Business Model Innovation and Owner–Managers:

The Moderating Role of Competition

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Abstract

This study examines the relationship between owner–managers, business model innovation and competition. We present a newly constructed data set of 111 new firms that launched electronic trading platforms (business model innovations) in the US and European bond markets between 1995 and 2004. We contribute to the emerging literature on business model innovation by integrating effectuation theory with the Austrian school's view of competition as a discovery process to examine the role of the entrepreneur in business model design. Our findings reveal that the presence of entrepreneurs as owner–managers positively influences the degree of innovation: this relation is stronger in less competitive environments but is weaker (and may even reverse) in highly competitive environments. We discuss implications for theory and for entrepreneurs in influencing the degree of business model innovation, and suggest future directions for research.

1. Introduction

Entrepreneurs are placing increasing emphasis on business model innovation in order to create competitive advantage (Doganova and Eyquem-Renault, 2009; GE Global Innovation Barometer, 2013; Walnofer and Hacklin, 2013). A business model summarizes the architecture and logic of a business (Baden-Fuller and Morgan, 2010), so business model innovation can often involve reconfiguring the basis of competition in a whole industry. However, the research on what affects the degree of business model innovation in new firms remains scant, and there are increasing calls for management scholars to study ownership and how it affects firm innovation and performance (Connelly et al., 2010; Filatotchev and Wright, 2011). In this study, we examine how the presence of the entrepreneurial owner as a manager influences the degree of business model innovation, and to what extent competition might influence such relationships.

We use effectuation theory, a supposition that takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means (Sarasvathy, 2001, 2008). This is in contrast to causation processes, where a particular effect is given and the focus is on selecting between means to create that effect. In effectuation theory, the entrepreneur builds a new business by connecting different stakeholders, which engenders new customer value propositions as well as delivering existing ones better[1] (Sarasvathy and Venkataraman, 2011). Business model innovation is the discovery of a fundamentally different mode of value proposition, value creation and value capture for an existing business (Markides, 2006; Teece, 2010). Hence, radical business model innovation involves substantial systemic changes to those factors relative to previous business models.

We argue that the presence of the entrepreneurial owner as a manager in a firm enables that actor to adopt a more radical business model innovation. This is because the

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[1] For example, delivering the existing customer value proposition more effectively or at lower cost.

effectual process requires the entrepreneur to connect various stakeholders in order to effect the transformation of the artefacts to create the value propositions, and their presence as managers enables those connections to be made more effectively. This is a result of their greater holistic understanding of the business, which, coupled with their closer connection to both its internal and external environments, enables the more systemic change that a radical business model innovation demands. Scholars have long argued that competition affects the degree of innovation (Aghion et al., 2005; Hart, 1983; Schumpeter, 1942), but such research has been largely silent on how competition affects the relationship between ownership and business model innovation. We conceptualize competition based on the Austrian school's proposition as the process of discovery of ideas (Hayek, 1984; Israel, 1997; McNulty, 1967). In doing so, the present study addresses how the presence of owner–managers affects the degree of business model innovation and how competition moderates the relationship.

We test our hypotheses by examining the US and European bond trading industry, a highly significant industry, with trading volumes exceeding US$400 billion per day. We show that the presence of entrepreneurs as owner–managers positively influences the degree of business model innovation. In addition, we show that the positive relationship between the presence of entrepreneurs as owner–managers and the degree of business model innovation is stronger in less competitive environments and can become weaker (or may even reverse) in highly competitive environments.

The rest of the paper is structured as follows. The next section reviews the literature and develops our hypotheses. The following sections discuss the data and empirical analysis, and are followed by a discussion of our findings. We conclude by providing some theoretical and managerial implications of our study.

2. Theory and Hypotheses

This section outlines the theoretical foundation of how the presence of owner–managers influences the degree of business model innovation, and we also examine the moderating role of competition on this relationship.

2.1 Business Model Innovation

A business model summarizes the architecture and logic of a business (Baden-Fuller and Morgan, 2010), and defines the organization's value proposition and its approach to value creation and value capture (Teece, 2010). Business model innovation involves the discovery and adoption of fundamentally different modes of value proposition, value creation and/or value capture (Markides, 2006) – so business model innovation can redefine what a product or service is, how it is provided to the customer, and how it is monetized. The degree of business model innovation can vary from incremental to radical. Incremental business model innovation is when there are minor changes to the value proposition, value creation and methods of value capture compared to the existing business model, while radical business model innovation involves major changes to these elements. In this sense, business model innovation is more *systemic* than product or process innovations (Velu and Stiles, 2013).

Business models are particular kind of configurations that link the firm's internal arrangements with how it delivers its customer value proposition in the external market environment and how value is monetized (Baden-Fuller and Mangematin, 2013). Hence business model innovation can change the bases of competition by altering the performance metrics along which firms compete (Daneels, 2004).

Research on business models has focused on innovation as the basis for transformation and change (Demil and Lecocq, 2010; Desyllas and Sako, 2013; Johnson et al., 2008; Sosna et al., 2010). Some scholars have emphasized the cognitive aspects, as well as the strategic decision-making processes, involved in business model innovation (Aspara et

al., 2013; Velu and Stiles, 2013). Other scholars have emphasized the role of co-creation of value in service or solution-based and in open innovation business models (Maglio and Spohrer, 2013; Frankenberger, Weiblen and Gassman, 2013; Storbacka et al., 2013).

Some scholars have extended the concept of the business model to encompass the network of stakeholders. In this view, the business model is a structural template of how a firm transacts with all its external constituents, whether they are customers or other parties - in other words, it describes how it connects with factor and product markets (Zott and Amit, 2008; Zott, Amit and Massa, 2011). In this context, scholars have explored the role of technology in influencing business model innovation (Baden-Fuller and Haefliger, 2013). Studies have also expressed the role of the business model as a narrative device that makes the inherent economic value of a technology explicit (Doganova and Eyquem-Renault, 2009; Wallnofer and Hacklin, 2013): in this view, the business model, especially in new firms, plays a performative function and the entrepreneur has an agency role in its development (Palo and Tahtinen, 2013). However, the extant literature has not explored how such an agency role for an entrepreneur would affect the degree of business model innovation - in particular, how the entrepreneur acting as owner–manager might influence the degree of business model innovation.

2.2. *Effectuation and Entrepreneurs as Owner–Managers*

The business model needs to be configured to engender new customer value propositions or deliver existing ones better. However, the role of the business model as a mechanism to translate an opportunity into a viable customer value proposition is not clear.

Scholars have argued that opportunities in the market often come into being as a result of creative processes (Buchanan and Vanberg, 1991), although such opportunities are often only articulated initially in broad terms, with significant amounts of ambiguity: as the discovery processes unfold over time, they help articulate those opportunities more precisely.

Entrepreneurs play a critical role in such creative processes to make the opportunity come into being, by managing the uncertainties associated with opportunities through the use of effectuation principles (Sarasvathy and Venkataraman, 2011). Effectuation takes a set of means as given, and focuses on identifying and then selecting between possible effects that can be created from that set of means (Sarasvathy, 2001; Sarasvathy, 2008). The contrast to the effectuation process is the causation process, where a particular effect is given and the process focuses on selecting between the means to create that effect. Effectual logic is often emphasized in the early stages of a venture, with a transition to more causal strategies as the new firm and its likely market emerge from uncertainty into more predictable forms (Perry, Chandler and Markova, 2012). Hence, the effectual process is often more evident in early stages of a venture, and is followed by the use of causal logic later (Berends et al, 2013).

The business model plays a crucial role both as a narrative instrument and as a means of connecting the factor markets to the customer – so the entrepreneur needs to engage with the business model and connect the various stakeholders in order to create the business opportunity. Entrepreneurs use analogical reasoning and are more likely than non-entrepreneurs to think holistically about business, to be more means-driven and interested in developing partnerships (Dew et al., 2008) and, in doing so, to focus on controlling outcomes (Sarasvathy, 2008). The entrepreneur as owners more holistic understanding of the business, coupled with their closer connection (as manager) to both its internal and external environments, can enable the more systemic change that a radical business model innovation demands. Their presence as owner–managers also enables connections between various stakeholders to be made more effectively. Hence, we can posit the following hypothesis:

Hypothesis 1: The presence of entrepreneurs as owner–managers is positively related to the degree of business model innovation.

2.3. Role of Competition

This section considers how competition might moderate the relationship between owner–managers and the degree of business model innovation (as posited in Hypothesis 1 above). A conception of competition as a discovery process comes from the Austrian school of economics, which differs from neoclassical equilibrium models, in which all market participants are considered as buying and selling identical commodities at uniform prices, and full information is accessible (Israel, 1997). The latter notion of competition is less relevant in the emergence of new business models, where all the necessary facts may not be known in advance (Hayek, 1984).

In such an Austrian school based discovery process, the market is seen as entrepreneurially driven (Israel, 1997). The entrepreneur starts with effectuation, focusing on selecting between possible effects that can be created with a given set of means, thus creatively constructing the opportunity based on their existing knowledge. One of the key principles of effectuation is *leverage contingency* (Sarasvathy, 2008), which implies converting surprising discoveries into opportunities. An effectual approach leverages new information by treating surprises as opportunities so as to benefit from newly emerging situations. Hence, entrepreneurs may benefit from embracing surprises rather than following a linear and goal-oriented process that seeks to avoid deviations from a predetermined plan. This process of leveraging new information and the corresponding opportunities opens up the resource of serendipity - unintended discovery - as part of the opportunity development process. Effectuation suggests leveraging contingency as an alternative to formal plans based on prediction, and so offers the possibility of end results being shaped through the innovative applications of contingent alternatives that arise during the creative process (Sarasvathy, 2008). Entrepreneurs often operate in conditions of enhanced uncertainty, so that leveraging

new information to shape new opportunities is a key element of the effectuation process (Sarasvathy et al., 2014).

Competition as created between entrepreneurs is essentially the formation of opinion as to which business model is most viable. New information is required for the effectual process to enable creativity and hence, encourage radical business model innovation. Having – initially - few other firms to compete with, the entrepreneur is able to discover more and to undertake more radical business model innovation. But, as opinions form over time, uncertainty reduces, so there is less new information available for the entrepreneur to leverage. Therefore, as competition intensifies, the effectual logic becomes less pronounced while causal logic becomes more prominent (Berends et al, 2013; Perry, Chandler and Markova, 2012). Effectual logic implies new information is used to enact opportunities that enable innovation (see Alvarez, Barney and Anderson, 2013). On the other hand, causal logic implies finding the objective opportunities that pre-exist and hence, adopt the innovation accordingly.

Leverage contingency requires the use of information in unusual ways for the creative process to unfold. The entrepreneur's ability to think holistically combined with the ability to leverage contingencies when faced with new information enables the creative enactment of opportunities and encourages radical business model innovation. When competition intensifies, the prominence of causal logic implies conforming to the already well defined business model rather than creatively enacting a radically new business model. When the competition is high, the manager who is closer to the environment is more likely to be effective in discovering the already well defined business model. Correspondingly, when competition is high the entrepreneur is less well positioned to take advantage of the opportunities afforded by the effectual process. As competitors enter the market, the value proposition becomes more well-defined: as the environment becomes more highly

competitive, the entrepreneur as owner–manager's role in the effectuation process, in leveraging contingency by using the business model construct, diminishes in value. So the creation of radical new business models by the entrepreneur as owner-manager is more likely when the competition from other entrepreneurs in shaping the market is less severe - as more and more firms enter with different business models, opinion hardens as to which is the most viable, reducing the scope for further radical business model innovation.

Hence, we argue that, in weak competitive settings, from a discovery sense, entrepreneurs acting as owner–managers are likely to put effort into designing innovative solutions to capture value: but when competition for the discovery of ideas strengthens as other firms enter the market, the positive impact of their presence on business model innovation (as postulated in Hypothesis 1) becomes weaker or may even reverse as the entrepreneur as manager imposes an effectual logic to a market that has transitioned to embrace causal logic. High competition implies that the discovery process for the design of the new business model is already mature and hence, there are less opportunities to leverage contingencies arising from new information in order to radically innovate the business model. Therefore, in high competitive environments the presence of the owner–manager might act to reduce the likelihood of business model innovation compared to when the entrepreneur is not the manager.

So we can posit the following hypothesis:

Hypothesis 2: The level of competition in the industry moderates the association between ownership and business model innovation in such a way that the positive relationship posited in Hypothesis 1 will be stronger when the competition is low but will be reduced (or even reversed) when competition is high.

3. Data and Methods

3.1. Empirical Setting

This section discusses the data and methods we used to test these hypotheses empirically, by studying business model innovation in the US and European bond trading markets between 1995 and 2004. This setting is suitable for testing our hypotheses because the advent of the Internet enabled innovations to existing business models. Over the study period, the bond market displayed the following characteristics:

- A traditional business model existed that had the potential to be transformed into a new business model with varying degrees of business model innovation.

- Owners acted as managers in some of the new e-trading platforms.

The trading of bonds has traditionally been carried out via dealer banks, which act as intermediaries in matching buyers with sellers and are therefore able to price these instruments. Until the mid-1990s, this dealer intermediation process was performed almost exclusively via a telephone-based system However, the advent of the internet enabled the proliferation of new business models in the bond markets: new business models varied from incremental business model innovations - whereby the dealers continued to act as intermediaries via electronic platforms - to more radical business model innovations, which enabled direct trading between investors on such electronic platforms. We describe the methods we adopted to obtain our survey measures and other variables of interest below.

3.2. Variable Description

Dependent variable: The dependent variable of interest is the degree of business model innovation. We developed a survey to measure this construct, which was administered to a set of expert raters from the bond markets. We framed the survey with short descriptions of the 111 electronic bond-trading platforms (launched between 1995 and 2004), and provided information in terms of the key components of the business models, such as their value

propositions, their means of value creation and their approaches to value capture. In particular, the description in the survey provided details such as customer value proposition, target customers, instruments to be traded, revenue architecture and the operational method of trading (Table I provides an example). We forwarded this survey to six raters, experts in the bond trading market, who we asked about the extent to which they agreed with the statement, 'This business approach is a business model innovation' (1 = strongly disagree and 5 = strongly agree). To help them decide, we provided a short description and an example of a business model innovation as part of the survey.

Insert Table I about here.

To account for differences in rating based on the raters' familiarity with the platforms, we gathered information about their degree of familiarity with each platform's business model, and used this information to develop a weighted average rating of the degree of business model innovation for each platform. Thus, if an expert rater were particularly familiar with the platform, their score on its degree of business model innovation would be given a relatively higher weight than the corresponding innovation rating from an expert who was less familiar with the platform.[2] We rounded the innovation rating thus obtained up to the nearest integer, so we had a dependent variable, with integer values between 1 and 5, which provided a measure of the degree of a platform's business model innovation.[3] As noted earlier, the expert raters provided scores that rated a platform as a more innovative business model when there were systemic changes across the customer value proposition and the operational model. For example, BondBook - which allowed direct trading between investors - was rated higher in terms of degree of business model innovation than MarketAxess, which merely translated the existing telephone trading practice and migrated it to an electronic

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[2] The expert raters had experience across a range of sectors in bond trading; hence, the potential bias due to familiarity with a particular platform was minimized.

[3] We conducted several inter-rater reliability checks of these expert ratings, such as the Proportional Reduction in Loss (PRL) analysis and Wilcoxon test, and found that they agreed within an accepted degree of confidence.

interface, so that investors still traded via a dealer bank. Based on the expert ratings, BondBook could be considered a radical business model innovation, but MarketAxess a more incremental business model innovation - the difference is illustrated in Table I.

The survey was conducted in 2009. In order to test the validity of this variable, and identify any potential bias due to the time difference between data collection and the expert ratings, we checked the variable's compatibility with a measure of business model innovation collected independently by *The Banker* magazine (Piggot, 2001), which rated a sub-sample of platforms with respect to their business model 'design' aspect. The rating was carried out via a survey of 40 institutions on individual electronic trading platforms, and yielded data which provided a proxy for the degree of business model innovation.[4] We also conducted a Wilcoxon test between our construct for the degree of business model innovation and the score given by *The Banker's* independent study (Piggot, 2001). The test showed a significant pair-wise matching (p<.001), which gives us confidence that our survey rating is a reliable proxy for the construct of the degree of business model innovation.[5]

Explanatory variables

Entrepreneurs as owner–managers: As postulated in our hypotheses, we expect entrepreneurs as owner–managers to play a significant role in influencing the degree of business model innovation. Press releases associated with the launch of the platforms (from such sources as *The Financial Times, The Wall Street Journal* etc., and from the *Factiva* database) provided information about whether existing employees of banks, major financial or non-financial firms left their job to set up these platforms. We checked to ensure that these actors were both owners and held senior management positions in the new ventures, and (if

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[4] The 'design' aspect of the platform is a good proxy for business model innovation, as the survey in *The Banker* aims to examine the level of difference of business approach of the new platforms, including various aspects of the customer value proposition.
[5] The Wilcoxon test is a parametric test. We also conducted the comparison using the non-parametric Fisher-Pitman test, and the results also revealed significant pair-wise matching (p<0.01).

so) call these entrepreneurs owner–managers. We created a dummy variable set to 1 if entrepreneurs acted as owner–managers in new trading platforms, and 0 otherwise.

Competition: We developed an index to operationalize the degree of competition platforms faced at the time of their launch. The Bond Market Association (BMA) reports defined 11 types of products or financial instruments that each platforms used to enable trading between customers. The ratio of the number of platforms trading in a particular category of instrument to the overall number existing at the time of a platform's launch provided a measure of the level of competition in these markets. We calculate this ratio as $c_{it} = \frac{n_{it}}{N_{it}}$, where n_{it} is the number of platforms trading in instrument i at time t and N_{it} is the overall number of platforms existing at time t. The measure of competition is calculated as the average value of this ratio for all the instruments the platform traded in, i.e., $C_{pt} = \frac{\sum_{i=1}^{k} n_{it}}{k}$, where p is the name of the platform and k the number of instruments traded in that platform. This construct operationalizes competition as a discovery process, as outlined in the earlier theoretical section, in which the more trading platforms already operating in a particular instrument category, the greater the competition in that market.

Control variables: We include several control variables in our model to enable more accurate tests of our hypotheses. Firms' ownership structures are considered an important determinant of their innovative activity (Tribo et al., 2007), and we control for this factor using the degree of ownership concentration. The level of a firm's diversification strategy matters because it affects its ability to cross-subsidize between different product lines (Colombo and Delmastro, 2001). We control for such levels of diversification strategies using a measure that captures the breadth of the products that firms provide to the market. The geographic location of the firms may also matter, because firms located in similar areas could result in a spillover of knowledge and hence lead to agglomeration effects (Chung and Kalnins, 2001). We control for geographic effects using a measure that captures whether the firm is located across more

than one geographic-market. We control for customer type (Rust, Moorman and Bhalla, 2010) through platform type, and for early entry advantage through the order of market entry (Srinivasan, Lilien and Rangaswamy, 2004).

Ownership concentration: This is another measure of ownership. We use details of investor numbers obtained from press releases to measure the number of investors who invested in a platform as a ratio of the average number of investors across all platforms, as an indication of ownership concentration.

Breadth of the platform: We measure the breadth of the platform by the number of products it offers. The BMA reports categorize the number of instruments traded by each platform into 11 general categories. The breadth measure is a count variable indicating the number of instruments that can be traded on each of the respective platforms.

Geographic spread: We operationalize the geographic spread of a platform by examining whether it traded only in its own domestic market alone, or in both its domestic and in international markets. Thus, the variable was given a value of 1 when a platform traded in both its domestic market (the US or Europe) and in international markets (e.g. the US *and* Europe), but coded as 0 if it only traded in its domestic market (*either* the US *or* Europe). The data for this variable was again obtained from BMA reports.

Platform type: An electronic platform can serve either the bank-to-investor market or the bank-to-bank market (called the inter-dealer market). To distinguish between these two customer markets, we coded this variable as a dummy, taking the value of 1 for inter-dealer platforms and 0 otherwise.

Order of market entry: The electronic trading platform in the bond markets developed from about 1995, following the start in the use of Internet technology as a medium enabling electronic transactions. To measure the advantage of early market entry we calculated the

time gap (in months) between January 1995 and date of each platform' launch announcement. Table II provides a summary of the variables and data sources.

Insert Table II about here.

Table III present descriptive statistics and the correlation matrix for the variables of interest. We conducted checks for multicollinearity using variance inflation factor, tolerance, and condition numbers criteria tests; we found no evidence for any multicollinearity problems in our sample data set as the VIF was below 10 (see Table III), and other indicators were within acceptable limits.

Insert Table III about here.

4. Econometric Model and Empirical Estimation

Our dependent variable of interest is the degree of business model innovation, which is an ordered discrete choice variable. We therefore use an ordered probit regression model to fit the data.[6]

There could be certain characteristics that determine the presence of entrepreneurs as owner–managers, and these same characteristics in turn might affect the degree of business model innovation. To account for this possible endogeneity, we used the Heckman (1979) two-stage sample selection estimation method, as reported in Tables IVA and IVB respectively. We first estimate the likelihood of the presence of entrepreneurs as owner-managers (The Stage 1 selection equation as reported in Table IVA).[7] Next, we used a probit specification with an inverse Mills ratio and the degree of business model innovation as the

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[6] There is no clear rule that helps to choose between ordered probit instead of ordered logit in this context (Greene and Hensher, 2010). We chose to use ordered probit; but our main results are also robust to ordered logit specification, although the coefficient magnitudes differ.

[7] The factors that determine the likelihood of the presence of entrepreneurs (in the Stage 1 selection model – Table IVA) as owner–managers included: (1) whether the business model was non-proprietary (allows multiple dealers to participate); (2) whether it was a non-incumbent firm venture (non-incumbent firms are firms that are not dealers); and (3) whether it was a proprietary platform provided by firms outside the bond industry (i.e. non-financial services firms).

dependent variable (Stage 2 main regression model as reported in Table IVB).[8] The key aspect of this estimation technique is that the significance of the inverse Mills ratio reflects the presence of endogeneity due to unobserved heterogeneity. As Table IVB reports, the inverse Mills ratio is not significant in predicting the degree of business model innovation and, hence, endogeneity due to unobserved heterogeneity is not an issue for our model. We therefore resorted to our original, simpler procedure for our dependent variable: the ordered probit regression with explanatory and control variables, as discussed earlier and reported in Table V.

Insert Table IV about here.

In Model 1, we conducted ordered probit regressions with the degree of business model innovation as the dependent variable and with entrepreneurs as owner–managers as the explanatory variable. Model 2 includes an interaction variable between competition and entrepreneurs as owner–managers, and Model 3 includes an additional interaction effect between one of the control variables that measures an ownership construct - ownership concentration - and competition.

Insert Table V about here.

4.1 Results of the Hypothesized Relations

H1: Entrepreneurs as owner–managers: Hypothesis 1 proposes that the presence of entrepreneurs as owner–managers is positively related to the degree of business model innovation. We find strong support for this hypothesis in models 1 (β=0.463, p<0.01), 2 (β=1.538, p<0.01) and 3 (β=1.702, p<0.01). The significance of entrepreneurs as owner–managers also holds in Models 2 and 3 when the interaction effects are introduced as well. The relationship between entrepreneurs as owner–managers and innovation is strongly

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[8] There is no readily available method for testing for endogeneity due to unobserved heterogeneity using the Heckman sample selection method in ordered probit models. Therefore, we used a probit specification to test for endogeneity using the Heckman procedure where we coded scores of 3 or more for the degree of business model innovation as 1 and 0 otherwise.

supported by our empirical analysis, which seems to imply that business model innovation require systemic changes, which call for the presence of owner-managers.

H2: Entrepreneurs as owner–managers and competition: The combined effect of entrepreneurs as owner–managers and competition affects business model innovation, as shown in Model 2 (β= -0.065, p<.01) and Model 3 (β= -0.067, p<.01). When competition is held at its mean, the presence of entrepreneurs as owner–managers increases the degree of business model innovation (as Table VI shows). The same positive effect holds when competition is one standard deviation below the mean. However, at higher levels of competition (one standard deviation above the mean) the relationship is reversed, and the presence of entrepreneurs as owner–managers seems to reduce the degree of business model innovation. As discussed earlier, we argue that the reason for this negative interaction effect is that high competition implies that the discovery process for the design of the new business model is already mature; hence, the presence of the owner–manager is likely to reduce the likelihood of business model innovation compared to when the entrepreneur does not also take on the role of the manager. The entrepreneur as owner–manager's role in the effectuation process, in leveraging contingency by using new information, diminishes in value as the highly competitive environment establishes the design of the viable business model.

Insert Table VI about here.

4.2 Other Results

Control variables: In addition to the main results outlined above, the ownership concentration, type of platform (inter-dealer dummy), product breadth and geographic spread control variables were all significant in some models. However, the variable measuring time since launch do not show any statistically significant effects on the degree of business model innovation.

4.3 Robustness Checks

We conducted a number of robustness checks. First, we tested the parallel regression assumption underlying the ordered probit estimation using the Likelihood Ratio (LR) test developed by Wolfe and Gould (1998) and found positive evidence for the assumption[9]. The LR test was conducted for the overall significance of the model. Second - following Hosmer and Lemeshow's (1980) approach - we developed an approximation of the model using a binary regression model to generate standardized residuals and found no evidence of outliers (Long and Freese, 2006, pp. 199–202). Third, we also tried a different specification for the dependent variable to account for the familiarity of expert-raters. The main results remain unchanged when we use the dependent variable based on reducing the deviation from the mean based on familiarity instead of the dependent variable based on the weighted average of familiarity.

5. Discussion

We contribute to the emerging literature on business model innovation by examining the role of the entrepreneur in business model design. We do so by integrating effectuation theory with the Austrian school's view of competition as a discovery process. Our study shows that the degree of business model innovation is higher when entrepreneurs act as owner–managers of their ventures. These findings support Hypothesis 1 on ownership and the degree of business model innovation, in which we argue that, through a process of effectuation, the entrepreneur as owner–manager has a more holistic understanding of the business, that, coupled with their closer connection as manager to both their firm's internal and external environments, enables the more systemic change that a radical business model innovation demands. We also show that competition moderates the Hypothesis 1 relationship - in

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[9] Parallel regression assumption holds at 1% level of significance, chi2(18) = 25.89, Prob > chi2 = 0.1022.

particular, the positive relationship between the presence of entrepreneurs as owner–managers and the degree of business model innovation is more pronounced in less competitive environments, but becomes weaker (and may even be reversed) in highly competitive environments, findings which support Hypothesis 2. This is because, in a highly competitive environment, the entrepreneur has less opportunity to leverage contingencies arising from new information as the value proposition becomes increasingly well-defined, and hence the owner-manager's ability to radically innovate the business model diminishes.

Business models are a particular kind of configuration that link the firm's internal workings with the customer value proposition in its external market environment and with how that value is monetized (Baden-Fuller and Haefliger, 2013; Berkout, Hartmann and Trott 2010). There is increasing evidence that technological and market related factors drive business model innovation (Lambert and Davidson 2013). Moreover, the success of business model innovation requires the alignment of various stakeholders (Giesen et. al., 2010), while scholars have also emphasised the role of the top-management team in achieving the alignment needed for business model innovation to succeed (Doz and Kosonen, 2010). However, the role of contingency variables in moderating the impact of the top-management team and the business model innovation remains limited (Patzelt et. al, 2008).

In this context, although entrepreneurs' activities have long been recognized as a key factor in firm innovation management, their role in business model design has been underexplored (Berkhout, Hartmann and Trott, 2010). In particular, the extant literature has not explored the entrepreneur's agency role in using the business model to connect factor and customer markets. Effectuation theory has shown that the entrepreneurs as owner-managers have a more holistic view of their businesses. Moreover, scholars have argued that business model is a complex activity system (Zott and Amit, 2010), so that management need to have a systemic view in order to innovate their business models. The literature has primarily

focused on agency theory as a theoretical frame to argue about the misalignment of incentives between owners as principals and managers as agents when examining the relationship between ownership and innovation (see Audretsch et. al., 2009; Eisenhardt, 1989; Holmstrom, 1989). The agency theory literature has largely ignored business model innovation. We examine a different mechanism to show that ownership matters in business model innovation. In particular, we use the proposition from effectuation theory that the benefits of an entrepreneur's holistic view are more likely to manifest themselves in influencing the degree of business model innovation when the entrepreneur is also a manager of the business than if the managers are not owners.

Studies have long argued that competition affects the degree of innovation (see Aghion *et al*., 2005), but research has been largely silent on how competition affects the relationship between ownership and the degree of business model innovation. Moreover, although the link between strategy and business models to create competitive advantage has been articulated (Casadesus-Masanell and Ricart, 2010; Lambert and Davidson, 2013), the role of competition in business model innovation has not attracted the attention of scholars.

We conceptualize competition based on the Austrian school's proposition as the process of discovery of ideas. In doing so, we highlight the importance of competition in moderating the relationship between entrepreneurs acting as owner-managers and the degree of business model innovation, as predicted by effectuation theory. Our study has several theoretical and managerial implications which we now discuss.

5.1 Theoretical Implications

Our findings have three theoretical implications. First, the study expands the scope of effectuation research from its prior primary focus on individual entrepreneurs and start-ups to include business model innovation. In doing so, the study has implications for how research and development outputs needs to be taken to market and, specifically, the role of the

entrepreneur in being able to innovate the business model in order to do so. In particular, our study has implications for further examining how the principles of the effectual process unfold as the entrepreneur innovates the business model. Second, we discuss the implications of the market developing effectually (capable of producing the effect) at first and then causally (has the nature of cause and effect) later. In particular, our research has implications for examining how new technologies from research and development need to strike a balance between these two processes as the market becomes more well-defined over time. Third, our study shows the importance of competition in influencing the role of business model innovation in linking technological markets with customer markets. It also reveals the different implications that notions of competition from the neo-classical and the Austrian schools bring to considerations of business model innovation.

5.2 Managerial Implications

Our study also has several managerial implications. First, it highlights when it might be appropriate for entrepreneurs who are involved in the management of their new enterprise to step-back and allow professional managers to manage the firm in order to make decisions about the appropriate degree of business model innovation.

Second, our study shows that ownership and business model innovation are likely to be moderated by the level of competition in the business environment. Professional managers might want to involve entrepreneurs in running the business with different degrees of intensity depending on the competitive environment. Such a policy could increase managerial discretion in order to choose the appropriate degree of business model innovation to help connect a new technology with customers so as to deliver a better customer value proposition.

Third, the study shows that entrepreneurs' ability to leverage contingencies arising from new information is critical in promoting business model innovation. Our study shows that

owner-managers are more able to leverage new information when competition is less severe in the early stage of the start-up rather than later. Therefore, owner-managers need to be more vigilant in leveraging both favourable and unfavourable opportunities in their ventures' early stages so as to enable radical business model innovation.

6. Limitations and Conclusion

We believe that our study is the first attempt at using effectuation theory to conceptualize business model innovation. In addition, it contributes to the business model innovation literature by highlighting the important role of the entrepreneur - acting as owner-manager - in instituting radical business model innovations. We also draw attention to the moderating influence of competition, a hitherto neglected factor in much of the existing business model innovation literature.

Our study has several limitations which invite further research. First, it examines a single industry: the bond markets - it would be useful to extend the study to other settings to examine whether a similar empirical regularity exists. Second, we examine the design of the business model at the time of a venture's launch: appropriate longitudinal data could allow our study to be extended to examine the evolution of business model innovation over time and so better understand the causality involved. Third, previous studies have shown that the effect of the role of owner–manager on venture performance may depend on the type of business model (see Patzelt et. al, 2008). Our study could be extended to examine how the role of the owner-manager might be affected differently according to the types of business model. Fourth, our study does not examine the human and social capital that the entrepreneur as owner–manager might bring to their venture, and how that might affect the degree of business model innovation. Finally, our study does not examine entrepreneurs' appetites for taking risks relative to those managers, which could influence the relative outcomes. We leave these possible extensions to future studies.

References

Aghion, P., Bloom, N.R., Blundell, R., Griffith, R., and Howitt, P. (2005) Competition and innovation: An inverted U-relationship. *The Quarterly Journal of Economics,* May, 701–728.

Alvarez, S.A., Barney, J.B., & Anderson, P. (2013) Forming and Exploiting Opportunities: The Implications of Discovery and Creation Processes for Entrepreneurial and Organizational Research. *Organization Science*, 24(1), 301–317.

Aspara, J., Lamberg, J.A., Laukia, A. Tikkanen, H. (2013) Corporate Business Model Transformation and Inter-Organizational Cognition: The Case of Nokia, *Long Range Planning*, 46, 459-464.

Audretsch, D.B., Lehmann, E.E. and Plummer, L.A. (2009) Agency and governance in strategic entrepreneurship. *Entrepreneurship, Theory and Practice,* **33**(1):149–66.

Baden-Fuller, C. and Morgan, M.S. (2010) Business models as models. *Long-Range Planning* **43,** 2–3, 156–171.

Baden-Fuller, C. and Haefliger, S. (2013) Business models and technological innovation. *Long-Range Planning* **46,** 6, 419–426.

Baden-Fuller C., Mangematin, V. (2013), Business models: A challenging agenda. *Strategic Organization*, 11(4) 418-427

Berends, H., M. Jelinek, I. Reymen and R. Stulteins. (2013). Product innovation process in small firms: Combining entrepreneurial effectuation and managerial causation, *Journal of Product Innovation Management*, 31(3), 616-635.

Berkhout, G. Hartman, D. ad Trott, P. (2010) Connecting technological capabilities with market needs using a cyclic innovation model, *R&D Management*, 40(5), 474-490.

Buchanan, J.M. and Vanberg, V.J. (1991). The market as a creative process, *Economics and Philosophy*, 7 (02), 167-173.

Casadesus-Masanell, R., Ricart, J.E., (2010). From strategy to business models and onto tactics. Long Range Planning 43(2-3), 195-215.

Colombo, M and M, Delmastro, (2001). Technology use and plant closure. *Research Policy*, 30(1), 21-34.

Chung, W., & Kalnins, A. (2001). Agglomeration effects and performance: a test of the Texas lodging industry. *Strategic Management Journal*, 22, 969-988.

Connelly, B.L., Hoskisson, R.E., Tihanyi, L., and Trevis, C.S. (2010) Ownership as a form of corporate governance. *Journal of Management Studies,* **47**, 1561–1589.

Daneels, E., (2004). Disruptive technology reconsidered: A critique and research agenda, Journal of *Product Innovation Management* 21, 246-258.

Demil, B., Lecocq, X., (2010). Business model evolution: In search of dynamic consistency. *Long Range* Planning 43 (2-3), 227-246.

Desyllas, P., Sako, M. (2013). Profiting from business model innovation: Evidence from Pay-As-You-Drive auto industry. *Research Policy* 42, 101-116.

Dew, N., Sarasvathy, S.D., Read, S., & Wiltbank, R. (2008). Immortal firms in mortal markets? An entrepreneurial perspective on the "innovator's dilemma." *European Journal of Innovation Management*, 11, 313–329.

Doganova, L., & Eyquem-Renault, M. (2009). What do business models do? Innovation devices in technology entrepreneurship. *Research Policy*, **38**, 1559-1570.

Doz, Y.L., Kosonen, M., (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal, *Long Range Planning* 43(2-3), 370-382.

Eisenhardt, K. (1989) Agency theory: An assessment and review. *Academy of Management Review* **14**(1):57–74.

Filatotchev, I. and Wright, M. (2011) Agency perspectives on corporate governance of multinational enterprises. *Journal of Management Studies* **48**, 2, 471–486.

Frankenberger, K, Weiblen, T, Gassmann, O. (2013) Network configuration, customer centricity, and performance of open business models: A solution provider perspective, *Industrial Marketing Management*, 42, (5) 671-682.

GE Global Innovation Barometer, 2013. Global Research and Findings Insight.

Giesen, E., Berman, E., Riddleberger; R. Christner; R. Bell. 2010. When and how to innovate your business model. *Strategy and Leadership*, 38: 17-26.

Greene,W. and Hensher, D.A., (2010) *Modeling Ordered Choices*, Cambridge University Press.

Hart, O. (1983) The market mechanism as an incentive scheme. *Bell Journal of Economics,* **XIV**, 366–382.

Hayek, F.A. (1984). Competition as a discovery process. *The Quarterly Journal of Austrian Economics*, 5(3) , 9-23. Translated by Marcellus Snow.

Heckman, J. (1979) Sample selection bias as a specification error. *Econometrica,* **47**, 53–62.

Holmstrom, B. (1989) Agency costs and innovation. *Journal Economics Behavior Organisation*, **12:** 305-–27.

Hosmer, D.W. and Lemeshow, S. (1980) Goodness-of-fit tests for the multiple logistic regression model. *Communications in Statistics, A10*, 1043–1069.

Israel, K. (1997) Entrepreneurial discovery and the competitive market process, *Journal of Economic Literature*, 35(1), 60-85.

Johnson, W., Christensen, C., Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review* 86 (12), 50-59.

Lambert, S and Davidson, R. (2013). Application in the business model in the studies of enterprise success, innovation and classification: An analysis of empirical research from 1996 to 2010. *European Management Journal*, 31, 668-681.

Long, J.S. and Freese, J. (2006) *Regression Models for Categorical Dependent Variable Using Stata*. Stata Press: College Station, Texas.

Maglio,P. and Spohrer,J. (2013) A service science perspective on business model innovation, *Industrial Marketing Management*, 42, (5) 665-670.

Markides, C., (2006). Disruptive innovation; In need of a better theory? *Journal of Product Innovation Management*, 23, 19-25.

McNulty, P.J. (1967) A note on the history of perfect competition, *Journal of Political Economy*, 75(4) 395-399

Palo, T and Tähtinen, J. (2013). Networked business model development for emerging technology-based services, *Industrial Marketing Management,* 42, (5) 773-782.

Patzelt, H., Zu Knyphausen-Aufse, D. and Nikol, P. (2008). Top Management Teams, Business Models and Performance of Biotechnology Ventures: An Upper Echelon Perspective." *British Journal of Management,* 19(3): 205-221

Perry, J.T, Chandler, G.N. & Markova, G. (2012). Entrepreneurial Effectuation: A Review and Suggestions for Future Research. *Entrepreneurship Theory & Practice*, 10, 1-24.

Piggot Charles. (2001). Espeed and Tradeweb win the Poll, *The Banker Magazine*, 151, Issue 906.

Rust, R, Moorman, C and Bhalla, G. (2010). Rethinking Marketing, *Harvard Business Review*, 88 (January/February), 94-101

Sarasvathy, S.D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26, 243–263.

Sarasvathy, S.D. (2008). *Effectuation: Elements of entrepreneurial expertise*. Cheltenham, U.K.: Edward Elgar.

Sarasvathy, S. D. and Venkataraman, S. (2011). Entrepreneurship as method: Open questions for an entrepreneurial future. *Entrepreneurship Theory and Practice*, 35(1): 113-135.

Sarasvathy, S.D., Kumar, K., and York, J.G. and Bhagavatula, S. (2014). An effectual approach to international entrepreneurship: Overlaps, challenges and provocative possibilities, *Entrepreneurship Theory and Practice*, 38(1): 71-93.

Schumpeter, J. (1942) *Capitalism, Socialism and Democracy*. Harper: New York.

Sosna, M., Trevinyo-Rodriguez, R.N., Velamuri, S.M. (2010). Business model innovation through trial and error learning. *Long Range Planning* 43(2-3), 383-407.

Srinivasan, R. Lilien, G.L. and Rangaswamy, A. (2004). First in, First Out? Network Externalities and Pioneer Survival. *Journal of Marketing* 68, 41-57

Storbacka, K., Windahl, C. Nenonen, S, Salonen, A. (2013). Solution business models: Transformation along four continua, *Industrial Marketing Management*, 42, (5) 705-716.

Teece, D., (2010). Business models, business strategy and innovation. *Long Range Planning* 43 (2-3), 172-194.

Tribo, J.A., Berrone. P., Surroca. J. (2007). Do the type and number of blockbusters influence R&D investments? New evidence from Spain. *Corporate Governance*, 15(5), September 828-842.

Velu, C. and Stiles, P. (2013) Managing decision-making and cannibalization for parallel business models, *Long Range Planning*, 43, 443-458.

Wallnofer, M. and F. Hacklin. (2013) The business model in entrepreneurial marketing: A communication perspective on business angels' opportunity interpretation, *Industrial Marketing Management*, 42, 755-764.

Wolfe, R. and Gould, W. (1998) An approximate likelihood ratio test for ordinal response models. *Stata Technical Bulletin,* **7**, 42, 199–204.

Zott, C. and Amit, R. (2008) The fit between product market strategy and business model: Implications for firm performance. *Strategic Management Journal,* **29**, 1, 1–26.

Zott, C. and Amit, R. (2010) Business model design: An activity system perspective, *Long Range Planning,* 43(2-3), 216-226.

Zott, C., Amit, R. and Massa, L. (2011) The Business Model: Recent Developments and Future Research. *Journal of Management*, 37(4): pp.1019-1042

Table 1: Differences between incremental and radical business model innovations

Business Model Components	Incremental Business Model Innovation	Radical Business Model Innovation
Value Proposition and Value Creation	Minor changes to the product (from telephone to e-trading platform). Minor changes to the distribution (buyers and sellers still trade through a dealer bank acting as an intermediary, except that it occurs over the electronic platform rather than via telephone). Minor changes to the promotion (which remains active and dealer-led, but occurs over the electronic platform rather than via telephone).	Major changes to the product (from telephone to e-trading directly between investors). Major changes to the distribution (from dealers acting as intermediary to direct trading between buyers and sellers, which enables a more transparent, comprehensive and unfiltered view of the market place). Major changes to promotion (from being actively dealer-led to being passively buyer-initiated information-gathering on the e-platform).
Value Capture	Through the difference between buy and sell prices for the securities (bonds).	Through transaction fees or credit guarantee fees for each transaction.

Table II: Summary of the measures and the relevant data sources

Table II: Summary of measures		
Conceptual Variable	**Measure**	**Data Source**
Business model innovation	Average ratings by experts	Survey among experts
Entrepreneurs as O–M	Entrepreneurs involved dummy	Press release
Competition	Average relative number of firms in each segment	Bond Market Association (BMA) reports
Ownership concentration	Number of investors/average number of investors	Press release
Breadth	Number of instruments traded	Bond Market Association (BMA) reports
Geographic spread	Dummy indicating US & Europe presence	Bond Market Association (BMA) reports, press release
Platform type	Inter-dealer dummy	BMA reports
Order of market entry	Market entry	Press release

Table III: Descriptive statistics and correlation matrix

Variable	VIF	M	SD	1	2	3	4	5	6	7	8
1	n/a	2.65	0.70	1.00							
2	4.13	0.27	0.44	0.09	1.00						
3	4.99	1.00	1.35	0.23*	0.10	1.00					
4	2.44	17.33	10.97	-0.01	-0.03	0.03	1.00				
5	1.19	2.13	1.52	0.10	0.03	0.08	-0.06	1.00			
6	1.10	0.21	0.41	0.00	0.02	-0.15	-0.07	0.15	1.00		
7	1.09	0.27	0.44	0.13	0.07	-0.10	0.00	-0.25*	-0.07	1.00	
8	1.63	55.93	20.23	0.04	0.03	0.06	0.63*	-0.16	-0.02	0.02	1.00

*(N=111) *p<0.05 VIF-Variance Inflation Factor*

Notes:
1: Innovation; 2: Owner–manager; 3: Ownership Concentration; 4: Competition; 5: Breadth;
6: Geography; 7: Platform; 8: Market entry.

Heckman two-stage sample selection estimation

Table IVA: Selection equation: Probit estimates of likelihood of entrepreneurs as owner–managers

DV: Entrepreneurs as owner–managers	Coef.	S.E.
Independent variables		
Constant	-1.533***	0.341
Non-proprietary	1.03***	0.299
Non-incumbents	0.449	0.288
External ownership	0.063	0.417
Observations	111	
Likelihood ratio statistic	16.44***	

***: p<.01, **: p<.05, *p<0.1

Table IVB: Main equation: Probit estimates of the influences on the degree of business model innovation

DV: Likelihood of high business model innovation	Coef.	S.E.
Independent variables		
Constant	-0.185	1.407
Entrepreneurs as owner–managers	0.070	0.407
Ownership concentration	0.083*	0.489
Competition	-0.016	0.010
Breadth	0.101	0.047
Geographic spread	-0.079	0.072
Platform type	0.403***	0.068
Market entry	0.005	0.008
Inverse Mills ratio	-0.133	0.738
Observations	111	
Likelihood ratio statistic	10.94***	

***: p<.01, **: p<.05, *p<0.1

Table V: Results showing the relationship between ownership and business model innovation

Independent Variables	Model without Interaction	Dependent Variable: Degree of Business Model Innovation	
		Models with Interaction Coefficient (SE)	
	M1	**M2**	**M3**
Entrep. as O–M	.463***	1.538***	1.702***
	(.139)	(.034)	(.225)
Competition	-.014***	-.003	-.018*
	(.003)	(.002)	(.010)
Interaction Terms			
Entrep. O–M x Competition		-.065***	-.067***
		(.014)	(.010)
Own'ship Con. x Competition			.020**
			(.010)
Control Variables			
Own'ship Con.	.179***	.149***	-.153
	(.046)	(.029)	(.159)
Breadth	.091***	.090***	.073**
	(.035)	(.031)	(.029)
Geographic spread	-.021	.043	.088**
	(.079)	(.095)	(.025)
Platform type	.437***	.388***	.436***
	(.013)	(.001)	(.033)
Market entry	.005	.004	.004
	(.008)	(.007)	(.007)
Likelihood ratio statistic	14.42***	19.71***	23.29***
N = 111			

***: p<.01, **: p<.05, *p<0.10 Standard errors given inside parentheses

Note: (1) Standard errors given inside parentheses

Table VI: Impact effect on the degree of business model innovation of change in interaction between entrepreneurs as owner–managers and competition

Degree of Competition	Change in Probability of Innovation (Dependent Variable<3)	Change in Probability of Innovation (Dependent Variable>=3)
One s.d. above mean	0.09	-0.09
Mean value	-0.19	0.19
One s.d. below mean	-0.36	0.36

The above is calculated when the platforms are not owned by entrepreneurs as owner–managers to when they are owned by them.