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**WHAT DRIVES BUSINESS MODEL ADAPTATION?
THE IMPACT OF OPPORTUNITIES, THREATS AND STRATEGIC ORIENTATION**

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WHAT DRIVES BUSINESS MODEL ADAPTATION?

THE IMPACT OF OPPORTUNITIES, THREATS AND STRATEGIC ORIENTATION

Abstract

Business models change as managers not only innovate business models, but also engage in more mundane adaptation in response to external changes, such as changes in the level or composition of demand. However, little is known about what causes such business model adaptation. We employ threat-rigidity as well as prospect theory to examine business model adaptation in response to external threats and opportunities. Additionally, drawing on the behavioural theory of the firm, we argue that the past strategic orientation of a firm creates path dependencies that influence the propensity of the firm to adapt its business model. We test our hypotheses on a sample of 1,196 Norwegian companies, and find that firms are more likely to adapt their business model under conditions of perceived threats than opportunities, and that strategic orientation geared towards market development is more conducive to business model adaptation than an orientation geared toward defending an existing market position.

Introduction

The business model has become a novel unit of analysis in management research (Zott, Amit & Massa, 2011). Although there is no generally agreed upon definition, many contributions to the literature define it in terms of the firm's value proposition and market segments, the structure of the value chain required for realizing the value proposition, the mechanisms of value capture that the firm deploys, and how these elements are linked together in an architecture (cf. Linder & Cantrell, 2000; Magretta, 2002; Morris, Schindehutte & Allen, 2005; Teece, 2010; Foss & Saebi, 2015; Wirtz, Pistoia, Ullrich & Gottel, 2015). We adopt this definition in the following. Additionally, Teece links the business model to top management cognition by suggesting that a business model reflects "management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit" (Teece 2010, p. 172). Teece's notion of a hypothesis is an apt metaphor, because it draws attention to the dynamics of business models: As scientific hypotheses confront data, business models are subjected to the market test. Just as scientific hypotheses may need to be changed or even rejected after confronting data, business models need to be modified in face of external discontinuities and disruptions.

However, in spite of recent strides forward in the understanding of the drivers, processes, and facilitators of business model change (notably Achtenhagen, Melin, & Naldi, 2013; Andries, Debackere, & Looy, 2013; Bohnsack, Pinkse, & Kolk, 2013; McNamara, Peck, & Sasson, 2013; Mason & Leek, 2008; Andries & Debackere, 2006, 2007; Willemstein, Valk, & Meeus, 2007), there is still little knowledge of how firms adapt their business models in response to external threats and opportunities. This is problematic because a contingency perspective would suggest that the fit between the firm's business model and its environment may influence profitability (Lawrence & Lorsch, 1967; Galbraith, 1973, 1977), and that timely response may be important.

The failure to adapt business models on time can occur for two main reasons. First, managerial cognition, in particular the interpretation of changes in the environment, can play a critical role in shaping organizational responses (Barr, 1998; Barr, Stimpert & Huff, 1992; Ginsberg & Venkatraman, 1995; Tripsas & Gavetti, 2000). Still, research is divided on whether the negative (i.e., a perceived threat) or positive (i.e., a perceived opportunity) framing of events is more likely to motivate organizational response. Proponents of threat-rigidity theory contend that perceptions of threat encourage managers to rely on existing routines, while perceptions of opportunity induce more risk-taking behaviour (Dutton & Jackson, 1987; Staw, Sandelands & Dutton, 1981). Interestingly, prospect theory makes exactly the opposite predictions: Under perceptions of threat, managers are more motivated to take risky action than under favourable conditions (Kahneman & Tversky, 1979; Barberis, 2013). Additionally, research also indicates that a firm's strategic orientation as it emerges from past experience, solutions and heuristics can result in path dependencies that influence organizational change and adaptability (Day, 1994; Gatignon & Xuereb, 1997; Lant & Mezias, 1992). In contrast, firms and managers that are oriented towards *continually* finding and exploiting new market opportunities might be more perceptive and better equipped to adapt their business model in face of emerging threats and opportunities than might firms with a more defensive posture (Teece, 2007).

We offer the following contributions in this study. First, reviewing extant literature on business model dynamics, we identify important drivers, processes, and facilitators of business model adaptation. Second, we examine to what extent established theories of organizational and strategic adaptation described by the threat-rigidity hypothesis (Staw et al., 1981) and prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) are able to predict business model adaptation. This is an important exercise, as we currently lack a strong theoretical foundation for understanding business model dynamics. Third, we test our hypotheses by examining the effects of the recent financial recession

on the propensity of firms to adapt their business models in the face of perceived threats and opportunities. We use the financial crisis as a natural experiment, which warrants a causal interpretation of our results, albeit a very cautious one. As Kitching, Blackburn, Smallbone and Dixon (2009, p.12) point out, “there is no single ‘recession effect’ for businesses, nor consequently any particular ‘best way’ to adapt applicable to all businesses”. Hence, business model adaptation may not be a viable option for all firms. In this regard, we offer empirical evidence on the contingent role that a firm’s strategic orientation plays in influencing whether or not a firm is likely to adapt its business model. Fourth, this study is one of the very few large-N empirical studies of business model dynamics. Specifically, we test our hypotheses on a sample of 1,196 Norwegian companies surveyed in 2010.

Theoretical Background

Business models and business model adaptation

Business models have become an influential new unit of analysis in management research. However, the literature has, like many other emerging fields, been characterized by conceptual proliferation. Thus, Shafer, Smith and Linder (2005) surveyed up to twelve different definitions of business models in established publications during 1998–2002, which together produced a list of forty-two different business model components. Recent reviews indicate that as interest has kept growing, the discrepancies in the use of constructs, definitions and operationalizations continue to plague the field (cf., Zott, Amit & Massa, 2011; George & Bock, 2011; Foss & Saebi, 2015). However, it is also the case that many contributions converge on a definition that stresses the following elements as necessary parts of the definition of a business model: (1) the firm’s value proposition, (2) the market segments it addresses, (3) the structure of the value chain, which is required for realizing the value proposition, (4) the mechanisms of value capture that the firm deploys, and (5) the often firm-specific ways in which

these elements are linked in an architecture (cf. Linder & Cantrell, 2000; Magretta, 2002; Morris et al., 2005; Casadesus-Masanell & Ricart, 2010; Teece, 2010; DaSilva & Trkman, 2013; Wirtz et al., 2015).

Increasingly, the literature has been moving from conceptualizing, characterizing and explaining a business model at a given point in time, towards a more dynamic view that examines phenomena like business model innovation and adaptation. Table 1 lists a number of concepts that are often used to refer to a change in an existing business model.

----- *Insert table 1 here* -----

Based on the research summarized in Table 1, two main types of business model dynamics can be identified. One group of studies seems to refer to the changes occurring in existing business models over time, often in response to an external trigger. This includes work on business model “evolution”, “learning,” “erosion” and “lifecycles” (cf., Demil & Lecocq, 2010; Teece, 2010; McGrath, 2010; Morris et al., 2005). We define these changes as business model *adaptation*, that is, the process by which management actively *aligns* the firm’s business model to a changing environment, for example, changes in the preferences of customers, supplier bargaining power, technological changes, competition, etc. In contrast, another group of studies refers to the need to create (typically, disruptive) innovation by means of implementing an innovative business model (cf. Markides, 2006; Aspara, Hietanen & Tikkanen, 2010; Casadesus-Masanell & Zhu, 2013). Often, business model *innovation* is defined as the process by which management actively innovates the business model to *disrupt* market conditions.

Business model adaptation and innovation differ in the following important ways. First, while the kind of novelty implied by the notion of an “innovation” might be a likely outcome of business model adaptation, it is not a necessary requirement. Business model adaptation can be non-innovative. Second, while business model adaptation is a response to external causes, business model innovation may be driven by internal as well as external factors (Bucherer, Eisert & Gassman, 2012). This further

highlights the difference in motivation between business model adaptation and innovation. In adapting the business model to changing external conditions, the firm aims to attain alignment with the environment (on strategic adaptation, cf. Frishammar, 2006; on organizational adaptation, see Hrebiniak & Joyce, 1985; Chakravarthy, 1982). In contrast, an important motivation for business model innovation is to shape markets or industries by means of creating disruptive innovations (cf. Markides, 2006; Saebi, 2015).

Drivers of business model adaptation

What is known about business model adaptation? Table 2 depicts four (partly overlapping) research streams within this emerging literature, namely, research on the drivers, performance implications, process and facilitators of business model adaptation. As our study is concerned with the drivers of business model adaptation, we excluded those studies that are solely focused on business model innovation.

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

Important drivers of business model adaptation include the need to adapt to *external stakeholders* (Ferreira, Proença, Spencer & Cova, 2013; Miller, McAdam & McAdam, 2014), changes in the *competitive environment* (Voelpel, Leibold & Tekie, 2004; De Reuver, Bouwman & MacInnes, 2009) and opportunities brought about by *new information and communication technologies* (ICT) (Pateli & Giaglis, 2005; Sabatier, Craig-Kennard & Mangematin, 2012; Wirtz, Schilke & Ullrich, 2010). In the literature that we reviewed, business model adaptation is likely to occur under conditions of threat as well as opportunity. However, no study has examined the relative importance of threat *versus* opportunity on the propensity of the firm to adapt its business model.

Instead, the majority of studies that we reviewed highlight the difficulties in managing the adaptation process. The *willingness to experiment* (McGrath, 2010; Sosna et al., 2010; Cavalcante, 2014;

Andries et al., 2013) and the ability to develop *leadership and organizational capabilities* (Achtenhagen et al., 2013; Demil & Lecocq, 2010; Dunford, Palmer & Benveniste, 2010; Doz & Kosonen, 2010) are found to be decisive in business model adaptation. Furthermore, an emerging stream of literature points towards *path dependencies* as a major hurdle in business model adaptation (e.g., Doz & Kosonen, 2010; Cavalcante, Kesting & Ulhoi, 2011; Bohnsack et al., 2013). Business models are manifested in a set of structured and interdependent operational activities and relationships within and between the firm and its external stakeholders (Doz & Kosonen, 2010). While these structures and processes contribute to stability and increased operational efficiency, they can lead to growing rigidity. In other words, business models can become increasingly inert over time (Cavalcante et al., 2011; Santos, Spector & van der Heyden, 2015).

Therefore, adapting an existing business model is often not an easy task. Adaptation may imply changes of the firm's value proposition, market segment, value chain and value-capture, or how these are linked in an architecture. Either way, adapting a business model is likely to involve some level of uncertainty with respect to the success of the outcome (Andries & Debackere, 2007; McNamara et al., 2013). Given organizational inertia and outcome uncertainty, firms are unlikely to change their business model unless they have rather strong incentives to do so. Even in cases where the need for adaptation seems evident, the firm's strategic orientation and the associated path dependencies are likely to impede the process of adapting an existing business model to new market demands or competitive threats (Cavalcante et al., 2011; Bohnsack et al., 2013; Santos et al., 2015). In the following, we discuss the effects of external threats versus opportunities on the propensity of firms to adapt their business model, and the role of strategic orientation in facilitating or hindering this process.

Hypotheses

Prospect theory versus threat-rigidity theory: predictions of risk behaviour

The adaptation of firms to their external environments has been investigated for several decades in various streams in the strategic and organizational literatures (e.g., Perrow, 1967; Hannan & Freeman, 1977; Chakravarthy, 1982; Nelson & Winter, 1982; Hrebiniak & Joyce, 1985; Teece, Pisano & Shuen, 1997). Among these streams, the behavioural theory of the firm places particular emphasis on the role of performance feedback for managerial and organizational decision-making, notably in connection with risk-taking (e.g., March & Shapira, 1987; Greve, 2003). How individuals and organizations perceive and respond to risk in face of external stimulus has been examined with respect to, for example, strategic change (Greve, 1998), decision making (Adner & Levinthal, 2004; Shimizu, 2007) or innovation (Bowman, 1980; Cyert & March, 1963).

Consistent with behavioural research we define risk-taking and risk-averse behaviour in the following ways: *Risk-taking* behaviour takes firms into unknown or uncertain domains can be difficult or costly to implement, and may involve the use of resources without a guarantee of positive returns. In contrast, *risk-averse* behaviour refers to actions that exhibit caution and an inward looking tendency for strategic action, as well as falling back on known and routinized patterns of actions (Cook, Shortell, Conrad & Morrissey, 1983; Dutton & Jackson, 1987; Pfeffer & Salancik, 1978; Chattopadhyay, Glick & Huber, 2001). In line with this, we perceive business model adaptation as risk-taking behaviour, since it often involves changing routinized patterns of actions (value proposition, market segments, value chain and/or value capture mechanisms), often with an uncertain outcome.

Threats are commonly defined as “negative situations in which loss is likely and over which one has little control”, while *opportunities* imply a “positive situation in which gain is likely and over which one has a fair amount of control” (Chattopadhyay et al., 2001, p. 939). Perceptions of threat and opportunities in the external environment could be critical drivers of business model adaptation. However, it is not clear whether the perceptions of threat or opportunities promote or inhibit business

model “inertia”. That is, are firms more likely to hold on to or adapt their initial business model in face of threats or opportunities?

Two distinct lines of argumentation—the threat-rigidity hypothesis (Staw, Sandelands & Dutton, 1981) and prospect theory (Kahneman & Tversky, 1979)—are often applied to predict firm behaviour in response to external stimuli (e.g., Mishra, 1996; Chattopadhyay et al., 2001). Holding different assumptions regarding the propensity of managers to engage in risk-averse versus risk-taking behaviour, these two theories predict very different organizational responses to external threats and opportunities. As we currently lack a strong theoretical foundation for understanding business model adaptation, bringing in these two established theories on organizational and strategic adaptation allows us to test their applicability in the context of business model adaptation.

Business model adaptation in response to external threats and opportunities

When facing a threat in the external environment, threat-rigidity theory (Staw et al., 1981) emphasizes the constraining role of past behaviour (past experience and rules) which is believed to determine largely actions taken in the present. “Because of restriction in information, constriction in control, and conservation of resources,” the organization and its top management “exhibit rigidity, or inability to act and/or do something new in the face of economic adversity” (Shimizu, 2007, p.1496). Research drawing on threat-rigidity theory thus finds that firms confronted with external threats are more likely to respond with caution, exhibit an inward-looking tendency, and to fall back on known and routinized patterns of actions (Chattopadhyay et al., 2001; Shimizu, 2007). Hence, expecting managers to respond to threats with risk-averse behaviour, proponents of the threat-rigidity hypothesis argue that managers seek to offset negative perceptions by responding in organizational areas over which they think they can exert greater organizational control, and by relying on existing routines and practices (Chattopadhyay et al., 2001; Staw et al., 1981). In contrast, opportunities are associated with higher

levels of control and are “more likely to make salient the potential gains rather than the risks involved” which can lead managers to “initiate actions that might otherwise be perceived as too risky” (Chattopadhyay et al., 2001, p. 939).

Following the logic of threat-rigidity theory, we predict that a perceived threat in the environment makes managers more likely to uphold the *status quo* of their business model, while perceiving an opportunity is likely to motivate managers to adapt their business model to take advantage of the opportunity:

H1_a: Under threat-rigidity theory, firms are less likely to adapt their business model under conditions of perceived threat than under conditions of perceived opportunity.

In contrast to the threat-rigidity theory, prospect theory relies on the assumptions of “reference dependency,” “loss aversion,” and “diminishing sensitivity” (Tversky & Kahneman, 1992). The basic idea is that managers are more sensitive to losses than to gains of the same magnitude. As a result, managers are more inclined towards risk-aversion when facing gains and more toward risk-taking when facing losses (Jegers, 1991; Shimizu, 2007; Barberis, 2013). Drawing on prospect theory, scholars have shown that firms performing poorly are more likely to exhibit risk-taking rather than risk-averse behaviour (Bowman, 1982, 1984). This is due to the fact, that firms facing threats of likely loss “have little to lose” and are thus more risk-seeking (Bromiley, 2010). In contrast, firms facing favourable conditions are risk-averse as they “have more to lose than to gain”, and are more likely to uphold the *status quo*.

As mentioned above, we assume that business model adaptation is risky behaviour, since changing an existing business model tends to be costly and uncertain with respect to its outcome. Hence, following the logic of prospect theory, firms facing unfavourable conditions are more likely to respond with business model adaptation. Firms facing favourable conditions are more risk-averse since they

“have more to lose than to gain”, and are thus more likely to uphold the status quo of their business model. In sum, prospect theory suggests the following hypothesis:

H1_b: Under prospect theory, firms are more likely to adapt their business model under conditions of perceived threat than under conditions of perceived opportunity.

The role of strategic orientation in business model adaptation

Previous research on organizational behaviour suggests that the way a firm responds to events in its external environment is, amongst others, influenced by its strategic orientation (cf. March, 1981; Lant & Mezias, 1992; Chattopadhyay et al., 2001). The strategic orientation of a firm reflects what set of actions it believes will lead to superior performance (Gatignon & Xuereb, 1997) and over time can build up to a strategic and organizational momentum. Strategic momentum occurs when firms develop routines based on past successful actions, and are likely to continue to act according to those routines. For example, while Hewlett-Packard and IBM sold their products through stores, Dell revolutionized the industry by cutting out intermediaries and selling PCs directly to consumers (Christensen, Johnson & Rigby, 2002). With the hype of the internet in the early 2000s, this business model became particularly successful. However, over time Dell had trouble in keeping up with the increasing demands for end-to-end services rather than merely selling hardware directly to the customer. The core competency that once contributed to success thus became a hindrance in identifying and acting upon changes in customer demand. Seemingly, a momentum very similar to the one that kept HP and IBM from responding to Dell later kept Dell from responding to new environmental changes.

In line with Miles, Snow, Meyer and Coleman (1978) and Chattopadhyay et al. (2001), we differentiate a firm’s strategic orientation into market development *versus* domain defence (or prospectors versus defenders, see Miles et al., 1978). Firms that emphasize market development continually seek to find and exploit new market opportunities and are often the engines of change in an

industry. Towards this end, they accumulate routines and skills that support them in being adaptable to changes in the external environment (Chattopadhyay et al., 2001). In contrast, firms that emphasize domain defence attempt to maintain their territory by engaging in competitive pricing and “developing a single core technology that is highly cost-efficient” (Miles et al., 1978, p.551). The major risk of such a strategy is the unwillingness or inability to adapt to major shifts in the market. Hence, we expect that a firm’s strategic orientation is likely to influence its propensity to adapt its business model in the face of external threats and opportunities.

Research based on threat-rigidity theory claims that an external threat is likely to *reinforce* the strategic momentum of the firm: When facing of external threats, managers are even more likely to act in accordance with what their firm is habituated to do (Ocasio, 1995; Staw et al., 1981; Chattopadhyay et al., 2001). Thus, firms that emphasize a strategy of market development are more likely to have the routines and resources in place to adapt more quickly to a threat than firms that are used to assuming a more defensive posture. With regard to perceived opportunity, threat-rigidity theory predicts that managers are motivated to “initiate actions that might otherwise be perceived as too risky” (Chattopadhyay et al., 2001, p. 939). Hence, a perceived opportunity in the external environment would further stimulate firms with a market development orientation to exploit new market opportunities. In contrast, firms emphasizing domain defence might consider the possibility to exploit an opportunity. However, without necessary routines in place, they need to spend time and effort on coordinating the required resources, and hereby risk looking the support of senior managers before they can act on the opportunity (Dougherty & Hardy, 1996; Chattopadhyay et al., 2001). Consequently, since managers are more likely to act in accordance with what their organization is habituated to do, we expect firms that emphasize market development to be better equipped to adapt their business model to emerging threats or opportunities in the external environment.

H2_a: The more a firm's strategic orientation emphasizes market development over domain defence, the more it is likely to adapt its business model to external threats and opportunities.

Hypothesis 2_a is consistent with both prospect theory and threat-rigidity theory. Prospect theory suggests that firms facing an external threat are more likely to engage in risk-seeking actions. Thus, for firms emphasizing a market development orientation, the effect predicted under prospect theory is amplified. For firms emphasizing domain defence, a threat in the external environment may lead to considerations of risk taking actions. However, a "... lack of enabling routines will reduce the likelihood of such action" (Chattopadhyay et al., 2001, p. 942). Under conditions of perceived opportunity, prospect theory predicts that managers are more risk averse, as they have more to lose than to gain. Consequently, since managers are more likely to act in accordance with what their organization is habituated to do, we expect firms that emphasize domain defence to uphold the status quo in lieu of threats or opportunities.

H2_b: The more a firm's strategic orientation emphasizes domain defence over market development, the more it is likely to uphold the status quo in lieu of threats or opportunities.

Data and methods

We use data from an extensive survey about the effects of the financial crisis and the subsequent recession on Norwegian firms. The survey was distributed to the CEOs of 5,000 Norwegian firms in November 2010. These firms were randomly chosen from the population of Norwegian firms with the following limitations: Firms had to have a minimum turnover of NOK 10 million (\$ 1.7 million) in 2007, and salary expenses of minimum NOK 3 million (\$ 0.5 million). This was done to avoid the large number of small firms that are set up as tax shelters, and have no real operations. We also removed all government-owned firms, and thirteen two-digit NACE-industries, which we believe would have disturbed the generality of the sample. These included firms from the agriculture, health and culture sectors due to their close connections to, and funding from, the public sector. The reason we did not

include them is that they could potentially use public financing as a buffer against the financial crisis, and/or they exist to serve non-profit goals. We believe that it is questionable whether the adaptation pressures, strategic orientations and possible business model adaptations we discuss here would fully apply to such firms. We also excluded firms from the banking and insurance sector since these firms were subject to special government intervention during our sampling period, and also because our primary interest was in the responses of the non-financial sector to the financial crisis. The list of excluded industries is provided in Appendix 1. These restrictions left us with a total sample frame of 17,312 firms from which 5,000 firms were randomly chosen to receive the survey. Appendix 2 provides descriptive statistics of the sample frame, and Appendix 3 describes the industry composition. We received 1,248 responses, yielding a response rate of 25%, which is above average for surveys using CEOs as respondents. Missing data from the survey or inability to match survey data with publicly available accounting data reduced the effective sample to 1,196 firms. Test for non-response bias showed no significant bias with respect to firm size, firm age, debt level, pre-recession profitability or industry membership.

Except for the control variables, all our variables are from the same survey, based on self-reports by the same informants, and collected at the same point in time. This means that common method variance (CMV) may potentially bias our data, and our coefficient estimates (Williams & Brown, 1994). We use Harman's one-factor test to examine if our data seems materially influenced by CMV.¹ The single factor model explained 26.6%, well below the conventional 50% threshold. If we do not constrain the model to a single factor, we obtain four distinct factors with eigenvalues > 1.0 . These four factors accounted for a total of 56% of the variance in our data, but the largest factor did not explain a majority

¹ There is a lively and as yet unsettled debate about how to detect CMV problems, and if they are found, how to correct for them (e.g. Podsakoff, MacKenzie, Lee & Podsakoff, 2003; Richardson, Simmering & Sturman, 2009; Williams, Hartman & Cavazotte, 2010); or even if CMV problems constitute an "urban legend" (Spector 2006, p. 230). We follow the mainstream in our choice of tests for CMV (Craighead, Ketchen, Dunn & Hult, 2011).

of this variance (26.6%). This does not mean that we conclusively rule out CMV, but these post hoc tests indicate that there are no “red flags”. However, we want to note that the most likely source of CMV in our data would be self-serving biases or social desirability bias. In particular, some of the CEO respondents may, for example, view a market development strategy more socially desirable than a domain defence strategy, and those that have this bias may also systematically prefer being perceived as someone who is dynamic and able to engineer change. The combination of these preferences could inflate the measured correlation between the market development orientation and extent of business model adaptation. Notably, there are problems with attempting to correct for CMV as well. As pointed out by Richardson, Simmering and Sturman (2009), all methods for correcting for CMV are risky, and if CMV-problems are small, the corrections may cause bigger problems than they solve. Given that CMV-problems appear to be small in our data, we cautiously proceeded without making any corrections.

Dependent variable: Business model adaptation

The question how to measure business models and the change thereof has not been clearly answered in the business model literature. That is, a validated measurement scale is still not available. Instead, as a recent study by Clauss (2016) shows, each business model dimension is commonly measured individually before an overall change in the business model can be detected. For this purpose, we aligned our measurement closely to what is arguably the dominant notion of a business model: (1) the value proposition, (2) choice of target customer, (3) structure of the value delivery and (4) value capture mechanisms. The value proposition defines a portfolio of solutions (products and or services) for customers (Morris et al., 2005; Johnson et al., 2008). Thus, to measure a change in this dimension, we asked whether respondents had *introduced new products/services* or *reduced number of products/services*. Further, business models can be adapted by changing the target customer, for example offering the same service to an entirely new segment of customers (hereby, creating a new

market). Thus, to measure a change in target segment, we asked whether respondents had *increased sales effort to new customers* or *increased sales effort to customers abroad*. The structure of value delivery defines how and by what means firms create value along the value chain using suppliers and external collaboration partners (Achtenhagen et al., 2013). Thus, we asked respondents whether they had *established closer links with partners, used new suppliers, or engaged in reorganization*. Value capture defines how value propositions are converted into revenues (Teece, 2010), hence we asked respondents whether they had reduced or increased prices because of the crisis.

To reveal to which extent firms adapted their business model, we asked respondents to indicate which initiatives had been taken *in response* to the crisis. In this way, we intended to reduce the risk of including changes that were done for other reasons than the financial crisis. Running a cluster analysis on these four variables revealed that firms could be classified into three groups based on the extent to which they adapted their business model as a response to the crisis. Tables 3a and 3b summarize the result of the cluster analysis. Firms that fall into Cluster 1 made no adaptations to their business models. Firms that fall into Cluster 2 adapted all four dimensions of their business model (“total adaptation”), while firms in Cluster 3 only adapted their target market and value delivery mechanisms (“semi adaptation”).

Independent variables

Type of impact. To measure the type of external impact (threat versus opportunity) posed by the financial crisis, we asked respondents to indicate on a 5-point Likert scale “to what extent the company was affected by the financial crisis and the recession that followed.” We define threat as the perception

of a negative effect, while opportunity refers to being positively affected. The variable exhibited the following frequencies:²

- “Strongly and severely negatively affected” (6.6%)
- “Significantly negatively affected” (23.4%)
- “Moderately negatively affected” (49.3%)
- “Not affected” (16.8%)
- “Positively affected” (3.9%)

Strategic orientation. To capture a market development orientation, respondents were asked to indicate whether they had emphasized *implementation of new solutions, launch of new products/services* and *innovation/R&D* in the competition against their closest competitors *before* the financial crisis. This ensured capturing the strategic momentum built up in firms prior to the financial crisis, as we expect firms to fall back on habituated routines and processes when faced with threats in the external environment. To capture a domain defence orientation, respondents were asked to indicate whether they had emphasized *reduction of operating costs, process improvement* and *low prices* before the crisis (Sanz-Valle, Sabater-Sanchez & Aragon-Sanchez, 1999; Dess & Davis, 1984).

Control variables

Firms of different size and age may have different robustness in the face of a recession, and have different abilities to marshal support from external stakeholders, even if they are exposed to the same level of exogenous disturbance (Geroski & Gregg, 1997; Petersen & Strongin, 1996). To avoid the possibility that

² We are aware that the threat stimulus is stronger than the opportunity stimulus. This raises the possible problem that our opportunity treatment is insufficiently strong to cause business model adaptation, while our threat treatment is. This warrants caution in interpreting our results.

size and age effects interfere with the relationships we wish to examine, we control for both size (measured as turnover from accounting data), and age (years since incorporation, also from accounting data).

Analysis and Results

Table 4 shows the results of bivariate correlations among the dependent and independent variables.

----- *Insert Table 4 here* -----

All hypotheses were tested by means of multinomial logistic regressions.³ Table 5 summarizes the results of the multinomial logistic regression. We furthermore examined the robustness of the coefficient estimates in Table 5 by bootstrapping, without finding any problematic biases.⁴ Table 6 provides the model summary (goodness of fit measures) for all models.

----- *Insert Tables 5 and 6 here* -----

Model 1 tests Hypotheses 1a and 1b, which concern how perceptions of threat and opportunity influence business model adaptation (controlling for size and age). Model 1 suggests that the more severe the external threat, the more likely is it that firms engage in business model adaptation. Companies that reported not being affected by the crisis are found to uphold their initial business model (i.e. not to engage in adaptation). However, there is no significant relationship between being “positively affected” (perception of opportunity) and the propensity to engage in business model adaptation. Thus, while we have to reject Hypothesis 1a (i.e., business model adaptation in response to perceived opportunity), there is support for Hypothesis 1b, that is, business model adaptation is more likely to happen when managers face a perceived threat in the external environment.

³ We chose *multinomial logistic regression*, because the dependent variable is categorical with more than two possible discrete outcomes (i.e., categorical variables). Conducting, for example, a multinomial probit regression would not be feasible, as the probit technique assumes that the probability of the dependent variable can be described by the normal distribution. This is not the case for our dependent variable. As we cannot satisfy the normality assumption, we chose the logit distribution.

⁴ We performed bootstrapping analyses both with and without stratified sampling. Our stratified sampling included size, age and degree of recession impact.

Model 2 tests Hypotheses 2a and 2b on the effect of strategic orientation on the propensity to engage in business model adaptation. The results show that firms with a market development orientation are more likely to engage in business model adaptation (findings significant at $p < 0.01$). In contrast, firms with a domain defence orientation are significantly less likely to engage in business model adaptation (findings significant at $p < 0.05$). Hence, both Hypotheses 2a and 2b are supported. Furthermore, Model 2 provides more detailed insight into the effects of threats and opportunities on business model adaptation. While Model 1 only showed that perceptions of threat lead to “total business model adaptation”, Model 2 further shows that perceptions of opportunity are significantly related to upholding the status quo of the business model. This further strengthens support for Hypothesis 1b predicted by Prospect theory. We summarize our findings in table 7.

----- *Insert Table 7 here* -----

Discussion and conclusions

Contribution to knowledge

The business model literature has made begun to address the drivers, processes and facilitators of changes in business models (e.g., Achtenhagen et al., 2013; Andries et al., 2013; Bohnsack et al., 2013; McNamara et al., 2013; Mason & Leek, 2008; Andries & Debackere, 2006, 2007; Willemstein et al., 2007). Linking up with such recent efforts, we have highlighted the need for more systematic knowledge about the drivers of business model adaptation, that is, how firms change their business models in response to external changes. In particular, we offered empirical evidence on the conditions (perceived threat versus opportunity, and strategic orientation) under which firms are more likely to adapt their business models. While some studies predicted that business model adaptation is likely to happen under conditions of external threat (e.g. Voelpel et al., 2004; De Reuever et al., 2009), others pointed towards the importance of perceived opportunities as a catalyst for business model adaptation (e.g., Pateli &

Giaglis, 2005; Sabatier et al., 2012). Our study is, to our knowledge, the first large-scale empirical inquiry into the drivers (opportunity versus threat) of business model adaptation.

Our results show that firms' propensity to adapt their business models depends on whether an event in the environment is perceived as a threat or as an opportunity, and what type of strategic orientation the firm pursues. In particular, we found that the more severe the external threat, the more likely that firms engage in business model adaptation. In contrast, perceptions of opportunity were found to be significantly associated with upholding the status quo of the business model. These findings are consistent with prospect theory, which suggests that in the face of external threats, managers are more inclined towards risky behaviour, such as adapting the firm's business model. In contrast, we could not find support for the threat-rigidity hypothesis, which predicted that a threat in the environment leads to upholding the status quo. There may be various reasons for this finding. Prospect theory and threat-rigidity theory build upon different assumptions regarding the propensity of managers to engage in risk-averse versus risk-seeking behaviour. Hence, they predict different organizational responses to external threats. Thus, one explanation for rejecting the threat-rigidity hypothesis might be the cultural idiosyncrasy of our Norwegian sample. For example, studies on cultural determinants of organizational behaviour have observed national differences in risk-taking behaviour between managers from different countries (e.g., Hsee & Weber, 1997, 1999; Weber & Hsee, 1998; Weber, Hsee & Sokolowska, 1998). Thus, managers in our sample might have been more prone to alter their existing business models when perceiving an external threat. Cross-cultural studies are required to shed more light on the role of culture in business model adaptation. Another potential explanation is that we do not have sufficiently high scores on perceived opportunities in our data, while we do have high scores on perceived threats. An

implication may be that prospect theory is correct on the threat side, while threat-rigidity theory may be correct on the opportunity side. However, our empirical analysis cannot show this.⁵

Furthermore, in line with both prospect theory and threat-rigidity theory, we expected that the strategic orientation of a firm (past experience and path dependencies) might determine the propensity of firms' to adapt their business model. Our results indicate that firms that pursue a market development orientation are also more likely to engage in business model adaptation. By definition, firms pursuing a market development orientation develop routines and processes that allow them to respond effectively to external stimuli. Such inherent innovativeness and flexibility allow these firms to be better equipped to adapt their business model to emerging threats and opportunities in the external environment.

In contrast, we found that firms pursuing a domain defence orientation, such as seeking to offer low prices and minimize operating costs, are significantly less likely to engage in business model adaptation. Perhaps one reason for this finding might be that such firms are often the least adversely affected in a recession, since low cost and low prices are usually more in tune with market changes during a recession. Since the market is "turning their way", one may assume that these firms are generally less likely to adapt their business models in response to a recession.

In fact, while in Model 1, a perception of an opportunity was not significantly related to business model adaptation, Model 2 shows that firms reporting "not being affected" or "positively affected" by the recession were significantly less likely to adapt their business models. This is, again, in line with prospect theory, predicting that firms facing favourable conditions are more risk-averse as they have more to lose than to gain.

⁵ Moreover, as Kitching et al. (2009, p.12) point out, "there is no single 'recession effect' for businesses, nor consequently any particular 'best way' to adapt applicable to all businesses."

Overall, our findings indicate that an external threat in the business environment is a strong predictor of business model adaptation. Furthermore, a firm's strategic orientation significantly affects its ability to pursue business model adaptation consistent with environmental imperatives. Our theorizing and analysis of the effects of external threats, opportunities and strategic orientation on the incidence of business model adaptation represents an important step towards an improved understanding of business model dynamics. As such, it links up with the emerging literature on the dynamics of business models (e.g., Achtenhagen et al., 2013; Andries et al., 2013; Bohnsack et al., 2013; McNamara et al., 2013; Mason & Leek, 2008; Andries & Debackere, 2006, 2007; Willemstein et al., 2007). For managers, our findings imply the important role of strategic orientation on the firm's ability to adapt its business model in face of threats and opportunities. While an orientation towards market development is found to facilitate business model adaptation, a domain defence orientation appears to be a hindrance when it comes to business model adaptation.

Future research

The results of this research should obviously be judged in the light of its limitations—which future research may address. First, our reasoning relies on key unobserved mechanisms, namely the behaviours of top managers and the mental processes that drive these behaviours. In other words, we have not observed the mechanisms based on prospect theory and threat-rigidity theory that we have postulated. In the absence of multi-level data for the same population that would allow us to address this mechanism, we cannot rule out that other mechanisms may underlie our findings. This is where more qualitative, observational and interview-based data may be useful to lend credence to the mechanism we have posited. Furthermore, our data are based on single respondents in each firm, collected at one point in time, using one common method of data collection. Each of these features of our research can be the source of potential biases that future research should seek to overcome.

The setting of our research (the recession in the wake of the financial crisis) is both a source of strength and a potential weakness. It can be considered a strength because it is an event that affects a large number of firms roughly at the same time, and in the same manner. Still there is also variation in the “treatment effect” in the sense that the severity of the impact differs. This makes it possible to obtain a sample large enough to study quantitatively how firms respond, and analyse differences in responses across firms. The weakness is that our findings could be specific to the financial crisis, and to Norway. The impact of the financial crisis on Norwegian firms came mostly in the form of reduced demand, and substantially less in the form of credit constraints. The former affected 68% of all businesses, and the latter 23%. We therefore believe that our findings generalize to negative demand shocks more generally, but this is admittedly a conjecture, not something we have proven. As we move towards threats of a very different nature, such as, say, regulatory shocks, terror, or natural disasters, we become increasingly less certain that our results generalize. Therefore, replication of our findings in the context of different types of threats (and opportunities) seems important and worthwhile. Still, we feel that the methodological advantages of being able to study a large “natural experiment” outweigh the disadvantages at this stage.

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