respondent Bias and Common Method Variance, Reliability and Validity of Our Measures**

We adopted multiple procedures, conducted two validation surveys, and tested our data extensively to rule out response bias, single respondent bias and common method variance and to assess the reliability and validity of our measures. A detailed account of these procedures, surveys and tests, which unanimously indicate that our results are unlikely to be biased significantly and that our measures possess high reliability and validity, is provided in Appendix B.
Table 3.1. Descriptive Statistics and Correlations\textsuperscript{a, b}

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Knowledge transfer success</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Strategic autonomy</td>
<td>0.009</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Operational autonomy</td>
<td>0.083</td>
<td>0.351</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Subsidiary mandate</td>
<td>0.281</td>
<td>0.029</td>
<td>0.088</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Cross-unit interfaces</td>
<td>0.484</td>
<td>-0.015</td>
<td>-0.010</td>
<td>0.242</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Interfaces with local environment</td>
<td>0.231</td>
<td>0.197</td>
<td>0.136</td>
<td>0.093</td>
<td>0.177</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7 Codifiability of knowledge</td>
<td>0.026</td>
<td>-0.018</td>
<td>-0.030</td>
<td>0.040</td>
<td>0.063</td>
<td>0.106</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8 Observability of knowledge</td>
<td>0.028</td>
<td>0.064</td>
<td>-0.177</td>
<td>0.011</td>
<td>0.030</td>
<td>0.005</td>
<td>0.334</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 R&amp;D intensity</td>
<td>0.169</td>
<td>-0.074</td>
<td>0.088</td>
<td>0.240</td>
<td>0.087</td>
<td>-0.111</td>
<td>-0.108</td>
<td>-0.214</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Size\textsuperscript{c}</td>
<td>0.344</td>
<td>0.095</td>
<td>0.078</td>
<td>0.248</td>
<td>0.222</td>
<td>0.069</td>
<td>-0.023</td>
<td>0.032</td>
<td>-0.056</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>11 Age\textsuperscript{c}</td>
<td>0.277</td>
<td>-0.039</td>
<td>-0.160</td>
<td>0.050</td>
<td>0.280</td>
<td>-0.092</td>
<td>-0.014</td>
<td>0.051</td>
<td>-0.092</td>
<td>0.219</td>
<td>1.000</td>
</tr>
<tr>
<td>Mean</td>
<td>4.147</td>
<td>4.365</td>
<td>4.908</td>
<td>0.586</td>
<td>2.898</td>
<td>4.394</td>
<td>3.638</td>
<td>3.320</td>
<td>13.867</td>
<td>5.556</td>
<td>2.569</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>1.719</td>
<td>1.255</td>
<td>1.061</td>
<td>0.493</td>
<td>1.331</td>
<td>1.430</td>
<td>1.309</td>
<td>1.332</td>
<td>25.605</td>
<td>1.810</td>
<td>0.943</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>1</td>
<td>1.25</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0.693</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>6.667</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>100</td>
<td>10.933</td>
<td>4.984</td>
</tr>
</tbody>
</table>

Notes to Table 3.1:

a. Correlations for country and industry dummies are not shown; they are available from the corresponding author.
b. Spearman correlations used due to the non-normal distribution of most variables. Correlations above |0.160| are significant at \( p < 0.05 \).
c. Logged variable.
3.4. Analyses and Results

Table 3.1 provides descriptive statistics and correlations for our variables. To test our hypotheses, we used maximum likelihood structural equation modeling (SEM). SEM is particularly appropriate because it simultaneously incorporates observed and latent constructs, it attenuates concerns as regards the convergent and discriminant validity of our psychometric measures, and it accounts for potential biasing effects of random measurement error in the latent constructs (Kline, 2010; Medsker, Williams and Holahan, 1994).

We adopted the two-step approach to SEM outlined in Anderson and Gerbing (1988) as recommended by numerous researchers (e.g., Hoyle and Panter, 1995; Mathieu and Taylor, 2006; Medsker et al., 1994; Simsek et al., 2005). The first phase of this approach involves the fit of a confirmatory factor analytic (CFA) model to the observed data. The second phase involves comparing a sequence of nested structural models to obtain information concerning the structural model that best accounts for the covariances observed between the model's exogenous and endogenous constructs. Appendix B provides details about the phases. Phase 1 provides further support for the convergent and discriminant validity of our measures and alleviates multicollinearity concerns. It shows that our measurement model fits the data well and is adequate to proceed with phase 2. Phase 2 compares a sequence of nested structural models and indicates that our hypothesized model fits the data well ($\chi^2 = 593.55$ with 504 d.f., $p<0.01$; GFI = 0.89; AGFI = 0.84; NFI = 0.85; NNFI = 0.96; CFI = 0.97; RMSEA = 0.03) (Bollen, 1989; Kline, 2010; Teo, Wei and Benbasat, 2003) and significantly better than the other models.

3.4.1. Results for Hypotheses

Given the above findings, we used the results from the hypothesized model shown in Figure 3.1 to assess our hypotheses. All hypotheses are supported: H1a which posited a negative relationship between strategic autonomy and knowledge transfer success at $p<0.05$; H1b which predicted a positive relationship between operational autonomy and knowledge transfer success at $p<0.05$; H2 which asserted a positive relationship between the subsidiary’s mandate status and knowledge transfer success at $p<0.05$; H3 which posited a positive relationship between cross-unit interfaces and knowledge
transfer success at \( p<0.001 \); and H4 which postulated a positive relationship between interfaces with the local environment and knowledge transfer success at \( p<0.001 \).

Moreover, the proportion of explained variance (squared multiple correlation) for knowledge transfer success is 51.3% in our hypothesized model, indicating that the hypothesized antecedents contribute substantially to explaining the variation of the dependent construct (Simsek et al., 2005).
3.4.2. Robustness Test: Regression Analysis

To triangulate the SEM results, we additionally specified and estimated robust Tobit regression models. Appendix B details how we proceeded and provides the table with the estimation results. The regression results also unanimously support all hypotheses at $p<0.05$ or better. Thus, they corroborate the findings from the SEM and the conclusions about the hypotheses derived from it. We are therefore confident that our results are not computational artifacts.

3.5. Discussion

Our study proposed a theoretical account and empirical test of the influence of organizational architecture on inter-subsidiary knowledge transfer success within a multinational corporation (MNC). Following previous research (Björkman et al., 2004; Fey and Furu, 2008; Foss and Pedersen, 2002; Frost et al., 2002), we focused on a unilateral transfer perspective whereby a focal subsidiary transfers knowledge to other subsidiaries inside the MNC. In order to determine antecedents that significantly influence the success of this transfer, we used agency theory to anchor hypotheses on four specific elements of the MNC’s formal organizational architecture (subsidiary autonomy, subsidiary mandate status, formal cross-unit interfaces, and formal interfaces with the local environment), finding that all of these elements are significantly associated with knowledge transfer success. This result confirms our overarching theoretical argument that by implementing an appropriate organizational architecture, the parent firm can harness both the focal subsidiary’s self-interest in order to stimulate it to transfer knowledge to other (recipient) subsidiaries and the self-interest of these recipients to utilize the knowledge. Thus, an important conclusion of our study is that the MNC can likely attain the goal of successful inter-subsidiary knowledge transfer if parent firm managers appropriately set elements of the MNC’s formal organizational architecture. Specifically, our results suggest that, in order to make inter-subsidiary knowledge transfer successful, the parent firm should provide the focal subsidiary with less strategic and more operational autonomy, grant it a mandate by which it undertakes activities on behalf of the MNC as a whole, and establish interfaces to span internal boundaries—between the focal and recipient subsidiaries—and external boundaries—between the focal subsidiary and its local
environment. These results make several important contributions to the academic literature and to management practice.

Our study improves the understanding of which elements of organizational architecture influence successful knowledge transfer within MNCs (and why). Prior research had paid little attention to the link between organizational architecture and intraorganizational knowledge transfer in MNCs (Björkman et al., 2004; Fey and Furu, 2008; Foss and Pedersen, 2002, 2004). By providing an unusually detailed account of this link and proposing an agency theory perspective to explain the theoretical mechanism governing this link, our study helps to close this knowledge gap and resolve related inconsistencies. In particular, we address several of the research challenges that Foss and Pedersen (2004) had defined: We develop the understanding of the effects of both autonomy and subsidiary mandates on inter-subsidiary knowledge transfer; we show that, because organizational architecture can incentivize subsidiaries to engage in successful knowledge transfer, parent firm managers can use organizational architecture as an incentive mechanism to stimulate the subsidiaries’ self-interest in successful inter-subsidiary knowledge transfer and can thus foster such transfer; and we develop the empirical measurement of important elements of organizational architecture by proposing multiple novel measures and extending existing ones.

Further, analyzing to which extent (and why) an appropriate organizational architecture can induce successful inter-subsidiary knowledge transfer extends previous literature that has described the benefits of knowledge sharing within MNCs, but not the organizational means of how to achieve them (e.g., Almeida and Phene, 2004; Andersson et al., 2002; Buckley and Carter, 1996; Forsgren, Johanson and Sharma, 2000; Ghoshal and Nohria, 1997; McEvily and Zaheer, 1999; Rugman and Verbeke, 2001). By clarifying which elements of formal organizational architecture the parent firm can set in order to induce successful knowledge transfer among its subsidiaries, we provide useful information to address one of the most important organizational design problems in MNCs (Foss and Pedersen, 2002). In so doing, we contribute to resolving the paradox that many MNCs seem to (re-)centralize or completely localize activities instead of leveraging knowledge controlled by their dispersed units on a global scale (Benito et al., 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005). This tendency suggests that many
MNCs forego the competitive advantages that are associated with global knowledge leverage. We could show that successful knowledge leverage is possible when an MNC appropriately sets its organizational architecture. Thus, our results indicate that MNCs can actually achieve the theoretically proposed advantages from the global orchestration of knowledge transfer if they reconsider the design of their organizational architecture in the light of our agency theory perspective. Simultaneously, our findings provide an explanation for the observation that some MNCs orchestrate intra-firm knowledge flows successfully, whereas many others seem to fail in this (Goold, 2005; Gupta and Govindarajan, 2000b; Hansen et al., 1999; Käser and Miles, 2002). Our findings suggest that these differences may well be due to different architectural configurations.

Each of the particular elements of formal organizational architecture that we study in this paper responds to an important gap in the literature. While subsidiary mandates have been identified as a crucial research challenge (Foss and Pedersen, 2004; Mudambi, 2011), to the best of our knowledge, no study so far has examined their effect on inter-subsidiary knowledge transfer. Similarly, the focal subsidiary’s linkages to other subsidiaries of the MNC and to its local environment have been highlighted as important paths (Meyer et al., 2011), but research on the effect of such interfaces on knowledge transfer is scarce. To date, this effect has been studied for only a small subset of formal cross-unit interface mechanisms (liaison personnel; cross-unit teams) (Gupta and Govindarajan, 2000a; Persson, 2006; Reiche et al., 2009) and as far as we know, not at all for formal subsidiary-environment interface mechanisms. The conceptual and empirical distinction between strategic and operational autonomy that we adopted in this study allows us to address the frequently highlighted conflict between the subsidiary’s freedom to create knowledge and the coordination that is necessary to leverage it globally (Birkinshaw et al., 1998; Persaud, 2005; Yamin and Otto, 2004). We believe that this differentiation between strategic and operational autonomy can at least partly explain why the overall findings regarding autonomy are inconsistent and unclear (Birkinshaw and Morrison, 1995; Nobel and Birkinshaw, 1998; Vereecke, van Dierdonck and de Meyer, 2006; Young and Tavares, 2004). Thus, this distinction and our findings respond to the repeated call for a better understanding of the autonomy construct (Ambos and Schlegelmilch, 2007; Glaister et al., 2003; Young and Tavares, 2004). While previous literature has suggested this
distinction (Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Glaister et al., 2003; Nobel and Birkinshaw, 1998), to the best of our knowledge, our study is the first to explicitly formulate separate hypotheses for strategic and operational autonomy. Future research may therefore find our theoretical arguments helpful to substantiate the understanding of subsidiary autonomy.

Our study emphasized knowledge transfer success, rather than knowledge transfer as such; therefore, it makes a number of additional contributions to the literature. Empirically, our study is among the few that deploy performance-based measures of knowledge transfer. Thus, our study responds to the call that the actual outcomes of knowledge-based production, rather than the transfer of knowledge itself, should be studied (Ambos and Ambos, 2009; Haas and Hansen, 2005; Minbaeva et al., 2003; Yamin and Otto, 2004). Our study extends attempts to measure the extent to which the transferred knowledge has been used in receiving subsidiaries (Björkman et al., 2004; Fey and Furu, 2008) by emphasizing the outcomes that result from successfully transferred knowledge, such as saved R&D expenditure or value creation. Thus, it qualifies the statement that an MNC’s ability to orchestrate knowledge transfer between organizational units is a central reason for its existence (e.g., Alcácer and Chung, 2011; Almeida and Phene, 2004; Andersson et al., 2002) by highlighting that successful transfer, rather than transfer itself, seems decisive for the specific form of economic organization that the MNC constitutes. Future research might proceed along the lines of knowledge transfer success and consider objects that are generated as a consequence of successful knowledge transfer. For instance, the theory of recombinant innovation argues that an innovation can result from a recombination of existing knowledge elements (Fleming, 2001; Henderson and Clark, 1990; Utterback, 1994). Since it seems likely that any recombination of knowledge elements that are dispersed across the subsidiaries of an MNC will fail if the knowledge elements cannot be transferred successfully, the quantity or quality of recombinant innovations produced could be an indicator of knowledge transfer success. Thus, our study provides a conceptual and empirical basis from which the little researched link between a firm’s internal organization and its innovation output can be studied (Argyres and Silverman, 2004).
The measures and the data our study deploys make important empirical contributions. Several of the scales we use are either completely new or further develop existing constructs. We followed Rugman and Verbeke’s (2003) call and used psychometric measures rather than archival data to gain deep and intimate empirical insights into the internal functioning of the MNC. In so doing, we also respond to Foss et al.’s (2010) call for systematic empirical work analyzing the organizational ramifications of knowledge sharing.

Our study also has important implications for the literature on agency theory. Prior studies have focused on monitoring, financial compensation and reward systems, or socialization as measures, by which principals can assuage concerns that agents will not attend to the principal’s goals (Gomez-Mejia and Wiseman, 2007; Shapiro, 2005). We take up Eisenhardt’s (1989) idea that principals can also take measures to make the agents contribute inadvertently or unwittingly to the principal’s goals by following their self-interest and pursuing their own goals. To the best of our knowledge, our study is the first to theoretically model and test this particular mechanism. We thus respond to the call that research needs to examine alternative mechanisms when the management of foreign subsidiaries is discussed (Roth and O'Donnell, 1996; Gupta and Govindarajan, 2000a), because it can be difficult to identify an appropriate basis for financial rewards (Björkman et al., 2004; Mitchell, 1982), financial rewards might ‘crowd out’ intrinsic motivation (Osterloh and Frey, 2000), monitoring can have detrimental effects on motivation (Falk and Kosfeld, 2006), employees might have to pass a year-long socialization process before they share their firm’s goals (Ouchi, 1980), and compensation and reward systems do not always seem to work as one might expect based on agency theory (e.g., Björkman et al., 2004; O’Donnell, 2000). By suggesting an alternative agency-based approach, our study helps firms to sidestep such problems.

Managers and executives can benefit from our findings in a number of ways. First, our results provide management practice with valuable insights regarding the elements of the MNC’s formal organizational architecture that top managers in the parent firm can set in order to increase the success of intrafirm knowledge transfer. Since executives are generally highly interested in findings that show which aspects of organizational architecture are linked to organizational outcomes (Foss et al., 2010), this is important...
information for management practice, particularly since such information has been delivered scantily in extant literature (Foss and Pedersen, 2002, 2004). The agency theory perspective we develop in this paper gives managers hands-on advice on how they may harness subsidiary self-interest for parent firm goals so that they could refrain from investing into monitoring and reward systems that control whether or not subsidiaries behave in accordance with these goals (Aulakh, Kotabe and Sahay, 1996; Eisenhardt, 1989). Thus, they can review and adjust monitoring devices employed in the headquarter-subsidiary relationship to minimize both operating cost and the adverse effect of monitoring on motivation (Falk and Kosfeld, 2006; Mudambi and Navarra, 2004). Subsidiary managers, on the other hand, may conclude from our study that given an appropriate organizational architecture, engaging in knowledge transfer with other subsidiaries can benefit their own subsidiary. This insight can help to eliminate any reluctance on their part to do so, which might be caused by the fact that they have to spend resources to transfer knowledge.

Future research could extend our study in several ways. First, we have focused on elements of formal organizational architecture that facilitate successful knowledge transfer from the focal subsidiary. Future research could examine elements of organizational architecture that facilitate successful knowledge transfer to the focal subsidiary. Second, since we emphasized inter-subsidiary transfer, future research could examine the association between organizational architecture and parent-subsidiary or subsidiary-parent knowledge transfer success. Third, inter-unit knowledge transfer is also important topic for other multi-unit types of firms, e.g., multi-business companies (Walter, Lechner and Kellermanns, 2007). Future research may test whether or not our results are generalizable to such contexts. Finally, future research could address the limitations of our study. On the one hand, as every study employing a cross-sectional design, our study is affected by the fact that this approach only allows to infer association, not causality. Thus, future research should deploy longitudinal research designs to study knowledge transfer success over time. Further, we collected shared-level constructs from individual respondents to operationalize our constructs. Future research might extend our measure of knowledge transfer success by considering objects such as technological innovations that result from knowledge transfer.
3.6. References


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3.7. Appendices to Chapter 3

3.7.1. Appendix A: Detailed Account of the Study’s Measures

All items composing the following scales were measured on Likert scales ranging from 1 to 7. The measure ‘subsidiary mandate status’ was captured by a dichotomous indicator that was coded ‘1’ if the subsidiary has received a mandate from the parent firm, and ‘0’ otherwise.

Knowledge transfer success (Cronbach’s alpha = 0.9320). To which extent does the following apply? ‘1’ means ‘not at all’, ‘7’ ‘to a great extent’: (KTS1) Our subsidiary has developed product technology that was also applied in other subsidiaries; (KTS2) Our subsidiary has developed process technology that was also applied in other subsidiaries; (KTS3) Our subsidiary has developed information and know-how that was also applied in other subsidiaries; (KTS4) Technology developed by our subsidiary helped to save R&D expenditure in other subsidiaries; (KTS5) Our subsidiary created competencies that were useful in other subsidiaries; (KTS6) By transferring technology developed by our subsidiary, we have created value in other subsidiaries.

Subsidiary mandate (adopted from Birkinshaw et al., 1998). Does your subsidiary undertake any R&D activity on behalf of the corporation as a whole? ‘Yes’ (coded ‘1’) or ‘No’ (coded ‘0’).

Strategic autonomy (adapted from Nobel and Birkinshaw, 1998; alpha = 0.6896). Who makes the decisions regarding the following points? ‘1’ means ‘parent alone decides’ and ‘7’ means ‘subsidiary alone decides’: (STAUT1) Overall direction of the subsidiary’s activities; (STAUT2) Which new projects to pursue; (STAUT3) Product design.

Operational autonomy (adopted from Nobel and Birkinshaw, 1998; alpha = 0.6852). Who makes the decisions regarding the following points? ‘1’ means ‘parent alone decides’ and ‘7’ means ‘subsidiary alone decides’: (OPAUT1) Hiring and firing senior staff; (OPAUT2) Cooperation with other subsidiaries in the firm; (OPAUT3)
Training programs for subsidiary staff; (OPAUT4) Salary level of subsidiary employees.

**Cross-unit interfaces (alpha = 0.8470).** How often does the following occur? ‘1’ means ‘never’, ‘7’ ‘very often’: (CUINT1) We employ personnel to coordinate decisions with other subsidiaries; (CUINT2) Our managers attend meetings at other subsidiaries; (CUINT3) Our managers have a mentor who is based at another subsidiary; (CUINT4) Subsidiary managers participate in job training which also involves participants from other subsidiaries; (CUINT5) Our meetings are attended by managers from other subsidiaries; (CUINT6) We have job rotation programs with other subsidiaries.

**Interfaces with the local environment (alpha = 0.8189).** To which extent does the following apply? ‘1’ means ‘not at all’, ‘7’ ‘to a great extent’: (LOCINT1) Our subsidiary organizes meetings with local third parties (e.g., customers, suppliers) to acquire new knowledge; (LOCINT2) Our employees record and store newly acquired knowledge from local firms for future reference; (LOCINT3) Our subsidiary has defined procedures to analyze whether or not the knowledge and capabilities of local firms are beneficial for our own technology.

**Codifiability of knowledge (adopted from Zander and Kogut, 1995; alpha = 0.7964).** How do you agree to the following statements? ‘1’ means ‘strongly disagree’, ‘7’ means ‘strongly agree’: (CODI1) The way our technology works can easily be described in manuals; (CODI2) New staff can easily learn about our activities by talking to skilled employees; (CODI3) Training new personnel is typically a quick and easy job for us.

**Observability of knowledge (adopted from Birkinshaw et al., 2002; alpha = 0.7741).** How do you agree to the following statements? ‘1’ means ‘strongly disagree’, ‘7’ means ‘strongly agree’: (OBS1) Competitors could learn about our technology by observing our employees; (OBS2) Competitors could learn about our technology by taking a tour of our facilities; (OBS3) Competitors could learn how to manufacture our products by examining our machines and equipment.
3.7.2. Appendix B: Technical Appendix

3.7.2.1. Post-hoc Tests, Validation Surveys, Single Respondent Bias, and Common Method Variance

Several post-hoc analyses and validation surveys served to assure the representativeness of respondent data and to validate responses received from informants. T-tests of response vs. non-response, response time, and subsidiary demographic characteristics showed no significant response bias. Moreover, there was no significant influence of a large number of subsidiaries responding from a single MNC, implying that our sample is unlikely to be biased by possible cluster effects.

Following the recommendations by Chang, van Witteloostuijn and Eden (2010) and Podsakoff et al. (2003), we employed multiple procedural (ex ante) and statistical (ex post) approaches to rule out single respondent bias and common method variance (CMV). First, the rigorous process that we have adopted to produce our questionnaire allowed us to reduce the items’ ambiguity, vagueness and unfamiliarity to the respondents. Second, we use different question formats and scale anchors to measure our constructs, a cover story that creates a psychological separation between the independent and dependent variables, and we counterbalanced the question order. Third, we assured the respondents of the anonymity and confidentiality of our study, that there are no right or wrong answers, and that they should answer as honestly as possible. Fourth, we validated the respondents’ answers with data from multiple sources by employing two randomly drawn subsamples comprising 30 observations each. Six weeks after initial data collection, a senior R&D manager at the respective parent firm of the subsidiaries in the first subsample was asked to furnish data on our dependent variable ‘knowledge transfer success’ and a second manager in the subsidiaries of the second subsample was invited to provide the complete questionnaire data. Common method bias concerns were alleviated by high inter-rater reliability between the original and the confirmation data; Cohen’s kappa (κ =

15 Interviews with R&D managers during the item revision phase suggested that to contact managers in the respective parent firm, rather than managers in receiving subsidiaries, would be a more promising approach to the external validation of the focal subsidiary’s assessment of its knowledge transfer success. While subsidiary managers are in an excellent position to assess how much knowledge their own subsidiary has received from the focal subsidiary, they typically are less familiar with the extent to which other subsidiaries have received knowledge. Therefore, they often are uneasy about providing an overall assessment of the focal subsidiary’s knowledge transfer success. Managers in the parent firm, in contrast, usually have a good impression of the knowledge flows that occur within the MNC (Gupta and Govindarajan, 2000a).
0.72 and $\kappa = 0.80$, respectively) was significantly above the conventional threshold of 0.60 in both cases (Nunnally and Bernstein, 1994).

In terms of statistical remedies to counter CMV, we did not only employ Harman’s one-factor test (see below), but also added one latent CMV factor to our structural equation model, on which all items were allowed to load in addition to loading on their respective theoretical construct (cf. Podsakoff et al., 2003). Examining the significance of the structural parameters both with and without this latent factor in the model does not reveal substantial differences.\footnote{Overall, the various approaches that we have used to alleviate CMV concerns unanimously suggest that our results are unlikely to be biased substantially.}

3.7.2.2. Assessment of Reliability and Validity of Measures

The reliability and validity of both our items and our scales were tested using diverse approaches. All of these methods consistently indicate high levels of reliability and validity.\footnote{The results provided in the manuscript are from the model without the latent CMV factor. The results from the model with this factor added are available upon request.} The reliability of our items was tested by calculating item-test, item-rest, and average inter-item correlations. In order to ensure the reliability of our scales, we calculated Cronbach’s alpha for each of them (cf. Nunnally and Bernstein, 1994). We used psychometric methods to assess convergent and discriminant validity of our measures. Convergent validity of our items was verified by calculating overlap-corrected\footnote{That is, the scale is calculated without the specific item in question to avoid inflating the correlation.} correlations between an item and the scale it pertains to (cf. Nunnally and Bernstein, 1994), and convergent validity of our scales by applying principal component factor analysis with oblique rotation.\footnote{We used oblique rotation because we expected the emerging factors to be theoretically related (Hair et al., 1998).} Ultimately, we retained 28 items, which formed seven scales.\footnote{Both the Bartlett test of sphericity ($\chi^2 = 3144.458$ with 378 d.f., $p = 0.000$) and the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA = 0.817, ‘meritorious’) indicated the data were eligible for factor analysis. A factor was retained prior to rotation if its Eigenvalue exceeded unity (Kaiser-Guttman criterion).} Table 3.2 details loadings, cross-loadings, and communalities for these items. The scales capture the subsidiary’s operational autonomy (Cronbach’s alpha = 0.685), strategic autonomy (alpha = 0.690), cross-unit interfaces (alpha = 0.847), interfaces with the local environment (alpha = 0.819),
Table 3.2. Final Set of Oblimin-rotated Factors

<table>
<thead>
<tr>
<th>Item (paraphrased)</th>
<th>1 Knowledge transfer success</th>
<th>2 Cross-unit interfaces</th>
<th>3 Interfaces w. local environment</th>
<th>4 Codifiability of knowledge</th>
<th>5 Strategic autonomy</th>
<th>6 Observability of knowledge</th>
<th>7 Operational autonomy</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTS1: Product technology applied</td>
<td>0.8896</td>
<td>0.0247</td>
<td>0.0337</td>
<td>0.0038</td>
<td>-0.0147</td>
<td>0.0000</td>
<td>0.0207</td>
<td>0.7938</td>
</tr>
<tr>
<td>KTS2: Process technology applied</td>
<td>0.8156</td>
<td>0.1806</td>
<td>0.0265</td>
<td>0.0443</td>
<td>0.0133</td>
<td>-0.0496</td>
<td>0.0328</td>
<td>0.7042</td>
</tr>
<tr>
<td>KTS3: Information and know-how</td>
<td>0.8841</td>
<td>0.0664</td>
<td>0.0620</td>
<td>0.0674</td>
<td>-0.0313</td>
<td>-0.0067</td>
<td>0.0556</td>
<td>0.7986</td>
</tr>
<tr>
<td>KTS4: R&amp;D expenditure saved</td>
<td>0.8060</td>
<td>0.1175</td>
<td>0.0590</td>
<td>-0.0910</td>
<td>-0.0533</td>
<td>0.0914</td>
<td>0.0530</td>
<td>0.6893</td>
</tr>
<tr>
<td>KTS5: Useful competence created</td>
<td>0.8296</td>
<td>0.1683</td>
<td>0.0972</td>
<td>0.0039</td>
<td>0.0507</td>
<td>-0.0147</td>
<td>-0.0201</td>
<td>0.7292</td>
</tr>
<tr>
<td>KTS6: Value created</td>
<td>0.8623</td>
<td>0.2186</td>
<td>0.0986</td>
<td>-0.0315</td>
<td>-0.0711</td>
<td>0.0706</td>
<td>-0.0023</td>
<td>0.8122</td>
</tr>
<tr>
<td>STAUT1: Overall direction of subsidiary activities</td>
<td>-0.1404</td>
<td>-0.0524</td>
<td>0.0480</td>
<td>0.0288</td>
<td>0.7894</td>
<td>-0.1016</td>
<td>0.1315</td>
<td>0.6763</td>
</tr>
<tr>
<td>STAUT2: New projects to pursue</td>
<td>-0.0588</td>
<td>-0.0683</td>
<td>0.0966</td>
<td>-0.0536</td>
<td>0.8645</td>
<td>0.0490</td>
<td>0.1238</td>
<td>0.7854</td>
</tr>
<tr>
<td>STAUT3: Product design</td>
<td>0.0917</td>
<td>0.1121</td>
<td>0.0630</td>
<td>-0.0159</td>
<td>0.7054</td>
<td>0.1958</td>
<td>0.0957</td>
<td>0.5703</td>
</tr>
<tr>
<td>OPAUT1: Hiring and firing senior staff</td>
<td>0.0320</td>
<td>0.0321</td>
<td>0.0532</td>
<td>-0.0613</td>
<td>0.2889</td>
<td>-0.0958</td>
<td>0.6599</td>
<td>0.5368</td>
</tr>
<tr>
<td>OPAUT2: Cooperation with other subsidiaries</td>
<td>0.1601</td>
<td>0.2077</td>
<td>0.0093</td>
<td>-0.0063</td>
<td>0.2820</td>
<td>0.0772</td>
<td>0.6157</td>
<td>0.5335</td>
</tr>
<tr>
<td>OPAUT3: Training programs for subsidiary staff</td>
<td>0.1218</td>
<td>-0.1370</td>
<td>0.0586</td>
<td>-0.0113</td>
<td>0.0630</td>
<td>0.0475</td>
<td>0.7681</td>
<td>0.6334</td>
</tr>
<tr>
<td>OPAUT4: Subsidiary employee salary level</td>
<td>-0.0285</td>
<td>-0.0754</td>
<td>0.0465</td>
<td>0.0021</td>
<td>0.0697</td>
<td>-0.1153</td>
<td>0.7283</td>
<td>0.5573</td>
</tr>
<tr>
<td>CUINT1: Personnel employed to coordinate decisions</td>
<td>0.3190</td>
<td>0.6560</td>
<td>0.0946</td>
<td>-0.0580</td>
<td>-0.0470</td>
<td>-0.0038</td>
<td>0.0494</td>
<td>0.5491</td>
</tr>
<tr>
<td>CUINT2: Meetings at other subsidiaries</td>
<td>0.2665</td>
<td>0.7671</td>
<td>0.0125</td>
<td>0.0173</td>
<td>0.0718</td>
<td>0.0052</td>
<td>0.0380</td>
<td>0.6666</td>
</tr>
<tr>
<td>CUINT3: Mentor based at other subsidiary</td>
<td>0.1516</td>
<td>0.7100</td>
<td>0.0144</td>
<td>-0.0679</td>
<td>-0.0332</td>
<td>0.0795</td>
<td>-0.0211</td>
<td>0.5398</td>
</tr>
<tr>
<td>CUINT4: Joint job training</td>
<td>0.2049</td>
<td>0.6875</td>
<td>0.1276</td>
<td>0.0364</td>
<td>-0.0721</td>
<td>-0.0264</td>
<td>-0.0523</td>
<td>0.5409</td>
</tr>
<tr>
<td>CUINT5: Other subsidiary managers attend meetings</td>
<td>0.3031</td>
<td>0.7415</td>
<td>0.0850</td>
<td>0.0940</td>
<td>-0.0069</td>
<td>0.0138</td>
<td>-0.0081</td>
<td>0.6581</td>
</tr>
<tr>
<td>CUINT6: Job rotation programs with other subsidiaries</td>
<td>0.1790</td>
<td>0.6688</td>
<td>0.0243</td>
<td>0.0603</td>
<td>-0.0290</td>
<td>-0.1175</td>
<td>-0.1411</td>
<td>0.5182</td>
</tr>
<tr>
<td>LOCINT1: Meetings with local third parties</td>
<td>0.1250</td>
<td>0.0841</td>
<td>0.8490</td>
<td>0.0570</td>
<td>0.0170</td>
<td>0.0357</td>
<td>0.0798</td>
<td>0.7547</td>
</tr>
<tr>
<td>LOCINT2: Knowledge from local firms is recorded and stored</td>
<td>0.1205</td>
<td>0.0636</td>
<td>0.8789</td>
<td>0.0306</td>
<td>0.0918</td>
<td>0.0288</td>
<td>-0.0097</td>
<td>0.8013</td>
</tr>
<tr>
<td>LOCINT3: Procedures to analyze utility</td>
<td>0.1550</td>
<td>0.0489</td>
<td>0.8107</td>
<td>0.0238</td>
<td>0.0691</td>
<td>-0.0548</td>
<td>0.0377</td>
<td>0.6934</td>
</tr>
</tbody>
</table>
of local knowledge and capabilities

<table>
<thead>
<tr>
<th>CODI1: Manuals</th>
<th>CODI2: Talking to skilled employees</th>
<th>CODI3: Training easy and quick</th>
<th>OBS1: Observing employees</th>
<th>OBS2: Tour of facilities</th>
<th>OBS3: Examination of equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.0318</td>
<td>0.1440</td>
<td>0.0197</td>
<td>0.7869</td>
<td>-0.0388</td>
<td>0.1694</td>
</tr>
<tr>
<td>0.0336</td>
<td>-0.0324</td>
<td>0.0578</td>
<td>0.8866</td>
<td>0.0463</td>
<td>0.1740</td>
</tr>
<tr>
<td>-0.0007</td>
<td>-0.0213</td>
<td>0.0524</td>
<td>0.8218</td>
<td>-0.0719</td>
<td>0.0947</td>
</tr>
<tr>
<td>0.0725</td>
<td>0.0460</td>
<td>-0.0958</td>
<td>0.2890</td>
<td>-0.0651</td>
<td>0.7364</td>
</tr>
<tr>
<td>0.0182</td>
<td>0.0209</td>
<td>0.0214</td>
<td>0.1802</td>
<td>0.0469</td>
<td>0.8443</td>
</tr>
<tr>
<td>0.0241</td>
<td>-0.0738</td>
<td>0.0703</td>
<td>0.0898</td>
<td>0.0834</td>
<td>0.8052</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>Proportion of variance explained</th>
<th>Cumulative variance explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.16</td>
<td>17.21%</td>
<td>17.21%</td>
</tr>
<tr>
<td>3.01</td>
<td>11.62%</td>
<td>28.82%</td>
</tr>
<tr>
<td>2.94</td>
<td>8.06%</td>
<td>36.88%</td>
</tr>
<tr>
<td>2.18</td>
<td>8.05%</td>
<td>44.94%</td>
</tr>
<tr>
<td>1.91</td>
<td>7.51%</td>
<td>52.45%</td>
</tr>
<tr>
<td>1.16</td>
<td>7.48%</td>
<td>59.93%</td>
</tr>
<tr>
<td>1.46</td>
<td>7.25%</td>
<td>67.18%</td>
</tr>
</tbody>
</table>

Note to table 3.2:

a. See Appendix A for a full account of each item’s wording.
Jointly, these seven factors explain 67.18% of the variance. The scree plot also suggested a seven factor solution. While the direct factor loadings are high (all above 0.60), no cross-loadings exceeds 0.35. A high degree of convergent validity is indicated by these results (Hair et al., 1998). According to Harman’s one-factor test, the fact that seven factors emerged and the first of these only explains 17.21% of the variance corroborates our above assessment that our findings are unlikely to be biased by CMV (Podsakoff and Organ, 1986). Finally, *discriminant validity* was examined by employing a multitrait and multi-item correlation matrix approach, in which the correlation of each item with each scale is considered (Ware and Gandek, 1998). Furthermore, we calculated average variance extracted and compared its square root to the correlation coefficients among the scales (Fornell and Larcker, 1981; Staples, Hulland and Higgins, 1999). High levels of discriminant validity were indicated by both analyses. Additional confirmation for the convergent and discriminant validity of our measures is provided by the structural equation model (see below).

### 3.7.2.3. *Anderson and Gerbing’s (1988) Two-step Approach to Structural Equation Modeling (SEM)*

**Phase 1: CFA Model Results**

In the first phase of Anderson and Gerbing’s (1988) approach, a CFA model is fit to the observed data to assess the fit of the overall measurement model and to examine the psychometric properties of constructs. Each latent variable in SEM needs to be explicitly assigned a metric or a measurement range (Kline, 2010). We did so by setting a loading to 1.0 for one indicator per latent variable.

The CFA model fits the data well ($\chi^2 = 370.41$ with 316 d.f., $p< 0.05$; GFI = 0.90; AGFI = 0.87; NFI = 0.88; NNFI = 0.98; CFI = 0.98; RMSEA = 0.03) (e.g., Bollen, 1989; Kline, 2010; Teo et al., 2003) and also confirms the convergent and discriminant validity of our measures and alleviates multicollinearity concerns. We further examined the discriminant validity of our constructs by performing a series of analyses to compare the fit of two models each, viz. one where the correlation between two indicators and their corresponding latent construct indicate convergent validity (Hair et al., 1998; Simsek et al., 2005); discriminant validity is indicated by the fact that no correlation between any latent constructs exceeds the recommended threshold of 0.65. The latter fact simultaneously alleviates multicollinearity concerns (Brown, 2006; Simsek et al., 2005).
specific factors was unconstrained with another where the correlation between them was constrained to 1.0. Chi-square difference tests indicate for all pairs of factors that the unconstrained model fits the data significantly better than the constrained version, thus signaling the constructs’ discriminant validity. These results suggested that our measurement model is adequate and that we could proceed with the second phase of Anderson and Gerbing’s (1988) two-step approach (Simsek et al., 2005).

**Phase 2: Sequence of Nested Structural Models Results**

In the second phase of Anderson and Gerbing’s (1988) approach, contrasts (chi-square difference tests) between a sequence of nested structural models are used to obtain the model that best accounts for the observed covariances. To this end, we compared the following structural models: our hypothesized model, in which all five hypothesized elements of organizational architecture are tested concurrently, thirty models, that constrain the influence of one, two, three, or four element(s) at a time on knowledge transfer success at zero, and one baseline model, in which the influence of all five elements is constrained at zero. In evaluating these models, we followed Bollen (1989) and Simsek et al. (2005). While the model fit is acceptable in every case and the path estimates between the elements and knowledge transfer success are significant in every constellation, the results indicate that the hypothesized model is the best-fitting one. Its fit is significantly better than that of the nested, constrained models (two-tailed chi-square difference tests with \( p < 0.05 \) or better in every case).

**3.7.2.4. Robustness Test for the SEM Results: Regression Analysis**

To specify and estimate regression models as a robustness test for the SEM results, we proceeded as follows. For each of our psychometric constructs we generated its scale by adding the individual scores of all items that constitute the respective construct and subsequently dividing this sum by the respective number of items (Dess and Davis, 1984; Trevor and Nyberg, 2008). Due to this scale construction method, the scale for

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22. We do not provide detailed results of all the tests we performed due to limitations of space. Extensive results are available from the corresponding author upon request.

23. The structural models differ from the final measurement model from phase 1 in that they further include observed variables.

24. Counting the two facets of autonomy as two elements.

25. Taking three steps, we assessed (1) model fit, using various indices, (2) the significance of the path estimates, as a test of the model’s hypotheses, and (3) the amount of variance explained in the endogenous construct, as an indication of practical significance. Detailed results are available from the corresponding author upon request.
Table 3.3. Robust Tobit Estimates for Dependent Variable Knowledge Transfer Success\textsuperscript{a,b}

<table>
<thead>
<tr>
<th>Model</th>
<th>Strategic autonomy</th>
<th>Operational autonomy</th>
<th>Subsidiary mandate</th>
<th>Cross-unit interfaces</th>
<th>Interfaces with local environment</th>
<th>Codifiability</th>
<th>Observability</th>
<th>R&amp;D intensity</th>
<th>Size</th>
<th>Age</th>
<th>Western Europe</th>
<th>Asia</th>
<th>Rest of world</th>
<th>Industry dummies</th>
<th>Constant</th>
<th>Log-pseudolikelihood</th>
<th>McFadden’s Pseudo R\textsuperscript{2}</th>
<th>F statistic (d. f.)</th>
<th>AIC</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (Baseline)</td>
<td>0.144 (0.100)</td>
<td>0.264* (0.118)</td>
<td>0.627** (0.223)</td>
<td>0.470** (0.076)</td>
<td>-0.025 (0.088)</td>
<td>0.023 (0.092)</td>
<td>0.014** (0.004)</td>
<td>0.364*** (0.067)</td>
<td>0.451*** (0.120)</td>
<td>0.651* (0.284)</td>
<td>-0.291 (0.384)</td>
<td>-0.591 (0.448)</td>
<td>Included</td>
<td>0.580 (0.658)</td>
<td>-466.454</td>
<td>0.081</td>
<td>8.02*** (11; 245)</td>
<td>958.908</td>
<td>256</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>-0.137 (0.099)</td>
<td>0.242* (0.118)</td>
<td>0.488* (0.224)</td>
<td>0.403*** (0.077)</td>
<td>-0.037 (0.087)</td>
<td>0.083 (0.091)</td>
<td>0.013** (0.005)</td>
<td>0.311*** (0.064)</td>
<td>0.429*** (0.117)</td>
<td>0.432 (0.277)</td>
<td>-0.436 (0.390)</td>
<td>-0.543 (0.422)</td>
<td>Included</td>
<td>0.368 (0.926)</td>
<td>-439.954</td>
<td>0.073</td>
<td>6.04*** (13; 230)</td>
<td>909.907</td>
<td>243</td>
<td></td>
</tr>
<tr>
<td>Model 3</td>
<td>-0.155 (0.096)</td>
<td>0.244* (0.115)</td>
<td>0.517* (0.223)</td>
<td>0.403*** (0.077)</td>
<td>-0.037 (0.087)</td>
<td>0.082 (0.091)</td>
<td>0.011* (0.004)</td>
<td>0.259*** (0.064)</td>
<td>0.453*** (0.115)</td>
<td>0.476 (0.275)</td>
<td>-0.403 (0.395)</td>
<td>-0.392 (0.425)</td>
<td>Included</td>
<td>0.360 (0.945)</td>
<td>-434.158</td>
<td>0.080</td>
<td>6.40*** (14; 228)</td>
<td>900.316</td>
<td>242</td>
<td></td>
</tr>
<tr>
<td>Model 4</td>
<td>-0.206* (0.094)</td>
<td>0.230* (0.110)</td>
<td>0.517* (0.223)</td>
<td>0.403*** (0.077)</td>
<td>-0.071 (0.080)</td>
<td>0.107 (0.086)</td>
<td>0.008 (0.005)</td>
<td>0.226*** (0.062)</td>
<td>0.353** (0.109)</td>
<td>0.223 (0.257)</td>
<td>-0.677 (0.373)</td>
<td>-0.629 (0.424)</td>
<td>Included</td>
<td>-0.100 (0.891)</td>
<td>-392.51383</td>
<td>0.107</td>
<td>10.11*** (15; 215)</td>
<td>819.028</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td>Model 5 (Full)</td>
<td>-0.206* (0.094)</td>
<td>0.230* (0.110)</td>
<td>0.517* (0.223)</td>
<td>0.403*** (0.077)</td>
<td>-0.091 (0.077)</td>
<td>0.107 (0.085)</td>
<td>0.009* (0.005)</td>
<td>0.205** (0.061)</td>
<td>0.409*** (0.108)</td>
<td>0.297 (0.254)</td>
<td>-0.611 (0.359)</td>
<td>-0.551 (0.409)</td>
<td>Included</td>
<td>-0.873 (0.913)</td>
<td>-382.077</td>
<td>0.145</td>
<td>11.40*** (16; 212)</td>
<td>800.155</td>
<td>228</td>
<td></td>
</tr>
</tbody>
</table>

Notes to table 3.3:

a. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed test). Robust standard errors in parentheses.

b. North America is the baseline category for the country dummies (the electrical industry for the industry dummies).
our dependent variable ‘knowledge transfer success’ is conditioned on values between 1 and 7, which is why we prefer Tobit models for analysis (Baum, 2006; Greene, 2003). We specified these models to report robust (Huber-White) standard errors to correct for potential heteroscedasticity. All models were constructed incrementally by first entering only the controls in a baseline model and then adding the covariates of each hypothesis step by step. We compared the respective model fits by calculating Akaike information criteria (AIC) and found that the full model which includes the same set of antecedents and controls as the final SEM model fits the data best. Table 3.3 documents all models and their diagnostics.

The regression results also unanimously support all hypotheses at \( p<0.05 \) or better. Since they corroborate the findings from the SEM and the conclusions about the hypotheses derived from it, our results are unlikely to be computational artifacts.
Chapter 4

Realizing Reverse Knowledge Transfer: Channeling Attention towards a Focal Subsidiary by Organizational Architecture

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4. Realizing Reverse Knowledge Transfer: Channeling Attention towards a Focal Subsidiary by Organizational Architecture

Abstract

This paper provides a theoretical account of the relationship between formal organizational architecture and ‘reverse’ (i.e. subsidiary-to-parent) knowledge transfers in multinational firms. Building on the attention-based view, it develops seven propositions arguing (a) that elements of organizational architecture affect the extent to which a focal subsidiary receives attention from the MNC’s parent firm, (b) that this extent of parent firm attention affects the extent of reverse knowledge transfers, and (c) that parent firm attention mediates the relationship between the elements of organizational architecture and reverse knowledge transfers. The elements of organizational architecture covered in this paper are the focal subsidiary’s degree of strategic and operational autonomy, its mandate status, and the emphasis on home-base augmenting objectives in the subsidiary’s mission. The paper concludes by discussing the implications of the theoretical insights for the academic literature, future research, and management practice.

Keywords: Organizational Architecture; Attention; Knowledge Transfer; Multinational Firm; Mediation
4.1. Introduction

In theory, a multinational corporation (MNC) can benefit from knowledge transfers between its units because these transfers allow the firm to leverage superior knowledge held by one subsidiary internationally and to generate additional knowledge through a global synthesis of dispersed knowledge (Almeida and Phene, 2004; Andersson, Forsgren and Holm, 2002; Rugman and Verbeke, 2001). These abilities constitute a major source of competitive advantage for MNCs (Andersson et al., 2002; Ghoshal and Nohria, 1989; Keupp, Palmié and Gassmann, 2011). Over the past decades, many MNCs have dispersed their knowledge development processes internationally and attempted to leverage specific advantages of their subsidiaries globally (Cantwell, 1989; Dunning, 1994; Granstrand, Håkanson and Sjölander, 1992; Håkanson, 1995; Serapio and Dalton, 1999).

However, many MNCs do not seem to achieve global leverage of these advantages, but (re-)centralize or completely localize activities (Benito, Grogaard and Narula, 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005). Thus, knowledge transfers from one international subsidiary to other units of the MNC – the parent firm and other subsidiaries – do not occur as frequently as one might expect. For example, the parent firms in Monteiro, Arvidsson and Birkinshaw’s (2008) sample of Swedish MNCs receive knowledge from 53.3% of their subsidiaries never or less than once a year. Similarly, 68.7% of the subsidiaries in Rabbiosi’s (2011) sample of Italian MNCs have not provided knowledge to their parent firm at all and another 10.6% had only low levels of ‘reverse’ knowledge transfers, i.e. knowledge transfers from the focal subsidiary to the parent firm. Thus, the question of why MNCs so rarely source knowledge from their subsidiaries and by which means they can facilitate subsidiary knowledge transfers is a theoretically interesting phenomenon of high practical relevance.

Prior literature has examined factors that can facilitate or impede knowledge transfers within MNCs, focusing in particular on the effects that absorptive capacity, motivation, network characteristics, and characteristics of the transmitted knowledge have on knowledge sharing (e.g., Gupta and Govindarajan, 2000; Hansen et al., 2005; Szulanski, 1996; Tsai, 2001; Zander and Kogut, 1995). While this literature has generated useful insights, these factors by themselves are unlikely to fully account for
the phenomenon of rare subsidiary knowledge transfers since transfers occur rarely in various contexts across which those factors differ and even with those subsidiaries that possess adequate knowledge and resources to act as knowledge sources (Birkinshaw, Hood and Jonsson, 1998; Doz et al., 2006; Piscitello and Rabbiosi, 2006). Thus, this phenomenon remains relatively unexplored to date (Blomkvist, Kappen and Zander, 2010; Monteiro et al., 2008).

Further, it has been highlighted repeatedly that our knowledge about the means by which knowledge transfers are facilitated is very scarce (Ambos and Ambos, 2009; Foss and Pedersen, 2002, 2004; Nielsen and Michailova, 2007). In particular, the influence of formal organizational architecture on subsidiary knowledge transfers has been emphasized as an important path for research because elements of formal organizational architecture could be very powerful means to foster these transfers (Foss and Pedersen, 2002, 2004; Gulati, Puranam and Tushman, 2009). However, only a few studies have pursued this path, so that crucial knowledge gaps persist (Björkman, Barner-Rasmussen and Li, 2004; Fey and Furu, 2008; Foss and Pedersen, 2002, 2004). This especially applies to subsidiary-parent knowledge transfers because these reverse knowledge transfers have in general received less attention than the ‘conventional’ parent-subsidiary knowledge transfers and ‘lateral’ inter-subsidiary knowledge transfers (Alcácer and Chung, 2011; Ambos, Ambos and Schlegelmilch, 2006). Distinguishing between the parent firm and other subsidiaries as the recipients of subsidiary knowledge transfers is important because the effect of a particular means can differ across these two cases (cf. Noorderhaven and Harzing, 2009). To the best of my knowledge, no study so far has primarily focused on elements of formal organizational architecture as antecedents to reverse knowledge transfers and only a few have examined individual of these elements among other factors (e.g., Gupta and Govindarajan, 2000; Noorderhaven and Harzing, 2009; Yang, Mudambi and Meyer, 2008). However, even these few studies yielded inconsistent, contradictory or unexpected results. My study intends to help overcome these inconsistencies and develop our understanding of the important phenomenon of reverse knowledge transfer.

To this end, I build on two arguments from the attention-based view (Ocasio, 1997): (1) The extent to which the parent firm will source knowledge from any particular subsidiary will be dependent on how much attention this subsidiary receives from the
parent firm. (2) This extent of attention, in turn, is influenced by the organizational architecture. Thus, rare subsidiary-parent knowledge transfers can be explained by the fact that the focal subsidiary receives too little attention from the parent firm. The importance of attention for firm-level outcomes is acknowledged in a developing literature (e.g., Dutton and Ashford, 1993; March and Olsen, 1976; Nadkarni and Barr, 2008; Ocasio, 1997). Since MNCs are characterized by ‘high levels of geographical and cultural diversity coupled with complex portfolios of businesses, functions, and markets’ (Bouquet and Birkinshaw, 2008: 577), parent firm managers are typically unable to attend to every possible issue or object (Kahneman, 1973; Nadkarni and Barr, 2008; Sharma, 2000). As a consequence, many subsidiaries receive only little attention from their parent firm (Bouquet and Birkinshaw, 2008), which, in turn, is thus unlikely to source knowledge from them (Ambos and Birkinshaw, 2010; Bouquet and Birkinshaw, 2008).

An appropriate organizational architecture could overcome this problem by channeling the attention towards a focal subsidiary (cf. Bouquet and Birkinshaw, 2008; Ocasio, 1997; Simon, 1947). My study therefore clarifies the crucial roles of parent firm attention for achieving international subsidiary knowledge transfers and of organizational architecture for channeling its attention. I develop propositions that (a) link specific elements of formal organizational architecture to the extent of parent firm attention the focal subsidiary receives, that (b) relate this extent to the extent of reverse knowledge transfers, and that (c) suggest the association between the elements of formal organizational architecture and reverse knowledge transfers to be mediated by the extent of attention received. The specific elements of organizational architecture my paper covers are strategic and operational autonomy, the subsidiary’s mandate status, and the emphasis placed on home-base augmenting objectives in the subsidiary’s mission.

By this approach, my paper can make multiple important contributions to the literature.

First, this paper responds to calls that the association between organizational architecture and intrafirm knowledge transfers should be studied to a much greater extent (Foss and Pedersen, 2004; Gulati et al., 2009). In so doing, it extends the extant

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26 Attention refers to the noticing, encoding, interpreting, and focusing of time and effort on objects, ‘issues’ (problems, opportunities, etc.) and action alternatives (Ocasio, 1997; Yadav et al., 2007).
literature, which has frequently described the benefits of leveraging knowledge across internationally dispersed units (e.g., Almeida and Phene, 2004; Andersson et al., 2002; Forsgren, Johanson and Sharma, 2000; Ghoshal and Nohria, 1997; McEvily and Zaheer, 1999; Rugman and Verbeke, 2001), but has shed little light on the organizational means by which this goal can actually be achieved. Further, by distinguishing between strategic and operational subsidiary autonomy, the paper helps resolve inconsistent findings regarding subsidiary autonomy (Ciabuschi, Martín and Ståhl, 2010; Fey and Furu, 2008; Noorderhaven and Harzing, 2009).

Second, I complement Bouquet and Birkinshaw’s (2008) analysis by highlighting the influence of organizational architecture. Bouquet and Birkinshaw (2008) have analyzed the influence of a subsidiary’s ‘weight’ (its strength within the MNC network and the strategic significance of its local market) and its ‘voice’ (initiative taking and profile building by its managers) on the attention it receives from the parent firm, while arguing that organizational architecture ‘creates strict constraints on the allocation of headquarters attention that certainly transcend weight and voice considerations’ (p. 595). They have therefore called for an analysis of organizational architecture to arrive at a more comprehensive understanding of attention allocation in MNCs. I respond to this call and further extend their study by showing that the extent of attention the subsidiary receives affects the extent to which its knowledge is transferred to the parent firm.

Third, by linking organizational architecture to attention allocation, my study provides one of the first theoretical applications of Ocasio’s (1997) central argument that organizational architecture assumes a major role in channeling attention. While the developing attention-based literature has analyzed various antecedents to attention (e.g., Bouquet and Birkinshaw, 2008; Cho and Hambrick, 2006; Dutton and Ashford, 1993; Hansen and Haas, 2001; Nadkarni and Barr, 2008), it has devoted little attention to elements of organizational architecture as these antecedents. By addressing this gap, my study may contribute to the attention-based literature in general and its further development (cf. Ocasio, 1997: 204).

Finally, the insights on the association between organizational architecture and intrafirm knowledge transfers should be helpful for executives who are generally highly interested in such findings (Foss, Husted and Michailova, 2010), but are rarely provided with related insights by the academic literature (Foss and Pedersen, 2004).
4.2. Theoretical Framework and Propositions

What managers and ultimately firms do depends on what managers attend to (Dutton and Ashford, 1993; March and Olsen, 1976; Nadkarni and Barr, 2008; Ocasio, 1997). The focusing of their attention creates a concentration of their energy and effort on the respective objects, issues, and action alternatives. Since managers are usually confronted with a vast amount of information that exceeds their limited cognitive capacity (March, 1994; Simon, 1991), they tend to focus selectively on particular issues, objects, and action alternatives, while paying little attention to others (Kahneman, 1973; Nadkarni and Barr, 2008; Sharma, 2000). Since the firm is unlikely to act on the latter, the attention of decision-makers at the parent firm is a scarce and critical resource (Cyert and March, 1963; Simon, 1947). These notions constitute the first of three interrelated premises of the attention-based view (ABV) (Ocasio, 1997: 188). Its second premise is that on what decision-makers focus their attention depends on the context they find themselves in, whereas the third states that this context and how decision-makers attend to it depend on the firm’s organizational structures. Thus, organizational structures can channel and distribute managers’ attention towards specific objects, issues, and action alternatives. Overall, the ABV therefore argues that firm behavior can be explained as a result of decision makers’ attention whose distribution is regulated by the firm’s organizational structures (Ocasio, 1997).

Given that the diversity and complexity associated with a multinational organization places substantial demands on the bounded cognitive capacity of parent firm managers (Bouquet and Birkinshaw, 2008; Levy, 2005), favorable organizational structures that direct the attention of parent firm managers appropriately may be particularly useful in MNCs.

This suggests that reverse knowledge transfers from a focal subsidiary to the parent firm could be the result of the extent of attention this subsidiary receives from the parent firm (cf. Ambos and Birkinshaw, 2010; Bouquet and Birkinshaw, 2008) and that this extent, in turn, could be dependent on the MNC’s organizational structures. These arguments are the core building blocks of my theoretical account.

I adopt the perspective of a focal subsidiary because first, subsidiaries in the MNC network may differ substantially in the extent to which they receive attention from the parent firm (Bouquet and Birkinshaw, 2008) and second, organizational structures may
vary across the subsidiaries of an MNC (Ambos and Schlegelmilch, 2007; Martinez and Jarillo, 1989).

These structures govern the allocation and distribution of attention and therefore of time, energy, and effort through several mechanisms (Ocasio, 1997: 196). First, they generate a set of values that order the legitimacy, importance, and relevance of objects, issues, and action alternatives. Second, they establish concrete activities, interactions, and communication and allocate decision-makers and objects, issues, and action alternatives into these. Third, they provide the decision-makers with a structured set of interests. Decision-makers will direct their attention to and therefore act on those stimuli, which are associated with highly valued issues and objects and which serve to enhance their interests (Ocasio, 1997: 201). The central component of such attention-directing organizational structures is the organizational architecture that guides and constrains decision-makers in accomplishing the firm’s tasks and in obtaining social status, credits, and rewards in the process (Ocasio, 1997; Simon, 1947).

The parent firm should therefore be highly interested in having an appropriate organizational architecture that directs managers’ attention towards a subsidiary whose knowledge can be leveraged internationally (Bouquet and Birkinshaw, 2008). Organizational architecture comprises both formal structures, such as the distribution of decision rights and the assignment of responsibilities, and informal aspects such as personal networks and organizational culture (Foss, 2007; Gulati et al., 2009; Nadler, Gerstein and Shaw, 1992). Elements of formal organizational architecture should be of particular interest to the parent firm since managers can make discrete choices to shape their firm’s formal architecture, whereas the informal organization is typically rather difficult to shape directly (Nickerson and Zenger, 2002). While informal architecture merely emerges over time, formal architecture is explicitly mandated (Criscuolo and Narula, 2007; Gulati et al., 2009, emphasis added). This paper therefore focuses on elements of formal organizational architecture. Two considerations entered the selection of specific elements to be analyzed: On the one hand, the selected elements should address key issues in managing the parent-subsidiary relationship, which therefore are also highly relevant to management practice, such as the locus of decision-making rights, the assignment of responsibilities to the subsidiary, and the specification of goals for the subsidiary (e.g., Bartlett and Ghoshal, 1986; Birkinshaw and Pedersen, 2009; Martinez and Jarillo, 1989). On the other hand, they should still
entail crucial knowledge gaps with regard to intra-MNC knowledge transfer. The following elements meet these criteria and are therefore examined in detail below: subsidiary autonomy, subsidiary mandate status, home-base augmenting objectives specified in the subsidiary’s mission (e.g., Cantwell and Mudambi, 2005; Foss and Pedersen, 2004; Song, Asakawa and Chu, 2011).

Together, the above arguments build the case for a mediation model where the effect of the organizational architecture on subsidiary knowledge transfers to the parent firm is mediated by the extent to which the subsidiary receives attention from the parent firm. This model is displayed in Figure 4.1.

**Figure 4.1. Graphical Representation of the Proposed Theoretical Model**

![Diagram of the Proposed Theoretical Model](image)

*Note to figure 4.1:*

a. The figure displays only direct effects. Propositions 5-7 further argue that the extent of attention the focal subsidiary receives from the parent firm mediates the relationship between each element of organizational architecture shown on the left and the subsidiary’s extent of reverse knowledge transfers.

Building on these arguments, in the following I first develop propositions that link the above elements of formal organizational architecture to the extent of attention a focal subsidiary receives from the parent firm. Then I formulate one proposition that relates the extent of this attention to the extent of reverse knowledge transfers, before I
specify three mediation propositions that pinpoint the mediating role of attention in the association between the specific element of organizational architecture and reverse knowledge transfers.

**4.2.1. Proposition 1: Autonomy and Parent Firm Attention**

Differentiating autonomy into *strategic* and *operational* autonomy can improve our theoretical understanding of the construct because ‘autonomy is a rather fuzzy concept unless the distinction is drawn between strategic autonomy and operational autonomy’ (Glaister, Husan and Buckley, 2003). In line with some rather exploratory studies (Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Nobel and Birkinshaw, 1998; Vereecke, van Dierdonck and de Meyer, 2006), I therefore address the effects of strategic and operational autonomy separately.

Strategic autonomy refers to the subsidiary’s ability to set its own agenda, operational autonomy to the ability to manage designated day-to-day activities in a way determined by the subsidiary itself (Bailyn, 1985; Perlow, 1998). A high degree of strategic autonomy allows subsidiaries to decide independently on strategic matters that directly affect their business interests. In contrast, a high degree of exclusively operational autonomy allows them to autonomously manage their day-to-day tasks, while decisions regarding their budget and business plan remain under the control of the parent firm (Birkinshaw, 1996; Glaister *et al.*, 2003).

First, I argue that the focal subsidiary’s degree of *strategic* autonomy is negatively associated with the extent of attention the subsidiary receives from the parent firm. The parent firm tends to be the more heavily involved in making (strategic) decisions that concern the subsidiary, the lower the subsidiary’s (strategic) autonomy is. For instance, Birkinshaw, Nobel and Ridderstråle (2002) suggest the following patterns of decision-making in order of decreasing degrees of subsidiary autonomy: the subsidiary decides something independently; the subsidiary decides after consultation with the parent firm; the subsidiary decides, but the decision is subject to approval by the parent firm; the parent firm decides after consultation with the subsidiary; the parent firm decides. By communicating extensively and interacting frequently with the subsidiary, the parent firm can increase the likelihood that the decisions, in which it is involved, satisfy the needs of both parties and that they are implemented according to its intention. The parent firm’s involvement in these decisions is therefore likely to
imply a high degree of communication and social interaction among headquarters and subsidiary managers (Tsang, 2002). And since communications and social interactions strongly increase the extent to which the interacting parties devote attention to each other (Malle and Pearce, 2001; Ocasio, 1997; Sperber and Wilson, 1985), the parent firm is thus likely to devote comparatively much attention to the subsidiary. As the parent firm’s involvement in decisions concerning the subsidiary diminishes with increasing subsidiary autonomy, the parent firm could probably occupy itself less intensively with the subsidiary without the subsidiary experiencing pressing problems. Since pressing problems attract managers’ attention (Radner, 1975), a subsidiary that does not experience such problems, which require parent firm intervention, is likely to receive less attention. Further, a higher degree of strategic autonomy increases the risk that the focal subsidiary’s integration into the MNC-network is diminished, that the subsidiary drops ‘out of the loop’ of this network and becomes isolated from the rest of the corporation (Cantwell and Mudambi, 2005: 1114; Birkinshaw et al., 1998). The subsidiary is therefore more likely to develop and acquire knowledge that is not very relevant to the rest of the corporation and potentially duplicate to or incompatible with the rest of the MNC’s knowledge (Keupp et al., 2011). Thus, even if a subsidiary uses the strategic autonomy it is granted to develop or acquire knowledge, there will be uncertainty whether a successful international leverage of this knowledge is feasible. Dutton and Webster (1988) have found that managers tend to pay less attention to issues that are surrounded by uncertainty and/or whose perceived feasibility is low. Therefore,

*Proposition 1a: The more strategic autonomy the focal subsidiary is granted, the less will it receive attention from the parent firm.*

Second, I propose a curvilinear (U-shaped) relationship between the focal subsidiary’s operational autonomy and the extent to which it receives attention from the parent firm.

In analogy to the strategic autonomy case, a parent firm tends to be heavily involved in making operational decisions concerning the subsidiary, when the focal subsidiary’s operational autonomy is low. As a consequence, a low degree of operational autonomy should be associated with a high extent of attention received as well, and this extent of attention received should decline as the subsidiary’s operational autonomy increases and the parent firm’s involvement into its operational decisions decreases.
However, a high degree of operational autonomy can provide subsidiary employees with opportunities to ‘approach problems in ways that make the most of their expertise and creative-thinking skills’ (Amabile, 1997: 82) and can thus foster their intrinsic motivation, creativity, and finally the emergence of innovative solutions on the organizational level (Amabile, 1997; Glynn, 1996). In so doing, operational autonomy should be likely to evoke the parent firm’s attention (cf. Bouquet and Birkinshaw, 2008). The way, in which the subsidiary manages its day-to-day activities, is unlikely to make these creative solutions and the associated knowledge irrelevant to other units inside the MNC, duplicate to or incompatible with their knowledge (Keupp et al., 2011). The uncertainty surrounding the global leverage of creative solutions and knowledge produced by an operationally autonomous subsidiary should therefore be comparatively low and the leverage should appear feasible. Parent firm managers should therefore be interested in such solutions and knowledge and a subsidiary with a high degree of operational autonomy should receive considerable attention from them (Dutton and Webster, 1988).

While I therefore predict that both low and high levels of operational autonomy will be associated with high levels of attention received by the subsidiary from its parent firm, I expect a moderate level of autonomy to be associated with little attention received. This is because social interactions and exchange require much attention (Malle and Pearce, 2001) so that fewer interactions and less exchange resulting from a weaker involvement in the subsidiary’s decision making should reduce the attention a subsidiary receives from the parent firm quickly. In contrast, the positive effects of increasing operational autonomy on attention received (by stimulating creative solutions) should unfold slowly because ‘a great deal’ of operational autonomy seems to be necessary to realize its benefits (Amabile, 1997: 85). Thus,

Proposition 1b: The focal subsidiary’s degree of operational autonomy will be curvilinearly associated with the extent to which the focal subsidiary receives attention from its parent firm (i.e., the relation takes a U-shaped form).

4.2.2. Proposition 2: Subsidiary Mandate Status and Parent Firm Attention

When it is granted a mandate, the focal subsidiary is given the responsibility to undertake certain activities on behalf of the corporation as a whole, so that it has international rather than just local responsibility for these activities (Birkinshaw et al., 1998). For example, the Japanese subsidiary of Siemens has a mandate to produce and
market compact magnetic resonance image machines (in partnership with Asahi Medical) for the world market, and Pfizer’s German subsidiary Mack has worldwide responsibility for a variety of fine chemicals as well as several cardiology and leukemia-based remedies (Birkinshaw et al., 1998; Roth and Morrison, 1992). I propose that being granted a mandate is positively associated with the extent of attention the focal subsidiary receives from the parent firm. By giving the subsidiary additional responsibility, a mandate is likely to increase the subsidiary’s strategic importance for the MNC as a whole. This effect may be due to several effects. For instance, the knowledge of a subsidiary that holds a mandate can become unique and hard-to-imitate within the MNC network because subsidiary mandates allow for a high degree of specialization across MNC units and hence a great diversity of the units’ knowledge is possible (e.g., Birkinshaw et al., 1998; Cantwell and Mudambi, 2005). In this case, other units are likely to become dependent on the focal subsidiary to perform their activities efficiently and effectively. Their dependence on the subsidiary that holds the respective mandate causes this subsidiary’s strategic importance to rise. Further, that a mandate extends the focal subsidiary’s responsibility for value activities beyond its local market implies that the subsidiary will be involved in generating a greater share of the MNC’s overall sales. A greater contribution to the MNC’s performance is typically also associated with a greater strategic importance within the network. A thus increased importance and strategic position of the focal subsidiary in the MNC network should in turn be positively related to the attention it receives from its parent firm (Bouquet and Birkinshaw, 2008; Dutton et al., 2001; Ocasio, 1997; Tsang, 2002). Therefore, 

Proposition 2: Holding a mandate for undertaking activities on behalf of the corporation as a whole will be positively associated with the extent to which the focal subsidiary receives attention from its parent firm.

4.2.3. Proposition 3: Home-base Augmenting Mission and Parent Firm Attention
By emphasizing the subsidiary’s home-base augmenting mission, the parent firm specifies that the focal subsidiary shall pursue the objective to augment the firm’s knowledge base by generating new knowledge, rather than merely exploit the firm’s existing knowledge base (Kuemmerle, 1997, 1999). I expect that the stronger the subsidiary’s mission emphasizes home-base augmenting objectives, the more attention the subsidiary will receive from the parent firm.
First, the subsidiary’s home-base augmenting mission can inform knowledge utilizing managers in the parent firm that this subsidiary should be a relevant source of knowledge that can be leveraged internationally. This information may help these boundedly rational managers to allocate their attention more effectively (cf. Björkman et al., 2004; Yadav, Prabhu and Chandy, 2007). As a consequence, they are likely to focus more heavily on a subsidiary if its mission emphasizes home-base augmenting objectives strongly.

Second, a home-base augmenting mission often signals that a subsidiary is located in a cluster of scientific excellence (Kuemmerle, 1997, 1999). Clusters of scientific excellence provide location-specific advantages that result from the availability of strong specialized knowledge and of specialized support services (Birkinshaw and Hood, 2000; Porter, 1990; Tallman et al., 2004). Since leveraging location-specific advantages internationally can improve the competitiveness of an MNC (Dunning, 1998), the availability of such advantages in the focal subsidiary’s environment typically stimulates managers in the parent firm to allocate attention towards this subsidiary (Bouquet and Birkinshaw, 2008; Porter, 2000). Moreover, a subsidiary whose mission places greater emphasis on its home-base augmenting objectives should develop more new knowledge and make more advantages accessible to the rest of the MNC (Yang et al., 2008). A stronger emphasis on these objectives should therefore structure the interests of parent firm managers such that they pay more attention to the focal subsidiary in order to leverage its knowledge and those advantages (Ocasio, 1997). Thus,

Proposition 3: The extent to which its mission emphasizes home-base augmenting objectives will be positively associated with the extent to which the focal subsidiary receives attention from its parent firm.

4.2.4. Proposition 4: Parent Firm Attention and Reverse Knowledge Transfers
The literature broadly concurs that attention exerts a strong influence on the strategic behavior of firms; many authors have theoretically developed and empirically confirmed this influence (e.g., D’Aveni and MacMillan, 1990; Garg, Walters and Priem, 2003; Hambrick and Mason, 1984; Kiesler and Sproull, 1982; March and Olsen, 1976; Walsh, 1995). One of the two central claims of the attention-based view is that what decision-makers and ultimately firms do depends on what issues and objects they focus their attention on (Ocasio, 1997: 188). Subsequently, I propose that
the extent to which the parent firm will source knowledge from the focal subsidiary depends on how much parent firm attention this subsidiary attracts.

Attention is a powerful mechanism by which subsidiary resources can be leveraged across the MNC (Ambos and Birkinshaw, 2010: 465). Since knowledge is one of the most important resources of firms (Grant, 1996; McEvily and Chakravarthy, 2002; Szulanski, 1996), the attention the subsidiary receives from the parent firm should be particularly related to the leverage of subsidiary knowledge. First, as knowledge is hard to evaluate (Galunic and Rodan, 1998; Szulanski, 1996), a parent firm that pays only little attention to the focal subsidiary may be unable to recognize whether the subsidiary could provide it with valuable knowledge. Since potential recipients are unlikely to source knowledge they do not recognize, little attention devoted to the focal subsidiary should result in low levels of reverse knowledge transfers from this subsidiary. In contrast, the better the parent firm understands the subsidiary’s knowledge, the more extensively it may source it as it is better able to recognize opportunities in which it may benefit from applying such knowledge. By paying more attention to the focal subsidiary, the parent firm is likely to develop a better understanding of the subsidiary’s knowledge (cf. Durand, 2003; Ocasio, 1997) and to become aware of more opportunities to leverage it (cf. Levy, 2005; Yadav et al., 2007). Second, the parent firm is likely to source subsidiary knowledge more extensively when it expects substantial benefits from leveraging this knowledge. If a subsidiary offers the prospects of such benefits, its importance for the parent firm will likely increase and the parent firm can be expected to devote more attention to this subsidiary (cf. Bouquet and Birkinshaw, 2008). To realize these prospects, which have attracted its attention, the parent firm should actually leverage the focal subsidiary’s knowledge and it can do so by receiving reverse knowledge transfers (Fey and Furu, 2008). Thus, reverse knowledge transfers from a subsidiary, in which the parent firm has invested much attention, are a mechanism by which the parent firm can generate substantial value. Since attention is a scarce and critical resource, the parent firm should strive to manage it strategically and deploy it towards those ends that may yield the greatest returns (Ambos and Birkinshaw, 2010). The parent firm could therefore be interested in limiting the attention it devotes to the focal subsidiary to the extent it considers sufficient to secure the subsidiary’s appropriate contribution to the MNC. Therefore,
Proposition 4: The extent to which the focal subsidiary receives attention from its parent firm is positively associated with the extent of reverse knowledge transfers from this subsidiary to the parent firm.

4.2.5. Propositions 5–7: Attention as a Mediator between the Antecedents of Propositions 1–3 and Reverse Knowledge Transfers

Finally, I propose that the association between each of the above elements of organizational architecture and the extent of reverse knowledge transfers is mediated by the extent of attention the focal subsidiary receives from the parent firm. I.e., I postulate that attention accounts (at least in part) for the relationship between the respective element and reverse knowledge transfers (cf. Mathieu and Taylor, 2006).

Firm behavior depends on what decision-makers of the firm focus their attention on; while they tend to act on issues that capture their attention, they are unlikely to act on issues that do not attract their attention (Cho and Hambrick, 2006; Dutton and Ashford, 1993; Ocasio, 1997). Thus, opportunities are unlikely to be realized and action alternatives are unlikely to be turned into action as long as they are ignored by managers (Huff, 1990; Dutton, Fahey and Narayanan, 1983; Nadkarni and Barr, 2008). Differences in the focus of attention can therefore cause differences in the way otherwise similar firms behave (cf. Bruner, 1957; Durand, 2003; Dutton and Duncan, 1987).

Since managers often face too much information to attend to every issue (Simon, 1991), decision making is often rather a matter of attention than of actual choice (March, 1994: 10). Thus, attention is the ‘chief bottleneck in organizational activity’ (Simon, 1973: 270). This is also likely to apply to the occurrence of reverse knowledge transfers because sourcing knowledge from foreign subsidiaries is typically an attention-intensive task (cf. Tsang, 2002). As leveraging subsidiary knowledge internationally can contribute substantially to an MNC’s long-term success, it is therefore a key question for MNCs whether subsidiaries gain the ‘necessary levels of headquarters attention to deliver on their potential’ (Bouquet and Birkinshaw, 2008: 578; emphasis added). The organizational architecture assumes a central role towards this end as it can channel parent firm attention towards particular subsidiaries (Bouquet and Birkinshaw, 2008; Ocasio, 1997). It thus helps to resolve the problem that many subsidiaries receive only little attention from their parent firm (Bouquet and Birkinshaw, 2008; Prahalad and Doz, 1987). I therefore expect the general argument
that attention is the ‘conduit’ by which characteristics of the organization are ‘converted’ into outcomes (Cho and Hambrick, 2006: 458; Ocasio, 1997) to hold in the present context. Thus,

Proposition 5: The relationship between the focal subsidiary’s degree of strategic autonomy (Proposition 5a) or operational autonomy (Proposition 5b) on the one hand and the extent of its reverse knowledge transfers on the other hand is mediated by the extent to which it receives attention from the parent firm.

Proposition 6: The relationship between the focal subsidiary’s mandate status and the extent of its reverse knowledge transfers is mediated by the extent to which it receives attention from the parent firm.

Proposition 7: The relationship between the extent to which the focal subsidiary’s mission emphasizes its home-base augmenting objectives and the extent of its reverse knowledge transfers is mediated by the extent to which it receives attention from the parent firm.

4.3. Discussion

This paper has examined the relationship between formal organizational architecture and ‘reverse’ knowledge transfers from a focal subsidiary to its parent firm. Building on the attention-based view (Ocasio, 1997), it has argued that this relationship is mediated by the extent of attention the focal subsidiary receives from the parent firm. Consequently, it has first developed propositions that link three specific elements of formal organizational architecture (subsidiary autonomy, subsidiary mandate status, objectives specified in the subsidiary’s mission) to the extent of parent firm attention received by the focal subsidiary. Specifically, these propositions posit that the subsidiary’s degree of strategic autonomy reduces the extent of attention it receives from the parent firm, that its degree of operational autonomy is curvilinearly related to the extent of parent firm attention (in a U-shaped form), that it will receive more attention if it is granted a mandate for undertaking activities on behalf of the corporation as a whole, and that a stronger emphasis on home-base augmenting objectives in its mission increases the extent to which it receives attention from the parent firm. This paper has then developed a proposition that relates this extent of attention to the extent of reverse knowledge transfers, arguing that knowledge will be transferred more extensively from the focal subsidiary to the parent firm, the more
attention this subsidiary receives from the parent firm. Finally, this paper has developed propositions, which suggest that this extent of attention mediates the relationship between the elements of organizational architecture and reverse knowledge transfers.

By this approach, my paper can make several important contributions to the academic literature and to management practice.

First of all, my study responds to Bouquet and Birkinshaw’s (2008) call to complement their analysis by examining the influence of organizational architecture on the extent to which the focal subsidiary receives attention from the parent firm. They argued that their insights on the influence of a subsidiary’s ‘weight’ (its strength within the MNC network and the strategic significance of its local market) and its ‘voice’ (initiative taking and profile building by its managers) on parent firm attention has to be complemented by such an examination, before a ‘grand theory of attention […] allocation] in MNCs’ can emerge (Bouquet and Birkinshaw, 2008: 596). The insights my study has generated therefore add to the foundation, from which building such a ‘grand theory’ can be initiated.

Second, by elaborating on the relationship between organizational architecture and the allocation of attention, my study should contribute to the emerging attention-based literature in general and its further development (cf. Ocasio, 1997: 204). This relationship assumes a central position in Ocasio’s (1997) formulation of the ABV and has also been at the core of Simon’s (1947) work. Attention-based studies have provided us with profound knowledge about the impact of attention on managerial behavior and firm-level outcomes (e.g., Durand, 2003; Levy, 2005; Yadav et al., 2007) and have considered a variety of influences on the allocation of attention (e.g., Bouquet and Birkinshaw, 2008; Cho and Hambrick, 2006; Dutton and Ashford, 1993; Hansen and Haas, 2001; Nadkarni and Barr, 2008; Tsang, 2002). However, previous studies have paid little attention to elements of organizational architecture as antecedents of attention. Given the centrality that both Ocasio (1997) and Simon (1947) attribute to organizational architecture in channeling attention, a more detailed examination of the effect of specific elements of organizational architecture, as my paper provides, should constitute a valuable extension of our knowledge.
Third, my study contributes to the literature on intra-firm knowledge transfers. Prior research in this area has chiefly examined the influence of characteristics of the transmitted knowledge, of organizational characteristics such as age, size, and absorptive capacity, and of network characteristics (Foss and Pedersen, 2004; Monteiro et al., 2008; van Wijk, Jansen and Lyles, 2008). Since personal networks across units are a main aspect of a firm’s informal organization (Gulati et al., 2009), this literature offers some insights regarding the influence of a firm’s informal organization (Hansen, 1999, 2002; Tortoriello and Krackhardt, 2010; Tsai, 2002). In contrast, it has so far paid only limited attention to the influence of formal organizational architecture on intra-firm knowledge transfers (Björkman et al., 2004; Fey and Furu, 2008; Foss and Pedersen, 2002, 2004). As a result, our understanding of the relationship between elements of formal organizational architecture and internal knowledge transfers is incomplete and theoretical inconsistencies and knowledge gaps exist (Fey and Furu, 2008; Foss et al., 2010; Turner and Makhija, 2006). While these notions hold for the various types of knowledge transfers that may occur within MNCs and even hold for other types of multiunit firms than MNCs, they especially apply to multinational knowledge transfers from a subsidiary to its parent. These ‘reverse’ knowledge transfers represent a particularly severe research gap as they tend to receive less attention than the ‘conventional’ parent-subsidiary knowledge transfers and ‘lateral’ inter-subsidiary knowledge transfers (Alcácer and Chung, 2011; Ambos et al., 2006). My study should help to close these knowledge gaps and might also provide a potential explanation for inconsistencies found in the relationship between organizational architecture and intra-firm knowledge transfers by suggesting that parent firm attention mediates this relationship.

By addressing the extent of parent firm attention the focal subsidiary receives, my study adopts an approach that has seldom been taken before; few studies have examined organizational units as meaningful entities that may capture (or fail to capture) attention from parent firm managers (Ambos and Birkinshaw, 2010; Bouquet and Birkinshaw, 2008; Morrison and Milliken, 2000). Since attention can play a decisive role in parent firm-subsidiary relationships (Bouquet and Birkinshaw, 2008; Galunic and Eisenhardt, 1996, 2001), adopting this approach should yield valuable insights, as reflected in Nadkarni and Barr’s (2008) call to intensify the examination of the attention focus on internal organizations. By adopting this approach, my study
responds to this call and can provide an explanation for the paradoxical phenomenon that many MNCs seem to (re-)centralize or completely localize activities instead of fostering a global synthesis of knowledge by successful knowledge transfers (Benito et al., 2003; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005). While previous studies observed that subsidiaries vary substantially in the extent of parent firm attention they receive (Bouquet and Birkinshaw, 2008; Prahalad and Doz, 1987), my study suggests that a higher extent of parent firm attention devoted to a subsidiary can increase the extent to which the parent firm sources knowledge from this subsidiary. Thus, low levels of reverse knowledge transfers can be the result of a small extent of parent firm attention devoted to the focal subsidiary. My study further suggests that an appropriate organizational architecture can channel the attention of managers in the parent firm towards the focal subsidiary, thus facilitating reverse knowledge transfers.

The argument that parent firm attention tends to increase reverse knowledge transfers complements Ambos and Birkinshaw’s (2010) finding that subsidiaries can benefit from parent firm’s attention devoted to them. By making this argument, my study suggests that the parent firm can also benefit from devoting attention to them as doing so may enhance its ability to leverage their knowledge. This result bears substantial implications for our knowledge about how firms should deal with the fact that their attention is typically limited. As it can be in the parent firm’s self-interest to pay attention to its subsidiaries, it might be preferable to either extend the firm’s attention capacity or to save attention elsewhere than to overly restrict the attention devoted to subsidiaries.

Intra-firm knowledge transfers can be a basis for ‘recombinant innovations’, i.e. innovations that result from a recombination of existing knowledge elements (e.g., Fleming, 2001; Katila and Ahuja, 2002). By highlighting both the role of attention as an antecedent to reverse knowledge transfers and the organizational architecture that is associated with a high extent of attention, my study is likely to make a substantial contribution to the theory of recombinant innovation, since the examination of attention has been identified as an avenue that allows innovation research in general to ‘make significant progress’ (Yadav et al., 2007: 97).
My study distinguishes between strategic and operational autonomy, taking up an idea from mostly exploratory research (Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Nobel and Birkinshaw, 1998; Vereecke et al., 2006). So far, this research has seldom formulated explicitly separate propositions or hypotheses for strategic and operational autonomy (Keupp et al., 2011). My study therefore extends the research on subsidiary autonomy by being one of the first to do so. Since ‘autonomy is a rather fuzzy concept unless the distinction is drawn between strategic autonomy and operational autonomy’ (Glaister et al., 2003), my study presents arguments that respond to the repeated call to improve our understanding of subsidiary autonomy (Ambos and Schlegelmilch, 2007; Glaister et al., 2003; Young and Tavares, 2004) and that are probably able to resolve some of the inconsistencies in the hitherto unclear overall findings regarding subsidiary autonomy (Keupp et al., 2011: 230). Deepening our theoretical understanding of strategic vs. operational autonomy and validating it empirically therefore seems to be a rewarding area for further research, which might find my arguments useful towards this end.

My study opens up several further promising opportunities for future research. First, future research should empirically test the theoretical model that my paper proposes. In this context, it is important to note the advantages of not restricting oneself to the examination of elements of organizational architecture as antecedents of parent firm attention. Using this attention as a mediator between organizational architecture and reverse knowledge transfers instead can account for the fact that, while attention is a critical predecessor to action, the relationship between the two may still be complex. For instance, bureaucratic and sociopolitical processes and the selection of suboptimal alternatives may impede the direct translation of attention into effective action, such that it is beneficial to keep attention and action separate (Dutton and Ashford, 1993). While some prior studies have analyzed outcomes of attention allocation (e.g., Durand, 2003; Levy, 2005; Yadav et al., 2007), using attention as a mediator between certain antecedents and certain outcomes has rather been an exception (Cho and Hambrick, 2006; Nadkarni and Barr, 2008; Tsang, 2002). Adopting this latter approach will tell us whether the attention induced by certain elements of organizational architecture actually yields a higher level of knowledge transfers and will provide additional insights into the significance of parent firm attention for the association between organizational architecture and knowledge transfers in particular and for the parent
firm-subsidiary relationship in general. Studies that operationalize attention and action as separate constructs may be well-advised to account for reverse causality. Thus, they should make sure that they actually measure the extent of attention that precedes action, and not confound it with attention that results from performing the respective activities. Second, future research could address the limitations of my study. For instance, my paper does not discuss levels-of-analysis issues as such, even though attention allocation is first and foremost a cognitive process occurring inside individuals (Cho and Hambrick, 2006; Ocasio, 1997), whereas antecedents and outcomes are located at the firm-level. Sidestepping such multilevel issues is typical for studies adopting the ABV; to this end, many studies argue that organizational attention could be proxied by the attention of the organization’s CEO or top management team (Bouquet and Birkinshaw, 2008; Cho and Hambrick, 2006; Nadkarni and Barr, 2008; Yadav et al., 2007). Applying explicit multilevel theory (e.g., Klein and Kozlowski, 2000) could therefore extend this literature by interesting new insights about the aggregation of individual attention-based processes into firm-level outcomes. The examination of knowledge transfers is likely to represent a particularly fruitful area for the application of multilevel theory because it would probably not be totally appropriate to equal parent firm attention with the attention of its top managers in this context. Rather, since managers across the hierarchy are potential users of subsidiary knowledge (Hansen and Løvås, 2004), the attention that a broad set of parent firm managers pays to the subsidiary seems relevant. Another limitation of my study is that I have focused on the attention-channeling effect of organizational architecture, but have not analyzed how the current organizational architecture emerged. Since the parent firm can set the MNC’s organizational architecture and retains ultimate responsibility for it (Criscuolo and Narula, 2007; Ghoshal, Korine and Szulanski, 1994; Gulati et al., 2009), organizational architecture relating to the focal subsidiary can itself be the result of parent firm attention devoted to the focal subsidiary. Given the importance of organizational architecture for channeling attention, future research should investigate how subsidiaries attract parent firm attention such that a particular organizational architecture is implemented. Third, my study has discussed elements of formal organizational architecture as antecedents to parent firm attention and ultimately reverse knowledge transfers. The examination of elements of informal organizational architecture and, in particular, of the interaction
effect between formal and informal organizational architecture could yield further illuminating results.

Finally, the insights my paper offers on the association between organizational architecture, attention, and reverse knowledge transfers could yield beneficial advice for executives. Since organizational architecture can be set by executives (Gulati et al., 2009: 575), insights on organizational architecture point towards a path for managerial action and should therefore be very relevant and helpful for executives (Foss and Pedersen, 2002). As a consequence, executives tend to be highly interested in research results on the influence of organizational architecture on organizational outcomes (Foss et al., 2010). However, the extant literature provides executives with too little theory-based insights on the organizational architecture that affects knowledge processes inside MNCs (Foss and Pedersen, 2004: 341). My study adds to the insights we can offer to them. Given that many MNCs seem to experience substantial problems with the global leverage of subsidiary knowledge (Benito et al., 2003; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005), the insights of my study could be useful to many firms.
4.4. References


Pull the Right Levers: Creating Useful Subsidiary Competence by Appropriate Organizational Architecture

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5. Pull the Right Levers: Creating Useful Subsidiary Competence by Appropriate Organizational Architecture

Abstract

Achieving a decentralized creation of internationally leveraged competence is an important, yet challenging task for many multinational corporations (MNCs). However, the literature provides few insights and little guidance on the means by which parent firm managers can foster the creation of competence, which is useful to other units inside the MNC, in the firm’s internationally dispersed subsidiaries. To overcome this knowledge gap, we first develop an overarching framework on the argument that an appropriate organizational architecture motivates subsidiaries to contribute to the parent firm’s objectives. We suggest that elements of the organizational architecture parent firm managers can set represent levers they can use to stimulate a subsidiary’s self-interest in creating competence that is useful to other units. We then build hypotheses on the association between three specific elements of formal organizational architecture and the extent to which a focal subsidiary creates such competence. These elements are a home-base augmenting mission, interfaces with other MNC units, and the subsidiary’s strategic and operational autonomy. We test these hypotheses with a unique sample of 287 subsidiaries and several novel psychometric measures that provide intimate insights into an MNC’s internal structure. The results strongly support our arguments. We close by discussing the implications of our research for the academic literature, management practice, and future research.

Keywords: Competence Creation; Organizational Architecture; Multinational Firm; Subsidiary; Autonomy
5.1. Introduction

A multinational corporation (MNC) should manage its international subsidiaries in a way that allows these subsidiaries to create competence that is useful for other organizational units of the MNC (Andersson et al., 2002; Buckley and Carter, 1996; Rugman and Verbeke, 2001; Tallman, 2003). In theory, the decentralized development of useful competence that is leveraged by other units allows MNCs to generate additional competence and to create competitive advantage (Andersson et al., 2002; Dossi and Patelli, 2010; Dunford et al., 2010; Ghoshal and Nohria, 1989).

What is less known, however, is by which organizational architecture the parent firm of an MNC can induce the creation of useful subsidiary competence (Blomkvist et al., 2010; Foss and Pedersen, 2002, 2004; Nielsen and Michailova, 2007; Persaud, 2005; Rugman and Verbeke, 2001). The firm’s organizational architecture comprises its explicitly mandated formal structure (e.g., incentive systems, authority relationships, interfaces) and emergent informal structure (e.g., organizational culture, social networks) (Gulati et al., 2009; Nadler and Tushman, 1988, 1997). The organizational architecture provides top managers with ‘some of the most powerful strategic levers’ they can pull to realize their intentions (Gulati et al., 2009: 575). The influence of organizational architecture on competence creation has therefore been highlighted as a promising path for further research (Foss and Pedersen, 2004; Gulati et al., 2009). 27

We refer to competence as being ‘useful’ if it is actively sought and leveraged by other MNC units (i.e., other subsidiaries and the parent firm). Other units will be likely to leverage the focal subsidiary’s competence if the competence is useful to them (Gupta and Govindarajan, 2000; Monteiro et al., 2008). This focus on the creation of competence that is useful to other units offers several advantages over considering the creation of any competence. First, not every competence a firm creates is actually put into use (Pfeffer and Sutton, 1999), yet typically, only a competence that is put into use can yield beneficial outcomes (Ambos and Ambos, 2009; Haas and Hansen, 2005). This especially applies to the MNC whose specific advantage results from other units leveraging the competence created by an individual unit. However, much competence

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27 Competence can be defined as the ability to perform certain activities by drawing from available assets and resources (McGrath et al., 1995: 254; Teece et al., 1997: 516). Thus, competence comprises information, expertise, and know-how (Hansen and Løvås, 2004). To illustrate, some subsidiaries of the pharmaceutical company Roche have developed useful competence in identifying and optimizing compounds for specific therapeutic areas and some in conducting pre-clinical and clinical studies (Crisc直到 and Narula, 2007). The Singapore subsidiary of Hewlett Packard has developed strong competence in developing and producing handheld information devices such as personal digital assistants and calculators (Frost et al., 2002).
created in an MNC is only used locally (Fors, 1997; Rugman, 2005) and thus does not contribute to the MNC-specific advantage. Second, not every competence that is put into use proves useful (Haas and Hansen, 2005). Therefore, our focus should provide more accurate insights to parent firm managers who wish to realize the MNC-specific advantage (cf. Bartlett and Ghoshal, 1989; Meyer et al., 2011; Mudambi and Pedersen, 2007).

Our paper therefore studies which elements of organizational architecture that can be set by parent firm managers foster the creation of useful subsidiary competence, and why. By this approach, it can contribute to several literature streams.

First, studying this question helps to develop the literature on the ‘eclectic paradigm’ (e.g., Dunning, 1981), which is the dominating international business framework and can incorporate other widespread approaches such as Bartlett and Ghoshal’s (1989) ‘transnational paradigm’ (Rugman and Verbeke, 1992; 2001). It argues that a firm’s international activities depend on firm- (or ‘ownership’-)specific advantages, on advantages the firm’s subsidiaries can develop in their respective host location, and on the advantages the firm can realize from internalizing the activities that are directed towards foreign markets (as compared to other forms of foreign market activity such as out-licensing). The firm’s ability to organize knowledge, competence, and related assets effectively throughout the world has become one of the most important firm-specific advantages an MNC can possess (Dunning, 2000, emphasis added). Moreover, this ability strongly affects the extent to which internalizing international activities can be advantageous for the MNC (Rugman and Verbeke, 1992). As a consequence, Rugman and Verbeke (2003) argue that the examination of the organizational architecture an MNC adopts represents an important path to develop this literature stream. Our paper responds to their call and their associated recommendation to use primary data collected from firms and managers.

Second, since we adopt the perspective of a focal subsidiary that develops competence which is useful to other MNC units, our paper is related to the literature on subsidiary roles, i.e., the roles subsidiaries assume within the MNC (see Rugman et al. (2011) for an overview). Studies from this literature have occasionally addressed the association between organizational architecture and a focal subsidiary’s role, both in terms of formal and of informal architecture (Ambos and Schlegelmilch, 2007; Birkinshaw and
Morrison, 1995; Frost et al., 2002; Nobel and Birkinshaw, 1998). In particular, they have focused on subsidiary autonomy (or its inverse – centralization) and socialization, respectively. We extend these studies by elaborating the analysis of formal organizational architecture and by considering the extent to which the subsidiary creates useful competence rather than fixed role categories. With few exemptions that do not focus on the influence of organizational architecture (e.g., Benito et al., 2003; Birkinshaw et al., 1998), studies on subsidiary roles usually employ fixed categories as variables. However, there might be considerable variation across subsidiaries that are assigned to the same category, and the boundaries between categories may not be clear-cut (Asmussen et al., 2009; Birkinshaw and Hood, 1997; Nobel and Birkinshaw, 1998), which makes it hard to derive clear and consistent implications from the results (see, e.g., Ambos and Schlegelmilch, 2007).

Third, our study also extends the literature on knowledge and competence transfers initiated by subsidiaries in several regards. While some studies have examined aspects of the MNC’s informal organization such as personal networks across subsidiaries (Hansen, 1999, 2002; Noorderhaven and Harzing, 2009; Tortoriello and Krackhardt, 2010; Tsai, 2002), elements of formal organizational architecture that promote knowledge transfer across MNC units have been studied little (Björkman et al., 2004; Fey and Furu, 2008). Additionally, while this literature discusses antecedents of knowledge and competence transfers, it does not focus on the means by which competence that might be transferred is generated (Foss and Pedersen, 2002). Finally, a transferred competence need not necessarily prove useful to the receiving unit (Ambos and Ambos, 2009; Szulanski and Jensen, 2006; Yamin and Otto, 2004), nor does a competence have to be transferred to another unit to be useful to it (Rugman and Verbeke, 2001). Therefore, the knowledge- and competence-transfer literature also provides little evidence on the extent to which (if any) a subsidiary creates competence that is useful to other MNC units.

28 The exception is subsidiary autonomy, which has been studied quite frequently (e.g., Ciabuschi et al., 2010; Fey and Furu, 2008; Noorderhaven and Harzing, 2009). However, the results have been inconclusive and conflicting.

29 For instance, the focal subsidiary may also provide another unit with an intermediate product or service, in which the competence it creates is embedded, and thus this competence can be useful to the other unit without being transferred itself.
Overall, with the exception of one exploratory study that uses a small sample (Persaud, 2005), we know very little about the relationship between organizational architecture and the development of subsidiary competence (Blomkvist et al., 2010; Foss and Pedersen, 2004).

These research gaps are problematic since many firms struggle with creating dispersed subsidiary competence that is internationally leveraged; many MNCs even seem to prefer (re-)centralizing or completely localizing activities instead (Benito et al., 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005). Since parent firm managers can set their firm’s organizational architecture and since the organizational architecture comprises very powerful levers (Gulati et al., 2009; Nadler and Tushman, 1997), the effects should be highly relevant to management practice (Foss and Pedersen, 2002, 2004).

Our paper advances theory and managerial practice by responding to these knowledge gaps. By adopting the perspective of a focal subsidiary, its overarching theoretical argument is that an appropriately set organizational architecture stimulates this subsidiary’s self-interest in creating useful competence and motivates it to act accordingly. Our analysis focuses on three elements of formal organizational architecture: the emphasis put on home-base augmenting objectives in the subsidiary’s mission; the extent to which it has cross-unit interfaces with other MNC units; and the degree of strategic and operational autonomy it is granted. Hypotheses for each of these levers are tested with a unique sample of 287 international subsidiaries. The findings yield strong support for our theoretical arguments.

Thus, our study can make a number of important contributions for academia and executives. The paper responds to calls that the creation of useful subsidiary competence and, in particular, the association between organizational architecture and subsidiary competence creation should be researched to a much greater extent (e.g.,

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30 Saying that parent firms can set the organizational architecture does not deny that subsidiaries can also influence it. By initiative-taking and lobbying parent firm managers, subsidiary managers can try to manipulate the organizational architecture according to their preferences (Birkinshaw and Hood, 1998; Birkinshaw et al., 1998). Depending on the subsidiary’s bargaining power, the parent firm might find it easier or harder to resist the subsidiary’s desires (Mudambi and Navarra, 2004), but technically the final decision regarding the organizational architecture is up to the parent firm (Ghoshal et al., 1994; Gupta and Govindarajan, 1991; Meyer et al., 2011) – even if this decision consists of (implicitly or explicitly) giving in to the subsidiary (Birkinshaw et al., 1998: 236). Note that we focus on the current organizational architecture, whereas the process and history of how a specific architecture was set is beyond the scope of this paper.
Birkinshaw and Hood, 1998; Foss and Pedersen, 2004; Gulati et al., 2009; Rugman and Verbeke, 2001). In so doing, it extends the extant literature, which has frequently described the benefits of creating and leveraging competence in and across internationally dispersed units (e.g., Andersson et al., 2002; Buckley and Carter, 1996; Rugman and Verbeke, 2001; Tallman, 2003), while the organizational means of how to actually achieve this goal have received little attention to date. Moreover, by distinguishing between strategic and operational subsidiary autonomy, our paper helps resolve inconsistent findings regarding subsidiary autonomy (Ciabuschi et al., 2010; Fey and Furu, 2008; Noorderhaven and Harzing, 2009). Finally, our findings on the association between organizational architecture and subsidiary competence creation should be helpful for executives who are generally highly interested in such findings (Foss et al., 2010), but are rarely provided with related insights by the academic literature (Foss and Pedersen, 2004).

5.2. Theoretical Framework and Hypotheses
A subsidiary has to invest substantial amounts of time and resources to create competence that can be leveraged by other units (Birkinshaw and Hood, 1998; Forsgren et al., 2000). Creating such competence is therefore not necessarily beneficial for the subsidiary itself, even though the competence’s international leverage might be beneficial for the MNC as a whole (Fey and Furu, 2008). Since subsidiaries tend to be primarily interested in their own ends and only secondarily in those of the MNC or of the parent firm (Mudambi and Navarra, 2004; Nohria and Ghoshal, 1994), this implies that a subsidiary could refrain from creating such competence. To increase the extent of useful competence creation in its subsidiaries, the parent firm should thus take measures to manage their self-interest appropriately. Self-interest and its implications for behavior are at the core of several theories, e.g. agency theory, resource-dependence theory, and expectancy theory. Agency theory deals with relationships, in which agents (subsidiaries) perform activities on behalf of the principal (the parent firm) such that the success of the principal’s plans and intentions depends on the agents’ behavior. However, due to diverging interests and information asymmetry, agents may pursue their own goals rather than act as their principal would want them to (Eisenhardt, 1989). In contrast, the subsidiary’s behavior will be unlikely to deviate from the parent firm’s preferences if their interests do not diverge (Eisenhardt, 1989;
Mudambi and Pedersen, 2007). Resource dependence theory argues that a subsidiary can be expected to behave such as to enhance its bargaining power within the MNC (Ambos et al., 2011; Pfeffer and Salancik, 1978). A subsidiary could try to increase its bargaining power by creating useful competence, but it might find this approach more promising, the more the created competence is likely to be actually leveraged by other units (Mudambi and Navarra, 2004). Generally, the fact that subsidiaries act according to their self-interest and do not automatically behave as the parent firm would want them to, implies that parent firm managers should take measures to motivate their subsidiaries to create useful competence. Expectancy theory (Vroom, 1964) argues that subjects will be more motivated to perform a particular task and will invest more energy in it, the more they expect its accomplishment to lead to highly valued outcomes (Steers et al., 2004; van Eerde and Thierry, 1996). Similar to agency theory (Mudambi and Navarra, 2004), expectancy theory is originally located at the individual level, but has also been fruitfully applied to explain the behavior of organizational units (e.g., Chen and Miller, 1994). Thus, the extent to which the focal subsidiary creates useful competence will depend on its expectation that doing so will prove valuable for itself. A subsidiary can expect valuable outcomes from creating competence, if this competence is actually leveraged by other units (Mudambi and Navarra, 2004). In contrast, creating competence without it being useful to other units can have negative effects for the subsidiary (Forsgren and Pedersen, 2000). Thus, the likelihood that the competence it creates is actually leveraged by other units should affect the subsidiary’s expectation of valuable outcomes from creating useful competence. In a related vein, impediments to the international leverage of its competence can diminish the subsidiary’s expectation of valuable outcomes, because resources the subsidiary has to invest to overcome such impediments reduce the value it derives from competence creation. Thus, overall these theories suggest that the parent firm can foster the creation of useful competence in its subsidiaries by harnessing the subsidiaries’ self-interest to act accordingly. Further, they argue that it can achieve this by taking measures that make the competence the subsidiaries create more likely to be actually leveraged internationally and make creating competence more beneficial for the subsidiaries themselves.

Setting the organizational architecture appropriately is a particularly powerful measure by which parent firms can manage subsidiary self-interest and motivation and thus
shape the actions of their subsidiaries (Gupta and Govindarajan, 1991; Keupp et al., 2011; Mudambi and Navarra, 2004). In particular, organizational architecture should exert a strong influence on competence creation and utilization (Fey and Furu, 2008; Gupta and Govindarajan, 1991; Meyer et al., 2011). In fact, Foss and Pedersen (2004: 341, emphasis added) called for more systematic research along these lines because ‘there are many a priori reasons, as well as substantial anecdotal evidence, to support the argument’ that organizational architecture affects competence-related outcomes inside MNCs. For these reasons, this paper studies elements of organizational architecture as antecedents to subsidiary competence creation. It focuses exclusively on elements of the formal architecture, since managers can make discrete choices to shape the formal architecture, whereas informal organization is typically rather difficult to shape directly (Nickerson and Zenger, 2002). While informal architecture emerges over time, formal architecture is explicitly mandated (Criscuolo and Narula, 2007; Gulati et al., 2009; emphasis added). Therefore, manipulating formal architecture will likely be key if managers want to change their organization (Ethiraj and Levinthal, 2004).

Three issues, which are considered important antecedents to behavior in the motivation literature (e.g., Locke and Latham, 2004), also emerge from the MNC literature as being particularly relevant for a decentralized creation of internationally useful competence: the objectives guiding the focal subsidiary’s activities; the boundaries between the subsidiary and other units within the MNC; and its autonomy (e.g., Criscuolo and Narula, 2007; Meyer et al., 2011). The three elements of organizational architecture that our study examines address these issues and have therefore been highlighted as crucial paths for further research: a home-base augmenting objective specified in the subsidiary’s mission; cross-unit interfaces spanning the boundaries between the focal subsidiary and other MNC units; and the subsidiary’s strategic and operational autonomy (e.g., Cantwell and Mudambi, 2005; Criscuolo and Narula, 2007; Foss and Pedersen, 2004; Song et al., 2011). Figure 5.1 provides an overview of our hypotheses.

5.2.1. H1: Home-base augmenting mission
Parent firm managers signal to the focal subsidiary that it should create useful competence, rather than merely exploit existing competence, when they provide it with
Figure 5.1. Hypothesized Association between Central Aspects of Formal Organizational Architecture and the Subsidiary's Creation of Useful Competence

a. The empirical data confirm all hypotheses in our model (see the ‘Results’ section).

a home-base augmenting mission (Kuemmerle, 1997, 1999). Subsidiary managers are likely to adopt this goal and should be motivated to behave accordingly since they know that they will be evaluated based on how well their unit performs on this dimension (Björkman et al., 2004; Melnyk et al., 2010). This motivation effect should render a subsidiary with a home-base augmenting mission indeed likely to create competence that augments the MNC’s existing competence (Fey et al., 2009). Such novel competence is likely to be useful for other organizational units within the MNC (Gupta and Govindarajan, 2000; Yang et al., 2008).

Further, parent firm managers are more likely to provide ‘seed money’ to subsidiaries with a home-base augmenting mission (Cantwell and Mudambi, 2005). Such additional financial resources can facilitate the creation of additional competence that is useful for other organizational units inside the MNC (Birkinshaw and Hood, 1998; Frost et al., 2002).

Parent firm managers have also been found to provide special support for subsidiaries with a home-base augmenting mission. For example, they provide them with access to other, non-financial resources that facilitate the development of useful competence,
such as idiosyncratic knowledge and experience, links to external partners whose input can be beneficial to the subsidiary’s competence creation, additional staff, and time budgets (Delany, 2000; Kuemmerle, 1997, 1999, 2002). Such measures signal the parent firm’s expectation that the subsidiary will use this help to eventually create useful competence that can be leveraged throughout the MNC, and the provided help may generate a moral obligation on the part of the subsidiary to comply with the parent firm’s expectation (Gouldner, 1960; Keupp et al., 2011). By putting more emphasis on the home-base augmenting objective in the subsidiary’s mission, parent firm managers should therefore be able to facilitate the creation of useful competence in the focal subsidiary. Thus,

Hypothesis 1: The stronger its mission emphasizes its home-base augmenting objective, the more will the subsidiary create useful competence.

5.2.2. H2: Cross-unit interfaces

Cross-unit interfaces are formal organizational integration mechanisms that span the boundaries between the focal subsidiary and other MNC units (Jansen et al., 2009). Examples of such interfaces comprise liaison personnel to coordinate the decisions with other units, job rotation programs with other units, and meetings that involve managers from the focal subsidiary and from other units. Cross-unit interfaces establish information channels between the focal subsidiary and other units within the MNC that allow for a smooth and rich information flow between them (Björkman et al., 2004; Gupta and Govindarajan, 2000). They therefore allow the focal subsidiary to better assess the availability and quality of competence in other units, an effect that helps the focal subsidiary identify specific specialist knowledge available in other units (Reiche et al., 2009). This ability to build on knowledge of other MNC units should allow the focal subsidiary to further develop competence (Mudambi and Navarra, 2004).

Cross-unit interfaces typically also improve coordination among the units (Johnston and Paladino, 2007) and enhance their understanding of each other’s tasks, capabilities, and objectives (Schulz, 2003). These effects should reduce the probability that the competence created by the focal subsidiary is duplicate to or incompatible with other units’ existing competence, while making it more likely to be relevant and thus finally useful to these other units (Monteiro et al., 2008; Yang et al., 2008).
By increasing the focal subsidiary’s cross-unit interfaces with other units, parent firm managers should therefore be able to facilitate the creation of useful competence in the focal subsidiary. Thus,

_Hypothesis 2: The more cross-unit interfaces with other organizational units the focal subsidiary has, the more will it create useful competence._

### 5.2.3. H3: Autonomy

We differentiate the concept of subsidiary autonomy into two separate constructs (*strategic* and *operational* autonomy), following recommendations in prior literature advising such a conceptual separation to increase the theoretical and empirical validity of the autonomy construct (Glaister et al., 2003; Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Nobel and Birkinshaw, 1998; Vereecke et al., 2006).

We therefore build separate hypotheses for the respective effects of strategic and operational autonomy on the focal subsidiary’s creation of useful competence.  
*Strategic* autonomy designates the focal subsidiary’s ability to set its own agenda; *operational* autonomy its ability to manage selected day-to-day activities autonomously (Bailyn, 1985; Perlow, 1998). Case-based illustrations show that those subsidiaries with a high level of *strategic* autonomy could make independent strategic decisions whenever their business interests were directly involved, whereas those with a high degree of *operational*, but not strategic autonomy were free to manage their day-to-day responsibilities while they had very little or no control over their budget and business plan (Birkinshaw, 1996; Glaister et al., 2003).

First, we argue that the more *strategic* autonomy the focal subsidiary has, the _less_ it will develop competence that is useful to other MNC units. With increasing strategic autonomy, the probability increases that the focal subsidiary’s integration into the intrafirm network is endangered or actually damaged (Birkinshaw et al., 1998). The less integrated a subsidiary is in the MNC network, the greater is the risk that the focal subsidiary develops competence in isolation from the rest of the organization. This isolation, in turn, strongly increases the probability that this competence will be duplicate, irrelevant to, or incompatible with existing organizational competence, i.e., that it will not be useful to other organizational units inside the MNC (Gupta and Govindarajan, 2000; Monteiro et al., 2008).
Leveraging the competence a subsidiary creates throughout the organization is a central element of the subsidiary’s integration into the MNC system (Mudambi, 2002). Prior research suggests that the more tightly integrated a subsidiary becomes in the corporate system, the more decisions of a truly strategic nature are taken out of the subsidiary’s hand and held at a corporate level (Birkinshaw et al., 2005: 235; emphasis added). Thus, as parent firm managers are interested in the focal subsidiary creating useful competence, they should reduce the focal subsidiary’s strategic autonomy (Ambos and Schlegelmilch, 2007; Frost et al., 2002). Therefore,

_Hypothesis 3a: The more strategic autonomy the focal subsidiary is granted, the less will it create useful competence._

Second, we argue that the more operational autonomy the focal subsidiary has, the more it will develop useful competence. A subsidiary with a higher level of operational autonomy is likely to be able to choose the external partners it collaborates with, since that choice is typically an operational, rather than a strategic issue (Nobel and Birkinshaw, 1998). Being allowed to collaborate with external partners of its own choice, the subsidiary is probably better able to form favorable linkages with parties in its local environment (Andersson and Forsgren, 2000; Birkinshaw et al., 1998). These linkages provide it with the opportunity to learn more from the local system of innovation and to absorb local resources, competencies, and knowledge more efficiently (Andersson et al., 2002; Pearce, 1999; Rugman and Verbeke, 2001). Further, operational autonomy is likely to provide subsidiary employees with the opportunity to approach problems in ways that make the most of their expertise and creative-thinking skills by fostering their intrinsic motivation, creativity, and finally organizational innovation (Amabile, 1997; Glynn, 1996). Therefore, subsidiaries are likely to create more novel competence the more their operational autonomy increases (Ambos and Schlegelmilch, 2007: 476; emphasis added).

Finally, the thus created novel competence is also likely to be useful for other organizational units inside the MNC. As the competence created by a subsidiary with a high degree of operational autonomy likely incorporates inputs from the most appropriate sources available in its local environment and draws on the particular expertise and skills of its employees, this competence should not only be relatively strong, but also quite unique within the MNC (Cantwell and Santangelo, 1999; Lewin et al., 2009). Since the way in which the focal subsidiary manages its day-to-day
operations seems unlikely to substantially reduce the extent to which its competence is relevant to other MNC units and compatible with their existing competence, these units should consider it quite useful (Monteiro et al., 2008; Yang et al., 2008). Parent firm managers should therefore be able to facilitate the creation of useful competence in the focal subsidiary by granting it more operational autonomy. Thus, 

_Hypothesis 3b: The more operational autonomy the focal subsidiary is granted, the more will it create useful competence._

### 5.3. Data and Methods

#### 5.3.1. Population and Sampling Frame

Our sample consisted of subsidiaries that undertake innovation and/or perform research and development (R&D) since these tasks offer opportunities for the creation of useful competence, which can be leveraged internationally (Cantwell and Mudambi, 2005; Meyer et al., 2011). These subsidiaries may perform other value activities in addition to R&D.

We used the database _ThomsonOne_ to identify Swiss and German firms irrespective of their industry affiliations. This geographic focus was chosen because first, firms in Switzerland and Germany typically display a high degree of R&D internationalization (Serapio and Dalton, 1999). This setting provides a fruitful context in which subsidiary competence creation and potential problems with such creation are highly likely to be observable. Second, since Germany and Switzerland are neighboring and culturally highly similar countries (Hofstede et al., 2010), our results are unlikely to be biased by potential effects of geographical and cultural distance between parent firms and subsidiaries once we control for subsidiary location. Through this process a total of 1,254 firms (983 German, 271 Swiss) were identified.

We only included those firms in the sampling frame which were MNCs and controlled at least one subsidiary that meets the above criteria. In order to classify firms according to these criteria, we analyzed each firm’s annual report and made additional confirmatory telephone calls. Consequently, 750 firms had to be excluded from the sampling frame. On average, the 504 remaining firms accounted for 68% of all sales by German and Swiss firms in their respective industries. We contacted the top management of these 504 firms to explain our research topic and to ask for participation in our study. 159 firms (104 German, 55 Swiss) agreed to cooperate. By
correspondence with corporate-level senior managers, 923 foreign subsidiaries were identified. These 923 subsidiaries constitute the population to which we sent out the questionnaire.

5.3.2. Item Development
We adopted a psychometric measurement approach and collected survey data from individual informants. Such shared unit-level constructs (Klein and Kozlowski, 2000) are naturally an approximation since individuals may differ in their perception of subsidiary characteristics. Thus, the projection of individual-level cognition to the organizational level should be deemed a heuristic (Schneider and Angelmar, 1993). Still, the interviews during the item revision phase indicated the subsidiaries’ general managers would be able to make valid and reliable assessments. Moreover, prior literature has consistently assumed that individual top-level employees are most familiar with the characteristics of their subsidiary and its relationships with other firm units (Björkman et al., 2004; Ciabuschi et al., 2010; Fey and Furu, 2008; Foss and Pedersen, 2002; Gupta and Govindarajan, 2000; Noorderhaven and Harzing, 2009). Nevertheless we performed multiple precautionary procedures to rule out potential biases.

To generate our items, we carefully reviewed the relevant literature and related scales. The two subsidiary autonomy scales were adapted from Nobel and Birkinshaw’s (1998) ‘centralization’ scale\(^{31}\). Since an organization’s products are highly important to realize value from its competence (Prahalad and Hamel, 1990; Teece, 2000), product design is likely to be an important decision parameter in our context, which is why we supplemented the ‘centralization’ scale by the item ‘product design’ from Birkinshaw’s (2002) scale. The scales we use to control for the codifiability and observability of competence are adopted from Zander and Kogut (1995) and Birkinshaw et al. (2002), respectively. The scale on formal cross-unit interfaces combines items from several previous scales (Gupta and Govindarajan, 2000; Jansen et al., 2009; O’ Donnell, 2000; Persson, 2006). To the best of our knowledge, no established scales to measure our other constructs were available. As a result, we employed a rigorous item creation and validation process for these scales, adhering to

\(^{31}\) Nobel and Birkinshaw (1998: 495) found that their centralization scale resulted in two different factors which they termed ‘strategic issue centralization’ and ‘operational issue centralization’.
recommendations in the measurement literature (Churchill, 1979; Schriesheim et al., 1993). The process began with the production of a preliminary item list based on the reviewed literature. Iterative rounds of discussions with international academics and managers from four MNCs followed to ensure the content, face, and external validity of the emerging constructs. If necessary, their feedback yielded substantive changes to the latest list. The revised list was then discussed with professors and managers until both groups agreed that no further clarifications and amendments would be required. Thus, we were able to produce a carefully tested questionnaire instrument.

5.3.3. Measurement

The subsidiary is the unit of analysis used for all constructs in this study. Accordingly, all variables are located at the subsidiary level. The items and scales are replicated in Appendix A. To construct each of the scales, we added its individual item scores and subsequently divided the sum by the number of items in the scale (Dess and Davis, 1984; Trevor and Nyberg, 2008).

5.3.3.1. Dependent Variable

Creation of useful subsidiary competence was measured by a four-item scale that we developed. We used seven-point items with differently anchored points – ‘not at all’ (1)/‘to a great extent’ (7) and ‘never’ (1)/‘very often’ (7). By ‘useful competence’, we mean competence that is actively sought and leveraged by other units of the MNC, i.e., by other subsidiaries and the MNC’s parent firm. Our dependent variable therefore measures the extent to which the focal subsidiary has created competence that is leveraged by these other units. Given the above scale construction method, the scale is conditioned on values between 1 and 7, which is why we prefer Tobit models for analysis (Baum, 2006; Greene, 2003) (Cronbach’s alpha = 0.8555).

5.3.3.2. Independent Variables

Home-base augmenting (HBA) mission was measured by a self-developed scale anchored at ‘not at all’ (1) and ‘to a great extent’ (7). It determines how much emphasis is placed on the objective to augment the MNC’s existing competence base in the subsidiary’s mission (Cronbach's alpha = 0.8626). The scale for cross-unit interfaces was anchored at ‘never’ (1) and ‘very often’ (7). It measures the extent to which the focal subsidiary has formal interfaces with other MNC units (alpha =
Strategic and operational autonomy are measured on two separate scales anchored at ‘parent alone decides’ (1) and ‘subsidiary alone decides’ (7). The two scales assess to what degree the focal subsidiary is autonomous from its parent firm in making strategic (alpha = 0.7055) and operational (alpha = 0.7357) decisions.

5.3.3.3. Control Variables
We control for codifiability of competence and observability of competence with two separate scales, which are both anchored at ‘strongly disagree’ (1) and ‘strongly agree’ (7). The former measures how easily the subsidiary’s competence can be described and learned (alpha = 0.7963), the latter how well the subsidiary’s competence can be learned by observation (alpha = 0.7894). Additionally, we control for R&D intensity by measuring the subsidiary’s R&D expenses relative to its budget, for subsidiary size by the logged number of its employees, for subsidiary age by subtracting the year in which the subsidiary started operations for the parent firm from 2009, for subsidiary location by individual country dummies and for subsidiary industry by individual industry dummies on the two-digit level using the NACE classification.

5.3.4. Questionnaire and Data Collection Procedure
Validated academic procedures of questionnaire design (Dillman, 2000) informed the production of our fully standardized questionnaire. To collect data, we e-mailed a copy of the questionnaire to every subsidiary together with a cover letter explaining the aims of the study, guaranteeing complete confidentiality, and offering the study results as an incentive to cooperate. Short phone calls were made to announce our questionnaire will arrive and to ask the subsidiaries’ general managers (our key informants) for their cooperation. Reminder letters were mailed to all managers who had not yet responded 14 and 30 days after they had received the original questionnaire. Of the total 923 subsidiaries, 290 responded, yielding a favorable response rate of 31.42%. We excluded three of these questionnaires from further analysis because of too much missing data. A raw sample of 287 questionnaires remained with no or only few missing data that were completely at random. We followed a conservative estimation strategy by instructing the statistical software to do listwise deletion on cases where information regarding one or more variables in the model is missing; thus, the models use less than 287 observations. Since this procedure
defies imputation, it should enhance the robustness of the empirical results (Allison, 2002).

5.3.5. Post-hoc Tests, Validation Surveys, Single Respondent Bias and Common Method Variance, Reliability and Validity of Our Measures

We adopted multiple procedures, conducted two validation surveys, and tested our data extensively to rule out response bias, single respondent bias and common method variance and to assess the reliability and validity of our measures. A detailed account of these procedures, surveys and tests, which unanimously indicate that our results are unlikely to be biased significantly and that our measures possess high reliability and validity, is provided in Appendix B.

5.4. Results

5.4.1. Descriptive Statistics and Results of Hypothesis Testing

Table 5.1 provides descriptive statistics and correlations for all variables. Since the dependent variable is conditioned on values between 1 and 7, we estimated Tobit regression models (Baum, 2006; Greene, 2003). We specified these models to report robust (Huber-White) standard errors to correct for potential heteroscedasticity. All models were constructed incrementally by first entering only the controls in a baseline model and then adding the covariates of each hypothesis step by step. We compared the respective model fits by calculating Akaike information criteria (AIC) and found the full model which includes all independent and control variables fits the data best. Table 5.2 documents all models and their diagnostics.

For all hypotheses, the found signs match the predicted signs. All three hypotheses are supported: H1 which posited a positive relationship between a home-base augmenting mission and the creation of useful competence by the subsidiary at $p < 0.01$; H2 which asserted a positive relationship between cross-unit interfaces and competence creation at $p < 0.001$; H3a which predicted a negative relationship between strategic autonomy and competence creation at $p < 0.05$; and H3b which posited a positive relationship between operational autonomy and competence creation also at $p < 0.05$. Additionally, we find that R&D intensity and size are positively associated with competence creation ($p < 0.05$ for both coefficients), whereas subsidiaries that are located in China
Table 5.1. Descriptive Statistics and Correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Subsidiary competence creation</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Home-base augmenting</td>
<td>0.338</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Cross-unit interfaces</td>
<td>0.557</td>
<td>0.336</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Strategic autonomy</td>
<td>-0.068</td>
<td>0.127</td>
<td>-0.129</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Operational autonomy</td>
<td>-0.010</td>
<td>0.118</td>
<td>-0.136</td>
<td>0.385</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 R&amp;D intensity</td>
<td>0.299</td>
<td>0.269</td>
<td>0.137</td>
<td>-0.054</td>
<td>0.010</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Size(^c)</td>
<td>0.227</td>
<td>0.043</td>
<td>0.193</td>
<td>0.097</td>
<td>0.084</td>
<td>-0.072</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Age</td>
<td>0.244</td>
<td>0.007</td>
<td>0.232</td>
<td>-0.036</td>
<td>-0.103</td>
<td>-0.082</td>
<td>0.228</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Codifiability of competence</td>
<td>0.022</td>
<td>0.068</td>
<td>0.029</td>
<td>-0.012</td>
<td>-0.016</td>
<td>-0.137</td>
<td>-0.039</td>
<td>-0.030</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>10 Observability of competence</td>
<td>-0.001</td>
<td>-0.006</td>
<td>0.065</td>
<td>0.087</td>
<td>-0.125</td>
<td>-0.224</td>
<td>0.020</td>
<td>0.030</td>
<td>0.334</td>
<td>1.000</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>1.323</td>
<td>1.597</td>
<td>1.157</td>
<td>1.268</td>
<td>1.055</td>
<td>25.193</td>
<td>1.799</td>
<td>21.610</td>
<td>1.312</td>
<td>1.344</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.6</td>
<td>0</td>
<td>0.693</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max</td>
<td>7</td>
<td>7</td>
<td>6.75</td>
<td>7</td>
<td>7</td>
<td>100</td>
<td>10.933</td>
<td>161</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

Notes to Table 5.1:
- a. Correlations for country and industry dummies are not shown; they are available from the corresponding author.
- b. Spearman correlations used due to the non-normal distribution of most variables. Correlations above |0.125| are significant at \( p < 0.05 \).
- c. Logged variable.
Table 5.2. Robust Tobit Estimates for Dependent Variable *Creation of Useful Subsidiary Competence*\(^a, b\)

<table>
<thead>
<tr>
<th></th>
<th>Model 1 (Baseline)</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4 (Full)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home-base augmenting mission</td>
<td>0.265*** (0.049)</td>
<td>0.131* (0.051)</td>
<td>0.163** (0.054)</td>
<td></td>
</tr>
<tr>
<td>Cross-unit interfaces</td>
<td>0.191*** (0.046)</td>
<td>0.156** (0.045)</td>
<td>0.111* (0.041)</td>
<td></td>
</tr>
<tr>
<td>Strategic autonomy</td>
<td>0.005 (0.033)</td>
<td>0.006† (0.030)</td>
<td>0.005† (0.030)</td>
<td></td>
</tr>
<tr>
<td>Operational autonomy</td>
<td>0.473*** (0.070)</td>
<td>0.467*** (0.071)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0.926** (0.276)</td>
<td>-0.859** (0.254)</td>
<td>-0.979*** (0.210)</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.140 (0.245)</td>
<td>0.061 (0.253)</td>
<td>0.026 (0.227)</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>-0.173 (0.235)</td>
<td>-0.230 (0.241)</td>
<td>-0.148 (0.220)</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>-0.926** (0.276)</td>
<td>-0.859** (0.254)</td>
<td>-0.979*** (0.210)</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>0.833* (0.355)</td>
<td>0.821* (0.335)</td>
<td>0.366 (0.300)</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>0.088 (0.430)</td>
<td>-0.052 (0.418)</td>
<td>-0.191 (0.423)</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>0.242 (0.381)</td>
<td>-0.085 (0.349)</td>
<td>0.214 (0.401)</td>
<td></td>
</tr>
<tr>
<td>Other Western Europe</td>
<td>0.122 (0.287)</td>
<td>0.165 (0.285)</td>
<td>0.040 (0.288)</td>
<td></td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>-0.472 (0.333)</td>
<td>-0.220 (0.354)</td>
<td>-0.136 (0.323)</td>
<td></td>
</tr>
<tr>
<td>Other America</td>
<td>-0.195 (0.350)</td>
<td>-0.105 (0.339)</td>
<td>-0.069 (0.383)</td>
<td></td>
</tr>
<tr>
<td>Other Asia</td>
<td>-0.085 (0.420)</td>
<td>-0.148 (0.395)</td>
<td>-0.214 (0.360)</td>
<td></td>
</tr>
<tr>
<td>Other locations</td>
<td>-0.800* (0.402)</td>
<td>-0.709 (0.433)</td>
<td>-0.841* (0.323)</td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>0.338 (0.265)</td>
<td>0.329 (0.258)</td>
<td>0.188 (0.254)</td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>0.192 (0.237)</td>
<td>0.213 (0.232)</td>
<td>0.038 (0.213)</td>
<td></td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>0.112 (0.327)</td>
<td>0.070 (0.303)</td>
<td>0.281 (0.282)</td>
<td></td>
</tr>
<tr>
<td>Basic metals</td>
<td>-1.083* (0.475)</td>
<td>-1.081* (0.512)</td>
<td>-0.815* (0.419)</td>
<td></td>
</tr>
<tr>
<td>Automotive</td>
<td>0.568* (0.276)</td>
<td>0.589* (0.268)</td>
<td>0.526* (0.249)</td>
<td></td>
</tr>
<tr>
<td>Electrical equipment</td>
<td>-0.005 (0.328)</td>
<td>0.025 (0.319)</td>
<td>0.031 (0.274)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.087 (0.242)</td>
<td>0.145 (0.228)</td>
<td>0.010 (0.209)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.744*** (0.400)</td>
<td>2.242*** (0.392)</td>
<td>1.636*** (0.388)</td>
<td></td>
</tr>
</tbody>
</table>

Log-pseudolikelihood | -366.514 | -349.023 | -302.999 | -284.049 |
McFadden’s Pseudo R\(^2\) | 0.102 | 0.135 | 0.198 | 0.205 |
F statistic (d. f.) | 5.21*** (23; 217) | 7.26*** (24; 213) | 13.41*** (25; 197) | 11.46*** (27; 184) |
AIC | 783.029 | 750.046 | 659.998 | 626.098 |
Number of observations | 240 | 237 | 222 | 211 |

Notes to table 5.2:

a. †p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001 (two-tailed test). Robust standard errors in parentheses.

b. Germany and Machinery are the respective baseline categories for the country and the industry dummies.
or in a country of the ‘other’ category ($p < 0.05$) tend to create less competence that is useful to other MNC units. Furthermore, competence creation is negatively associated with a subsidiary being in the basic metals manufacturing industry ($p < 0.05$), and positively with it being in the automotive industry ($p < 0.05$).

### 5.4.2. Sensitivity Tests and Alternative Specifications

We performed additional analyses to test the validity of these results. First, to ensure the stability of the Tobit estimates, we estimated robust OLS regression models. While these are, strictly speaking, a misspecification for our data given the conditioned nature of the dependent variable, they allow us to test whether or not the residuals are normally distributed (the central assumption of Tobit models). Both a standardized normal probability plot as well as Shapiro-Wilk and Kolmogorov-Smirnov tests indicated this was the case. We also analyzed whether multicollinearity of measures was a problem because some correlations exceed 0.40. To this end, we computed variance inflation factor (VIF) indices. Both the maximum (2.26) and the mean VIF (1.57) are well below the threshold of 10, alleviating multicollinearity concerns (Chatterjee et al., 2000). While the magnitude of coefficients reflected the differences of OLS vs. Tobit model metrics, the patterns of significance across all coefficients as well as their signs remained stable. As an additional robustness test, we performed maximum likelihood structural equation modeling (SEM). SEM offers the advantages that it simultaneously incorporates observed and latent constructs, that it attenuates concerns as regards the convergent and discriminant validity of our psychometric measures, and that it accounts for potential biasing effects of random measurement error in the latent constructs (Kline, 2010; Medsker, Williams and Holahan, 1994). Adopting Anderson and Gerbing’s (1988) two-step approach to SEM (see Appendix B), the SEM results provide further support for the convergent and discriminant validity of our measures and further alleviate multicollinearity concerns. Appendix B provides details about the approach that we have taken and our findings. We use the model represented in Figure 5.2 to assess our hypotheses. The results also unanimously support all hypotheses at $p < 0.05$ or better. Thus, they corroborate the findings from the regression analyses and the conclusions about the hypotheses.

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32 The detailed OLS results are available from the corresponding author upon request.
derived from them. We are therefore confident that our results are not computational artifacts.

5.5. Discussion

Our paper has analyzed the influence of formal organizational architecture on the creation of useful subsidiary competence that is leveraged by other units within the MNC. Adopting the perspective of a focal subsidiary, we argued that an appropriate organizational architecture motivates this subsidiary to develop competence that can be leveraged internationally by stimulating its self-interest in creating such competence. Our findings unanimously support this overarching argument. Testing hypotheses on three selected elements of formal organizational architecture, our study suggests that the parent firm should emphasize the home-base augmenting objective in the subsidiary’s mission, should implement formal interfaces to other MNC units at the subsidiary site, and should provide the focal subsidiary with more operational and less strategic autonomy. These findings have several important implications for theory and management practice.

The direct implication of our findings is that by implementing an appropriate organizational architecture, MNCs can achieve the decentralized creation of internationally leveraged competence. Our study thus extends previous literature that has described these benefits, but not the organizational means by which these can be achieved (e.g., Andersson et al., 2002; Buckley and Carter, 1996; Rugman and Verbeke, 2001; Tallman, 2003). In so doing, we respond to Rugman and Verbeke’s (2003) call who have identified this as one of the major lines for developing the literature. As parent firm managers can set the MNC’s formal organizational architecture (Criscuolo and Narula, 2007; Gulati et al., 2009), our study addresses the link between managerial action and the realization of those benefits, which was frequently highlighted as a crucial knowledge gap both for theorists and practitioners (e.g., Bouquet and Birkinshaw, 2008; Foss and Pedersen, 2002, 2004; Luo, 2002; Persaud, 2005; Wu et al., 2007).

Despite the tendency among many MNCs to (re-)centralize or completely localize activities instead of attempting to globally leverage subsidiary competence (Benito et al., 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Pearce, 1990;
Rugman, 2005), our results show that subsidiaries can create internationally leveraged competence. At the same time, our results caution managers that subsidiaries are unlikely to do so, unless the MNC implements an appropriate organizational architecture. This conclusion corroborates prior research that finds that the non-realization of a subsidiary’s potential for the MNC as a whole is rather a matter of
implementation than one of strategy (Mudambi and Navarra, 2004). Responding to this problem, our paper suggests which elements of organizational architecture managers can set to induce the creation of useful subsidiary competence that is leveraged internationally.

While some studies have discussed antecedents of knowledge transfers initiated by subsidiaries (e.g., Gupta and Govindarajan, 2000; Håkanson and Nobel, 2001; Hansen, 1999; Szulanski, 1996; Zander and Kogut, 1995), little light has been shed on the extent to which (if any) useful subsidiary competence is created (Foss and Pedersen, 2002). As our study identifies by which organizational architecture the creation of useful subsidiary competence can be induced, it directly addresses this knowledge gap. As it helps to close this gap, our study responds to an important call for research (Birkinshaw and Hood, 1998; Foss and Pedersen, 2004; Gulati et al., 2009; Rugman and Verbeke, 2001).

Moreover, the conceptual and empirical distinction between strategic and operational autonomy that we adopted in this study allows us to address the frequently highlighted conflict between the subsidiary’s freedom to create knowledge and the coordination that is necessary to leverage it globally (Birkinshaw et al., 1998; Persaud, 2005; Yamin and Otto, 2004). We believe that this differentiation between strategic and operational autonomy can at least partly explain why the overall findings regarding autonomy are inconsistent and unclear (Birkinshaw and Morrison, 1995; Nobel and Birkinshaw, 1998; Vereecke et al., 2006; Young and Tavares, 2004). Thus, this distinction and our findings respond to the repeated call for a better understanding of the autonomy construct (Ambos and Schlegelmilch, 2007; Glaister et al., 2003; Young and Tavares, 2004). While previous literature has suggested this distinction (Bartlett and Ghoshal, 1989; Birkinshaw, 1996; Birkinshaw and Morrison, 1995; Glaister et al., 2003; Nobel and Birkinshaw, 1998), to the best of our knowledge, we are the first to explicitly formulate separate hypotheses for strategic and operational autonomy. Future research might therefore find our insights helpful to enhance our understanding of subsidiary autonomy.

Further, by emphasizing the usefulness of subsidiary competence, our study cautions managers and theorists alike that a unilateral focus on competence creation alone is likely to fall short of what is required to make international leverage succeed. By
‘useful’, we refer to the effect that competence that a focal subsidiary creates is actively sought and leveraged by other organizational units in the MNC. This seems to be an important aspect given that subsidiary competence can remain in isolation, be duplicate, or even useless to other organizational units inside the MNC (Monteiro et al., 2008). In contrast, what seems to be important for realizing the benefits of decentralized competence creation in MNCs is the leverage of subsidiary competence by other organizational units (cf. Bartlett and Ghoshal, 1989; Meyer et al., 2011; Mudambi and Pedersen, 2007). We therefore believe that this focus on the creation of competence that is internationally leveraged, rather than studying the creation of competence in general, is an important addition to the literature. The elements of organizational architecture we identify contribute to the creation of subsidiary competence that is leveraged by other units by harnessing the subsidiary’s self-interest in creating competence that is useful to these other units. The relevance of such an approach is highlighted by repeated calls in the knowledge- and competence-transfer literature. Since competence transfer itself is unlikely to benefit the receiving unit unless it can use the transferred competence to generate value, these calls have argued that the outcomes of competence transfer, rather than the transfer as such, should be studied (Ambos and Ambos, 2009; Haas and Hansen, 2005; Kotabe and Mudambi, 2004; Yamin and Otto, 2004). Moreover, the emphasis on the usefulness of competence makes it possible to account for one important aspect that cannot be captured by studying competence transfer: ‘usefulness to other units’ does not necessarily imply that the competence itself is transferred to these units (Rugman and Verbeke, 2001). For instance, other MNC units can also benefit from the competence the focal subsidiary creates if the subsidiary provides them with an intermediate product or service, in which the competence is embodied. The focus on the creation of subsidiary competence that is useful to other MNC units therefore has important implications for research on both competence creation and competence transfer. In our view, this focus constitutes a major path for future enquiries.

The measures and the data our study deploys make several empirical contributions. With the exception of the observability scale, all measures we use in this study are either completely new or further develop existing constructs. Following Rugman and Verbeke’s (2003) call, we used psychometric measures rather than archival data to gain deep and intimate empirical insights into the internal functioning of the MNC.
Consistent with our theoretical perspective on usefulness, the dependent variable we designed captures the extent to which the subsidiary creates competence that is actually useful to other organizational units. It takes into account that competence need not be transferred to other units in order to be useful to them. Since it exhibits high reliability and validity in our study, it provides a good basis for replication and development in future studies along these lines.

Our study also reveals multiple useful insights for executives. First, our results provide hands-on levers which managers can pull to promote the creation of useful subsidiary competence and ensure its global leverage throughout the MNC. Such straightforward suggestions for managerial action have been delivered scantly to date (Foss and Pedersen, 2002). While executives are generally highly interested in findings that relate organizational architecture to organizational outcomes (Foss et al., 2010), they find little guidance in the academic literature regarding organizational architecture that fosters subsidiary competence creation (Foss and Pedersen, 2004). Given that the creation and international leverage of subsidiary competence seems to pose substantial problems to many MNCs (Benito et al., 2003; Currie and Kerrin, 2004; Doz et al., 2006; Fors, 1997; Pearce, 1990; Rugman, 2005), the insights and guidance provided by our study should be useful to many firms.

Moreover, we find that by setting organizational architecture appropriately, managers can motivate subsidiaries to create useful competence by harnessing their self-interest to do so. This result helps executives spare unnecessary investments into monitoring and reward systems that control whether or not subsidiaries behave in accordance with the MNC’s goals (Aulakh et al., 1996; Eisenhardt, 1989). Parent firm managers can therefore benefit from our study by reviewing and adjusting monitoring devices employed in the headquarter-subsidiary relationship to minimize both operating cost and the adverse effect of monitoring on motivation (Falk and Kosfeld, 2006; Mudambi and Navarra, 2004). Subsidiary managers, on the other hand, may conclude from our study that, given an appropriate organizational architecture, creating useful competence and its international leverage is highly likely to be in their subsidiary’s own interest. Since creating competence and sharing it with other units inside the firm can be beneficial for the subsidiary (Keupp et al., 2011; Mudambi and Navarra, 2004), they could even decide to take initiative and to lobby parent firm managers in order to influence their firm’s organizational architecture such that they can create more useful
competence. In this regard, our study shows subsidiary managers what organizational architecture they might strive for. Furthermore, our results suggest that a subsidiary’s strategic autonomy frequently leads to its isolation from the rest of the MNC. Given that creating useful competence can be beneficial for the subsidiary, our study cautions subsidiary managers against letting the freedom they are granted detach themselves from the MNC’s global organization. Finally, other units that are looking for useful competence might find the organizational architecture helpful towards this end because it can provide them with a signal of where to find such competence. Thus, they can approach those subsidiaries, which are more likely to have developed useful competence due to the firm’s organizational architecture.

Our study also opens up some paths for future research. First, we focused on carefully selected elements of formal organizational architecture. Future research could complement our approach by studying elements of the informal organization. Second, future research could address the limitations of our study. On the one hand, our study shares the limitation of all studies that use a cross-sectional design, viz. that this approach only allows to infer association, not causality. Thus, future efforts could deploy longitudinal research designs to study subsidiary competence creation and leverage over time. On the other hand, we collected shared-level constructs from individual respondents to operationalize our constructs. While the techniques we used to assert the reliability and validity of our measures suggested the absence of significant subjective bias, future research may complement our work with archival measures. Third, our study examined the current organizational architecture of MNCs, whereas the process and history of how the respective architecture was set was beyond the scope of this paper. While the final decision regarding the organizational architecture lies with the parent firm (Ghoshal et al., 1994; Gupta and Govindarajan, 1991; Meyer et al., 2011), we have also pointed out that subsidiaries can try to influence it. It would be interesting to know how big the subsidiary’s influence tends to be. Future research should tackle this question. Finally, our results might generalize to contexts beyond international business, since the question of which elements of organizational architecture influence the intra-organizational leverage of dispersed

33 We are grateful to an anonymous reviewer and to the participants of the special issue workshop for pointing our attention to this issue.
34 We thank an anonymous reviewer for pointing our attention to this issue.
competence (and why) has also been identified as an important research gap and source of inconsistencies in the strategic management literature (Foss et al., 2010). The elements we study might also be applicable to types of multi-unit firms other than MNCs, e.g., multi-business companies. Future research could test whether or not this generalization holds.
5.6. References


Baum, C.F., 2006. An Introduction to Modern Econometrics Using Stata. Stata Press, College Station, TX.


5.7. Appendices to Chapter 5

5.7.1. Appendix A: Detailed Account of the Study’s Measures

All items composing the following scales were measured on Likert scales ranging from 1 to 7.

Creation of useful subsidiary competence (Cronbach’s alpha = 0.8555). To which extent does the following apply? ‘1’ means ‘not at all’, ‘7’ ‘to a great extent’: (CC1) Our subsidiary has developed information and know-how that was also applied in other MNC units; (CC2) Our subsidiary created competencies that were useful in other MNC units. How often does the following occur? ‘1’ means ‘never’, ‘7’ ‘very often’: (CC3) Our technological expertise is demanded by other MNC units; (CC4) If we would not provide our competencies, there would be serious trouble for other MNC units.

Home-base augmenting (HBA) mission (alpha = 0.8626). To what degree are the following motives present in your subsidiary’s mission? ‘1’ means ‘not present at all’, ‘7’ ‘highly present’: (HBA1) To explore new technological opportunities; (HBA2) To collaborate with specialized local universities or firms; (HBA3) To take advantage of a better R&D environment in this country; (HBA4) To generate specialized technological know-how.

Cross-unit interfaces (alpha = 0.7589). How often does the following occur? ‘1’ means ‘never’, ‘7’ ‘very often’: (CUI1) We employ personnel to coordinate decisions with other MNC units; (CUI2) Subsidiary managers have a mentor who is based at another MNC unit; (CUI3) Our meetings are attended by managers from other MNC units; (CUI4) We have job rotation programs with other MNC units.

Strategic autonomy (alpha = 0.7055). Who makes the decisions regarding the following points? ‘1’ means ‘parent alone decides’ and ‘7’ ‘subsidiary alone decides’: (SA1) Overall direction of the subsidiary’s activities; (SA2) Which new projects to pursue; (SA3) Product design.
Operational autonomy (alpha = 0.7357). Who makes the decisions regarding the following points? ‘1’ means ‘parent alone decides’ and ‘7’ ‘subsidiary alone decides’: (OA1) Hiring and firing senior staff; (OA2) Cooperation with other subsidiaries in the firm; (OA3) Training programs for subsidiary staff; (OA4) Salary level of subsidiary employees; (OA5) Transfer of subsidiary staff between units.

Codifiability of competence (alpha = 0.7963). How do you agree to the following statements? ‘1’ means ‘strongly disagree’, ‘7’ means ‘strongly agree’: (COD1) The way our technology works can easily be described in manuals; (COD2) New staff can easily learn about our activities by talking to skilled employees; (COD3) Training new personnel is typically a quick and easy job for us.

Observability of competence (alpha = 0.7894). How do you agree to the following statements? ‘1’ means ‘strongly disagree’, ‘7’ means ‘strongly agree’: (OBS1) Competitors could learn about our technology by observing our employees; (OBS2) Competitors could learn about our technology by taking a tour of our facilities; (OBS3) Competitors could learn how to manufacture our products by examining our machines and equipment.

5.7.2. Appendix B: Technical Appendix
5.7.2.1. Post-hoc Tests, Validation Surveys, Single Respondent Bias, and Common Method Variance
Several post-hoc analyses and validation surveys served to assure the representativeness of respondent data and to validate responses received from informants. T-tests of response vs. non-response, response time, and subsidiary demographic characteristics showed no significant response bias. Moreover, there was no significant influence of a large number of subsidiaries responding from a single MNC, implying that our sample is unlikely to be biased by possible cluster effects.

Following the recommendations by Chang et al. (2010) and Podsakoff et al. (2003), we employed multiple procedural (ex ante) and statistical (ex post) approaches to rule out single respondent bias and common method variance (CMV). First, we use different question formats and scale anchors to measure our constructs, a cover story that creates a psychological separation between the independent and dependent
variables, and we counterbalanced the question order. Second, we assured the respondents of the anonymity and confidentiality of our study, that there are no right or wrong answers, and that they should answer as honestly as possible. Third, we validated the respondents’ answers with data from multiple sources by employing two randomly drawn subsamples comprising 30 observations each. Six weeks after initial data collection, a senior manager at the respective parent firm of the subsidiaries in the first subsample was asked to furnish data on our dependent variable ‘creation of useful subsidiary competence’ and a second manager in the subsidiaries of the second subsample was invited to provide the complete questionnaire data. Common method bias concerns were alleviated by high inter-rater reliability between the original and the confirmation data; Cohen’s kappa (κ = 0.72 and κ = 0.80, respectively) was significantly above the conventional threshold of 0.60 in both cases (Nunnally and Bernstein, 1994).

In terms of statistical remedies to counter CMV, we did not only employ Harman’s one-factor test (see below), but also added one latent CMV factor to the structural equation model (SEM) that we calculated as an additional robustness check (see below). All items were allowed to load on this latent CMV factor in addition to loading on their respective theoretical construct (cf. Podsakoff et al., 2003). Examining the significance of the structural parameters both with and without this latent factor in the model does not reveal substantial differences. Overall, the various approaches that we have used to alleviate CMV concerns unanimously suggest that our results are unlikely to be biased substantially.

5.7.2.2. Assessment of Reliability and Validity of Measures

The reliability and validity of both our items and our scales were tested using diverse approaches. All of these methods consistently indicate high levels of reliability and

35 Interviews with managers during the item revision phase suggested that to contact managers in the respective parent firm, rather than managers in receiving subsidiaries, would be a more promising approach to the external validation of the focal subsidiary’s assessment of its creation of competence that is useful to other units. While subsidiary managers are in an excellent position to assess how useful the competence developed by the focal subsidiary is for their own subsidiary, they typically are less familiar with the extent to which other subsidiaries have leveraged the focal subsidiary’s competence. Therefore, they often are uneasy about providing an overall assessment of the focal subsidiary’s competence creation. Managers in the parent firm, in contrast, usually have a good impression of how competence created by one unit is leveraged across the MNC (Gupta and Govindarajan, 2000).

36 The results provided in the manuscript are from the model without the latent CMV factor. The results from the model with this factor added are available upon request.
validity. The reliability of our items was tested by calculating item-test, item-rest, and average inter-item correlations. In order to ensure the reliability of our scales, we calculated Cronbach’s alpha for each of them (cf. Nunnally and Bernstein, 1994). We used psychometric methods to assess convergent and discriminant validity of our measures. Convergent validity of our items was verified by calculating overlap-corrected correlations between an item and the scale it pertains to (cf. Nunnally and Bernstein, 1994), and convergent validity of our scales by applying principal component factor analysis with oblique rotation. Ultimately, we retained 26 items, which formed seven scales. Table 5.3 details loadings, cross-loadings, and communalities for these items. The scales capture creation of useful subsidiary competence (Cronbach’s alpha = 0.8555), home-base augmenting mission (alpha = 0.8626), cross-unit interfaces (alpha = 0.7589), subsidiary strategic autonomy (alpha = 0.7055), subsidiary operational autonomy (alpha = 0.7357), codifiability of competence (alpha = 0.7963), and observability of competence (alpha = 0.7894). Jointly, these seven factors explain 66.97% of the variance. The scree plot also suggested a seven factor solution. While the direct factor loadings were high (all above 0.60), none of the cross-loadings exceeded 0.35. A high degree of convergent validity is indicated by these results (Hair et al., 1998). According to Harman’s one-factor test, the fact that seven factors emerged and the first of these only explains 12.19% of the variance corroborates our above assessment that our findings are unlikely to be biased by CMV (Podsakoff and Organ, 1986).

Finally, discriminant validity was examined by employing a multitrait and multi-item correlation matrix approach, in which the correlation of each item with each scale is considered (Ware and Gandek, 1998). Furthermore, we calculated average variance extracted and compared its square root to the correlation coefficients among the scales (Fornell and Larcker, 1981; Staples et al., 1999). High levels of discriminant validity were indicated by both analyses. Additional confirmation for the convergent and

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37 The results of these calculations are not reported here due to limitation of space, they are available from the corresponding author.
38 That is, the scale is calculated without the specific item in question to avoid inflating the correlation.
39 We used oblique rotation because we expected the emerging factors to be theoretically related (Hair et al., 1998).
40 Both the Bartlett test of sphericity ($\chi^2 = 2421.103$ with 325 d.f., $p = 0.000$) and the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA = 0.782, ‘middling’) indicated the data were eligible for factor analysis. A factor was retained prior to rotation if its eigenvalue exceeded unity (Kaiser-Guttman criterion).
**Table 5.3. Final Set of Oblimin-rotated Factors**

<table>
<thead>
<tr>
<th>Item (paraphrased)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home-base augmenting</strong></td>
<td>0.0497</td>
<td>0.8709</td>
<td>0.0406</td>
<td>0.1145</td>
<td>0.0831</td>
<td>-0.0472</td>
<td>0.0264</td>
<td>0.7856</td>
</tr>
<tr>
<td><strong>Cross-unit interfaces</strong></td>
<td>0.0805</td>
<td>0.8550</td>
<td>-0.0069</td>
<td>0.1270</td>
<td>0.0461</td>
<td>0.0380</td>
<td>-0.0064</td>
<td>0.7572</td>
</tr>
<tr>
<td><strong>Codifiability</strong></td>
<td>0.3277</td>
<td>0.7763</td>
<td>0.0129</td>
<td>0.1374</td>
<td>-0.1261</td>
<td>-0.0433</td>
<td>-0.0337</td>
<td>0.7480</td>
</tr>
<tr>
<td><strong>Strategic autonomy</strong></td>
<td>0.2756</td>
<td>0.6129</td>
<td>0.0174</td>
<td>0.3148</td>
<td>-0.1235</td>
<td>-0.1491</td>
<td>-0.0048</td>
<td>0.5885</td>
</tr>
<tr>
<td><strong>Observability</strong></td>
<td>0.8694</td>
<td>0.1888</td>
<td>0.0234</td>
<td>0.0310</td>
<td>0.0228</td>
<td>0.0707</td>
<td>0.0261</td>
<td>0.7993</td>
</tr>
<tr>
<td><strong>Creation of know-how applied in other units</strong></td>
<td>0.8275</td>
<td>-0.0150</td>
<td>0.1078</td>
<td>0.2181</td>
<td>0.0999</td>
<td>-0.0160</td>
<td>-0.0670</td>
<td>0.7588</td>
</tr>
<tr>
<td><strong>Collaborate with local universities or firms</strong></td>
<td>0.7893</td>
<td>0.1639</td>
<td>0.0783</td>
<td>0.0647</td>
<td>-0.0107</td>
<td>-0.0860</td>
<td>0.1036</td>
<td>0.6785</td>
</tr>
<tr>
<td><strong>Exploit better local R&amp;D environment</strong></td>
<td>0.8266</td>
<td>0.1467</td>
<td>-0.0737</td>
<td>0.0140</td>
<td>0.0026</td>
<td>0.1505</td>
<td>-0.0237</td>
<td>0.7337</td>
</tr>
<tr>
<td><strong>Generate specialized technological knowledge</strong></td>
<td>0.2319</td>
<td>0.3069</td>
<td>0.0723</td>
<td>0.6331</td>
<td>-0.0378</td>
<td>-0.0951</td>
<td>-0.0069</td>
<td>0.5645</td>
</tr>
<tr>
<td><strong>Position to coordinate with MNC units</strong></td>
<td>0.0591</td>
<td>0.2250</td>
<td>-0.0685</td>
<td>0.7151</td>
<td>-0.0920</td>
<td>-0.0651</td>
<td>0.0217</td>
<td>0.5833</td>
</tr>
<tr>
<td><strong>MNC units mentor for focal managers</strong></td>
<td>0.1797</td>
<td>0.3302</td>
<td>-0.0900</td>
<td>0.6836</td>
<td>0.0411</td>
<td>-0.0769</td>
<td>0.0339</td>
<td>0.6254</td>
</tr>
<tr>
<td><strong>MNC unit managers attend focal meetings</strong></td>
<td>0.1115</td>
<td>0.1204</td>
<td>-0.0872</td>
<td>0.7715</td>
<td>0.0159</td>
<td>0.0410</td>
<td>-0.0896</td>
<td>0.6396</td>
</tr>
<tr>
<td><strong>Job rotation programs with other units</strong></td>
<td>-0.0339</td>
<td>-0.1387</td>
<td>0.1478</td>
<td>-0.0480</td>
<td>0.0246</td>
<td><strong>0.7851</strong></td>
<td>-0.0711</td>
<td>0.6665</td>
</tr>
<tr>
<td><strong>Direction of activities</strong></td>
<td>0.0287</td>
<td>-0.0296</td>
<td>0.1580</td>
<td>-0.0391</td>
<td>-0.0477</td>
<td><strong>0.8569</strong></td>
<td>0.0740</td>
<td>0.7702</td>
</tr>
<tr>
<td><strong>Choice of new projects</strong></td>
<td>0.2305</td>
<td>0.0557</td>
<td>0.1023</td>
<td>-0.0375</td>
<td>0.0020</td>
<td><strong>0.6832</strong></td>
<td>0.2402</td>
<td>0.5926</td>
</tr>
<tr>
<td><strong>Product design decisions</strong></td>
<td>0.2027</td>
<td>-0.0442</td>
<td><strong>0.6034</strong></td>
<td>-0.0355</td>
<td>-0.0626</td>
<td>0.3194</td>
<td>-0.0788</td>
<td>0.5205</td>
</tr>
<tr>
<td><strong>Hiring and firing senior staff</strong></td>
<td>0.0846</td>
<td>0.0553</td>
<td><strong>0.6209</strong></td>
<td>0.1676</td>
<td>-0.0215</td>
<td>0.3256</td>
<td>0.0384</td>
<td>0.5318</td>
</tr>
<tr>
<td><strong>Cooperation with other subsidiaries in firm</strong></td>
<td>0.0789</td>
<td>0.0985</td>
<td><strong>0.7500</strong></td>
<td>-0.1746</td>
<td>-0.0164</td>
<td>-0.0014</td>
<td>0.0462</td>
<td>0.6113</td>
</tr>
<tr>
<td><strong>Training programs for subsidiary staff</strong></td>
<td>0.0125</td>
<td>-0.0301</td>
<td><strong>0.7495</strong></td>
<td>-0.0714</td>
<td>-0.0399</td>
<td>0.0467</td>
<td>-0.0033</td>
<td>0.5717</td>
</tr>
<tr>
<td>employees</td>
<td>-0.0713</td>
<td>-0.0019</td>
<td><strong>0.6893</strong></td>
<td>-0.0082</td>
<td>0.1103</td>
<td>0.2475</td>
<td>-0.1043</td>
<td>0.5646</td>
</tr>
<tr>
<td>OAS5: Transfer of subsidiary staff between units</td>
<td>-0.0233</td>
<td>-0.0304</td>
<td>-0.0031</td>
<td>0.0925</td>
<td><strong>0.7882</strong></td>
<td>-0.0221</td>
<td>0.1757</td>
<td>0.6627</td>
</tr>
<tr>
<td>COD1: Technology easily described in manuals</td>
<td>0.0311</td>
<td>0.0063</td>
<td>-0.0132</td>
<td>-0.0428</td>
<td><strong>0.8807</strong></td>
<td>0.0687</td>
<td>0.1929</td>
<td>0.8205</td>
</tr>
<tr>
<td>COD2: Skilled employees easily teach new employees</td>
<td>0.0952</td>
<td>0.0137</td>
<td>0.0044</td>
<td>-0.0770</td>
<td><strong>0.8079</strong></td>
<td>-0.1048</td>
<td>0.1201</td>
<td>0.6934</td>
</tr>
<tr>
<td>COD3: Quick and easy to train new employees</td>
<td>0.0544</td>
<td>0.0754</td>
<td>0.0425</td>
<td>0.0116</td>
<td>0.2811</td>
<td>-0.0169</td>
<td><strong>0.7368</strong></td>
<td>0.6328</td>
</tr>
<tr>
<td>OBS1: Imitation through observation of employees</td>
<td>0.0043</td>
<td>-0.0234</td>
<td>0.0057</td>
<td>-0.0235</td>
<td>0.1694</td>
<td>0.0564</td>
<td><strong>0.8823</strong></td>
<td>0.8115</td>
</tr>
<tr>
<td>OBS2: Imitation through tour of facilities</td>
<td>-0.0193</td>
<td>-0.0293</td>
<td>-0.0827</td>
<td>-0.0229</td>
<td>0.1127</td>
<td>0.0818</td>
<td><strong>0.8203</strong></td>
<td>0.7008</td>
</tr>
</tbody>
</table>

| Eigenvalue | 4.90 | 3.47 | 3.07 | 1.89 | 1.56 | 1.37 | 1.14 |
| Proportion of variance explained                | 12.19% | 11.03% | 9.49% | 8.70% | 8.67% | 8.46% | 8.44% |
| Cumulative variance explained                   | 12.19% | 23.22% | 32.71% | 41.41% | 50.08% | 58.54% | 66.97% |

Note to table 5.3:

a. See Appendix A for a full account of each item’s wording.
discriminant validity of our measures is provided by the structural equation model (see below).

5.7.2.3. Robustness Test for Our Regression Results: Structural Equation Modeling (SEM)

To provide an additional robustness test of the regression results, we also used maximum likelihood structural equation modeling (SEM) to test our hypotheses. We adopted the two-step approach to SEM outlined in Anderson and Gerbing (1988) as recommended by numerous researchers (e.g., Hoyle and Panter, 1995; Mathieu and Taylor, 2006; Medsker et al., 1994; Simsek et al., 2005). The first phase of this approach involves the fit of a confirmatory factor analytic (CFA) model to the observed data. The second phase involves comparing a sequence of nested structural models to obtain information concerning the structural model that best accounts for the covariances observed between the model’s exogenous and endogenous constructs.

Phase 1: CFA Model Results

In the first phase of Anderson and Gerbing’s (1988) approach, a CFA model is fit to the observed data to assess the fit of the overall measurement model and to examine the psychometric properties of constructs. Each latent variable in SEM needs to be explicitly assigned a metric or a measurement range (Kline, 2010). We did so by setting a loading to 1.0 for one indicator per latent variable. The CFA model fits the data well ($\chi^2 = 294.28$ with 265 d.f., $p < 0.10$; GFI = 0.91; AGFI = 0.88; NFI = 0.88; NNFI = 0.98; CFI = 0.99; RMSEA = 0.02) (e.g., Bollen, 1989; Kline, 2010; Teo et al., 2003). Moreover, it provides further support for the convergent and discriminant validity of our measures and alleviates multicollinearity concerns. We also examined the discriminant validity of our constructs by performing a series of analyses to compare the fit of two models each, viz. one where the correlation between two specific factors was unconstrained with another where the correlation between them was constrained to 1.0. Chi-square difference tests indicate for all pairs of factors that the unconstrained model fits the data significantly better than the constrained version,

41 The large and statistically significant factor loadings among the indicators and their corresponding latent construct indicate convergent validity (Hair et al., 1998; Simsek et al., 2005); discriminant validity is indicated by the fact that no correlation between any latent constructs exceeds the recommended threshold of 0.65. The latter fact simultaneously alleviates multicollinearity concerns (Brown, 2006; Simsek et al., 2005).
thus signaling the constructs’ discriminant validity.\textsuperscript{42} These results suggested that our measurement model is adequate and that we could proceed with the second phase of Anderson and Gerbing’s (1988) two-step approach (Simsek et al., 2005).

**Phase 2: Sequence of Nested Structural Models Results**

In the second phase of Anderson and Gerbing’s (1988) approach, contrasts (chi-square difference tests) between a sequence of nested structural models are used to obtain the model that best accounts for the observed covariances.\textsuperscript{43} To this end, we compared the following structural models: our hypothesized model, in which all four\textsuperscript{44} hypothesized elements of organizational architecture are tested concurrently, fourteen models, that constrain the influence of one, two or three element(s) at a time on ‘creation of useful competence’ at zero, and one baseline model, in which the influence of all four elements is constrained at zero. In evaluating these models, we followed Bollen (1989) and Simsek et al. (2005).\textsuperscript{45} While the model fit is acceptable in every case and the path estimates between the elements and competence creation are significant in every constellation, the results indicate that the hypothesized model is the best-fitting one. It fits the data well ($\chi^2 = 444.02$ with 372 d.f., $p < 0.01$; GFI = 0.89; AGFI = 0.85; NFI = 0.85; NNFI = 0.96; CFI = 0.97; RMSEA = 0.03) (Bollen, 1989; Kline, 2010; Teo et al., 2003) and significantly better than the nested, constrained models (two-tailed chi-square difference tests with $p < 0.05$ or better in every case).

We therefore used the results from the hypothesized model shown in Figure 5.2 to assess our hypotheses. All hypotheses are supported: H1 which posited a positive relationship between a home-base augmenting mission and the creation of useful competence by the subsidiary at $p < 0.01$; H2 which asserted a positive relationship between cross-unit interfaces and competence creation at $p < 0.001$; H3a which predicted a negative relationship between strategic autonomy and competence creation at $p < 0.05$; and H3b which posited a positive relationship between operational

\textsuperscript{42} We do not provide detailed results of all the tests we performed due to limitations of space. Extensive results are available from the corresponding author upon request.

\textsuperscript{43} The structural models differ from the final measurement model from phase 1 in that they further include observed variables.

\textsuperscript{44} Counting the two facets of autonomy as two elements.

\textsuperscript{45} Taking three steps, we assessed (1) model fit, using various indices, (2) the significance of the path estimates, as a test of the model's hypotheses, and (3) the amount of variance explained in the endogenous construct, as an indication of practical significance. Detailed results are available from the corresponding author upon request.
autonomy and competence creation also at $p < 0.05$. Since the SEM results also unanimously support all hypotheses, they corroborate the findings from the regression analyses and the conclusions about the hypotheses derived from them. We are therefore confident that our results are not computational artifacts.
Curriculum Vitae of Maximilian Felix Palmié

1983  Born in Kassel (Germany)

Education:

since 2010  PhD studies in Business Administration,
            University of St. Gallen
2008 – 2010  Research internship,
            Institute of Technology Management,
            University of St. Gallen
2002 – 2009  Studies in Business Administration
            (final degree: Diplom-Kaufmann),
            University of Mannheim (Germany) and
            Trinity College, University of Dublin (Ireland)

Work Experience:

since 2010  Research Associate,
            Institute of Technology Management,
            University of St. Gallen
2004 – 2007  Teaching Assistant (Tutor) for multiple classes (part-time),
            University of Mannheim (Germany)
2003 – 2010  Several internships, in total approx. two years (full-time)