BUSINESS MODEL DIVERSIFICATION, RESOURCE RELATEDNESS, AND FIRM PERFORMANCE

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Abstract

Despite the recognition that many firms operate multiple business models at the same time, little is known about when and how business model diversification may create value. In this study, we develop the construct of business model relatedness and examine its relationship with firm performance. Using a unique panel dataset of multibusiness firms in the retail- and wholesale-trade sectors (1997–2010), we find that the extent to which business model diversification is related increases firm performance. Interestingly, results also show that business model relatedness is more influential in determining firm performance than industry relatedness. This finding suggests that the concept of business model relatedness may be better able to capture the underlying resource relatedness among lines of business than the traditionally used concept of industry relatedness.

Keywords: business model; corporate diversification; relatedness; firm performance; resource-based view.

Running head: Business Model Diversification and Firm Performance

INTRODUCTION

Over the last decade, the notion of the business model has received increasing attention in the literature and in practice, and has been referred to as the logic of a business, describing the way it operates and how it creates and captures value (e.g., Casadesus-Masanell and Ricart, 2010; Teece, 2007). Previous research has focused primarily on single business models as the unit of analysis, and examined topics such as business model design (Amit and Zott, 2001; Casadesus-Masanell and Ricart, 2010; Zott and Amit, 2007), business model innovation (Casadesus-Masanell and Zhu, 2012; Chesbrough, 2010; Gambardella and McGahan, 2010), business model competition (Casadesus-Masanell and Ricart, 2011; Casadesus-Masanell and Zhu, 2010), and business model replication (Winter and Szulanski, 2001).

More recently, a number of studies have observed that firms increasingly operate multiple business models at the same time (Casadesus-Masanell and Tarzijan, 2012; Casadesus-Masanell and Zhu, 2010; Markides, 2013; Markides and Charitou, 2004; Sabatier, Mangematin, and Rousselle, 2010). Based on anecdotal evidence, these studies have argued that with the emergence of discount, electronic, and sponsor-based business models in many industries, the question of which business models to combine under the corporate umbrella represents a significant challenge to an increasing number of firms. This question is important given that business models identify how firms create and capture value and therefore are directly linked to firm performance. Accordingly, the few existing studies on this topic have recognized that business model diversification may provide an important source of competitive advantage but can also be a major cause of strategic failure. Unfortunately, the literature on business models has not sufficiently explored which business models could be combined into a portfolio to create value.

Similarly, the large literature on corporate diversification has not considered the topic of business model diversification. Since the seminal work of Rumelt (1974), strategy research

has focused on studying firm diversification into related and unrelated lines of business. Drawing on the resource-based view of the firm (Barney, 1991; Penrose, 1959; Peteraf, 1993; Wernerfelt, 1984), the literature has argued that portfolio relatedness (Robins and Wiersema, 1995) can enable diversified firms to exploit synergy by sharing strategic resources among their lines of business, thereby increasing firm performance (Farjoun, 1998; Markides and Williamson, 1994; Rumelt, 1974, 1982; Silverman, 1999). To capture the concept of portfolio relatedness, previous research has traditionally conceptualized cross-business relatedness based on the similarity of industries that a firm's lines of business serve (e.g., Bryce and Winter, 2009; Farjoun, 1998; Jacquemin and Berry 1979; Montgomery, 1982; Palepu, 1985; Teece, 1980, 1982). Most of the previous studies have provided evidence that diversification into related industries creates value, whereas diversification into unrelated industries destroys value (Palich, Cardinal, and Miller, 2000).

Strategy research has recognized that lines of business consist of *industries* and *business models* (e.g., Amit and Zott, 2001; Casadesus-Masanell and Ricart, 2010; Magretta, 2002; Teece, 2010; Zott and Amit, 2007). While a business' industry identifies *what* product market is served, its business model identifies *how* factor and product markets are connected (Zott, Amit, and Massa, 2011). Consequently, lines of business can be distinguished and classified not only based on the industries they serve but also based on the business models they employ. The focus of such substantial academic attention on firm diversification into industries may be driven by the notion that the concept of industry has been established in the literature since the foundation of the strategy field, whereas the concept of business model has become an emerging focus of research only over the last few years, motivated by the increasing possibilities of adopting new ways of doing business in established industries (Zott *et al.*, 2011). Moreover, business-level data are typically classified by industries, rather than

by business models, making empirical investigations of firms' business model choices more challenging.

However, because lines of business serve industries by operating business models, we argue that using the recently emerged concept of business model may provide a new step in examining the transferability of strategic resources among lines of business. Specifically, building on the few studies that examined portfolio relatedness beyond the industry level (e.g., Markides and Williamson, 1994; Prahalad and Bettis, 1986), we introduce the business model as a new concept to capture resource relatedness in business portfolios. Drawing on the resource-based view, we argue that the extent to which a firm's business model diversification is related may increase its performance.

As previously mentioned, existing research shows that business models and industries are distinct concepts. In the airline industry, for example, LAN Airlines owned two lines of business operating as air passenger carriers and one line of business operating as air cargo carrier before its 2012 merger with TAM Linhas Aéreas (Casadesus-Masanell and Tarzijan, 2012). Since all three lines of business operate in the two-digit Standard Industrial Classification (SIC) industry 45 (Transportation by Air), they would be classified as related according to their product market activities (they belong to the same two-digit SIC code). However, as argued by Casadesus-Masanell and Tarzijan (2012), the discount business model operated by one air passenger carrier is substantially different from the full-service business model operated by the other air passenger carrier and the airfreight-shipping business model operated by the air cargo carrier. Thus, corporate diversification research would typically view LAN Airlines as related diversified according to its industry activities, although the firm's way of doing business is considerably dissimilar across its lines of business.

Conversely, the easyGroup has recently added a hotel chain (SIC 7011) to its established air passenger carrier business (SIC 4512). While the group's airline and hotel

businesses operate in different industries (they belong to different two-digit SIC codes), both lines of business use discount business models to connect with factor and product markets. Consequently, although its way of doing business is remarkably similar across its lines of business, the easyGroup would be classified as unrelated diversified based on its industry activities.

These two examples illustrate that firms may diversify into lines of business that operate in related industries, but do so by operating unrelated business models, and vice versa. Unfortunately, the current literature has not yet integrated the business model and industry perspectives on portfolio relatedness, nor examined their relative importance in capturing the extent to which valuable resources may be exchanged inside multibusiness firms. However, considering both perspectives simultaneously may be highly relevant for firms to evaluate, choose, and integrate new lines of business. Moreover, because both perspectives can substantially differ from one another in some cases, considering the potential for synergy creation only on the basis of industry relatedness may lead to incorrect performance expectations.

Relying on the resource-based view, the strategy literature has suggested that classifications of related businesses should be based on the similarity of their underlying logic (Rumelt, 1974; Prahalad and Bettis, 1986). We argue that, by definition, business models reflect the logic underlying businesses better than industries, implying that corporate headquarters can leverage strategic resources across similar business models more effectively than across similar industries. Moreover, in reviewing the literature on business models, Zott *et al.* (2011) have argued that business models provide a more holistic perspective on how businesses ‘do business’ (i.e. how they connect with factor and product markets), whereas industries provide a more particularistic and functional perspective on what businesses do (i.e. what products they offer to serve addressable market segments). Accordingly, examining

lines of business from a business model perspective, rather than an industry perspective, may capture to a larger extent the potential to effectively exchange strategic resources among lines of business. As a consequence, we expect that the concept of business model relatedness may be better able to explain superior firm performance than the concept of industry relatedness.

This study develops and tests these ideas using a unique panel dataset that allows us to identify the business models employed by 84 multibusiness firms within and across the industries that comprise the retail- and wholesale-trade sectors of the economy (SIC 50–59) over the period from 1997 to 2010. We seek to contribute to the literature in three ways. First, we develop the construct of business model relatedness, providing a heretofore unexplored perspective on the relatedness of business portfolios. To operationalize business model relatedness, we consider four business model types (non-store selling, discount, traditional small-store, and traditional large-store retail models), where the business models are similar within but dissimilar across types. Second, we argue theoretically, and show empirically, that the construct of business model relatedness is positively associated with firm performance. Third, we theorize about the relative importance of business model and industry relatedness in identifying strategic resources and their transferability inside the multibusiness firm. We argue that business model relatedness will be more important in determining superior firm performance than industry relatedness and provide evidence for this argument. In summary, by introducing the construct of business model relatedness to the literature, the focus of this study is to improve the understanding of when and how operating a portfolio of business models may increase firm performance, and to contribute to a more complete conceptual and empirical understanding of portfolio relatedness.

THEORY AND HYPOTHESES

In this section, we integrate the nascent literature on business models with mainstream strategy research on corporate diversification to develop two research hypotheses; one on the

relationship between business model relatedness and firm performance, and another on the relative importance of business model and industry relatedness in determining firm performance.

The concept of business model

In the strategy literature, a business model has been typically defined as an activity system that connects factor and product markets (Zott and Amit, 2010), identifying the fundamental logic of how a business is organized to create and capture value (Casadesus-Masanell and Ricart, 2010). The business model concept therefore embodies the “organizational and financial ‘architecture’ of a business” (Teece, 2007: 1329), with the purpose of explaining sustained performance differences. On a more detailed level, a business model has been referred to as consisting of elements such as a value proposition, a profit formula, key resources, and key processes (Johnson, Christensen, and Kagermann, 2008). By identifying the typical ways in which these elements are aligned for superior value creation, previous research has suggested that variations of business models are usually represented by ‘generic business model types’ (Baden-Fuller and Morgan, 2010; Demil and Lecocq, 2010; Zott *et al.*, 2011). These studies have argued that such generic representations of doing business can be applied in multiple industries and sectors, classifying specific business models into business model types.

Most studies have explicitly or implicitly distinguished between types of business models by providing examples of pioneering business models in either traditional or Internet-related industries, which have subsequently been adopted by an increasing number of firms across industries (Baden-Fuller and Morgan, 2010; Teece, 2010). In traditional industries such as the airline, retail, and hotel industries, ‘discount’ or ‘no-frills’ business models have been regarded as belonging to a business model type, as they are “well documented and regularly referred to as a coherent set of choices that offer the potential for superior performance”

(Demil and Lecocq, 2010: 228). Moreover, with the emergence of Internet-related industries, one of the most widely discussed business model types has been referred to as the ‘e-business’ model (Zott *et al.*, 2011), describing how businesses sell products and services directly to customers using the Internet, instead of physical retail stores. This business model type encompasses models such as ‘e-commerce’, ‘e-markets’, and ‘e-shops’ (Timmers, 1998), and has been employed not only by Internet-related businesses, but also by businesses originally operating in traditional service and manufacturing industries. Other business model types that have been identified include ‘sponsor-based’, ‘subscription-based’, and ‘razor-razor blade’ models (Casadesus-Masanell and Zhu, 2010, 2012; Tripsas and Gavetti, 2000), which became widespread across both traditional and Internet-related industries. For example, sponsor-based business models are used by businesses that offer products or services for free to customers and finance themselves through advertising revenues, while razor-razor blade models are employed by businesses that offer products or services below production cost but sell complementary products or services at high margins.

The literature on business models has argued that the business model concept is distinct from the concept of industry (Zott *et al.*, 2011), and provided multiple examples showing that businesses can target similar product markets (the *what*), but do so by employing dissimilar business models (the *how*), and vice versa (e.g., Magretta, 2002; Markides and Charitou, 2004; Teece, 2010; Zott and Amit, 2008). Because the business models employed by lines of business are distinct from the industries they serve, the concepts of business model and industry can be used simultaneously to describe and classify lines of business.

Previous research has also distinguished between the concepts of business strategy and business model. For example, Zott and Amit (2008: 2) argue that a business model captures the structure of a business’ activity system, and also examine the business model in a

contingent relationship with business strategy, establishing conceptually and showing empirically that a “firm’s product market strategy and its business model are distinct constructs that affect firm performance.” Specifically, they argue that while product market strategy is focused on how a business positions itself against rivals, the business model is a construct that highlights a business’ operational transactions with customers, partners, and suppliers. Accordingly, Christensen (2001) and Teece (2010) suggest that the business model employed by a business can be a source of competitive advantage that is distinct from the business’ product-market positioning. Moreover, Casadesus-Masanell and Ricart (2010) view the business model as a reflection of a business’ realized strategy. They suggest that substantial differences between strategy and business model can arise when contingencies (e.g., environmental uncertainty) call for business model modifications. Accordingly, business strategy describes the broader direction of a firm’s competitive positioning, which can be achieved by operating different business models. In this study, we focus on the business model because it directly reflects how a business operates, and thereby captures the specific resources and processes needed to create and capture value (e.g., Demil and Lecocq, 2010; Johnson *et al.*, 2008; Teece, 2010; Zott and Amit, 2007).

Applying the business model concept, previous research has improved the understanding of issues that have traditionally been of major interest in the strategy literature, such as competition, organizational design, and innovation. In this study, we seek to contribute to the literature by applying the business model concept to another field that has historically been the focus of significant attention in the literature: the relationship between diversification and firm performance.

The concept of relatedness

The resource-based view of the firm (Barney, 1991; Penrose, 1959; Peteraf, 1993; Wernerfelt, 1984) has been widely regarded as providing a valuable theoretical lens for understanding the

mechanisms driving the diversification-performance relationship. The central concept of the resource-based view of diversification is that of relatedness, which has been referred to as the degree of commonality between separate lines of business (Rumelt, 1974). Based on the concept of relatedness, the resource-based view of diversification suggests that multibusiness firms can create value by sharing resources among their lines of business (Bryce and Winter, 2009; Farjoun, 1998; Rumelt, 1974; Robins and Wiersema, 1995; Silverman, 1999; Tanriverdi and Venkatraman, 2005).

More specifically, previous research has distinguished between cross-business sharing of strategic resources, such as knowledge and skills, and ordinary resources, such as raw material and equipment (Markides and Williamson, 1994). Strategic resources have been defined as the assets, capabilities, and organizational processes that are valuable, rare, difficult to imitate, and have few substitutes (Barney, 1991). Contrary to ordinary resources, strategic resources are in long-term short supply in the marketplace and can therefore provide a major source of sustained competitive advantage. However, strategic resources are also more specialized than ordinary resources, which implies that they can only be applied to activities performed by related lines of business (Montgomery, 1994). Because the incremental cost of applying a strategic resource is much less than its cost of development, a firm can benefit from synergies in the form of economies of scope and generate economic quasi-rents by diversifying into related lines of business (Peteraf, 1993; Teece, 1980, 1982).

Given that, by definition, strategic resources are difficult to identify, conceptualizations of portfolio relatedness can only provide imperfect proxies of a firm's potential to deploy strategic resources among lines of business. These limitations present a particular problem for empirical investigations of resource relatedness in business portfolios. To approximate resource relatedness among lines of business, previous research has traditionally conceptualized portfolio relatedness based on industry similarities. In doing so,

most studies have relied upon the SIC hierarchy to measure the relatedness between pairs of industries (Jacquemin and Berry 1979; Palepu, 1985). Specifically, the SIC-hierarchy-based measurement of industry relatedness views distinct product markets as related to one another if they belong to the same two-digit SIC code, and as unrelated if they belong to different two-digit SIC codes.¹

Previous research has recognized several limitations of the SIC-based measurement approach; the hierarchical distance between industries, for example, may insufficiently capture strategic resources in the ways that firms actually share them among their lines of business (Robins and Wiersema, 1995). Based on this recognition, an ongoing discussion in the literature has focused on improving the measurement of resource-based industry similarities. This stream of research has developed industry relatedness measures that capture technological relatedness (Miller, 2006; Robins and Wiersema, 1995; Silverman, 1999), skill-based relatedness (Farjoun, 1998; Neffke and Henning, 2013), and chemical relatedness (Diestre and Rajagopalan, 2011) across industries. Moreover, Bryce and Winter (2009) developed a ‘general interindustry relatedness index’ that provides a percentile relatedness rank for pairs of four-digit SIC manufacturing industries, reflecting how manufacturing firms actually combine industries into a portfolio. Overall, previous research using measures of industry relatedness with and without a SIC-hierarchy-based foundation has typically shown that diversification into related industries is more profitable than diversification into unrelated industries (Palich *et al.*, 2000).

While previous research has significantly contributed to the understanding of portfolio relatedness and how it is associated with firm performance, only few studies have conceptualized resource relatedness beyond dimensions of industry similarity. As an example of this research line, Prahalad and Bettis (1986: 485) conceptualized relatedness based on the

¹ Within any two-digit SIC group, a four-digit SIC group represents a higher level of product-market detail, with the eight-digit SIC group representing the most detailed product-market classification.

strategic similarity of businesses, rather than basing relatedness on industry characteristics, arguing that strategically similar businesses can be managed with a single “dominant logic”. Similarly, Markides and Williamson (1994: 149) argued that the understanding of the benefits of related diversification can be improved by focusing on “strategic relatedness”, and found evidence that strategic relatedness is superior to industry relatedness in predicting when related diversification leads to sustained performance advantages. In this study, we aim to supplement this line of research by introducing the business model concept as a new way to capture strategic resources in multibusiness firms. Specifically, we suggest that because lines of business consist of both industries and business models, the understanding of portfolio relatedness can be improved by also shedding light on the business model choices of diversifying firms. In accordance with previous business model research, we argue that business models are inherently distinct from industries. Consequently, conceptualizing portfolio relatedness based on the similarity of business models may provide an important new direction in studying how multibusiness firms may create value.

Business model relatedness

By integrating the concept of business model with the concept of relatedness, we propose the construct of business model relatedness. Similar to the logic of the SIC system, which classifies product markets as being related or unrelated depending on whether or not they belong to the same industry group, we propose to classify business models as being related or unrelated depending on whether or not they belong to the same business model type.

Accordingly, we refer to related business model diversification as the diversification *within* business model types (i.e. diversification into business models with similar alignments of the value proposition, profit formula, key resources, and key processes) and unrelated business model diversification as the diversification *across* business model types (i.e. diversification into business models with dissimilar alignments of the value proposition, profit formula, key

resources, and key processes). Based on this classification of related and unrelated business models, we refer to *business model relatedness* as the extent to which a firm's diversification into business models is related.

Business model relatedness and firm performance

We anchor the construct of business model relatedness in the resource-based view of diversification to predict its relationship with firm performance. Since business models determine how businesses use and configure key resources and organizational processes to perform certain activities, the choices made regarding the business model require specific resource profiles. Relying on the resource-based approach, we argue that business model diversification can enable firms to create superior value if the business models (and therefore their underlying resource profiles) are related to one another. In the following, we first seek to identify bundles of strategic resources that may underlie the operation of business models. We then aim to describe when firms may be able to transfer these strategic resources across business models.

To shed some light on the strategic resources that firms may develop by operating a business model, we follow Teece (2007: 1330) who suggests that “designing, implementing, and validating business models” is difficult to codify and routinize, involving a significant amount of tacit knowledge that businesses may develop over time. First, business model design relates to a complex set of interdependent business activities, reflecting the logic of how a business operates to achieve sustainable business success. Specifically, business model design includes several elements, such as the design of a value proposition, the design of a profit formula, and the design of key resources and organizational processes (Johnson *et al.*, 2008). We propose that a line of business may develop unique expertise in designing each of these elements. Another critical capability that a line of business may develop ensures that the specific business model design elements are synchronized and inter-related in a consistent

way that maximizes overall value creation and capture (Casadesus-Masanell and Ricart, 2011). For example, business models that belong to the e-business model type must design all key resources and organizational processes in alignment with the requirements of a non-store ordering and home-delivery value proposition and its corresponding profit formula. Second, business model implementation can be referred to as the actions taken by a line of business to operate its business model. Previous research argues that a business implements its business model through a ‘trial-and-error’ learning process, allowing it to explore and improve those operating procedures that maximize value creation (Sosna, Treviño-Rodríguez, and Velamuri, 2010). Finally, business model validation involves the continuous adjustment of the business model to environmental changes. This process is especially important in fast changing business environments and requires a deep understanding and anticipation of customer needs, competitive dynamics, and sales cycles (Teece, 2007).

In summary, because the knowledge of business model design, implementation, and validation involves a considerable tacit component, it is not readily available in factor markets, which implies that lines of business develop this knowledge internally in idiosyncratic ways. As a result, the resource-based approach suggests that this specialized knowledge can constitute a highly valuable bundle of resources for a line of business, which may ultimately determine sustained business success.

Having identified bundles of strategic resources that a line of business may develop in operating its business model, we next establish when multibusiness firms may be able to leverage these unique resources among their lines of business. We argue that these strategic resource bundles are similar among business models that belong to the same business model type, but dissimilar among business models that belong to different business model types. The resource-based view of diversification suggests that firms may only create value by sharing similar resources across lines of business, not dissimilar resources. Consequently, firms may

only be able to achieve performance advantages by sharing strategic resources across business models that belong to the same business model type.

For example, a diversified firm may own two lines of business that operate related business models. One line of business may possess specialized expertise in communicating its value proposition more effectively, while the other may have developed unique knowledge in implementing IT-enabled processes to deliver its value proposition more efficiently. Because businesses cannot easily acquire such idiosyncratic knowledge in factor markets and the internal development of such expertise is costly, firm-internal sharing of this business model-related knowledge can enable both lines of business to be more profitable than they would have been alone, creating value at the corporate level. Similarly, Casadesus-Masanell and Tarzijan (2012: 6) suggest that

the greater the number of critical assets the models share, and the greater the number of shared capabilities and resources that result from the operation of the models, the more likely that combining the two models will yield a more valuable result.

As a result, we argue that firms that diversify into related business models (i.e. business models of the same business model type) may be able to leverage bundles of strategic resources developed and accumulated in the process of business model design, implementation, and validation among their lines of business, and thereby increase firm performance.

However, firms that diversify into unrelated business models (i.e. business model of different business model types) may experience major difficulties in leveraging their strategic resource base, need more time to understand the complexity of new business models, and experience higher coordination and control costs in operating business portfolios. This is because the underlying configuration of key resources and processes that support one particular business model are fundamentally different from the resource configuration required to operate another, unrelated business model. Thus, diversification into unrelated

business models can lead to inconsistencies in the information and expertise required to operate the models. Such inconsistencies, in turn, may increase the risk of inappropriate inference and mismanagement from corporate headquarters (Markides and Charitou, 2004).

Moreover, the organizational culture of different business model types may cause internal conflicts, raising barriers for potential resource sharing. Accordingly, in referring to dissimilar business models, Markides (2008: 81) argues that

the evidence shows that most established companies that attempt to employ dual business models fail to do so successfully - exactly because the presence of conflicts means that by trying to pursue business model B, a company harms its business model A.

Thus, firms may experience substantial cost that outweigh the potential benefit of business model diversification if they simultaneously employ business models that are unrelated to one another, which may result in decreasing firm performance.

In summary, these arguments suggest that business model relatedness (i.e. the extent to which a firm's diversification into business models is related) will increase firm performance. This reasoning leads to our first hypothesis:

Hypothesis 1. Business model relatedness will be positively associated with firm performance.

The relative importance of business model and industry relatedness

Since previous diversification research has traditionally used industry relatedness to conceptualize portfolio relatedness, the question now arises of whether business model or industry relatedness has greater influence on firms' potential to create and capture value. We expect the similarity of business models to be more influential because business model relatedness may capture the extent of strategic resources that firms can effectively share among lines of business better than industry relatedness. We will justify this argument below.

First, pioneering strategy research on corporate diversification has argued that classifications of related businesses should be based on the similarity of the "underlying

logic” between businesses (Rumelt, 1974: 54). Similarly, as mentioned before, Prahalad and Bettis (1986) have argued that businesses should be considered as related to one another if they can be characterized by a single dominant logic. They suggest that the extent of diversity in business portfolios may not arise from the variety of products, technologies, markets, or the number of distinct businesses, but rather from the variety of dominant logics that underlie the businesses in corporate portfolios. Studies building on this argument propose that corporate headquarters can better understand the unique resource requirements of businesses if their underlying logic is similar, leading to a more effective identification and exchange of strategic resources among a firm’s business portfolio.

Since the business model, by definition, describes the logic of a business, while the industry could be served using multiple business models, therefore involving different logics, we expect that the similarity of business models should lead to a more effective deployment and redeployment of strategic resources among businesses than the similarity of industries. Consequently, business model relatedness will have a stronger positive relationship with firm performance than industry relatedness.

Second, business models and industries may capture strategic resources in different ways and to different extents. Specifically, strategic resources with potential application in multiple related industries mainly encompass specialized product and customer knowledge. Typically, such organizational expertise is shared across specific functional areas, such as R&D (Robins and Wiersema, 1995), manufacturing (John and Harrison, 1999), or marketing (Capron and Hulland, 1999). Conversely, as the business model more generally encompasses the full activity system and identifies how a business ‘does business’, strategic resources may be developed in all functional areas (e.g., procurement, logistics, human resource, finance, and marketing) and their interrelations to the external environment (e.g., suppliers, partners, and customers). In conclusion, business models provide a more holistic perspective on entire

activity systems that bridge factor and product markets, whereas industries provide a more particularistic perspective on specific functional areas of a business (Zott *et al.*, 2011).

Because operating a business model may lead to the development of strategic resources in all internal and external transactions of a business, while serving an industry may only lead to the development of more narrowly applicable resources, we expect that business models capture the strategic resources of business lines to a larger extent than industries. Accordingly, we argue that firms can share strategic resources to a larger extent across business models than across industries. Consequently, business model similarity will affect firm performance more strongly than industry similarity.

In summary, we expect that business model relatedness enables firms to share strategic resources both more effectively and to a larger extent among business lines than industry relatedness, leading to our second hypothesis:

Hypothesis 2. Business model relatedness will be more influential in determining superior firm performance than industry relatedness.

METHODS

Data and sample

To test these two hypotheses, we faced several challenges in terms of sample selection. First, we needed a sample that provided information about both the business models and industries of lines of business in corporate portfolios. Second, we had to choose a sample that included several business model types, where firms coexist that simultaneously operate business models that belong to either the same or different business model types. Finally, the firms in the sample also had to simultaneously operate in multiple product markets that belong to either the same or different industries.

We found that the data provided by Planet Retail, a leading private retail research company,² included the required information on firms' operations in business models and industries.³ Previous research has also used this database to examine topics of diversification in retailing (e.g., Gielens and Dekimpe, 2001, 2007). Moreover, prior studies on business models have frequently used examples of retail firms to describe the design of pioneering and traditional business models (e.g., Christensen and Tedlow, 2000; Johnson *et al.*, 2008; Magretta, 2002; Markides and Charitou, 2004). Specifically, these studies provided several examples suggesting that electronic (or non-store selling), discount, and traditional business model types co-exist in retailing, and that retail firms simultaneously operate several business models that belong to the same or different business model types. Finally, many retail firms own multiple businesses within and across the industries that comprise the retail- and wholesale-trade sectors of the economy (SIC 50–59). In short, we found that retailing is a particularly appropriate empirical setting to test our two hypotheses.

Based on Planet Retail's ranking lists of 1997 and 2010, we obtained panel data on 100 worldwide leading retail firms for which profitability data were available.⁴ Our focus on multibusiness firms reduced our final sample to 84 firms. This sample constituted an unbalanced panel for the time period from 1997 to 2010 and included retail firms such as US-based Wal-Mart, Target, and Dollar General, France-based Carrefour, Auchan, and Casino, and Japan-based Seven & I Holdings, FamilyMart, and Aeon. Specifically, 75 percent of the firms in the final sample were among the leading retail firms in 2010, whereas 25 percent were among the leading retail firms in 1997 but not in 2010.⁵ The sampled firms originate

² See <http://www1.planetretail.net>

³ The databases typically used in prior corporate diversification research (e.g., Compustat) included insufficient information on business models.

⁴ The sampled firms owned retail chains such as convenience stores, forecourt stores, supermarkets, discount stores, hypermarkets, or superstores as dominant businesses.

⁵ Of those firms that were among the leading firms in 1997 but not in 2010, 19 percent did not survive until 2010.

from various world regions⁶ and were mainly diversified within and across two-digit industries of the retail- and wholesale-trade sectors of the economy.⁷

Dependent variable

Previous strategy research on the diversification-performance relationship has typically used return on sales (ROS) and/or return on assets (ROA) as accounting-based profitability measures (Palich *et al.*, 2000). Previous studies show that ROS and ROA are highly correlated ($r = 0.91$) and therefore generate similar results (Hitt, Hoskisson, and Kim, 1997). We decided to use ROS as dependent variable due to data availability.⁸ For any given year, we computed profitability (ROS) as a firm's earnings before interest and taxes (EBIT) expressed as a percentage of its net sales.

Independent variables

Relatedness measure

The entropy index is one of the most widely used continuous measures in the literature to compute related and unrelated diversification (Jacquemin and Berry, 1979; Palepu, 1985). A firm's degree of total diversification (DT) is given by:

$$DT = \sum_{i=1}^N P_i \ln(1 / P_i)$$

In this equation, P_i = proportion of annual sales of a distinct line of business for a firm with N different lines of business. Thus, the entropy index encompasses a firm's diversification in terms of both breadth (number of lines of business) and depth (relative importance in terms of sales of each line of business). Unrelated diversification (DU) is computed in a similar way using two-digit SIC data, where P_i = proportion of annual sales of a distinct line of business for a firm with N different two-digit SIC businesses. Related diversification (DR) is then

⁶ 46 percent of the sampled firms originated from Europe, 24 percent from America, 21 percent from Asia, five percent from Australia, and four percent from South Africa.

⁷ The sampled firms have, on average, 99.4 percent of their sales in these two sectors of the economy.

⁸ Data required to compute a firm's ROS were reported by Planet Retail, while data on ROA were not directly available.

computed as the difference between total diversification and unrelated diversification ($DR = DT - DU$).

Our sample included annual sales data of a firm's distinct lines of business, with the industry information corresponding to the eight-digit level of the SIC system. For example, within the industry group of food stores (SIC 54), supermarkets (SIC 54110101) are distinguished from hypermarkets (SIC 54110102). Therefore, we were able to group all lines of business into two-digit SIC industries. The Planet Retail database also provided information beyond the information available in the SIC system, allowing us to identify the distinct business model operated by each line of business and group these models into business model types. Consequently, we were able to group a firm's lines of business into both business model types and two-digit industries, as described in more detail below.

Business model relatedness

Based on our conceptualization, we measured business model relatedness as the extent to which a firm's diversification into business models is related. Since we referred to related business model diversification as the diversification *within* business model types and unrelated business model diversification as the diversification *across* business model types, the classification of specific retail models into business model types was a necessary first step in operationalizing business model relatedness.

We reviewed the business model literature and found that three business model types appeared to be dominant in retailing, namely, non-store selling (e.g., Christensen and Tedlow, 2000), discount (e.g., Magretta, 2002), and traditional (e.g., Casadesus-Masanell and Ricart, 2010; Raff, 2000) retail models. To validate this categorization, we conducted interviews with managers of diversified retail firms.⁹ We discussed similarities and dissimilarities of different retail models that they had experience with. In accordance with the literature, all interviewed

⁹ We interviewed six managers of four different firms, a CEO of a leading diversified retail firm, a Vice President (VP) of sales & marketing, a manager of a non-store business line, two chain-store managers, and a former chain-store sales manager (who now works in a business school).

retail managers identified non-store selling and discount business models as distinct business model types. For example, the CEO of a leading retail firm that traditionally focuses on hypermarkets said, “starting our online business was difficult because the required skills have not much in common between real stores and online stores. Nobody wanted to be responsible for the online business. Our employees feared it.” The interviewed managers also confirmed that there was significant similarity among business models within the same business model type. For instance, the above mentioned firm today operates several non-store selling business models and the managers of these businesses meet three times a year to exchange best practices. In the words of one of these managers, “the other executives [of non-store selling businesses] looked over our business plan and made several suggestions that helped my team to avoid painful mistakes.”

Beyond the categorization into non-store selling and discount business model types, all interviewees distinguished between the groups of traditional small-store and traditional large-store (big-box) retail models. They stated that the business models are similar within and dissimilar across these two groups. For example, a VP of sales & marketing said, “running the business model for convenience stores is in our genes. We are very good in managing and replicating our small stores that are located in the city center and offer a limited range of fresh food products for day-to-day shopping trips. Operating the big-box concept would require very different skills that we don’t have. This is why we focus on experimenting with different types of small-store models where we can apply our knowledge, instead of expanding into the big-box segment.” Similarly, a manager of a hypermarket chain that represents the company’s core business said, “managing the hypermarket model is in our DNA. It was easy for us to start our superstore business but we find it hard to manage our convenience store chain. The convenience store concept is not part of our culture and it is hard to find managers that are willing to do this business.” Finally, the interviewed CEO said, “we have synergies between

our large hypermarkets and garden centers but not between our hypermarkets and convenience stores.” Interestingly, the firm’s hypermarkets (SIC 54) and garden centers (SIC 52) serve different industries, while its hypermarkets and convenience stores operate in the same industry (SIC 54).

Consequently, to operationalize business model relatedness, we decided to consider four business model types (i.e. non-store selling, discount, traditional small-store, and traditional large-store business models). First, we classified e-commerce, mail order, and delivered wholesale businesses into the non-store-selling business model type. Retail firms such as Amazon (for e-commerce), QVC (for mail order), and Metcash (for delivered wholesale) provide popular examples of firms that focus on operating non-store-selling business models. Second, we classified discount superstore, discount store, and fixed-price point businesses into the discount business model type. Retail firms such as Wal-Mart, Target, and Kmart (for discount superstores), Aldi, Family Dollar, and Save-A-Lot (for discount stores), as well as Dollar General, Dollar Tree, and Poundland (for fixed-price point stores) provide typical examples of firms that focus on operating discount business models. Finally, we classified traditional retail businesses into small- and large-chain-store businesses. Specifically, we classified businesses such as convenience stores, forecourt stores, and neighborhood markets that operate less than 400 square meters of selling area into the small-store business model type and the remainder such as hypermarkets, superstores, and wholesale clubs into the large-store business model type.¹⁰ For example, retail firms such as 7-Eleven, Lawson, and Spar (for convenience stores, forecourt stores, and neighborhood markets) focus on operating small-store retail models, whereas Carrefour, Kroger, and BJ’s (for hypermarkets, superstores, and warehouse clubs) focus on operating large-store retail models.

¹⁰ In robustness checks, we used cut-off values between 200 and 2,000 square meters of selling area to categorize traditional small and large chain-store businesses. Our substantive results were robust to these cut-off values.

Based on this grouping of related and unrelated business models and by using the above described operationalization of related and unrelated diversification, we calculated the degree of *unrelated* business model diversification by applying the entropy index on a firm's sales distribution across these four business model types. We then calculated the degree of *related* business model diversification as the difference between a firm's total diversification and unrelated business model diversification. Finally, to examine the extent to which a firm's business model diversification is related, we followed the approach of Farjoun (1998) and calculated the ratio of related-to-total diversification, implying that the degree of business model relatedness ranged from zero to one hundred percent.

Industry relatedness

Following the procedure described above, we computed *unrelated* industry diversification by capturing a firm's diversification across two-digit SIC groups and *related* industry diversification by calculating the difference between total diversification and unrelated industry diversification. We then measured industry relatedness as the extent to which a firm's diversification into industries is related by taking the ratio of related-to-total diversification, implying that the degree of industry relatedness also ranged from zero to one hundred percent.

Control variables

We included several control variables. First, prior research argued that firm size may be correlated with firm diversification and performance (e.g., Montgomery, 1994). Therefore, we controlled for firm size in any given year with the logarithm of a firm's corporate-level sales. Second, firms focusing on operating small or large chain stores differ in their tangible investments (e.g., Parmigiani and Holloway, 2011), which may be correlated with firm diversification and performance. Therefore, in addition to firm size, we controlled for firm efficiency by taking the logarithm of a firm's sales per unit of selling area (Gielens and

Dekimpe, 2001). Third, since firm growth can affect both diversification and firm performance (e.g., Ramanujan and Varadarajan, 1989), we controlled for firm growth with a firm's percentage change in sales over successive years (i.e. $[\text{sales}_t / \text{sales}_{t-1}] - 1$). Fourth, because a firm's international diversification can be correlated with its product diversification and performance (Hitt *et al.*, 1997), we controlled for a firm's degree of international diversification, using the above described entropy index to operationalize a firm's degree of total diversification into countries. Fifth, the economic environment in a firm's home region might be correlated with its corporate diversification and performance (Wan and Hoskisson, 2003). We thus obtained data from the Euromonitor database to control for location-specific advantages with the logarithm of retail sales per capita in a firm's home region.¹¹ Sixth, we included year dummies in our data analysis to control for unobserved time-varying factors such as macroeconomic trends in the economy. Finally, we suspected that diversification decisions might be endogenous (Campa and Kedia, 2002). As suggested by Park (2003), we controlled for the level of a firm's prior performance because high performing firms may tend to pursue related diversification, whereas low performing firms may tend to pursue unrelated diversification. In the following section, we describe how we took a firm's level of prior performance into account.

Statistical method and analysis

To control for the level of prior firm performance, we were interested in estimating a dynamic panel-data model that allows past realizations of the dependent variable to affect its current value and uses instruments to address our endogeneity concerns. Moreover, we were interested in including the lagged dependent variable to address the problem of autocorrelation in panel data that can affect the estimates of standard errors (Wooldridge,

¹¹ Geographical home region is based on Euromonitor's categorization of North America, South America, West Europe, East Europe, Asia, and Pacific (i.e. Australia and New Zealand). The sampled firms have, on average, over 90 percent of their sales in their home region.

2002). Finally, we aimed to address the problems of unobserved firm-level heterogeneity in our models.

Therefore, our equations are dynamic relationships between a firm's profitability (i.e. ROS) in the current year on the left-hand side and its lagged profitability of the previous year as well as its current degree of business model and industry relatedness on the right-hand side. More formally, Y_{it} represents the profitability observations of firm i at time t and $Y_{i,t-1}$ denotes the one-year lagged profitability observations. The vector X_{it} represents the independent variables (i.e. business model and industry relatedness, respectively), Z_{it} the vector of control variables, and $v_i + \varepsilon_{it}$ the residual. The equation explaining the effect of business model and industry relatedness on firm profitability is expressed as follows:

$$Y_{it} = \alpha Y_{i,t-1} + \beta X_{it} + \gamma Z_{it} + v_i + \varepsilon_{it}$$

where β s are the coefficients of interest. To estimate this equation, ordinary least squares (OLS) coefficient estimations are biased because of the firm-specific fixed effect v_i .

Moreover, with the inclusion of the lagged dependent variable as a predictor, fixed-effect (within) coefficient estimations are only consistent for data with a long time dimension.¹² As described above, there is an average of seven years of observations per firm in our dataset.

We chose the difference generalized method-of-moments (GMM) estimator derived by Arellano and Bond (1991) as it is designed for dynamic panel data with a short time and larger firm dimension. This estimator has several advantages. First, the difference GMM estimator removes time-invariant firm-specific heterogeneity by differencing the data.

Second, this estimator uses lagged levels of the dependent and potentially endogenous variables as instruments. In our model, we treated business model and industry relatedness as

¹² For shorter time dimensions, coefficient estimates of fixed-effects regressions are biased because the lagged dependent variable is correlated with the error term.

endogenous variables. Finally, the difference GMM estimator controls for autocorrelation and heteroskedasticity.¹³

RESULTS

Table 1 presents descriptive statistics for the variables used in our study and summarizes within-firm and overall Pearson correlations for the variables in our dataset. As shown in Table 1, all correlation coefficients between explanatory variables were below the recommended threshold of 0.80 (Mason and Perreault, 1991). The within-firm correlations showed that business model and industry relatedness were positively correlated with firm performance as expected, whereas the overall correlations indicated the opposite. This finding suggests that the fixed-effects used in our regression model account for important sources of unobserved heterogeneity across our sampled firms.

----- *Insert Table 1 about here* -----

We argued in this study that several firms may exist that diversify into lines of business that employ related business models but serve unrelated industries, and vice versa. Indeed, the relatively low positive within ($r = 0.06$) and overall ($r = 0.24$) correlation between a firm's degree of business model and industry relatedness indicates that both measures capture a firm's portfolio relatedness in different ways. We performed a pooled estimation of the variables used in this study (including year dummies) to calculate the variance inflation factor (VIF). The maximum VIF value was 2.12 (mean = 1.70). Thus, all VIF values were below the often-used threshold of 10, indicating that multicollinearity was not a significant concern.

Table 2 reports the coefficients and their standard errors from the one-step GMM estimator of our dynamic panel-data models. The inclusion of the lagged dependent variable and the usage of instruments reduced our sample size to 76 firms in the dynamic panel-data

¹³ To examine the robustness of our coefficient estimates, we also report a fixed-effects regression model.

estimation model.¹⁴ The Sargan test indicated that the instruments were valid and the Wald statistics rejected the null hypothesis that all coefficients except the constant were zero.

----- *Insert Table 2 about here* -----

Model 1 in Table 2 includes only the control variables. In Models 2 and 3, we added the business model and industry relatedness variables, respectively, to test their independent effects on firm performance. Model 4 includes both independent variables simultaneously to examine their relative importance in determining firm performance.

Among the control variables in Model 1, we found that prior profitability (in year $t - 1$) is positively associated with current profitability (in year t), firm size is negatively associated with firm profitability, firm efficiency is positively associated with firm profitability, and industry size per capita in a firm's home region is positively associated with firm profitability. Model 2 tests Hypothesis 1, which suggests that business model relatedness is positively associated with firm performance. The results show that the coefficient of the business model relatedness variable is positive and significant ($\beta = 4.41, p < 0.001$), indicating that firm profitability increases with the extent to which a firm's diversification into business models is related. Thus, Hypothesis 1 is supported. In Model 3, we examine the industry relatedness variable. Consistent with prior research, results of Model 3 show that the coefficient of the industry relatedness variable is also positive and significant ($\beta = 2.57, p < 0.05$).

Next, we test Hypothesis 2, which postulates that business model relatedness is more influential in determining superior firm performance than industry relatedness. To test Hypothesis 2, Model 4a and Model 4b include both the business model and industry relatedness variables. The standardized coefficients of both variables in Model 4b show that business model relatedness ($z\beta = 1.14, p < 0.001$) has a stronger positive relationship with firm performance than industry relatedness ($z\beta = 0.30, p > 0.10$). We conducted an F-test and

¹⁴ The fixed-effects regression models in the robustness check include all 84 firms.

found that the difference between the two coefficients was significant ($p < 0.05$). We then compared Models 2 and 3 with Model 4a, showing that the inclusion of the business model relatedness variable improves the model fit significantly ($p < 0.001$), whereas the inclusion of the industry relatedness variable did not improve the model fit ($p > 0.10$). Thus, our results also support Hypothesis 2.

Robustness checks

To test the robustness of our results, we first examined whether our results were sensitive to the econometric model. We chose to estimate a fixed-effects model since the Hausman specification test was significant, indicating that a random-effects model would be inconsistently estimated. The coefficients of the fixed-effects model denote the degree of within-firm variation in firm profitability explained by within-firm variation in business model and industry relatedness. We introduced a one-year lag into our dependent variable ($t+1$). Table 3 shows that our substantive results were robust to this alternative model.

----- *Insert Table 3 about here* -----

The robustness check with the fixed-effects model allowed us to examine the variance in firm performance explained by our independent variables. Specifically, compared to the baseline Model 1, the addition of the business model relatedness variable in Model 2 increased the explained variance in firm performance (within R^2) by 43.06 percent, while the addition of the industry relatedness variable in Model 3 increased the explained variance by only 9.7 percent. Moreover, likelihood-ratio (LR) tests show that business model relatedness is more influential than industry relatedness in explaining firm performance. These findings provide further evidence in support of Hypothesis 2.

Because firms can potentially achieve the same degree of business model or industry relatedness with different degrees of total diversification, we checked the robustness of our results by adding a variable controlling for a firm's degree of total diversification to the other

variables described in this study. Our substantive results were robust to the inclusion of this additional control variable.

DISCUSSION

Although several studies on business models provide anecdotal evidence suggesting that business model diversification is pursued by an increasing number of firms, the understanding of which business models could be combined to achieve superior performance is limited. Moreover, despite the recognition that lines of business serve industries by employing business models, no study has examined the coherence of business portfolios by integrating the industry and business model perspectives on portfolio relatedness.

Our study seeks to address these research gaps. Specifically, the first purpose of this study was to develop the construct of business model relatedness and examine its relationship with firm performance. We drew on the resource-based view of diversification to hypothesize that business model relatedness will be positively associated with firm performance. The second purpose of this study was to explore the relative importance of business model and industry relatedness in explaining superior firm performance. We integrated and compared the business model and industry perspectives on portfolio relatedness and hypothesized that business model relatedness will be more influential in determining superior firm performance than industry relatedness. Our empirical results provide support for both hypotheses.

Collectively, our findings can be interpreted as evidence showing that business model relatedness plays a critical role in determining a firm's potential for synergy creation among its lines of business. In the following, we expand on these results by discussing theoretical and managerial contributions and identifying limitations and future research directions.

Theoretical implications

The resource-based view of diversification suggests sharing strategic resources among lines of business may lead to sustained corporate-level performance advantages. Therefore, it is

central to organizational research to understand which kind of strategic resources lines of business may develop and when multibusiness firms may be able to effectively transfer these strategic resources inside their corporate boundaries. Based on the resource-based logic, this study identified strategic resources underlying the operation of business models to construct theory on the business model diversification-performance relationship in particular.

Moreover, by comparing strategic resources and the business logic underlying the operation of business models and industries, this study extended theory on portfolio relatedness in general. Overall, we provide three main contributions for both the literatures on business models and corporate diversification.

First, since the concept of business model is still in the early stages of development, we demonstrated its application to research on corporate diversification, which has historically been the focus of substantial attention in the literature. Specifically, by integrating research on business models and portfolio relatedness, we introduced the construct of business model relatedness to the literature.

Second, we used the construct of business model relatedness to shed some light on the transferability of strategic resources across similar business models. As the resource-based view of diversification suggests, we found that business model relatedness is positively associated with firm performance. This result can be interpreted as evidence indicating that by operating a business model, lines of business develop unique resources that can be shared across similar business models. Since the cross-business transferability of strategic resources underlying the operation of business models has been unappreciated in previous corporate diversification research, this study contributes to the literature by building a theoretical framework that explains when and how business model diversification increases firm performance.

Third, this study integrated the business model and industry perspectives on portfolio relatedness to improve the understanding of how these two perspectives may differ in identifying strategic resources and their transferability among lines of business. As hypothesized, our results show that business model relatedness is more influential in determining firm performance than industry relatedness. One explanation for this result is that the concept of business model relatedness is better able to capture both the effectiveness and extent of strategic resource sharing among businesses. Specifically, we argued that business models reflect the dominant logic of a business better than industries, implying that firms have a greater ability to effectively transfer strategic resources across related business models than across related industries. Moreover, we argued that the expertise required to operate business models is present in all internal and external business activities, while the expertise required to serve an industry may be more concentrated in specific functional areas, such as R&D, manufacturing, or marketing. Consequently, this study contributes to a richer understanding of portfolio relatedness by explaining why the concepts of business model and industry relatedness may differ in predicting superior firm performance.

Managerial implications

From a practical perspective, our framework can provide managers with a useful lens for analyzing and evaluating potential diversification moves into new businesses and divestments of existing businesses. For example, the interviewed CEO of a traditionally hypermarket-focused firm explained, “in early 2000, everyone wanted to be in the discount segment. After starting our discount business, we realized that the discount model can only be successful with a centralized structure, while our businesses are successful with lots of autonomy and entrepreneurship at the local level. Our decentralized way to work did not apply to the discount model. That is why we sold it.” Remarkably, both the company’s hypermarket and discount business lines served the same industry (SIC 54), and would therefore be regarded as

related businesses according to their product-market activities. Therefore, managers should carefully analyze the potential “fit” between existing and potential lines of business based on the business models employed, and should consider that the similarity of business models may be more fundamental in creating cross-business synergy than the similarity of industries. Operating multiple related business models at the same time can create unique opportunities for value creation and capture, resulting in a distinct competitive advantage.

Our results can also be used by managers for rethinking the design of organizational structures and governance systems. While lines of business are often combined within organizational units when they serve similar industries, managers could consider restructuring organizational units and reallocating decision rights by taking business model similarities into account. As a result, restructuring organizational units based on the similarity of business models may facilitate cross-business exchanges of strategic resources, and therefore provide an important potential source of competitive advantage.

Limitations and future research directions

The findings of this study have several limitations. First, continuing with the topic of organizational structure, the relationship between business model relatedness and firm performance likely depends on how firms use organizational units and management hierarchy to operate multiple business models simultaneously (Markides and Charitou, 2004; Markides, 2008). Since examining differences in organizational structure was beyond the scope of this study, additional research is called for to examine when and why business models should be physically separated or combined into organizational units. As shown by recent business model research (Markides, 2013), building on the ambidexterity literature may provide an important foundation for providing insights into how firms can design organizational structures to operate multiple business models at the same time. Second, because we tested our hypotheses in the context of the retail- and wholesale-trade sectors of the economy, future

research could build on our study by testing the business model relatedness construct in different empirical settings. We also hope that additional identification of specific business models and their classification into business model types will contribute to further empirical tests of the business model relatedness construct and the development of a fine-grained business model classification system. Third, previous research has indicated that entry mode choices (i.e. greenfield expansions vs. mergers & acquisitions) can be associated with performance implications of diversifying firms (Lee and Lieberman, 2010). However, we were not able to control for entry mode decisions because this information was not available for many firm-years in our dataset. Future research could focus on entry events into new lines of business and examine how performance implications of business model relatedness are contingent on entry mode decisions. Finally, performance implications of business model relatedness likely depend on differences in the quality of strategy execution. For example, for a firm operating multiple related business models, superior performance is contingent on its ability to exploit cross-business synergy. Our dataset, however, did not allow us to examine the quality of a firm's strategy execution. Future research could address this limitation.

Overall, we encourage future research to focus more on the intersection between the business model and corporate diversification literatures. The combination of these literatures may provide a promising avenue towards extending our understanding of topics that consider business model diversification as a determinant of corporate strategy. Because business models provide means to describe and classify businesses, we hope that examining business model relatedness in addition to industry relatedness will provide a new direction in the literature on business models and corporate diversification.

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Table 1. Descriptive statistics and correlations^a

Variables	Mean	S.D.	1	2	3	4	5	6	7	8
1. Return on sales (ROS)	3.92	2.58		<i>0.24</i>	<i>0.07</i>	<i>0.03</i>	<i>0.06</i>	<i>0.03</i>	<i>0.05</i>	<i>0.13</i>
2. Business model relatedness	0.65	0.29	-0.09		<i>0.06</i>	<i>-0.09</i>	<i>-0.04</i>	<i>-0.02</i>	<i>0.06</i>	<i>-0.10</i>
3. Industry relatedness	0.64	0.29	-0.25	0.24		<i>0.24</i>	<i>-0.04</i>	<i>0.10</i>	<i>0.12</i>	<i>0.26</i>
4. Firm size ^b	22.70	1.29	0.05	0.08	0.17		<i>0.24</i>	<i>0.19</i>	<i>0.30</i>	<i>0.63</i>
5. Firm efficiency ^b	8.56	0.56	0.27	-0.16	-0.07	0.24		<i>0.14</i>	<i>-0.18</i>	<i>-0.02</i>
6. Firm growth	0.09	0.19	0.05	-0.09	-0.03	-0.10	-0.03		<i>-0.05</i>	<i>0.01</i>
7. International diversification	0.40	0.51	0.10	-0.00	0.10	0.36	0.04	-0.01		<i>0.26</i>
8. Industry size in home region ^b	7.89	1.09	-0.07	0.03	0.08	0.46	0.24	-0.03	0.04	

^aN=76 firms. Correlations above |0.08| are significant at $p < 0.05$. Italicized correlations are within-firm correlations, calculated as the deviation of each variable relative to the firm mean. This transformation allows for examination of the correlation between variables within firms over time. The non-italicized correlations are overall Pearson correlations.

^bLogarithm

Table 2. Results of dynamic panel-data regression analysis for return on sales (ROS)

Variables	Model 1	Model 2	Model 3	Model 4a	Model 4b (std. coeff.)
Lag ROS _{t-1}	0.26*** (0.06)	0.19** (0.05)	0.31*** (0.05)	0.27*** (0.05)	0.28*** (0.05)
Business model relatedness		4.41*** (0.70)		2.80*** (0.64)	1.14*** (0.21)
Industry relatedness			2.57* (1.25)	0.56 (1.01)	0.30 (0.31)
Firm size	-1.03** (0.37)	-0.80* (0.33)	-1.17** (0.35)	-0.77* (0.31)	-1.11** (0.35)
Firm efficiency	0.90 [†] (0.49)	0.56 (0.44)	0.83 [†] (0.47)	0.80 [†] (0.43)	1.22** (0.46)
Firm growth	-0.00 (0.36)	-0.17 (0.33)	0.00 (0.35)	-0.12 (0.33)	-0.06 (0.33)
International diversification	0.30 (0.74)	0.11 (0.68)	0.45 (0.72)	0.10 (0.66)	0.83 (0.68)
Industry size in home region	1.79 [†] (1.03)	1.01 (0.93)	2.23* (0.96)	1.52 [†] (0.88)	1.77 [†] (0.93)
Year dummies	YES	YES	YES	YES	YES
Constant	4.34 (8.55)	6.15 (8.16)	3.11 (8.09)	-0.46 (7.88)	3.46 (7.84)
Wald χ^2	50.24***	100.63***	76.87***	99.90***	128.04***
Number of instruments	105	183	182	260	215
Observations	559	554	554	554	554
Number of firms	76	76	76	76	76

[†] $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors are in parentheses.

Table 3. Results of fixed-effects regression analysis for return on sales (ROS_{t+1})

Variables	Model 1	Model 2	Model 3	Model 4a	Model 4b (std. coeff.)
Business model relatedness		1.96*** (0.47)		1.86*** (0.48)	0.55*** (0.14)
Industry relatedness			1.53 [†] (0.78)	1.06 (0.78)	0.31 (0.23)
Firm size	-0.51* (0.25)	-0.67** (0.25)	-0.66* (0.26)	-0.76** (0.26)	-0.76** (0.26)
Firm efficiency	1.02* (0.40)	1.18** (0.39)	1.14** (0.40)	1.25** (0.40)	1.25** (0.40)
Firm growth	-0.44 (0.35)	-0.38 (0.34)	-0.46 (0.35)	-0.40 (0.34)	-0.39 (0.34)
International diversification	0.85 [†] (0.50)	0.79 (0.49)	0.92 [†] (0.50)	0.84 [†] (0.49)	0.84 [†] (0.49)
Industry size in home region	2.32** (0.73)	2.39** (0.72)	2.23** (0.73)	2.32** (0.72)	2.32** (0.72)
Year dummies	YES	YES	YES	YES	YES
Constant	-11.51 [†] (6.05)	-11.09 [†] (5.95)	-9.61 (6.11)	-9.80 (6.03)	-7.93 (6.13)
<i>F</i>	2.68***	3.68***	2.77***	3.58***	3.58***
Within <i>R</i> squared	0.072	0.103	0.079	0.106	0.106
ΔR squared ^a		43.06%	9.7%	47.2%	47.2%
LR-test ^a		20.44***	4.53*	22.60***	22.60***
LR-test ^b				2.17	2.17
LR-test ^c				18.07***	18.07***
Observations	616	616	616	616	616
Number of firms	84	84	84	84	84

[†] $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors are in parentheses. ^aagainst Model 1. ^bagainst Model 2. ^cagainst Model 3.