The role of differentiation, integration, and governance in developing innovative business models

ABSTRACT

How can established firms that seek to innovate their business models organize best to achieve high degrees of novelty in the resulting business model designs? Rooted in corporate entrepreneurship literature we develop and test a model that explains why the degree of novelty of business model designs depends on the extent of alignment between differentiation, integration and governance mechanisms. Results from a unique hand-collected sample of 141 business model innovation initiatives in large established companies support the theoretical hypotheses. We discuss the implications of our findings for research on corporate entrepreneurship and business model innovation.

INTRODUCTION

How exactly can established firms develop radically new business models? This question has become increasingly relevant for senior executives of leading multinational companies who aim at enhancing the existing activity systems of their firms through new elements (IBM White Paper series, 2006, 2016, Bieger, Franz, & Herrmann, 2017).¹ Since those elements provide the firm with options for future growth and could even ensure of the firm's competitiveness and survival, their degree of novelty is of utmost strategic importance. However, despite extensive research into business model innovation in recent years (Baden-Fuller & Morgan, 2010; Casadesus-Masanell & Zhu, 2013b; Demil, Lecocq, Ricart, & Zott, 2015; Foss & Saebi, 2016; Massa, Tucci, & Afuah, 2016; Zott, Amit, & Massa, 2010), we still know relatively little about how established firms that set out for renewing their business model can achieve radically new business models instead of just developing incremental ones (Demil et al., 2015; Foss & Saebi, 2016). This is potentially problematic because start-ups with new business models are rapidly emerging in large numbers across all industries to threaten established incumbents (Amit & Zott, 2001; Casadesus-Masanell & Zhu, 2013b).

In this paper, we define a business model innovation (BMI) as a novel boundary-spanning activity system that can be achieved through adding novel activities, through linking existing activities in new ways, or through adding or shedding new stakeholders, such as strategic partners, suppliers, or customers (Zott & Amit, 2010). Indeed, it is in this context that research on corporate entrepreneurship (CE) has received new and increased attention over the past few years (Burgers & Covin, 2016; Burgers, Jansen, Van den Bosch, & Volberda, 2009; Corbett, Covin, O'Connor, & Tucci, 2013; Dess et al., 2003; Karimi & Walter, 2016; Kuratko, Ireland, & Hornsby, 2004; Shimizu, 2012). The CE literature has a long tradition of

¹ According to a recent study of the Boston Consulting Group (2014) where they surveyed 1,500 senior executives, 94% stated that their companies had attempted some degree of business model innovation

investigating how established firms can renew themselves through internal developments (Burgelman, 1983a). Yet, for the purpose of fully understanding business model innovation, the CE literature has been limited to date in several ways. First, that literature has focused predominantly on *what* new business and product-market domains firms can move into and not so much on the question of *how* firms can do business differently in their existing product-market domains. Second, the level of analysis in CE research is primarily the firm, or the business unit, whereas business model innovation in practice is often driven by project teams, which suggests a reanalysis of the involved mechanisms. Third, CE research has focused largely on explaining how to enhance the quantity of new initiatives in companies rather than their degree of novelty. Although, emerging literature has examined the antecedents of novel business model designs in young firms (Amit & Zott, 2015), relatively little work has addressed the question of how established firms can achieve highly novel business model designs. Hence, we ask in this paper: *How do established firms that engage in business model innovation efforts manage to achieve a high degree of novelty in the resulting business model design?*

Extant research on CE suggests the importance of organizational differentiation for BMI, for example the structural differentiation of new and existing activities into distinct organizational units, both for coming up with new initiatives as well as implementing them (Burgelman, 1983a, 1985; Burgers & Covin, 2016; Garrett & Covin, 2015; Zahra & Covin, 1995). Differentiated groups can perform their tasks more effectively (Lawrence and Lorsch, 1967), because they are protected from the impeding forces of the mainstream business (Burgelman, 1983; Christensen, Bartman, & van Bever, 2016) and because differentiation provides managers of exploratory groups with the possibility to search for and access novel knowledge and novel partners more easily (Burgers et al., 2009; Fiol, 1995). However, increased differentiation often comes at the cost of lower support from other organizational units, fewer knowledge transfers and increased costs of coordination (H. J. Burgers & Covin,

2016; Shimizu, 2012). Therefore, CE scholars suggest combining differentiation with integration measures, such as cross-functional interfaces, senior team integration, and a shared vision (Burgers & Covin, 2016; O'Reilly & Tushman, 2008). The main theoretical argument is that such integration measures serve to contain the negative effects of increased differentiation, provide balance, and thus lead to a combined positive effect on CE outcomes. However, empirical evidence of this relationship, i.e., a hypothesized positive interaction between differentiation and integration, to date has been mixed (Burgers & Covin, 2016; Burgers et al., 2009). This may be due partly because the right balance between differentiation and integration is difficult to strike. The mixed findings raise the question which combinations and degrees of differentiation versus integration are truly optimal to foster CE, specifically BMI novelty outcomes (Burgers and Covin, 2016)? And are there other organizational dimensions that should be taken into account?

The key idea that this article promotes is to consider a third dimension besides differentiation and integration, namely managerial governance. The shift in focus from the firm or business unit to the initiative as unit of analysis for studying business model innovation supports this idea. It is well established in the literature on initiatives and individual initiative-taking that governance mechanisms are important predictors of team and/or individual task performance (e.g. Burgelman, 1983, Glaser, Stam, & Takeuchi, 2016; Hornsby, Kuratko, & Zahra, 2002; Kuratko et al., 2004; Shimizu, 2012). While this research has primarily focused on formal governance mechanism, such as formal rules or procedures, informal governance mechanism may be even more effective, when uncertainty is high, such as in the context of business model innovations (Cardinal, Sitkin, Long, & Freeman, 2004). In this paper, we investigate autonomy of the initiative team members on the job (in short: autonomy) as key element of formal governance (Hornsby et al., 2002; Kuratko et al., 2004; Shimizu, 2012; Zahra, Jennings, & Kurtako, 1999), and the performance-management context in the BU (in

short: performance context) as key constituent of informal governance (Ghoshal and Bartlett, 1994; Gibson and Birkinshaw, 2004; Glaser et al., 2016). Surprisingly, these mechanisms have not yet been considered in terms of how they could influence the interplay between differentiation and integration in CE. In this paper we argue theoretically and show empirically that this is an important oversight, and that including governance in the form of autonomy and performance context can help address the question of how to best organize for business model innovation. Specifically, we argue that combining differentiation in the form of knowledge differentiation and integration in the form of social integration can provide the initiative team with a valuable mix of novel and existing knowledge, which can be the basis for radical innovations (Fiol, 1995; Miles & Covin, 2002). Also it provides the initiative with sufficient support to implement such novel ideas on the system level (Brea-Solís, Casadesus-Masanell, & Grifell-Tatjé, 2015; Kim & Min, 2015; Taylor & Helfat, 2009). However, social integration also raises the risk for the initiative team of being overly influenced by the mainstream business (Boumgarden, Nickerson, & Zenger, 2012; Burgers & Covin, 2016). To mitigate this risk, appropriate governance could shield the project team from such influence, for example, by strengthening the motivation and confidence of project team members to pursue their novel ideas and withstand attempts to water them down. Thus, we hypothesize that formal and informal governance mechanism (autonomy and performance context) are a key boundary condition that need to be taken into account for understanding the effect of knowledge differentiation and social integration on business model innovation. See figure 1 for our theoretical model.

[INSERT FIGURE 1 ABOUT HERE]

In order to test our hypotheses, we hand-collected data on 141 business model initiatives from 112 business units in 48 large multinational firms in technology-based industries. Based on our empirical analyses of these data, we found broad support for our theory. First, an

initiative team's level of knowledge differentiation is positively related to the degree of novelty of the resulting business model design. Second, the extent of social integration positively moderates the relationship between knowledge differentiation and novelty of business model design. Third, and most importantly, incorporating autonomy and performance context as governance measures further enhances significantly the joint positive effect of social integration and knowledge differentiation on business model novelty. We conducted multiple robustness tests to ensure the validity of our findings.

This study makes several contributions to the CE literature. First, we theoretically argue and empirically show that adding governance as a third dimension besides differentiation and integration provides a helpful explanation of the conditions under which CE outcomes such as BMI are enabled in established firms. By introducing two new governance variables (autonomy and performance context) to the debate about organizing for CE outcomes, our analysis helps address the dilemma of how to strike a balance between differentiation and integration in order to foster CE outcomes. We believe that the omission of governance constructs in prior research goes some ways towards explaining the mixed empirical results in the literature.

Second, our theoretical developments in this paper provide much needed illumination about the increasingly important phenomenon of corporate renewal through business model innovation. In this empirical context, our research advances the CE literature theoretically (a) by providing a more nuanced understanding of the mechanisms and relevant units and levels of analysis for explaining CE outcomes, especially the importance of considering initiatives in addition to CE at the corporate level; (b) by expanding the range of relevant CE outcomes from the quantity of new initiatives in companies to their degree of novelty; and (c) by considering not only what new business and product-market domains firms can move into but also how firms can do business differently in their existing product-market domains, in other words, by conceptualizing business model innovation as an important CE outcome.

Our paper also contributes to the literature on business model innovation, which so far has focused mostly on newly founded and young firms, and favored single descriptive case studies over large sample quantitative studies that could yield reliable insights and reveal generalizable patterns. Another limitation of that literature has been its focus on broad environmental triggers of business model innovation, and on founder-related mechanisms in start-ups. We extend this literature in several ways. First, our study provides a unique perspective on the challenge for incumbent firms to innovate their business models. Specifically, our research addresses the question of how to best organize for business model innovation, which according to Foss and Saebie (2017) is a question that has been under-researched in business model research to date. Second, we contribute theoretically to the examination of how business model innovation comes about by going beyond environmental triggers such as technology shifts or changing consumer demands and broad antecedents of design such as templates or constraints (Amit & Zott, 2015). Here, we add a set of organizational design choices (differentiation, integration, governance) at the initiative level that have not been considered in business model research so far, and we build and test a theoretical model of the relevant constructs to explain the novelty of the resulting business model design in established firms. Lastly, we provide a unique data set of business model initiative in established firms that allows us to test the hypothesized relationships in a reliable and generalizable manner. These unique contributions represent a significant advance in our understanding of the phenomenon of business model innovation.

BUSINESS MODEL INNOVATION IN ESTABLISHED FIRMS

We follow Zott & Amit (2010) and define the business model as a boundary-spanning activity system which focuses on a focal firm while at the same time taking into account the value creating and value delivering activities of partners, suppliers and customers (Brandenburger & Stuart, 1996; Zott & Amit, 2010). A novelty-centered business model design is characterized

by linking existing participants in new ways, or by connecting new participants, who were previously not involved in economic exchanges. Novelty-centered business models recombine products, services, and information in new ways. Firms, applying novelty-centered business model designs, usually are pioneers in their industry (Zott & Amit, 2007, 2008).

Over the last years, research on business model innovation has increased significantly (see for a recent overview Foss & Saebi, 2016; Massa et al., 2016; and Wirtz, Pistoia, Ullrich, & Göttel, 2016). Earlier contributions in this field have mainly focused on young entrepreneurial firms to study the phenomenon (e.g. Amit and Zott, 2001; Zott and Amit, 2007, 2008; Doganova and Eyquem-Renault, 2009). However, designing and implementing novelty-centered business model designs is significantly more challenging in incumbent firms, as novel designs often conflict with the traditional configuration of firm assets and its current value creation and appropriation mechanisms (Christensen et al., 2016; Kim & Min, 2015). Consequently, initiative teams that set out to develop highly novel business model designs, may experience resistance from other units operating in the mainstream business, as they see their current way of doing business threatened (Chesbrough, 2010; Christensen, Bartman, van Bever, 2017). Such units may refuse to share knowledge, or to adapt their activities, or they may try to influence the initiative team with the dominant business logic of the mainstream business, all which may ultimately reduce the degree of novelty of the resulting business model design. Investigating which configurations of organizational structure design are ideally suited to overcome these barriers and to develop and implement radically new business model designs depicts an area of research, which has been neglected so far (Foss & Saebi, 2017).

Before we started to develop our theory, we conducted initial fieldwork to better understand the organizational structure design in business model innovation processes. We obtained access to 35 incumbent firms, which had engaged in business model innovation efforts over the last months and we interviewed 2-3 key decision makers in these firms. In studying

the content of the interviews, we made the following key observation: In all cases, business model innovation efforts were *initiative-driven*. These initiative teams formed relatively independent organizational subunits embedded within a BU and they were treated like “internal start-ups”. They were typically composed of various members of the organization, who were fully dedicated to the initiative. Usually, organizations initiated multiple business model initiatives. Such business model initiatives were launched by a rough idea and ended when the business model design was developed and implemented.

HYPOTHESES

In this paper we understand CE relatively broadly, as the development and implementation of different types of value-creating innovations (Hornsby et al., 2002; Kuratko et al., 2004). Accordingly, business model innovation is defined here as the development and implementation of novel boundary-spanning activities. Put differently, novel business model designs require not only the design of novel activities for the initiative group but also the modification of current activities on the system level (Zott and Amit, 2010). More novelty typically requires more adjustments on behalf of other organizational units. Hence in this paper novel business model design corresponds to novel and adjusted activities on the system level.

CE has a long tradition in investigating how organizational structure affects specific CE outcomes. A key premise of this theory is that mainstream and exploratory activities need to be structurally differentiated (Burgelman, 1985; Burgers & Covin, 2016; Garrett & Covin, 2015). The literature on differentiation in the context of CE has used various concepts to describe the extent of subdivision of exploratory and exploitive tasks into distinct organizational units (Burgers & Covin, 2016; Jansen et al., 2009). Given our focus on business model initiatives we focus on knowledge differentiation to capture variance in structural differentiation among sample initiatives (McGrath, 2010; O'Reilly & Tushman, 2008; Raisch & Birkinshaw, 2008). Knowledge differentiation describes the extent to which initiative teams

differ with respect to their knowledge set compared to the dominant knowledge set existent in the mainstream business units. Such a knowledge set is composed of the following interconnected dimensions: skills, know-how, managerial systems used and technological systems used (Leonard-Barton, 1992; O'Reilly & Tushman, 2008). In line with existing CE theory that broadly argues for a positive effect of differentiation on CE outcomes we posit the following baseline hypothesis:

Baseline Hypothesis 1: *There is a positive effect between an initiative's level of knowledge differentiation and the degree novelty of the resulting business model design.*

Developing and implementing novel business models involves recombining novel and existing knowledge and the modification of the existing activity system of the firm, which both requires knowledge transfer and support of the other units (Christensen et al., 2016; Zott & Amit, 2010). CE research has posited that “targeted integration” can ensure coordination between units (e.g. Burgers et al., 2009). Combining knowledge differentiation with integration creates ‘loosely coupled systems’ (Weick, 1976), in which knowledge differentiation ensures acquisition of novel knowledge from outside the firm and protection from the impeding forces of the mainstream business, and integration simultaneously facilitates knowledge transfer and support between differentiated units (Gilbert, 2006; O'Reilly & Tushman, 2008). Consistent with our level of analysis and the overall phenomenon, we focus in terms of integration on *social relationships* between the initiative team and other organizational groups as the key mechanism for enhancing inter-group integration (Lechner, Frankenberger, & Floyd, 2010; Tsai & Ghoshal, 1998). Based on Nahapiet and Ghoshal (1998) we conceive of social relationships as characterized by three interrelated dimensions: relational, structural, and cognitive dimension. The relational dimension refers to the quality of the relationships in terms of frequency and closeness, the structural dimension refers to the number of strong social relationships an initiative group has, and the cognitive dimension refers to the similarity in the vision between two groups. Following prior research on CE (Burgers & Covin, 2016; Burgers

et al., 2009) that has often argued for the advantages of combining structural differentiation and integration to achieve desired CE outcomes, we suggest the following:

Baseline Hypothesis 2: *Social integration of an initiative team with other organizational units strengthens the positive relationship between an initiative's level of knowledge differentiation and the degree of novelty of the resulting business model design.*

Governance mechanism as key boundary condition

Despite the general assumption in prior research that the interaction between differentiation and integration is positive, findings to date are ambiguous (Boumgarden et al., 2012; Burgers et al., 2009; Jansen et al., 2009). To reconcile the conflicting findings, we suggest adding governance mechanism as additional contingency variable to the model, which has been recognized by prior research on initiative teams and individual initiative taking to guide employee behavior (Burgelman, 1983b; Glaser et al., 2016; Hornsby et al., 2002; Kuratko et al., 2004; Marginson, 2002; Shimizu, 2012). To date this literature has mainly focused on formal governance mechanism, such as the existence or absence of rules or formal processes (e.g. Hornsby et al., 2002; Kuratko et al., 2004; Shimizu, 2012). Another form, that has been less in the focus of prior research are informal governance mechanism, which are embedded in the work ethic of an organization (Ghoshal and Bartlett, 1994; Birkinshaw and Ghoshal, 2004; Glaser et al., 2016; Cardinal et al., 2004). Informal governance mechanism are especially important when firms pursue highly risky and uncertain initiatives – such as business model initiatives – as the effectiveness of formal governance mechanism might be limited (Glaser et al., 2016). Therefore, we investigate in this paper the effectiveness of both – formal and informal – governance mechanism. At the initiative level we focus on group autonomy, which is a key aspect of *formal governance* mechanism that has been shown to trigger entrepreneurial behavior (Burgelman, 1983b; Hornsby et al., 2002; Kuratko et al., 2004; Shimizu, 2012). At the BU level we focus on performance context, which is a key aspect of informal governance, and which captures the extent to which BU members

(including the initiative team) voluntarily do much for the organization than justified by their economic rents or rewards (Ghoshal & Bartlett, 1994; Gibson & Birkinshaw, 2004).

The moderating role of autonomy on business model innovation

Autonomy is the amount of freedom and discretion that an initiative has in structuring its own work and in making decisions. It also refers to the amount of authority the initiative team members have in performing their job (Langfred, 2007; Hackman and Oldham, 1976). In what follows, we argue that the positive interaction between differentiation and integration on BMI novelty is existent when autonomy is high, but not present when autonomy is low. In other words, we will argue a (positive) three-way interaction effect.

Low autonomy implies restricted decision authority for initiative teams (Glaser et al., 2016; Hornsby et al., 2002) with little room for experimentation and innovation (Burgelman, 1983; McGrath, 2010). The close monitoring by top management reduces the intrinsic motivation of the group (Langfred, 2007) and reduces self-esteem of the initiative itself (Glaser et al., 2016). In addition, initiative teams with low autonomy are associated with low status in the organization (Langfred, 2000), which decreases the appreciation of other units for their work and proposed solutions. When autonomy is low, we expect social integration not to positively moderate the differentiation-novelty relationship. First, low autonomy signals that top management is not convinced of the output of the initiative team (Langfred, 2000). Consequently, other units are also unlikely to be convinced of the proposed solution, independent of strong social ties between the groups and will not transfer tacit knowledge or adapt its activities in line with initiative's proposed solution. Second, low autonomy is associated with low status in the organization and other groups are not willing to support low status groups, which are on top of that also highly risky (Langfred, 2000). Third, less autonomous initiatives are by themselves less convinced of their solution and less motivated to "fight" for their novel solution (Glaser et al., 2016). Thus, they are more vulnerable to the

impeding forces of the mainstream business, especially when differentiation and thus uncertainty is high, which will ultimately reduce the resulting novelty level. In sum, despite strong social ties we do not expect a positive interactive effect of social integration on the differentiation-novelty relationship when autonomy is low.

However, when *autonomy is high*, the novelty benefits of knowledge differentiation can be expected to vary significantly as a function of social integration. In other words, we expect social integration to strongly moderate the differentiation-novelty relationship. High autonomy stands for high decision authority and a high degree of freedom which fosters creativity and the development of ideas outside the dominant logic of the organization (Burgelman, 1991; Floyd & Lane, 2000; Puranam, Singh, & Zollo, 2006). In addition, autonomous teams feel quite powerful and self-confident (Glaser et al., 2016). However, as autonomy also leads to increased information asymmetry between top and lower managers (Kuratko et al., 2004), it may also foster self-serving and opportunistic behavior on the side of the initiative team (Shimizu, 2012).

This “downside” of high autonomy is especially critical when social integration is low. Without close and trusting relationships to other units, initiative teams may not feel part of the organization and may not be committed to contribute to organization’s success. Thus, when knowledge differentiation increases and communication and understanding between the initiative team and other units becomes more difficult (Carlile, 2004), initiative teams without social ties are isolated from the rest of the organization (Glaser et al., 2016). In a high autonomy situation, where top management lacks of control and oversight (Shimizu, 2012), initiative teams may use the access to external partners to develop solutions that serve their own interests or the interests of external partners (Glaser et al., 2016; Shimizu, 2012).

Meanwhile, opportunistic solutions and weak social ties to other units inside the organization will lead to increased resistance from other units to support the solution or to adapt their activities accordingly. A high level of autonomy may further magnify the resistance of

other units, as a high level autonomy for such novel initiatives may lead to perceived unfairness on the side of the units operating in the mainstream business (Shimizu, 2012). As units in the mainstream business are responsible for managing the business highly efficiently, their degree of autonomy is likely to be low (Burgelman, 1983). Accordingly, they may envy the highly autonomous business model initiative team, especially when there are no social interrelationships between the units, which may lead to resentment and enhanced resistance. Accordingly, differentiated initiative groups with low social integration face severe challenges in convincing units in the mainstream business to adjust their activities when autonomy is high.

Conversely, when social integration is strong, high autonomy amplifies the positive effects of combining differentiation with integration, thus resulting in radically new business model designs. This is because, first, strong social ties to other units will decrease the risk of opportunistic behavior on the side of the initiative team, as the initiative team will feel part of the organization and will be committed to contribute to the organization's success (Lechner et al., 2010; Tsai & Ghoshal, 1998). High autonomy can thus further motivate the initiative team to exploit the potential benefits of knowledge differentiation (Langfred, 2005). Second, when social ties are strong the initiative team can leverage existing knowledge and combine it with novel knowledge, which is recognized to lead to radical innovations (Fiol, 1995; Katilia & Ahuja, 2002), as outlined by Kogut and Zander (1992:391): "innovations do not occur in abstraction from current capabilities." Autonomy will further enhance this knowledge recombination activity as it provides the team with the necessary freedom to try out things and to experiment with novel knowledge combinations (Burgelman, 1983; McGrath, 2010). Further high autonomy induces "high status" to the initiative team (Langfred & Olin, 2000), which intensifies the willingness of other units to cooperate and to work together with this unit. Third, strong and trusting linkages will reduce the resistance of other units (Lechner et al., 2010; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Trustful and close relationships will

reduce jealousy and resistance for novel ideas and may even trigger joint problem solving (Lechner et al., 2010) and risk taking on the side of the mainstream units (Nahapiet & Ghoshal, 1998; Rost, 2011). High autonomy situations further enhance this positive interaction effect as top management backing (Langfred, 2000) further strengthens the motivation of the team and its associated units to engage in risky solutions and to adjust the activities accordingly. Thus we posit our first core hypothesis:

Hypothesis 1: Autonomy moderates the positive interactive effect of social integration and knowledge differentiation on novelty of business model design in such a way that this positive interaction only occurs when group autonomy is high.

The moderating role of performance context on business model innovation

A performance context is an informal governance mechanism. In contrast to autonomy – which is a formal governance mechanism – it is not encompassed in specific rules or procedures, but it is rather present in the work environment of an entire BU. Ghoshal and Bartlett (1994) who first introduced the concept describe it as a specific work ethic that influences the behaviors and actions of its members. They further compare it with the organizational context in strategy process literature (Bower, 1970; Burgelman, 1983; Haspeslagh, 1986) and with climate or culture in the organizational theory literature (Tagiuri and Litwin, 1968; Pettigrew, 1979; Ouchi, 1981). Such a performance context can be described along two dimensions (Gibson and Birkinshaw, 2004; Ghoshal and Bartlett, 1994): discipline and stretch. Discipline is present when initiative teams voluntarily attempt to meet all expectations generated by their commitments. It also introduces clear standards of performance and behavior and a system of open, candid, and rapid feedback. Stretch, is present when groups voluntarily strive for more rather than less ambitious goals.

When the *performance context is low*, initiative groups face ambiguity about what behaviour is expected from them (Grant and Rotbard, 2013). In addition low performance context will reduce the level of energy and effort an initiative team puts into its activities, as

extra effort is not rewarded by top management (Glaser et al., 2016). This may also lead to the derailment of original goals (Burgelman, 1983). In addition, a lack of ambition within a BU appreciate incremental innovations more than radical innovations (Burgelman, 1983; Glaser et al., 2016). Under a low performance context, we do not expect a moderating effect of social integration on the positive baseline effect of differentiation on BMI novelty. Although initiative teams could leverage strong social relationships to enhance the novelty levels of their proposed solution and to ensure acceptance from other units, they are not willing to do so in a low performance context. When the work ethic of the BU is characterized by low stretch and low discipline initiative teams will not put extra energy in developing novel designs but will take the path with lowest resistance (Ghoshal and Bartlett, 1994). Obviously this is the case when initiative teams develop business model designs that are in line with the mainstream business. In addition, as top management appreciates incremental improvements more than radical improvements in a low performance context (Glaser et al., 2016), business model initiatives will use their strong social ties to learn about the dominant business model of the mainstream business and to adjust its proposed solution accordingly. Accordingly, initiative teams with high degrees of knowledge differentiation and strong social relationships will not achieve radical business model designs in a low performance context.

Conversely, when the performance context is strong, we expect a strong positive interaction between knowledge differentiation and social integration on the resulting degree of novelty of the business model design. In other words, under a strong performance context we expect social integration to (positively) moderate the differentiation-novelty relationship. A strong performance context induces discipline and a strong will to achieve desired ends (Ghoshal and Bartlett, 1994). When the initiative team has only weak social relationships it cannot build on existing knowledge to develop novel recombinations of knowledge. In a strong performance context, such as team may extend its search for radically new information and

may intensify its interactions with external partners in order to accomplish its aggressive goals. Also, top management support for radical innovations will further spur their motivation to search widely for radically new knowledge outside the firm (Glaser et al., 2016). However, by doing so, the team may forget the core needs of the organization and especially of other organizational units, which may lead to solutions that may be novel, but that are completely detached from the needs and the competencies of the organization. Implementing such a solution on the system level is challenging if not impossible. Accordingly, differentiated teams may develop solutions with little value to the organization in a high performance context.

Initiatives with strong relationships inside the organization, in turn, can achieve high levels of novelty in the resulting business model design from increasing levels of knowledge differentiation when the performance context is strong. Put differently, a strong performance context amplifies the positive interaction effect of differentiation and integration on novelty degrees in the resulting business model. First, as top management supports radical innovations in a strong performance context (Burgelman, 1983), initiative teams are even more motivated to search for radically new knowledge outside the organization, to access more tacit knowledge inside the organization and to find knowledge recombinations which are radical. In addition, in a strong performance context they will be more inspired to leverage their strong social ties to gain the acceptance of other units for radically new solutions.

In addition strong performance context implies continuous and fast-cycle feedbacks, which fosters rapid learning and adjustments (Ghoshal and Bartlett, 1994; Gibson and Birkinshaw, 2004). Such continuous feedback is especially valuable for differentiated initiative teams with strong ties to other units as they are likely to engage in joint problem solving with other units to test their novel ideas (Lechner et al., 2010). Continuous and rapid feedback will enhance their discussions and the quality of their proposed solutions. Also initiative teams benefit from fast-cycle feedback as this requires them to continuously rethink their solution

and to adjust their novel ideas in such a way that they are aligned with and build on the core underlying assets of the organization (Kim and Min, 2016). According to the motto “fail early, fail cheap” timely feedback significantly speeds up the development process of novel business model designs and strengthens the quality of the developed solutions. Thus:

***Hypothesis 2:** Performance management moderates the positive interactive effect of social integration and knowledge differentiation on novelty of business model design in such a way that this positive interaction only occurs when performance context is high.*

METHODS

Research Setting

We tested the hypotheses with a study of 141 hand-collected business model innovation initiatives within BUs of large multinational companies, headquartered in Switzerland and Germany. In order to identify business model innovation initiatives within BUs, we used an approach similar to McGrath (2001) and Lechner et al. (2010). We approached the BU heads with a list of criteria to identify business model innovation initiatives within their BU. Specifically, we asked them to identify past initiatives that were considered business model initiatives in terms of renewing the boundary-spanning activity system of the BU and being directed towards creating and capturing value for the BU and its stakeholders (Zott et al., 2011). In order to avoid biases through incomplete memory of past events, we only selected projects, which were completed within the last 18 months. We asked for “successful” and “unsuccessful” initiatives in terms of market success in order to inhibit survival biases. In total we analyzed 141 business model innovation projects coming from 122 different BUs from 47 multinational corporations. We chose BUs operating in the high tech, automotive & assembly, chemicals, energy, and consulting industry. We selected those different industries to represent a range of industries with different degrees of environmental dynamism (Burgers and Covin, 2014). The BMI initiatives lasted on average between six months and 2 years and their average size was 6 employees.

Research Design and Data collection

To minimize single-informant bias and common method variance we collected data from two different groups of respondents. First we collected data on the independent variables (knowledge differentiation, social integration, project governance) from the heads of the business model initiative teams, as they were the persons with most knowledge about the projects (Hansen, 1999). The name and the contact details of the project heads was made available to us by our contact person from the BU management team. Second, we collected data on the dependent variable – the degree of novelty of the business model design – from persons who were not directly involved in the project team, usually from the respective BU head or business development managers in the BU. As our second group of respondents was not involved in the projects, they could more objectively assess the degree of novelty of the initiatives, thus mitigating concerns of single-informant bias. Moreover, by using two different respondents for the independent and dependent variables we could reduce concerns of common method variance, often existent in survey studies.

We used two different surveys to collect data on the different variables. One for the initiative head and one for the independent second respondent, typically the BU head. The survey was pretested with a group of 30 Executive MBA students. Links to the online questionnaires were sent out by email. A reminder notice was sent after three weeks and another one after five weeks. Because we identified initiatives and respondents together with top management, which was known throughout the BUs, all identified respondents completed and returned the questionnaires (100 percent response rate). To decrease social desirability bias, we assured that we would retain all specific responses entirely confidential, promised that the outcomes would be restricted to aggregated data and guaranteed that we would not identify any individual or organizational unit. Questionnaires were administered in English, as this was the working language in all business units of the participating organizations.

Following prior studies on the initiative level (e.g. Lechner et al., 2010), the underlying logic for the methodological approach was that BMI initiative teams form relatively independent units within the intergroup social network of a BU. “Hence, initiative teams may be considered independent, albeit temporary, units in an intergroup network” (Lechner et al., 2010: 872). The resulting business model innovation – the dependent variable in our study – then referred to changes in the activity system on the BU level. Hence, we analyzed two different levels of analysis in our study: While knowledge differentiation, social integration, and project governance refers to the initiative level of analysis, novelty of business model design refers to the BU level of analysis.

Measures and Validation

In this study we applied two kinds of measures – relational and non-relational measures. We used the relational measures to calculate the social integration measure. The non-relational measures were used to assess knowledge differentiation, project governance, and novelty-centered business model design. Most of the measures were operationalized by multi-item and 7-point, rated on a scale from 1 (“strongly disagree”) to 7 (“strongly agree”). We thereby relied on existing measures with multiple items. After collecting the data, we conducted a factor analysis with varimax rotation for the non-relational measures to examine the dimensionality of measures and appropriateness of items. When necessary we dropped items to improve internal consistency of the scales. Subsequently, we calculated the mean averages across the items for each construct. In order to calculate the social integration measure, we transformed the relational measures into locational properties using network analytics. We created socio-matrices for each dimension of social integration and each business model innovation initiative, which enabled us to calculate the degree of social integration between the initiative team and other units in the organization. All measures with their items are listed in the appendix.

Novelty of resulting business model design. Novelty of resulting business model design was measured using a four-item scale that captures the extent to which the resulting business model design offers new combinations of products, services and information, the extent to which it brings together new participants, the extent to which it links existing participants in novel ways, and the extent to which the novel business model design is considered to be a pioneer in its industry (Zott and Amit, 2007, 2008). We factor-analyzed the items and found that all items loaded on a single factor having an eigenvalue of 2.06 and accounting for 51% percent of the variance ($\alpha = .67$). For each initiative, we averaged the four items into a single score representing the overall degree of novelty of the resulting business model on the BU level.

Knowledge differentiation. We employed knowledge differentiation, or the extent to which the capabilities of the initiative team are new to the core capabilities in the BU as a moderator in our analysis. We adapted a four-item measure from McGrath (2001), which was also used by Lechner et al. (2010), and Lechner and Floyd (2012). The measure captures the extent to which capabilities of the initiative team – such know-how, skills, technological systems and management systems - were new to the BU at the beginning of the initiative. We asked for example the following question: “*To what extent were the skills of your project team new to your business unit at the commencement of the initiative?*” All items loaded on one single factor having an eigenvalue of 2.60 and accounting for 65 percent of the variance ($\alpha = .78$). Consequently, for each initiative team, we averaged the items into a single overall knowledge differentiation score.

Social integration. Initiative’s degree of social integration was measured on the inter-group level according to our theory and to prior research (e.g. Tsai and Ghoshal, 1998, Lechner et al., 2010). Social integration is a second-order reflective factor (Snachez and Farnosos, 2014; Carr et al., 2011; Casanueva-Rocha, Castro-Abancéns, & Galan-González, 2010; Sanchez-Famoso,

Maseda, & Iturralde, 2013) that includes the structural, relational and cognitive dimension commonly recognized as the key dimensions of social integration in literature (Inkpen & Tsang, 2005; Inkpen and Tsang, 2015; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Lechner et al. 2010; Villena et al., 2011). To identify the relevant network for each initiative we used the realist approach (i.e. we asked the network participants to recognize the boundaries) and the name generator technique (Burt, 1997). We asked the initiative heads of each initiative the following question: “Please list the organizational units that were interacting (e.g. phone calls, formal/informal meetings, emails, chat, etc.) with your team during the development of the business model”. The project leads could list up to 24 network contacts. Subsequently, the project leads were asked to assess the level of social integration with each listed organization units along the three key dimensions of social integration. All dimensions of social integration loaded on one single factor having an eigenvalue of 2.78 and accounting for 70 percent of the variance ($\alpha = .72$). Consequently, for each initiative team, we averaged the items into a single overall measure for social integration. Further below, we investigate the appropriateness of using a second-order construct for social integration.

Group autonomy. Group autonomy was measured using a three-item scale based on the works of Langfred (2000) and Hornbey et al. (2009). A sample item was “The project set-up encouraged to give sufficient authority to the participants to do their jobs well.” All items loaded on one single factor having an eigenvalue of 1.80 and accounting for 60 percent of the variance ($\alpha = .66$). Consequently, for each initiative team, we averaged the items into a single overall autonomy score.

Performance Context. Performance context was measured using an adapted four-item scale based on the works of Bartlett and Ghoshal (1998) and Gibson and Birkinshaw (2004). A sample item was “The work ethic in the BU encouraged to stretch oneself and voluntarily strive for more, rather than less, ambitious objectives.” All items loaded on one single factor having

an eigenvalue of 2.18 and accounting for 55 percent of the variance ($\alpha = .72$). Consequently, for each initiative team, we averaged the items into a single overall performance context score.

Control variables. We used several control variables to control for potential alternative explanations. To control for industry fixed effects, we included industry dummy variables. As explained above we had five different industries represented in our sample (high tech, automotive & assembly, chemicals, energy, and consulting). Hence, we included 4 industry dummy variables. For each BU we coded the respective industry dummy with 1 when the BU belonged to respective industry and with 0 otherwise. Controlling for industry is important as different industries represent different levels of environmental uncertainty, which has been shown in prior research to influence the level of differentiation and integration (e.g. Burgers and Covin, 2013). Furthermore, we controlled for country fixed effects as different countries might influence organizational control mechanism in BUs. Thus, we included a dummy for BUs headquartered in Switzerland. We also controlled for BU size, which has also been shown to influence the balance between differentiation and integration (e.g. Burgers and Covin, 2013). We also controlled for BU age, as older BUs might face more problems in developing innovative business models than younger BUs. We controlled for BU R&D intensity, as R&D intensity is often used as a proxy for innovativeness (Hitt, Hoskisson, and Kim, 1997) and this may in turn influence and BUs ability to develop innovative business models. Furthermore, on the initiative level, we controlled for initiative size, the number of employees working on the initiative in average over the last 2 years. This number was provided by the initiative members themselves and examined for correctness by top management. Finally, we controlled for initiative duration as longer initiatives may show different novelty levels because they had more time for experimenting.

RESULTS

Confirmatory factor Analysis

As a first step, we conducted confirmatory factors analyses (CFA) using Lisrel 9.30 (Jöreskog and Sörbom, 2005) to examine the factor structure of the study variables. A 4-factor model (knowledge differentiation, social integration, group autonomy, and performance management context) reached good fit ($\chi^2 = 142.87$; $df = 84$; $p < 0.0001$; $RMSEA = 0.070$; $CFI = 0.94$). An alternative 6 factor model – where the three subdimensions of social integration were studied as discrete variables – showed an unacceptable model fit, as the RSMEA values were beyond the value of 1 (Schulz, Ainley, & Fraillon, 2011).

Descriptive Statistics

Table 1 presents the means, standard deviation, and correlations among the variables of our study. Because the relational measures were measured on different scales than the non-relational measures, we standardized all the independent measures (except the dummy variables) before entering them into the regression and before creating the interaction terms (Reinholt et al., 2011). To test for multicollinearity, we calculated the variance inflation factors (VIF) for all variables used in the regression. All VIF scores for the independent variables and the interaction terms were below 1.9 and thus multicollinearity is unlikely to be severe. We entered the variables in a stepwise approach (Hair et al., 2009).

[INSERT TABLE 1 ABOUT HERE]

Hypothesis Testing

Table 2 summarizes the results of the regression analysis. In the first model (Model 1), we included the control variables. As shown in model 2a, knowledge differentiation is significantly related to novelty of business model design ($b = .30$, $p < 0.05$). This supports our baseline hypothesis 1 and replicates prior findings showing that structural differentiation is positively related to CE outcomes (Burgers and Covin, 2014; Jansen, 2009; Burgers et al., 2009). Baseline hypothesis 2 predicted that social integration strengthens the positive effect of knowledge differentiation on novelty of business model design. We tested this effect in model

3a. Our results show a positive significant interaction effect ($b = .26, p < 0.01$), thus supporting baseline hypothesis 2.

[INSERT TABLE 2 ABOUT HERE]

Model 4a tests the contingent effect of group autonomy on the positive interaction effect of differentiation and integration on novelty of business model design. The results show a significant positive effect between the interaction of knowledge differentiation, social integration and group autonomy and novelty of business model design (group autonomy: $b = .26, p < 0.05$). In line with Aiken and West (1991), we performed simple slope tests and slope difference tests (Dawson and Richer, 2006), and plotted the slopes for high and low values of group autonomy (figure 2a). The slope difference test was significant, for high values and insignificant for low values of group autonomy, thus supporting our first hypothesis (high group autonomy: $t = 3.60, p < 0.001$) that states that group autonomy amplifies the positive interaction effect of social integration and knowledge differentiation on novelty of business model design.

[INSERT FIGURE 2 ABOUT HERE]

Next to group autonomy we also hypothesized in the theoretical part that performance management context is a second key boundary condition for the positive interaction effect of differentiation and integration on novelty of business model design. We tested this effect in model 5a. The results show a significant positive effect between the interaction of knowledge differentiation, social integration and performance management context and novelty of business model design (group autonomy: $b = .26, p < 0.05$; performance context: $b = .24, p < 0.05$). In line with Aiken and West (1991), we performed simple slope tests, slope difference tests (Dawson and Richer, 2006), and plotted the slopes for high and low values of group autonomy/performance management context (Figure 3). The slope difference test was significant, when performance management context was high and insignificant when the value was low, thus supporting hypothesis 2 ($t = 3.36, p < 0.01$).

[INSERT FIGURE 3 ABOUT HERE]

The effect sizes of the three-way interactions were strong. We calculated the effect sizes f according to Cohen (1992). Based on the adjusted R^2 effect size, the effect size f for the three-way interaction with group autonomy was $f = 0,37$ and for the three-way interaction with performance context was $f = .35$. Cohen (1988) argued that effect sizes of $f = .25$ represent a medium effect and $f = .40$ represent a strong effect. As both of our effect sizes are closer to .40 than to .25 we classify both effects as strong effects.

Supplementary analyses

We performed several additional analyses to examine the robustness of our findings.

First, we calculated the models without controls; the results are displayed in the model 2a-5a.

The results are highly comparable to the ones we identified with the controls. Second, we were concerned about reverse causality, which is why we analyzed the effect of prior innovativeness of the BU on our independent variables. The result indicated that BU's prior innovativeness does not drive our results and thus the risk of reverse causality is mitigated.

We also included prior BU innovativeness as control variable in our main study which further mitigated concerns of reverse causality. Third, we were concerned about endogeneity or that knowledge differentiation and/or social integration are correlated with unobservable variables that are relegated to the error term. Therefore, we conducted 2SLS regression models with instruments for the two variables. Results showed that endogeneity was not an issue in our study. Fourth, we were concerned that different firms assessed group autonomy significantly different. It could be that in some firms employees may rate it rather high, while in other firms they may rate it low, although it is the same. To mitigate this risk, we asked specific question, we inserted industry fixed effects, and finally we compared the range of autonomy scores across firms with various business model initiatives. We performed t-tests between any two firms with multiple business model initiatives and for none of those pairs we did find

a significant difference between the means of the autonomy values. Thus, we concluded that there was no systematic error regarding the autonomy values.

DISCUSSION

How can established firms organize for achieving novel business model innovations? To date CE research has typically hypothesized that differentiation combined with integration are beneficial organizational design choices to achieve high levels of CE. However, empirical findings are mixed regarding the combined effect of differentiation and integration on CE. Moreover, extant studies are rather silent about how much integration is needed relative to the level of differentiation in order to maximize CE outcomes. In other words to date there is little understanding of the conditions in which the hypothesized positive interaction effects obtain. Our study informs this debate by introducing governance mechanisms as key boundary conditions that clarify the conditions under which combining differentiation and integration is beneficial. Findings from a sample of business model innovation initiatives within multinational organizations indicated that integration strengthens the novelty benefits of knowledge differentiation especially with a governance mechanism characterized by high autonomy or a strong performance context. In contrast, when the autonomy of the initiative team is low or its performance context is weak the hypothesized positive interaction largely disappears. Besides showing these relationships, we also develop detailed theoretical explanations for them. Accordingly, a key novel insight, empirical as well as theoretical, of this study is that CE outcomes under knowledge differentiation combined with social integration depend strongly on the alignment between structural design and managerial governance.

This new contingency was brought to the surface by our focus on the initiative level and provides a useful management tool for senior managers. Without this new level of analysis, which was driven more by the phenomenon, than by theoretical reasons in CE research, this

new contingency would not have emerged. Using this detailed view opened up some other new approaches so far not used in the CE literature. First, while initiative teams are already structurally differentiated we use here another form of differentiation, namely knowledge differentiation. Also regarding the level of integration. We found out that integration is not steered by senior management – as stated in previous CE papers (O'Reilly and Tushman, 2008; Covin and Burgers, 2016) but happens through formal and informal social linkages between the initiative team and other organizational units. By integrating governance variables into the debate of differentiation and integration, we bring together two strands of literature in CE research, which have so far only been developed in their silos. The first one has focused on the debate on how to manage the complex interplay between differentiation and integration and has primarily stuck to this debate (e.g. Burgers et al., 2009; Burgers and Covin, 2016). The other strand of literature has identified the value of integrating governance mechanism into research on CE but has not yet linked this to the debate of differentiation and integration (e.g. Dess et al., 2009; Corbett et al., 2013). Furthermore, by building on business models as the primary context for our study we also shifted attention to the degree of novelty of individual initiatives. This is a nice addition and complements prior CE research by expanding the range of relevant CE outcomes from the quantity of new initiatives in companies to their degree of novelty. Finally, our initiative level focus allows us to shift the level of analysis by considering not only what new business and product-market domains firms can move into but also how firms can do business differently in their existing product-market domains – in other words, by conceptualizing business model innovation as an important CE outcome.

This paper also contributes to business model literature. First, and most importantly it provides guidance how established firm should best organize to achieve radical business model innovations. This is, according to a recent review of Foss and Saebi (2017), one of the key gaps in current business model literature. Our paper theoretically argues and empirically shows that

radically new business model innovations can be achieved when initiatives are differentiated, integrated and governed by high autonomy or by a work ethic characterized by a strong performance context. This adds much needed clarity to a research stream that is so far dominated by anecdotal evidence (e.g. Markides and Charitou, 2004; Markides, 2013, Christensen et al., 2016). Second our paper adds to emerging research on the antecedents of business model innovation. Research so far has primarily focused on environmental triggers (Ferreira, Proença, Spencer, & Cova, 2013) or broad antecedents for design (e.g. Amit and Zott, 2015) and has just recently started to investigate internal antecedents of business model innovation (Martins, Rindova, & Greenbaum, 2015). Our paper contributes to this emerging research stream by adding organization structure design as an important internal antecedent of business model innovation. Finally, our study adds a large-scale empirical study in a field that is dominated by anecdotal or single case-based evidence by using a unique data set on 141 business model innovation initiatives in established firms.

Limitations and opportunities for future research.

Although the usual caveats with respect to perceptual, cross-sectional data apply, considerable attention has been taken to pay attention to concerns of reliability, validity, and generalizability. We used two independent respondent groups for assessing the independent and the dependent variables to ensure quasi-objective assessment of the outcomes. While the initiative heads assessed the independent variable, BU heads assessed the dependent variable. We further ensured confidentiality for respondents, which reduces their motivation to artificially manipulate their responses. Its deficiencies notwithstanding, this study represents an attempt to provide a comprehensive and accurate picture of the effects of differentiation, integration and managerial governance on the novelty degrees of business model innovations. Due to the complexity and difficulty of data collection and analysis on corporate renewal and business model innovation specifically, the majority of the CE and business model literature has

remained in the conceptual phase and has never been validated in empirical tests (e.g. Kuratko, 2004; Dess et al., 2002; Shimizu, 2012; Zahra et al., 1999; Christensen et al., 2016).

Future research could investigate the moderating effect of other forms of formal and informal managerial governance mechanism. It would also be interesting to analyze the interaction between autonomy and performance context and to see if a combination of both governance mechanism leads to even higher degrees of novelty. Future research could also discuss the potential challenge or benefits of executing both governance mechanism in parallel. It would also be helpful to combine research on more exploitative initiatives and to investigate how they can be best organized to achieve desired ends. Finally, the link between business model innovation and performance could be studied in more detail including relevant boundary conditions (Foss and eabie, 2017)

CONCLUSION.

Managerial governance exerts a significant influence on the outcomes of organizational design choices in the process of CE. So far this theoretical proposition has prompted relatively little empirical research on the contingent role of managerial governance on the relationship between differentiation, integration and the degree of novelty of CE initiatives. The results here confirm the importance of two managerial governance mechanism and show their moderating influence on the relationship between an initiative's level of knowledge differentiation and social integration and the degree of novelty of the resulting business model design. We hope other studies will continue to refine understanding of how managerial governance affects the process of corporate entrepreneurship.

FIGURE 1: MODEL **TABLE 1: Means, Standard Deviations, and Correlations**

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 High Tech	0.43	0.50														
2 Automotive & Assembly	0.30	0.46	-.58**													
3 Energy	0.12	0.33	-.24**	-.25**												
4 Chemicals	0.08	0.27	-.25**	-.19*	-.11											
5 Switzerland	0.33	0.47	.05	-0.11	.02	.07										
6 Size of BU (log)	3.87	0.63	.28**	-0.04	.16	-.17*	-.08									
7 BU R&D intensity	0.07	0.04	.48**	-.22**	-.13	-.14	-.14	.12								
8 Age of BU (log)	1.69	0.36	-.19*	.19*	.04	.11	-.02	.17*	-.16							
9 Initiative Size (log)	0.71	0.30	.01	.02	-.08	-.03	-.15	.05	.06	.03						
10 Initiative duration	2.66	0.96	.04	.11	-.12	-.06	.05	.13	.03	.15	.14					
11 Task differentiation	4.63	1.30	-.15	.13	-.03	.11	-.03	-.03	-.12	.03	-.07	-.00				
12 Social integration	3.61	0.91	.11	.00	-.13	-.07	-.07	-.03	.13	-.11	.06	-.04	-.04			
13 Group autonomy	5.00	1.25	-.07	-.03	.17*	.02	.08	-.07	.08	.01	.03	-.02	.09	.13		
14 Performance Management Context	5.22	1.08	.08	.05	.08	-.13	.05	.14	.22*	-.01	.05	.00	.21*	.15	.54**	
15 Novelty of business model design	4.23	1.10	.05	-.11	.07	.04	.02	.10	.01	-.04	-.01	.09	.28**	.04	.09	.17*

Note: n = 141 business model innovation initiatives at the BU level

** p < 0.01, * p < 0.05 ; two-tailed tests

TABLE 2: Results of Regression Analysis predicting Novelty of Resulting Business Model Design

Variables	Model 1	Model 2	Model 2a	Model 3	Model 3a	Model 4	Model 4a	Model 5	Model 5a
<i>Control Variables</i>									
High Tech Dummy	-.13 (.44)	-.15 (.39)		-.09 (.38)		-.22 (.38)		-.07 (.38)	
Automotive&Assembly Dummy	-.30 (.40)	-.45 (.38)		-.41 (.37)		-.49 (.37)		-.43 (.37)	
Energy Dummy	.07 (.43)	.02 (.42)		.10 (.41)		.04 (.41)		.10 (.41)	
Chemicals Dummy	.14 (.48)	.01 (.46)		.11 (.45)		-.01 (.45)		.09 (.45)	
Switzerland Dummy	.00 (.21)	.01 (.20)		-.02 (.20)		.01 (.20)		-.01 (.20)	
Size of BU (log)	.13 (.11)	.12 (.11)		.07 (.11)		.07 (.11)		.09 (.11)	
BU R&D intensity	-.01 (.11)	-.02 (.11)		-.02 (.11)		-.04 (.11)		-.05 (.11)	
Age of BU (log)	-.08 (.10)	-.06 (.10)		-.05 (.10)		-.05 (.10)		-.04 (.10)	
Project Size (log)	-.03 (.10)	-.02 (.09)		-.01 (.09)		-.03 (.09)		-.02 (.09)	
Project Duration	.12 (.10)	.12 (.10)		.13 (.09)		.11 (.09)		.14 (.09)	
<i>Main effects</i>									
Task Differentiation		.30 (.10)**	.28 (.09)**	.26 (.10)**	.24 (.09)**	.21 (.10)*	.20 (.09)*	.20 (.10)*	.19 (.10)*
Social Integration		.06 (.10)	.04 (.09)	.00 (.10)	-.02 (.09)	.04 (.10)	.02 (.09)	.03 (.10)	.00 (.09)
Group autonomy		-.00 (.11)	-.00 (.11)	-.02 (.10)	-.01 (.10)	-.03 (.11)	-.01 (.11)	-.04 (.11)	-.03 (.10)
Performance management context		.12 (.12)	.13 (.11)	.16 (.12)	.14 (.11)	.14 (.12)	.12 (.11)	.17 (.12)	.16 (.11)
<i>Two-way interaction</i>									
Task differentiation x social integration (Hypothesis 1)				.26 (.10)**	.27 (.10)**	.28 (.10)**	.29 (.10)**	.21 (.10)*	.22 (.10)*
Task differentiation x group autonomy						-.08 (.09)	-.07 (.08)	.06 (.08)	.05 (.07)
Social integration x group autonomy						-.19 (.12)	-.20 (.12)	-.15 (.11)	-.12 (.10)
Task differentiation x performance management context									
Social integration x performance management context									
<i>Three-way interaction</i>									
Task differentiation x social integration x group autonomy (Hypothesis 3)						.26 (.12)*	.28 (.11)*		
Task differentiation x social integration x performance management context (Hypothesis 4)								.24 (.11)*	.22 (.11)*
R2	0.04	0.14	0.09	0.18	0.14	0.23	0.19	0.22	0.17
Adjusted R2	-0.04	0.04	0.07	0.08	0.11	0.12	0.14	0.11	0.12
F-value	0.516	1.45	3.50**	1.83*	4.51**	2.04*	3.94***	1.94*	3.46**

Note: n = 141 business model initiatives, Coefficients are reported with standard errors in parentheses. All independent variables (except dummies) were standardized.

** p < 0.01, * p < 0.05

FIGURE 2: Interaction of Knowledge differentiation, Social Integration, and Group Autonomy

FIGURE 3: Interaction of Knowledge Differentiation, Social Integration, and Performance Management Context

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