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A Fuzzy Set Approach to Business Model Design And Strategy

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Abstract

I draw on the configurational approach to explore interdependence and complementarity of business model design themes and competitive strategies in different contexts. Insights from prior research have been inadequate or controversial in trying to explain how the design themes can be configured effectively within and across the business model and strategy dimensions. I use fuzzy set qualitative comparative analysis to investigate high and low performing configurations of 232 publicly traded firms of two types: online businesses and computer technology firms. Interestingly, I find that the absence of cost leadership is a necessary condition for consistent high performance and that the expected high performing combinations of the design themes and strategies do not appear consistently effective. This paper extends current literature on business model design themes and contributes to the debate on business model-strategy relationship. I conclude by proposing that future research should account for the configurational nature of business models and strategies and treat them as a set of interconnected choices rather than investigating their constituting elements in isolation.
ABSTRACT

I draw on the configurational approach to explore interdependence and complementarity of business model design themes and competitive strategies in different contexts. Insights from prior research have been inadequate or controversial in trying to explain how the design themes can be configured effectively within and across the business model and strategy dimensions. I use fuzzy set qualitative comparative analysis to investigate high and low performing configurations of 232 publicly traded firms of two types; online businesses and computer technology firms. Interestingly, I find that the absence of cost leadership is a necessary condition for consistent high performance and that the expected high performing combinations of the design themes and strategies do not appear consistently effective. This paper extends current literature on business model design themes and contributes to the debate on business model–strategy relationship. I conclude by proposing that future research should account for the configurational nature of business models and strategies and treat them as a set of interconnected choices rather than investigating their constituting elements in isolation.

Keywords: business model design; competitive strategy; configuration; fuzzy set qualitative comparative analysis
INTRODUCTION

The configurational approach to studying the strategy-performance relationship is becoming increasingly prominent in strategic management research (Fiss, 2011; Ketchen, Thomas & Snow, 1993; Miller, 1996; Short, Payne & Ketchen, 2008). The configurational approach assumes that organizations are systems of highly interdependent elements that need to be consistently aligned in order to create internal and external fit, which, in turn, leads to superior performance (Doty, Glick & Huber, 1993; Miller, 1992; Siggelkow, 2002), such as when scholars have explored configurations of strategy, structure, and the environment (e.g. Burns & Stalker, 1961; Chandler, 1962; Miles & Snow, 1978; Miller, 1986; Miller & Friesen, 1984; Mintzberg, 1979; Siggelkow, 2001).

While the majority of research in this field has been focusing on explaining the implications of various strategy-structure combinations, we know much less about the consequences of other structural forms of organizations that may have similar fit issues (Yin & Zajac, 2004). For example, a new important unit of analysis has recently emerged in strategic management research and practice: the business model (Zott & Amit, 2013; Zott, Amit & Massa, 2011). The increasing popularity of this construct seems to derive from its universally accepted potential to explain firms’ combined efforts of value creation and value capture (Chesbrough & Rosenbloom, 2002; Massa, Tucci & Afuah, 2016; Teece, 2010). Interestingly, while scholars have still not converged on a unanimous definition of the business model, their insights have inevitably led to configurational thinking. Several studies have considered business models consisting of multiple dimensions and a variety of inter-related characteristics that in sum represent a firm’s architecture of translating an entrepreneurial opportunity into a viable business (Aversa, Furnari & Haefliger, 2015; Afuah,
One of the most promising recent developments in business model research roots in a transactional view according to which firms create value through four different drivers – novelty, efficiency, lock-in, and complementarity (Amit & Zott, 2001), with subsequent work highlighting that in particular novelty seems to matter for firm performance (Zott & Amit, 2007, 2008). In this line of work configurational insights were limited to the observation that trying to create value simultaneously through both novelty and efficiency may turn out to be counterproductive (Zott & Amit, 2007) or that firm performance may be enhanced by combining novelty-centered business models with competitive product market strategies (Porter, 1980, 1985) i.e. cost leadership and differentiation (Zott & Amit, 2008). Further studies have been carried out by other scholars, but these studies have either focused on examining only novelty and efficiency instead of including all four design themes, or they have neglected the strategy dimension (e.g. Brettel, Strese & Flatten, 2012; Kulins, Leonardy & Weber, 2015; Wei, Yang, Sun & Gu, 2014).

While these initial findings have added a considerable amount to our understanding of value creation and value capture, I argue that there is much more to be learned by applying a full configurational perspective to the business model construct. Specifically, I argue that we still know little about how different sources of value creation – or business model design themes (Zott & Amit, 2007, 2008) – can be effectively combined and how they interact with competitive strategies. For example, a high focus on novelty or efficiency may be a necessary, but not a sufficient condition for high performance, and may need to be (predictably) combined with other design themes or competitive strategies to be more effective. On the contrary, a strong focus on all four design themes may be sufficient but not necessary for high performance thus implying potential
superfluous, costly investments made by the firm. Moreover, low performing firms may reveal us patterns of ineffective design combinations. Thus, by exploring varying business model-strategy configurations, we may be able to gain more knowledge about how they may be used to explain and, possibly, predict firm performance. Building on these arguments, I thus propose to study the question of how business model design themes and competitive business strategies work together (in-)effectively in different contexts.

In order to answer this question, I draw from the configurational approach, and in particular the concepts of interdependency (e.g. Rivkin & Siggelkow, 2003; Siggelkow, 2002) and complementarity (Ennen & Richter, 2010; Milgrom & Roberts, 1995). Using a unique manually collected data set from public sources I conduct a large-N fuzzy set qualitative comparative analysis (fsQCA) (Fiss, 2011; Ragin, 2000, 2008) to explore a sample of 232 publicly traded firms of two types; online businesses and manufacturers of electronic computers. A fsQCA approach is appropriate for studying combinations of interdependent and complementary strategies that, depending on their consistency, may or may not lead to a desired outcome (Delbridge & Fiss, 2013; Greckhamer, Misangyi, Elms & Lacey, 2008). QCA is generally a methodology that embraces causal complexity (Misangyi, Greckhamer, Furnari, Fiss, Crilly & Aguilera, 2016) in terms of equifinality (Doty et al., 1993; Gresov & Drasin, 1997; Katz & Kahn, 1966, 1978; Payne, 2006), causal conjectures (Ragin, 1987; Schneider & Wagemann, 2012), and causal asymmetry (Ragin, 2008) – aspects that conventional correlational methods do not account for. I find that the absence of cost leadership strategy is a necessary condition for firms’ high performance and that the expected high performing configurations of design themes and strategies do not consistently lead to high performance. The study contributes to the business model design theory (e.g. Amit & Zott, 2001; Zott & Amit, 2007) and to the literature on the relationship of business model and
strategy (e.g. Massa et al., 2016; Teece, 2010; Zott & Amit, 2008). I conclude by proposing that rather than investigating single business model elements (including design themes) in isolation, irrespective of the definition used, the elements be considered in combinations to account for more real life complexity.

**THEORY**

A company’s business model describes a set of interconnected choices and mechanisms through which it pursues to create value for its stakeholders, and capture some of that value for itself (Casadesus-Masanell & Richart, 2010; Chesbrough & Rosenbloom, 2002; Teece, 2010; Zott & Amit, 2010). In this study, I use the definition of business model provided by Amit & Zott (2001); according to them, business model is “…content, structure, and governance of transactions designed so as to create and capture value through the exploitation of business opportunities”. They (Amit & Zott, 2001; Zott & Amit, 2007, 2008) draw, among others, on transaction cost economics and theories of Schumpeterian innovation to identify four different sources of value creation—so-called ‘design themes’ of the business model: novelty, efficiency, lock-in, and complementarity. For example, companies establishing a novelty-oriented business model focus on product or service innovation and hope to win customers over by providing superior use value. Oppositely, efficiency-oriented companies build transaction-based, scalable business models to remove market imperfections. In particular, if companies focused on taking extreme positions on these two dimensions, these examples already show how combining those two dimensions may not be wise. At the same time, however, one could imagine cases in which an efficiency-oriented business model may require novelty, such as the first-of-a-kind transactional platform. In addition, depending on what novelty or efficiency aspects are particularly salient to management, the
business may be better protected by lock-in—such as by designing positive direct and indirect externalities to customers—as well as by offering complementary services or building a partner network. Thus, the design themes are neither mutually exclusive nor collectively exhaustive, and operate interdependently as they can have lateral or even reciprocal reinforcing effects (Amit & Zott, 2001). Consequently, putting the advantage of theoretical parsimony of having four clean dimensions aside, I propose that business model design best be understood as a toolkit: a set of mandatory, idiosyncratic decisions, which come together to make up a coherent whole. However, for this coherent whole to function, the individual decisions have to be made in accordance with each other.

This logic of interdependence is adequately captured by configuration theory. Configurations are considered “any multidimensional constellations of conceptually distinct characteristics that commonly occur together” (Meyer, Tsui & Hinings, 1993: 1175). This definition is helpful for our understanding of configurations in several ways. First, “multidimensional constellations” implies that several conditions causally linked to the outcome are examined in combinations. For instance, strategy, structure and environment are such dimensions forming a constellation that has been thoroughly studied in the field of management (e.g. Ketchen et al., 1993; Miller, 1988). Second, the multidimensional constellations consisting “of conceptually distinct characteristics” refers to dissimilarity of the causal conditions that determine the outcome. For example, novelty and efficiency as well as firm size and age are clearly distinct conditions and interact with other attributes of a firm differently. Moreover, Zott and Amit (2008) established that novelty and efficiency as business model designs can be distinguished from Porter’s differentiation and cost leadership strategies. Third, the dimensions of the constellations “commonly occur together” entails an assumption that the causal conditions can be frequently observed in real world. While
some constellations may be rare, or even practically impossible, other combinations are more common (see “limited diversity” e.g. Fiss, 2011; Ragin, 2000; Soda & Furnari, 2012).

From a configurational perspective, the question of business model design thus becomes one of identifying (1) a complementary internal configuration that (2) exhibits external fit (Siggelkow, 2002; Venkatraman & Camillus, 1984). First, complementarity constitutes that choices across several dimensions of a configuration are interdependent, and that specific choices will exhibit different levels of positive and negative externalities, or synergy (Milgrom & Roberts, 1995). To increase firm performance, it is up to management to identify a configuration that maximizes synergies, which means that choosing an inferior solution to a specific problem dimension may sometimes be preferred from a systems perspective. At the same time, many potential configurations that lead to the highest level of synergies may simultaneously exist (Gresov & Drazin, 1997). Second, the idea of ’external fit’ (Drazin & van de Ven, 1985; Miller, 1992; Siggelkow, 2001) captures whether the chosen configuration is right given the prevailing external environment. For example, while both the organic and mechanistic organizations are prototypically optimized internal configurations for innovating organizations, the organic organization should be applied in volatile environments, and the mechanistic organization in stable ones (Burns & Stalker, 1961).

To understand how business model configuration contributes to firm performance, I thus propose to explore how varying configurations of the different business model design themes are necessary or sufficient for firm performance in combination with crucial external contingencies. Here, past work points to the crucial importance of three environmental factors: first, firm strategy and the fit of strategy, structure, and action (Porter, 1985; Fiss, 2011; Zott and Amit, 2008). Assuming that firm strategy describes the general idea about how firms hope to extract value, a
fitting business model would represent an implementation in line with that general direction; for example, a novelty-oriented business model seems more fitting to enact a differentiation strategy (Zott & Amit, 2008). In addition, even more extensively than different business model designs, the performance effects of pure and hybrid strategies have been subject to a number of studies in strategic management research (e.g. Cambell-Hunt, 2000; Hill, 1988; Miller, 1992; Porter, 1996; Thornhill & White, 2007), but there are still many unanswered questions. Second, a firm’s size has been widely used to capture its ability to acquire and exploit resources efficiently (e.g. Burns & Stalker, 1961; Donaldson, 1982; Miles & Snow, 1978; Pugh, Hickson, Hinings & Turner, 1968). Based on prior research, large size could thus be a better fit with efficiency-centered business models and cost leadership strategy. Finally, most of the insights that we currently have into the topic of business models draws from work on electronic businesses (Zott & Amit, 2011). Thus, in order to test the generalizability of existing theorizing around business models, I will further explore as to whether being an e-business or not changes what is an internally and externally fitting configuration.

DATA AND METHOD

General research approach

I use fuzzy set qualitative comparative analysis (fsQCA) (Fiss, 2011; Ragin, 2000, 2008) to study 232 publicly traded Internet and technology firms’ configurations of business model designs and competitive strategies in different contexts. In this study I use fsQCA for several reasons. First, rather than estimating coefficients or bi-variate interactions on a correlational basis, I aim to detect effective (high performing) and ineffective (not high and low performing) combinations of multiple conditions (Ragin & Fiss, 2008; Rihoux & Ragin, 2009). QCA generally is a suitable
analytical method for problem statements involving causal complexity as it accounts for 1) *equifinality* i.e. the assumption that multiple combinations of varying conditions may lead to the same outcome, 2) *conjunctural causation* i.e. outcomes are often results of the interdependence of two or more conditions, and 3) *causal asymmetry* meaning that causally relevant conditions may be relevant for the presence of an outcome (e.g. high performance) but not for its absence (e.g. not high performance; Misangyi et al. 2016). Second, QCA allows for identifying necessary and sufficient conditions for desired outcomes (Ragin, 1987). For example, Misangyi and Acharya (2014) found that the presence of CEO stock options was a necessary governance mechanism for firm high performance, because it was present in all consistently high performing configurations. In such a case the necessary condition can be excluded from further analysis and hence the overall complexity reduced. Third, identifying core and peripheral conditions and thus understanding the strength of causal relationships between the conditions and the outcome is possible when using fsQCA. The concepts of causal core, causal periphery, and neutral permutations (i.e. changing peripheral elements around the core element(s) without influencing the overall effectiveness of that specific configuration) allow for generating deeper insights on equifinality (Fiss, 2011). Fourth, after having been developed and used in particular in sociology and political science, fsQCA has become an established method also in management research. It has been both used across various fields in strategic management (e.g. Bell, Filatotchev & Aguilera, 2014; Crilly, Zollo & Hansen, 2012; Garcia-Castro & Francoeur, 2014; Greckhamer, 2016; Misangyi & Acharya, 2014) as well as developed and tested as a method (e.g. Fiss, 2007, 2011; Fiss, Sharapov & Cronqvist, 2013; Greckhamer et al., 2008; Greckhamer, Misangyi & Fiss, 2013). For example, Greckhamer, Misangyi, Elms and Lacey (2008) concluded that QCA is a viable method in strategic management research and provides substantial benefits especially when examining potential
interdependencies and complexity. Fiss (2011) showed that fsQCA demonstrates several potential advantages over correlational interaction methods, cluster analysis, and deviation scores, when building typological theories with causal core and periphery. For a full review of management studies using QCA, please refer to Misangyi and colleagues (Misangyi et al. 2016).

**Sampling**

I use data on a sample of 232 publicly traded firms of which 157 were so called e-businesses and 75 were operating in the computers and office equipment sector. I chose to study e-businesses and computer technology firms since the theory of business model design themes (Amit & Zott, 2001; Zott & Amit, 2007, 2008) was originally developed and later tested in the field of electronic business. Yet, rigorous examination of potential differences of the business models and strategies between e-businesses and non-e-businesses has not been carried out. Hence, to advance theory I also chose to study computer and office equipment industry since most of the companies in this sector are manufacturers of computers or computer-related technology and because their strategies and business models typically differ across firms, which makes them interesting for studies concerning firm performance. Moreover, computers and related industries involving advanced technology have been much used in strategic management research (e.g. Brown & Eisenhardt, 1997).

The nature of the analysis as well as the performance data used in this study implied three central sampling criteria. First, to obtain relevant information on the business models and strategies, availability of data was critical for the inclusion of a firm. Typically, data on large or otherwise well-known firms is more available and easier accessible. In addition, given that I measure firm performance using Tobin’s Q as the outcome variable, the firms needed to have a market capitalization value and thus be publicly traded. Second, the firms should operate with a
relatively clear main business model, which in the context of this study enables to yield more meaningful results. Yet, large firms typically have diversified businesses and the inclusion of such firms would substantially bias the analysis. Therefore, I carefully assessed the business models of all potential sample firms and chose only firms that generated a clear majority of their revenues by means of one principal business model. For example, although Google was involved in several businesses in 2014, which is the target year of my analysis, it still yielded roughly 90% of its revenues via search engine business – almost all other services such as Gmail and Hangouts were free of charge. Third, as I also wanted to explore potential differences in the configurations and performance of e-businesses and non-e-businesses, I first sampled for former and then for latter.

The sampling of the e-businesses followed three steps. First, I started the process by defining what an e-business is. Although almost every firm has their own website in 2014 and perhaps they even utilize online channels to generate more sales, e-businesses deal mainly with informational products and services mostly without any physical manufacturing activities. Similar to Zott and Amit (2007, 2008), I distinguished e-businesses from non-e-businesses by the extent to which they exploited online channels. When a firm generated at least estimated 50% of its revenues through online sales, I considered it an e-business. If the firms did not report this in the public, I relied on subjective assessments based on websites such as Investsnips.com and discussions with colleagues or the employees of such firms. Second, I looked for e-businesses listed on at least one of the following stock exchanges: NYSE, NASDAQ, London, Paris, Frankfurt. I did so by scanning through all the companies, and especially those included in a technology or Internet index, followed by a first assessment of the suitability of the firms. In this way I found 284 firms that I considered e-businesses. Third, while in the second step I made a first assessment of the firms’ inclusion in my sample as an e-business, I now needed to assess the appropriateness of the firms’
business models. Since I did not sample only young or small firms (cf. Kulins et al., 2015; Zott & Amit, 2007, 2008) in order to make further contributions to the current literature, I had to exclude several firms that had too diversified business models. The final sample size of e-businesses counted 157 firms.

I defined the sample of the non-e-businesses by examining all publicly traded firms with the SIC code 357 (computer and office equipment) included on at least one of the above-mentioned five international stock exchanges. I downloaded the list of these firms on ORBIS and the results yielded 116 firms of which 41 were excluded from the sample due to their diversified business models or missing performance data. The final sample with both types of firms then included 232 cases. For a fuzzy set qualitative comparative analysis, this sample size is large enough when the analysis comprises eight causal conditions (e.g. Fiss, 2011), which was the goal in this study.

Data

Outcome variable. As I aimed to find out which combinations of business model designs and strategies lead to high and low performance, I measured performance by using the firms’ Tobin’s Q in the year 2014 (Brainard & Tobin, 1968; Tobin, 1969). Opposite to merely realized (such as RoA or EBIT%) or perceived (such as market capitalization) performance measures, Tobin’s Q combines these two and is forward looking (Ceggangoli, 2009; Visnic, Weingarten & Neely, 2016). Here, it is calculated as the daily average ratio of a firm’s market capitalization and total assets. If Tobin’s Q is greater than 1.0, the firm’s market value is greater than the value of its assets, and vice versa. I obtained the measures from ORBIS database. Similarly to Misangyi and Acharya (2014), I standardized the Tobin’s Q of each sample firm by their industry at the two-digit SIC level. I used ORBIS to derive both the firm-specific and the respective industry data.
**Business model design, strategy, and firm size.** I collected the data on business model designs and competitive strategies by using slightly modified operationalizations developed by Zott and Amit (2007, 2008). Each construct comprises a set of statements (survey items) that were assessed along a five-point Likert scale ranging from totally disagree (1) to totally agree (5). **Novelty** of the business models attracts customers and partners and is typically a result of innovative activity. Novelty was measured using eight statements such as “The business model links participants to transactions/business in novel ways”, “Incentives offered to participants are novel”, and “The company offers new combinations of products, services, and information”. **Efficiency** typically results in rapid growth as value is created through simple transactions. I used nine items to assess it such as “The business model enables fast transactions”, “The business model enables standardization/low number of errors in the execution of transactions”, and “The business model is scalable”. **Lock-in** refers to the customers’ and other business model participants’ engagement to repeat transactions. It was measured by four items such as “Personalization/Individual offerings and recommendations are important and effective in attracting and maintaining participants”, “The customers of the company have high switching costs due to technology”, and “The participants have high switching costs due to learning investments”. **Complementarity** is the value created by additional offerings or channels through which to engage to transactions. It was measured using eight items such as “Cross-selling of products/services is important for the business model”, “The business model enables complementarities between the company's technologies and technologies provided by others”, and “The company uses online and offline channels/sales as complementarities”. **Differentiation** strategy denotes a firm’s pursuit of competitive advantage over its competitors by being unique and offering something what competitors do not offer. Differentiation was measured by four items such as “The company emphasizes new product
development, innovation and R&D activity”, “Branding and advertising are very important as part of the company's marketing strategy”, and “The company emphasizes unique product/service features”. Similar to differentiation, cost leadership represents a strategy for achieving competitive advantage, but cost leadership refers to actions that aim to reduce costs along the firm’s value chain. It was measured by three items, which were “The company tries to minimize product-related expenditures, in particular through process innovations, standardization, and/or low material costs”, “The company emphasizes economies of scale and scope with products and services”, and “The company strives to charge lower prices than its competitors”. All survey items used for this study can be found in the appendix. Firm size was measured by the number of employees, which I obtained from ORBIS or the firms’ annual reports.

**Data collection process and validation**

A considerable proportion of the survey items were based on a relatively subjective assessments, due to which, similarly to Zott and Amit (2007, 2008) and MacCormack, Verganti and Iansiti (2001), I assigned students writing their master’s thesis under my supervision, to collect the same data for the sake of cross-validation. All participating students were trained for the data collection and provided with in-class training as well as written guidance and instructions in order to ensure a required quality standard. The students also used the data in their own master’s thesis, which motivated them to properly investigate the assigned firms’ business models and strategies. The data on the sample firms’ business models and strategies in 2014 were collected between April 2015 and November 2016. We collected the data independently using various public sources such as the firms’ annual reports and other SEC filings, analysts’ reports, industry analyses, the firms’ websites utilizing tools such as the Wayback Machine and Google Cache, press releases, and news
articles. Subsequently, all data points were compared and discussed with the students to derive a consensus thus reaching an agreement of 100% on the assessments.

In order to evaluate validity and reliability of the constructs I ran exploratory factor analyses and calculated Cronbach alphas. After having dropped problematic items due to the results of the factor analyses the Cronbach alphas yielded 0.86 for novelty (eight items), 0.87 for efficiency (nine items), 0.71 for lock-in (four items), 0.82 for complementarity (eight items), 0.90 for cost leadership strategy (three items), and 0.79 for differentiation strategy (four items). Hence, all measures satisfy the benchmark of 0.7 (Nunnally, 1978). Subsequently, I calculated an average score without weights for each measure per firm, which I then used in the fuzzy set analysis.

**Calibration**

Prior to a fuzzy set analysis an important step is to calibrate thresholds for the set membership in each causal condition (Ragin, 2000). For the calibration of any variable the researcher is required to have theoretical or substantial knowledge of the cases for being able to define meaningful thresholds (Schneider & Wagemann, 2012). For the calibration of high performance, I followed Misangyi and Acharya (2016) and Fiss (2011) and set the standardized 75th percentile of the industry’s Tobin’s Q as a threshold for the set membership of being fully in. The cross-over point was set at the 62.5th percentile, while the 50th percentile constituted the threshold for being fully out of the set of high performing firms.

All four business model design themes and two competitive strategies were calibrated in a similar way. Since most of my measures had more than three items of which each was assessed along a Likert scale ranging from 1 to 5, the minimum and maximum aggregated values of the single constructs rarely, if ever, reached even close to 1 or 5. Therefore, I set the thresholds at 4 (fully in), 3 (cross-over point), and 2 (fully out). Often, such as here, there is little or no theoretical
or substantial knowledge about meaningful thresholds that apply in socially complex phenomena. Hence, scales and other similar measurement instruments can provide practical help for calibration (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). Furthermore, scale-based calibration has become an established way for setting thresholds for set memberships (Misangyi et al, 2016).

In prior research, firm size has been an important measure for organizational theorists. In most studies it has been measured by the number of employees. For instance, Fiss (2011) used a categorization provided by European Union and ranging from 10 (fully out of the set of large firms) to 250 (fully in the set of large firms). Since my sample in the current study consists of publicly traded firms from 28 employees to over 300,000 employees the average being over 10,000 employees, I decided not to use existing calibrations but rely on my own knowledge derived from discussions with colleagues and practitioners. Subsequently, I decided to set the threshold for being fully out of the set of large firms at 250 employees, the cross-over point at 1,000 employees, and the full membership threshold at 10,000 employees.

Lastly, e-businesses were coded in a crisp-set manner and obtained a membership score of 1 if at least 50% of their revenues were generated online (Zott & Amit, 2007, 2008) and otherwise 0 indicating the firms’ membership in the set of non-e-businesses.

Analytical procedures

After the calibration procedure, fsQCA proceeds in three steps. First, the researcher generates a truth table that displays all theoretically possible combinations of the causal conditions used in the analysis (Ragin, 1987, 2000). In addition, the truth table shows how the studied cases distribute across the combinations as well as their consistency with regard to the desired outcome. Second, two further thresholds for the outcome of the analysis are set, namely consistency and frequency thresholds. While consistency refers to the degree to which a combination of causal conditions
produces an outcome in question (e.g. high performance), frequency depicts simply the number of cases (sample firms) that follow a certain configuration. Consistency is recommended to set to at least 0.75 (Ragin, 2008), but I followed Fiss (2011) and set it at 0.80 to avoid inconsistencies in the analysis. I set the frequency threshold at two cases per configuration and was thus able to include 83% of my sample firms. In the third step, the researcher makes assumptions regarding the counterfactual analysis that results due to limited diversity (Soda & Furnari, 2012; Ragin, 2000) meaning that all theoretically possible configurations are not observed in the real world. I therefore assumed that the presence of each business model design theme contributes to firms’ high performance. In turn, for the other four conditions used in this study, differentiation, cost leadership, size, and e-business, I assumed a contribution to firms’ high performance neither through their presence not absence.

RESULTS

Descriptive statistics and correlations

Table 1 illustrates descriptive statistics and correlations between the measures used in this study. There are two interesting points. First, the table shows that the measures related to business model design and strategy correlate with each other at a significant level. As would be expected, the correlation between novelty and differentiation is higher than the correlation between novelty and cost leadership. In turn, efficiency is stronger associated with cost leadership than with differentiation. Yet, none of the correlations is negative or even low, but they are rather relatively strong and significant. In addition, lock-in and complementarity are also correlated with both strategies, however, interestingly, lock-in is negatively associated with both efficiency and cost leadership. The second interesting point are the correlations of the design themes and strategies...
with the actual Tobin’s Q and the standardized Tobin’s Q. These correlations are low to almost zero – in some of the instances even negative. Only the correlations with efficiency and cost leadership are at a significant level.

High performing configurations

The results of the fsQCA reveal four high performing configurations (first-order equifinality) of which the fourth one allows for changing peripheral conditions thus leading to two different subtypes (second-order equifinality). This phenomenon is also known as neutral permutation (Fiss, 2011). The overall solution consistency is 0.83 meaning that 83% of the sample firms following one of the high performing configurations also show high performance. In turn, the overall solution coverage is 0.26 referring to the fact that these five configurations represent 26% of all high performing configurations. The high performing configurations are presented in Table 2.

Configuration 1 consists of large e-businesses that are characterized by an efficiency-centered business model design and lack of strategy. Interestingly, the absence of both strategies are also core causal conditions together with being an e-business and the absence of complementarity-based business model design. Moreover, while efficiency is present and complementarity absent, it does not matter whether novelty and lock-in are present or absent. Firms following this configuration are e.g. LivePerson Inc. that offers products and solutions for online messaging and marketing. Configuration 2 refers to novelty- and efficiency-based e-businesses, such as TrueCar
Inc. and Coupons.com. Also these high performing firms have no proper strategy, but they are also small unlike the firms in the first configurations. Configuration 3 seems to combine three of the design themes excluding novelty. These firms follow differentiation strategy and are e-businesses of any size, such as Zendesk Inc. and NetSuite Inc. Configuration 4a includes novelty-based non-e-businesses such as Anoto Group and A10 Networks, while configuration 4b includes Mitek Systems and Absolute Software, and is just slightly different from configuration 4a.

Overall the findings reveal two interesting aspects. First, the combinations of the business model design themes and competitive strategies were somewhat unexpected. For example, it could be expected that novelty combines effectively with differentiation strategy and that efficiency works well with cost leadership. However, this is not the case. On the contrary, there are no clear patterns how they work effectively. Moreover, and interestingly, configurations including both novelty and efficiency also appear to be effective sometimes. Second, cost leadership is absent in each high performing configuration and is thus a necessary condition for high performance meaning that consistent high performance cannot be achieved by pursuing cost leadership strategy. Moreover, in the first two configurations it seems that the high performing firms are not pursuing any of the two strategies, which is surprising in particular because the first configuration works only for large firms.

**Not high and low performing configurations**

As causal asymmetry implies that the configuration of causal conditions leading to the presence of an outcome (e.g. high performance) is not necessarily the inverse of the configuration that produces the absence of the same outcome (Misangyi et al., 2016; Ragin, 2000), I analyzed configurations leading to not high and low performance. The analysis is similar to the main analysis above, but here I use different outcome definitions. First, I took the negation of high performance and ran the
analysis. Then, I re-calibrated the outcome variable Tobin’s Q to correspond to the 25th, 32.5th, and 50th percentiles of the lowest performing firms and ran the analysis. I did not identify any configuration that would consistently lead to not high or low performance. The consistency levels were much lower from the recommended 0.80 or 0.75. This indicates that there are many ways to underperform and that the causal conditions used in this study cannot plausibly explain the sample firms’ bad performance.

Robustness tests

I ran further analyses to ensure robust results. First, I ran the same analysis with different thresholds for set memberships. I re-calibrated the thresholds of all causal conditions but “e-business” and “size” by changing them from 4.0 to 4.25. The results remain relatively unchanged – mainly neutral permutations take place and the number of sub-configurations change (unsubstantially), but the same observed core elements and the interpretation of the solutions persist. Second, although I carefully considered what assumptions to make and am convinced about not changing them for the actual investigation, I ran the same analysis with different assumptions about the causal conditions’ contribution to high performance. Surprisingly, the results still appeared relatively unchanged. For example, the absence of cost leadership strategy always remained a necessary condition for firms’ high performance.

DISCUSSION

Contributions of the study

In this paper, I had set out to extend the strategy literature on business models by applying a full configuration perspective. Following the definition of business models as interconnected activity
systems, I enquired whether business model design themes, individually, conjointly, and matched with strategy, allowed firms to achieve above average or low performance. I applied fsQCA to a set of e-businesses and non-e-businesses and uncovered several surprising combinations, which allow me to make three contributions to the strategy literature.

First, my findings clearly highlight how the activity systems embedded in business models are to be considered separately from business strategy. Partly in contrast to Fiss (2011), who finds consistency between the Miles and Snow typology (1978) and business strategy, I find no clear combinations between business strategies aimed at generating above-average performance and the activity systems chosen to enact those. In particular, I find combinations of differentiation strategies with or without novelty, or even with efficiency orientation, which would be traditionally associated with a cost leadership focus (Porter, 1980, 1985; Zott & Amit, 2008). Thus, there seems to be equifinality even in how strategies can be enacted to achieve the same level of (high) performance. Intriguingly, my findings also suggest that low cost strategies are generally ruling out above-average performance, yet that may be an artifact of both the industry as well as the time period I observed.

Second, I contribute to the burgeoning work on business models. While Amit and Zott (2001) identified four value drivers only novelty and efficiency have been studied rigorously mainly due to parsimony and theoretical reasons (see e.g. Brettel et al., 2012; Zott & Amit, 2007, 2008; Wei et al., 2014). Only a very few studies (e.g. Kulins et al. 2015) have included all four design themes, yet no study has looked at them through a configurational lens so far. In doing so, I uncover that, different to initial assumptions on their incompatibility (Zott & Amit, 2008), high-performing configurations exist that bring supposedly incommensurable dimensions – in particular novelty and efficiency – together. Yet, there may be a relatively simple explanation for the effectiveness
of simultaneous value creation through novelty and efficiency. Based on the definition of novelty in terms of transaction-related value creation, and the survey items used to measure it, novel business models do not exclude any of the other design themes. In fact, a novel business model may be novel, because it involves a new, more efficient transaction design. Besides, e-businesses are inherently efficient as they deal with information rather than goods or services. Yet, this does not mean that they are also efficiently managed entities, such as mechanistic organizations (Burns & Stalker, 1961), because efficiency here (in the context of business models) refers to the content, structure, and governance of transactions. Moreover, e-businesses are a relatively new phenomenon, and the rapidly developing Internet-based technologies continuously enable new ways to create and capture value by means of novel designs of transactions. Therefore, novelty and efficiency can simply occur simultaneously, but similar to the argument of Miles and Snow (1978), I argue that the combination can be very effective but that it is difficult to maintain over a longer period of time as it would require innovations in the business model (see e.g. Amit & Zott, 2012; Casadesus-Masanell & Zhu, 2012).

In addition, I find how the presence or absence of lock-in and complementarity elements can further foster performance, even highlighting a particular configuration solely building on those two dimensions, and excluding novelty. This suggests a potential for equifinality in business model design for beyond what is currently considered in academic work. Rather, my findings point to the usefulness of current practitioner tools in experimenting with widely different configurations of business models (Osterwalder & Pigneur, 2010), as long as these clearly enable the business model designer to visualize and account for potential interdependencies across design choices and value dimensions. Additional work scrutinizing these issues may further draw from the extended scales on business model design dimensions (see Amit & Zott, 2001) I presented.
Third, the current study is also an attempt to extend the boundary conditions of the business model design theory. So far the theory has mainly been applied in and most of the insights we have on business models are from the e-business field as the Internet and related technologies have enabled more and more novel ways to create and capture value (Zott et al., 2011). In my analysis I include non-e-businesses whose offering involves manufacturing or services, such as consulting. I also compare these with the e-businesses’ configurations and find that there are some similarities and some differences. Most notably, while efficiency appears vital for e-businesses’ performance, none of the four design themes alone is necessary to lead to high or low performance. In addition to extending the theoretical boundaries by examining firms that are not only e-businesses, I also investigate firms with a greater spectrum in terms of age and size. Prior studies (e.g. Kulins et al., 2015; Zott & Amit, 2007, 2008) have sampled e-businesses that have recently gone through an initial public offering (IPO) to ensure that the sample firms have relatively simple business models that are easier to analyze than the business models of large and complex conglomerates. While this is understandable due to the potential bias related to measurement, there are large established firms whose business models are relatively simple and that do not represent the same high level of measurement bias as firms with complex business models. Thus, this study increases the explanatory power of the theory and shows that also large and more established firms can be examined by means of the theory and its measurement instruments. In addition to this I use slightly modified and a reduced number of the originally developed survey items to collect data on the business model design themes (Zott & Amit, 2007). I modified the exact questions for the sake of understandability and removed ones that were either showing no or little variance and those that I found redundant. In addition, I developed survey items for lock-in and complementarity on my own as these were not available in the previous work. Having done this, I hope to improve the
current measurement tools for business model designs and thus provide help for future studies in this field.

**Conclusion**

By studying business model design themes and competitive strategies in different contexts I aimed to detect theoretically and practically meaningful configurations leading to high and low performance. In addition, this paper attempts to advance our understanding of the configurational nature of business models and sheds light on their internal and external interdependencies and complementary relationships. Hence, I contribute to the extant body of work by providing insights into high and low performing business model–strategy configurations and propose that business models should be not only viewed but also treated as multidimensional constellations of highly interrelated elements that, if internally and externally consistent, lead to high performance. Consequently, with this study I hope to advance research on business models and strategies as well as open up new avenues for further theory development.

The study also has limitations. One is related to sample bias due to selection and survival bias. E-businesses are not as easy to define anymore as it was maybe 20 years ago. Thus, the line between e-businesses and non-e-businesses is blurred. This may have made the sample firms being too different from each other. However, at the same time this may be an advantage for the study since variance among the business model and strategy dimensions was desired. Moreover, it is too early to make assumptions of the long-term performance of the firms and it may be that some of them have already or will exit the business in the near future, which would imply bias for the analysis. Yet, I collected performance data on not only 2014 but also 2015 to check whether the performance of any of the sample firms had significantly changed. A few of them had been
acquired and a few of them had gone private, but for the great majority the performance remained at the same level.

The study also raises questions that can be addressed by future research. For instance, it would be interesting (and important) to know why the absence of cost leadership appears to be a necessary condition for high performance. This could be further investigated with new samples including firms in other industries. Moreover, due to the absence of cost leadership in all high performing configurations, it was not possible to see how the strategies would work simultaneously. It would be further interesting to examine how the strategies combine, if at all, in the presence of other activity systems.
REFERENCES


# APPENDIX

Table 1. Descriptive Statistics and Correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
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<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>8</th>
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<td></td>
<td></td>
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<td>1.00</td>
<td></td>
<td></td>
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<td>2. Efficiency</td>
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<td>1.00</td>
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<td>3. Lock-in</td>
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<td>4. Complementarity</td>
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<td>5. Differentiation</td>
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<td>6. Cost leadership</td>
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<td>8. E-business</td>
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<td>9. Tobin's q</td>
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<td>10. Standardized Tobin's q</td>
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<td>-0.06</td>
<td>0.03</td>
<td>0.97</td>
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*Correlations of 0.13 or higher are significant at $\leq 0.05$. 
Table 2. Configurations for achieving high performance\textsuperscript{a}

<table>
<thead>
<tr>
<th></th>
<th>Solution</th>
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<td><strong>Business model</strong></td>
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<tr>
<td>Efficiency</td>
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</tr>
<tr>
<td>Lock-in</td>
<td>●</td>
</tr>
<tr>
<td>Complementarity</td>
<td>●</td>
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<tr>
<td><strong>Strategy</strong></td>
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<tr>
<td>Differentiation</td>
<td>●</td>
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<tr>
<td>Cost leadership</td>
<td>●</td>
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<tr>
<td><strong>Context</strong></td>
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<td>Large size</td>
<td>●</td>
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<tr>
<td>E-business</td>
<td>●</td>
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</table>

| Consistency            | 0.83     | 0.77     | 0.83     | 0.87     | 0.86     |
| Raw Coverage           | 0.06     | 0.06     | 0.13     | 0.07     | 0.08     |
| Unique Coverage        | 0.02     | 0.02     | 0.09     | 0.01     | 0.01     |

\textsuperscript{a}Black circles indicate the presence of a condition and white circles with an X indicate its absence. Large circles indicate core conditions; small circles indicate peripheral conditions. Blank spaces indicate “Don’t care”.

Overall Solution Consistency 0.83
Overall Solution Coverage 0.26
APPENDIX B: Survey items (1/2)

| Novelty 1 | The company offers new combinations of products, services, and information |
| Novelty 2 | The company's business model brings together new participants (e.g. sellers/suppliers, information or content providers/partners, customers) |
| Novelty 3 | Incentives offered to participants are novel (e.g. customers can create content, developers can design own features) |
| Novelty 4 | The business model links participants to transactions/business in novel ways |
| Novelty 5 | The company claims to be a pioneer with its business model |
| Novelty 6 | The company has continuously introduced innovations in its business model |
| Novelty 7 | The company was the first one to introduce this kind of a business model |
| Novelty 8 | Overall, the company's business model is novel |

| Efficiency 1 | Transactions are simple from the user's point of view (e.g. no big hassle, easy to configure purchase, easy to find information) |
| Efficiency 2 | The business model enables fast transactions (information search time, processing time, delivery time etc.) |
| Efficiency 3 | The business model enables standardization/a low number of errors in the execution of transactions |
| Efficiency 4 | Costs for participants in the business model are reduced (i.e., marketing and sales costs, transaction-processing costs, communication costs, etc.) |
| Efficiency 5 | The business model is scalable (i.e. can handle small as well as large number of transactions without a larger change of costs) |
| Efficiency 6 | The business model enables participants to make informed decisions |
| Efficiency 7 | Access to large range of products, services, information, and other participants is provided |
| Efficiency 8 | Transactions are transparent: flows and use of information, services, goods can be verified (by participants) |
| Efficiency 9 | The business model, overall, offers high transaction efficiency |

| Lock-in 1 | Personalization/Individual offerings and recommendations are important and effective in attracting and maintaining participants (customers and partners) |
| Lock-in 3 | The customers of the company have high switching costs due to technology (e.g. dominant design) |
| Lock-in 4 | The participants (customers & other partners) have high switching costs due to learning investments (how the business model and products/services work) |
| Lock-in 5 | The participants (customers and other partners) have high switching costs due to specialized assets they need in order to "use" the business model |
APPENDIX B: Survey items (2/2)

Complementarity 1  The company offers lots of complementary products, services, and information (e.g. after-sales services (=vertical), one-stop shopping (=horizontal))
Complementarity 2  The participants (partners, customers) of the company's business model offer complementary products, services, and information
Complementarity 3  Cross-selling of products/services is important for the business model
Complementarity 4  The partners have incentives to develop co-specialized resources
Complementarity 5  The company uses online and offline channels/sales as complementarities
Complementarity 6  The partners benefit from jointly performed activities of participants (e.g. supply chain integration)
Complementarity 7  The business model enables complementarities between the company's technologies and technologies provided by others
Complementarity 8  Overall, the bundling of complementary products/services is important to the business model

Differentiation 1  The company emphasizes new product development, innovation and R&D activity
Differentiation 2  The company emphasizes growth by acquiring, or merging with R&D/technology intensive firms
Differentiation 3  Branding and advertising are very important as part of the company's marketing strategy (i.e. they invest lots of resources in it)
Differentiation 4  The company emphasizes unique product/service features (quality, reliability, functionality, materials, "greenness" etc.)

Cost leadership 1  The company tries to minimize product-related expenditures, in particular through process innovations, standardization, and/or low material costs
Cost leadership 2  The company emphasizes economies of scale and scope with products and services
Cost leadership 3  The company strives to charge lower prices than its competitors