LUISS Guido Carli
LIBERA UNIVERSITA' INTERNAZIONALE DEGLI STUDI SOCIALI

PhD in Management

XXVI° Cycle

Department of Business and Management

LUISS Guido Carli University

BUSINESS MODEL INNOVATION: ANTECEDENTS OF BUSINESS MODEL INNOVATION AND EFFECTS ON FIRM PERFORMANCE

Ph.D. Candidate:

Monika Hartmann

Ph.D. Advisors:

Prof. Raffaele Oriani

Prof. Hazel Bateman

To my parents,

to my brother

Contents

INTRODUCTORY SECTION

ACKNOWLEDGEMENTS

My Ph.D. thesis has been a long journey and I would like to thank some of the many people that have accompanied me along it.

My supervisor, Prof. Raffaele Oriani, helped me from the very start. His guidance and input allowed me to formulate my topic, decide on relevant research questions and develop my research papers. Without his steady presence I would not have had the chance to present my work at AOM, DRUID and the SEI consortium.

My external advisor, Prof. Hazel Bateman, played a significant role in gaining access to my empirical setting and data in Sydney. Her strong support in managing various industry partners and finding the right way to approach and succeed in the Australian superannuation industry were essential to my research success.

I would like to thank both warmly, as my thesis would not be here today without them.

My thank also goes to LUISS university and in particular the competent hands involved in the Ph.D. program, Prof. Paolo Boccardelli, Prof. Maria Isabella Leone and Prof. Francesco Rullani. Their support made the Ph.D. experience very rewarding and enjoyable. Without their presence and guidance throughout the Ph.D. my thesis could not have been enriched with the many opportunities to meet first class researcher from top universities and the valuable time spent in my period abroad.

I would also like to thank the staff and students at the School for Actuarial Studies, UNSW in Sydney for taking me in so warmly and being supportive in so many ways. The various

seminars I had the opportunity to attend and to present my work at helped to refine my research and bring it forward.

Last, but certainly not least, I am grateful for all the support I have received from my family and friends. My Ph.D. cohort was a fantastic group of people and the exchange of thoughts and ideas, as well as the fun times inside and outside of the classroom has made the Ph.D. an unforgettable experience. The support and show of confidence from my friends around the world also sustained and motivated me throughout the years. Finally, my family deserves a special mention, as without them I would not have embarked on this journey. Their unconditional support, advice and encouragement accompanied me from the start to the successful end of my Ph.D. Without them, this thesis would never have been written.

INTRODUCTION

This body of work has been written for consideration as doctoral thesis in the field of management research. The thesis is centered on the construct of business model innovation.

Industry landscapes are in continuous change. Firms have to adapt and innovate to keep pace with new customer needs and expectations. The advent of the internet era opened possibilities for firms to engage with each other and the customer in ways unthinkable before. The introduction of this technology not only revolutionized one industry, but completely altered the way firms can do business. The business model and business model innovation was born in order to give firms a way to express themselves when talking about their approach to doing business. More specifically, how they create and capture value (Teece, 2010). Research on business model innovation has its origins in practitioner work and publications. In recent years, it has generated strong interest in the academic community. Figure 1 shows the steady increase in academically published papers (PAJ). The figure shows the vast quantity of non-academic articles (PnAJ) starting from ca. 1990 and then showing a strong and steady increase in the following years.

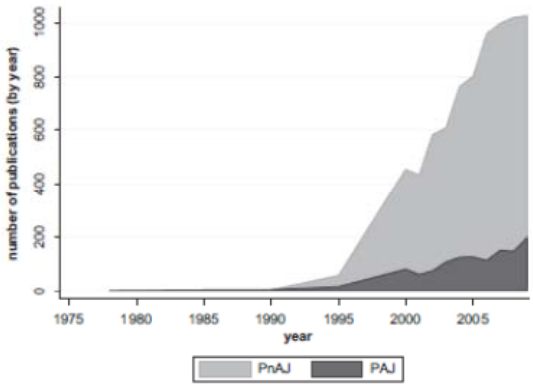

Figure 1 - Development of Publications Involving Business Models
(Source: (Zott, Amit, & Massa, 2011), p. 1023)

Academic studies focused on innovative business models in emerging firms that had the power to disrupt an industry (e.g., Amit & Zott, 2001; Zott & Amit, 2007). This line of research concentrated mainly on virtual markets and e-business environments. The firms under study were newly established companies that competed on the market with new business models based predominantly on information and communication technology.

Other studies focused on the relationship between business model innovation and successful technology exploitation (Chesbrough, 2010; Chesbrough & Rosenbloom, 2002; Gambardella & McGahan, 2010). It was noted that certain technologies operate more successfully if brought to market via a different business model than the one prevalent within the firm. A key success factor for firms trying to exploit a new technology is thus to consider if the extant business model is suited to support the nascent technology or if an innovative business model can support the technology in a more adequate way. However, business model innovation is not only found in standard business environments, but also in social contexts such as the fight against poverty (Thompson & MacMillan, 2010; Yunus, Moingeon, & Lehmann-Ortega, 2010) or on the level of the individual (Svejenova, Planellas, & Vives, 2010). Recently, the distinction has been made between business model design and business model reconfiguration. Business model design relates to the design of new business models for new ventures. Business model reconfiguration on the other hand relates to incumbent firms and the reconfiguration of an existing business model (Massa & Tucci, 2013). Business model innovation is seen as being possible in both areas depending on the radicalness of the approach. Business model innovation has hence become a topic of prevalent interest within the academic world.

The studies mentioned above are examples of the increased research on business model innovation in recent years (Zott et al., 2011). However, there is still room and need for continued research in this area. Past work has emphasized the need for better understanding of the forces that facilitate and shape extant business model designs and the mechanisms and process behind business model innovation (Chesbrough et al., 2002; George & Bock, 2011; Wirtz, Schilke, & Ullrich, 2010; Zott et al., 2007). Further research has also been called for on the impact of business model innovation on performance (Zott et al., 2007). Especially, past work has mainly focused on entrepreneurial firms and their types of business models. The innovation of business models of incumbent firms in established industries has not been a strong focus of empirical analysis. A first approach in this direction analyses multinational corporations (Santos, Spector, & Van der Heyden, 2009). This work however, strongly focuses on the relationship between organizational units and the firms headquarter, as well as the ideal supporting environment for business model innovation. It remains conceptual in nature and fails to delineate business model innovation from other concepts, such as outsourcing, as well as giving limited indication for an operationalization of the construct. Work has also been done regarding different business model designs (Zott et al., 2007), however the antecedents that influence the change of a business model design have not been the focus of research. Furthermore, while the performance effects of different types of business models have been analyzed (Zott et al., 2007), the performance effects of business model innovation in incumbents has so far not been the subject of theoretical or empirical investigation.

Thus, so far no research has been conducted with specific focus on single, established firms, key factors that influence the reconfiguration and innovation of the business model and the effects on firm performance. This is the research gap that this doctoral thesis addresses.

In order to close this gap three research papers are presented. Each addresses one of the open points mentioned above. The first research paper focuses on the antecedents to business model reconfiguration. The second research paper focuses on the performance effect of business model innovation within incumbent firms. The third research paper takes a closer look at the role of leaders and stakeholders in promoting business model innovation within a specific industry setting.

Each research paper necessitates the quantification of the business model construct. Business model innovation is quantified by using a methodology developed during my Ph.D. work and that uses the NK-model literature as a 'metaphor' (Afuah & Tucci, 2012). The NK-model was introduced into the social sciences by Kauffman (1993). Its origins lie in the evolution of species over time. This idea has been transported into the business world by equating firms with species. Academic researchers have employed the NK-framework to model a variety of problems in the social sciences (Kauffman, Lobo, & Macready, 2000; Levinthal, 1997), as for example hierarchical decision processes (Rivkin & Siggelkow, 2002). I draw upon the NK-model framework to develop a methodology that allows the empirical analysis of business model innovation and hence introduces a quantitative approach into the research on business model innovation. This means a departure from the existing predominantly qualitative research in this field and is a methodological contribution of this thesis.

The developed methodology is then applied in the empirical analysis of the introduced research questions. The chosen industry departs from previously utilized market environments. In particular, the different analyses are set in the Australian superannuation industry. This industry has the advantage of being an experienced industry with a wide

variety of incumbent players. This allows the departure from prevailing empirical settings that focused on the high-tech industry and newly established firms.

The body of this doctoral thesis is set up as follows. Firstly, the business model construct is introduced and set apart from other prevailing management constructs. Subsequently, business model innovation is defined. Thirdly, the NK-model framework is introduced and its relevance for the subsequent analyses highlighted. Next, the empirical setting and data collection are described. Then, the three research papers are presented that form the core of the research for this PhD thesis. Last, the thesis ends with a conclusion and discussion of the research results and contributions.

LITERATURE REVIEW

The importance of business model innovation has been highlighted in various works within academia. It is a construct set apart from other prevalent management constructs and merits its own usage and analysis.

In particular, business model innovation needs to be distinguished from other prevalent theoretical constructs in order to understand the novelty and power of the approach. Past work has especially stressed the difference between business models and strategy (Baden-Fuller & Morgan, 2010; Sabatier, Mangematin, & Rousselle, 2010; Teece, 2010; Zott & Amit, 2008). Although the business model reflects the firm strategy it cannot be set equal to the strategy (Casadesus-Masanell & Ricart, 2010). This is also reflected in the definition of strategy as "determination of the basic long term goals of an enterprise, and the adaptation of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1962, p.13). The strategy of the firm is thus rather referring to the choice of business model to act in the market place, while the business model itself describes the concrete mechanisms of value creation and value capture. It has especially been noted that an innovation of the business model is distinct from a strategic change (Amit & Zott, 2010; Casadesus-Masanell et al., 2010; Teece, 2010). Teece (2010) notes that a business model defines the "how" of an enterprise: how value is created, delivered and appropriated. Strategic analysis on the other hand is a necessary first step to establish in which direction the firm should position itself. Only the combination of a well-defined strategy and a well-suited business model will allow the firm to generate a competitive advantage. Thus, business model innovation is different from strategic change.

Business model innovation is also to be seen as distinct from technological innovation (Teece, 2010). Innovation can be defined as "an invention which has reached market introduction in the case of a new product, or first use in a production process, in the case of a process innovation" (Utterback, 1971, p.77). A business model on the other hand has been connected to a technological innovation as "a heuristic logic that connects technical potential with the realization of economic value" (Chesbrough et al., 2002, p.529). The business model is thus needed to allow the firm to expropriate the value generated by the technological innovation. Innovation can generate economic value through a business model already familiar to the firm or necessitate a new business model (Chesbrough et al., 2002; Teece, 2010). Business model innovation can thus be triggered by an innovation, but does not per se necessitate an innovation (George et al., 2011). It should also be noted that technological innovation focuses on fulfillment of needs, thus value creation (Dosi, 1982). The business model on the other hand looks at both the value creation and value capture mechanisms within the firm (Gambardella et al., 2010).

Lastly, business model innovation and outsourcing decisions should not be confounded. The outsourcing literature has noted that outsourcing can be a tool to concentrate on the competences of a firm that enable it to provide value to the customer (Quinn & Hilmer, 1994). In this it is different from business model innovation, where the "how" of value creation and appropriation of the firm is reinvented. Where outsourcing maintains the key activities and transactions of the firm, business model innovation redefines the key activities and transactions. Outsourcing hence looks at single, existing elements of the business model of a firm at a time (Poppo & Zenger, 1998; Quélin & Duhamel, 2003) and does not necessarily consider an innovation in them.

Business model innovation can hence be seen as separate from other management constructs. However, business model innovation has so far remained a fuzzy construct from an academic point of view. This is reflected in the missing congruence on a precise definition of a business model (George et al., 2011; Zott et al., 2011). In this thesis a unifying definition is developed that builds on the existing definitions brought forward in the literature (Afuah & Tucci, 2001; Amit et al., 2001; Baden-Fuller et al., 2010; Casadesus-Masanell et al., 2010; Chesbrough et al., 2002; Demil & Lecocq, 2010; Johnson, Christensen, & Kagermann, 2008; Morris, Schindehutte, & Allen, 2005; Seelos & Mair, 2007; Stewart & Zhao, 2000; Teece, 2010; Williamson, 2010). George and Bock (2011) for example propose a definition with a strong entrepreneurial touch. The business model is seen as "the design of organizational structures to enact a commercial opportunity" (George et al., 2011, p. 99). Other authors have taken a more general view on the business model construct and propose definitions more applicable in less entrepreneurial fields. Magretta (2002) proposes a narrative view on business models that focus on the story of how business works. A stronger relationship based view has been promoted by Santos et al. (2009) who focus on activities and relationships between organizational units and corporate headquarters.

The definition I developed draws especially on an activity-based perspective of a business model (Zott & Amit, 2010), but at the same time acknowledges the linkage and interrelatedness between transactions and activities (Afuah et al., 2001; Ben-Porath, 1980; Commons, 1932). In order to achieve this, it considers the business model as consisting of a set of different components (see also Seelos et al., 2007) that can have a stronger internal or external focus. Internal focus relates to components within the boundaries of the firm. External focus relates to components that span the boundaries of the firm. This allows a more general and broad view of the business model construct and simplifies the application in

environments outside of the e-business and technological innovation domains. The following definition of a business model is put forward: "The business model of a firm is defined by a set of key components – internally focused and externally engaging – that enable the firm to create, deliver and capture value."

On basis of this definition of a business model the notion of reconfiguration and innovation of the business model can be defined.

Innovation has been studied extensively in an entrepreneurial (e.g., Hargadon & Douglas, 2001; Howell & Higgins, 1990; Tatum, 2007) as well as technical (e.g., Garcia & Calantone, 2002; Howells, 2006; Laursen & Salter, 2006; Lounsbury, 2007; Utterback, 1971) context. It can be a novelty, an adaptation or implementation (Crossan & Apaydin, 2010) initiated by a focal firm. In the context employed here, innovation is seen as initiated by the focal firm and incorporates the understanding of innovation as absolute, as well as relative novelty. Thus, it encompasses innovation that is common practice in other organizations, but new to the entity under research (Crossan et al., 2010; Van de Ven, 1986). This definition of innovation is in line with literature on innovation studies (Garcia et al., 2002) and recent research on business model innovation (Amit et al., 2010). In this sense, business model innovation is the "modification or introduction of a new set of key components – internally focused or externally engaging – that enable the firm to create, deliver and capture value."

This definition of business model innovation is well suited for theoretical analysis of antecedents and performance effects, as well as empirical analysis of developed hypotheses. Furthermore, it allows looking at business model reconfiguration, as well as business model innovation. Hence, it allows the focus on incumbent firms that change their business model with a varying degree of radicalness. Business model reconfiguration is present at a low

degree of radicalness, whereas business model innovation is present at a high degree of radicalness. In my thesis I analyze antecedents to business model reconfiguration by drawing on the strategy and organizational theory literature. The analyzed antecedents allow the firm to overcome seen barriers to business model reconfiguration. In the literature, the ability of a firm to overcome resistance and manage reconfiguration has been seen to play a decisive role on the path to innovation. Before embarking on an innovation path there is strong resistance from all parts of the firm. In order for the needed changes to be initiated these barriers need to be overcome. Barriers hereby focus on the organizational, as well as the managerial side of the firm.

In a first step, this research hence pursues the following research question. The unit of analysis is the individual firm.

Research question 1: "What factors influence the propensity of a firm to reconfigure its business model?"

This doctoral thesis provides an answer to this question in research paper one titled “Exploring the Antecedents to Business Model Reconfiguration: An Analysis of the Pension Fund Industry”. Various versions of this paper were presented as a discussion paper at the 2013 Academy of Management Conference held in Orlando, Florida in August, the Vienna conference in strategic management in June, 2013, as well as the SEI doctoral consortium in September, 2013 in London.

Research regarding business model design and innovation has also tried to shed light on the relationship of business model innovation and performance effects for the firm. The closest study in this field compared different styles of entrepreneurial business models and their performance differences (Zott et al., 2007). Furthermore, studies have been conducted

analyzing the combined effect of firm business models and specific product market strategies on firm performance (Zott et al., 2008). As well as the combination of business models and technological innovation on the realization of economic value from an innovation (Chesbrough et al., 2002). More specific studies have focused on the shift from free to fee business models in the digital domain (Pauwels & Weiss, 2008), or the comparison of different business models in the biotechnology industry (Patzelt, Zu Knyphausen-Aufseß, & Nikol, 2008).

Conceptual work has been done with respect to explaining the performance of a firm via the different elements of its business model (Afuah, 2004; Afuah et al., 2001). All of these past studies however have a specific approach to the analysis of performance and business models. For example the business model is seen as a contingency variable moderating the effect of top management team characteristics on firm performance (Patzelt et al., 2008). Alternatively, different types of business models are compared and ranked in terms of best performance. A very recent study by Desyllas and Sako (2013) analyzed the performance effect of pay-as-you-go auto insurance. This study however, concentrates purely on a specific type of business model innovation that is partially patentable. Hence, the performance effect is approximated through the revenue stream. The revenue stream is determined by looking at profits made via the exploitation of the patents held by the company and not via increases in general profitability of the whole business. Here we depart from this strong caveat and look at business model innovation in general terms without relying on possible profits from a patent. This is particularly useful in the business model innovation setting, as most business model innovation pursued by firms is not patentable under current legislation in any country.

A pure analysis of the effect of business model innovation coming from an extant business model is hence an open issue in the academic literature that merits attention conceptually, as well as empirically. In this, not only the direct effect of business model innovation is of interest, but in particular, the conditions under which business model innovation is more advantageous for the firm. Hence, the contingency factors that moderate the relationship between business model innovation and the performance of the firm are of particular interest to this paper.

In a second step, this thesis hence pursues a second research question regarding the effect of business model innovation within established firms on firm performance. The unit of analysis is the individual firm.

Research question 2: "What influence does business model reconfiguration have on the performance of a firm and in which conditions is this most prominent?"

The answer to this research question is provided in research paper number two titled “Does business model reconfiguration lead to better performance in incumbents? An empirical analysis of Australian pension funds.” This paper was accepted as a divisional paper at the 2014 Academy of Management Conference in Philadelphia in August and, in a previous version, was presented at the DRUID conference in Barcelona, Spain in June, 2013.

In a third step, the specific role of the management team in enabling business model innovation is looked at. Thus, this thesis explores the role of leaders and stakeholders in promoting business model innovation within their firm. Here, the research is strongly focused on the specific research setting of my thesis, namely the Australian pension fund industry. In this industry one can speak of business model innovation instead of reconfiguration, as the

changes observed in the firms are very radical for this industry. Research in this industry has mainly focused on looking at the governance issues of funds (Benson, Hutchinson, & Sriram, 2011; Drew & Stanford, 2003; Gupta, Jin, Orszag, & Piggott, 2008; Nguyen, Tan, & Cam, 2012; Sy, Esho, & Sane, 2008) or economies of scale and scope in the industry (Bateman & Mitchell, 2004; Higgs & Worthington, 2012). The actual funds themselves, their setup and evolution over time have so far not been a strong focus of research. However, considering the strong importance of the pension funds for the retirement system of Australia (APRA, 2013), stronger knowledge of the structure of the firms in this industry is warranted. This topic is approached by more closely analyzing the development of funds in the chosen research setting of the Australian pension fund industry[1]. This industry is well suited for this type of analysis, as the governance structure of pension funds has specific characteristics. The trustee board of a fund has sole decision-making powers. Thus, the industry provides an ideal experiment to see how different board compositions and experience levels of board members influence the propensity of a fund to innovate the business model and evolve over time.

The third research question this doctoral thesis answers regards the influence of leaders and stakeholders on the evolution of pension funds and in particular their business model. The unit of analysis is the single pension fund.

Research question 3: “How do fund leaders influence fund evolution over time and what role do other stakeholders play in promoting fund evolution?”

This doctoral thesis provides an answer to this question in research paper number three titled “Fund evolution in the Australian superannuation industry: The role of leaders and

[1] The Australian pension fund industry is locally referred to as superannuation industry. The pension funds are hence called superannuation funds. In paper three the local terminology of superannuation funds is used.

stakeholders for superannuation funds". This paper was presented at the 21st Annual Colloquium of Superannuation Researchers in July, 2013 held in Sydney, Australia.

EMPIRICAL SETTING AND DATA COLLECTION

Previous research on business models has focused on the high-tech industry and newly founded firms. In the academic literature a call for research in other industries and within established firms has been voiced (Zott et al., 2007). This research addresses this gap and proposes the pension fund industry with its established firms as a research setting. Specifically, the research papers are based on empirical analysis of the Australian pension fund industry.

In order to adequately analyze business model innovation, its antecedents and resulting performance effects, the ideal empirical setting should provide the following features. Firstly, the industry under investigation shows an established and functioning market environment with varying environmental conditions and hence suggesting room for multiple business models. Secondly, the empirical setting is characterized by a multitude of firms showing different organizational attributes. Thirdly, ambiguity about the success of business model innovation in the industry exists, making inertia a viable option. Fourth, the empirical setting is well understood by observers allowing the identification of relevant characteristics of the business model and organizational capabilities. Last, business model innovation and the performance implications can be observed empirically.

The Australian pension fund industry fulfils the above mentioned desirable characteristics for an empirical setting. The Australian pension fund industry is an established industry that has grown into an AUD 1.40 trillion business and biggest retirement income system of this kind on a per capita basis in the world, as of 30 June 2012 (APRA, 2013). The industry has been active since the 1980s (APRA, 2007). Thus, the industry satisfies the need for research outside of entrepreneurial firms and allows the analysis of business model innovation in

contrast to new business model design.

The industry is strongly growing in size, thus increasing the opportunities and incentives for firms to innovate their business model. Compulsory contributions of individuals to the pension funds are set to rise (Economist, 2011), further pumping liquidity into the market and thus building room for experimentation and stronger reward for risks taken. The industry has also seen a wave of consolidation (Cooper et al., 2010), increasing the pressure on funds to find ways to stay ahead of their peers and seek a competitive advantage.

The regulatory framework that envelopes the pension fund industry is an advantage for the proposed research. It allows the analysis to take place in a uniform environment where business boundaries are government regulated and every fund needs to comply with the rules. It is also important to note that the pension fund industry started out as a free market business and was subsequently regulated as compulsory pension contributions were introduced. In regulating the industry the current market landscape was taken into consideration (APRA, 2007). This has the advantage that the market environment was captured within the regulation allowing for diverse approaches to superannuation and hence a variety of business models. Licensing requirements in 2004 further pushed the industry to rethink and decide on their business model. All fund trustees that wanted to continue to be active in the industry compulsorily had to apply for a pension fund license (APRA, 2007). This license could either be made out with respect to the current status of the fund activity or a fund could apply for a license that differed from the current business scope. Empirically this gives a precise time from which a multitude of changes in the business model can be observed.

The strong institutional environment of the empirical setting however, also presents a

challenge to the proposed research. The influence of regulation changes and the introduction of new laws need to be taken into account when analyzing the propensity of funds to innovate the business model. The requirement for licensing for example, while allowing the option of business-as-usual, could be seen as a strong stimulus for business model innovation. In the technological change literature the strong influence of the institutional environment on the innovation pattern of firms has been noted (Whitley, 2000). As a result, innovation strategies of firms vary depending on the surrounding institutional environment. The resource based view literature has also noted that the usefulness and efficacy of organizational capabilities is context dependent. The market dynamism and business environment have been shown to affect the development process of dynamic capabilities (Aragón-Correa & Sharma, 2003; Helfat, 1997; Teece, Pisano, & Shuen, 1997).

Typically, regulation is seen as reducing managerial discretion and limiting strategic choices (Peteraf & Reed, 2007), in this research setting however continued movement within the industry persists. This makes the analysis of business model innovation even more intriguing, as it is seen in an environment typically declared as hostile to innovation and change. Furthermore, it is important to note that it remains a homogeneous institutional context, thus exposing all firms under investigation to the same norms and rules. An influence of the business environment, as promoted by the contingency theory is hence accepted, a deterministic view is however not postulated (Aragón-Correa et al., 2003). The firms in the industry retain room for maneuver. Research has shown that firms adapt their strategies in response to environmental change. Regulation changes in the pension fund industry can be seen as such an environmental change. This can hence be a stimulus for innovation in firms (Kraatz & Zajac, 2001; Moore & Kraatz, 2011 ; Peteraf et al., 2007). However, research in

industries affected by deregulation also shows that post deregulation freedom does not account for all decision-making related to strategic change. Firm specific factors continue to play a decisive role (Moore et al., 2011). Nonetheless, when evaluating the effect of firm characteristics on the propensity to innovate, the prevalent institutional environment needs to be kept in mind as it could push more firms to pursue business model innovation than would otherwise be observed.

Lastly, data availability for regulated funds is positive and sufficient for the proposed research. Various data sources are drawn upon in the conducted research. The Australian Prudential Regulation Authority (APRA) responsible for regulating the industry has regularly collected extensive data on the funds within the industry. In particular, fund-level data has been collected since 2004 creating a substantial panel dataset regarding key financial figures of all pension funds in the industry. This dataset forms the basis for the empirical analysis conducted[2].

The APRA dataset is a good starting point for the data necessities posed by the research. However, further information regarding the funds in the industry had to be supplemented through other data sources. In order to gain insight into the business model of the funds under study I accessed two further sources of data. Firstly, I contacted the industry body ASFA (Association of Superannuation Funds in Australia) and after multiple interviews with the CEO and head of research of the organization I gained access to a series of surveys conducted by ASFA in the past. The surveys contained valuable information regarding a variety of variables relating to the operations of the funds.

[2] For a complete list of the available variables, please see the appendix B.

The merging of the two databases allows a better view on the industry and the individual funds. However, only through an analysis of the annual report of each fund in each year was sufficient data collected. The combination of three distinct and separate sources of data underlies the presented research. This also avoids common method bias and so increases the robustness of results.

In order to utilize the business model innovation definition developed in the PhD work, further analysis of the industry was needed. The business model innovation construct necessitates the understanding of the major innovations that were introduced into the industry in the time frame under study. In order to achieve this deep understanding of the industry and its funds, I established industry contacts ranging from executive management, to industry representatives and academic researchers.

A series of semi-structured interviews were conducted with the interview participants. The interviews were structured in open form with general and broad questions asked in order to avoid a focus on elements preselected by the interviewer. The in-person interviews allowed a better understanding of the important characteristics and organizational factors relevant to the pension fund industry. During the interviews individual questions were developed spontaneously in order to best utilize the respondents' area of expertise and experience within the industry.

The results of the interview process led to the definition of the innovation components most prevalent in the business models under study. Subsequently, interview results were checked against previous research, before conducting a further round of presentation of the results in front of academic staff and practitioners in order to achieve extensive validation.

This process allowed to establish the intersecting set between business model components specified in previous research and specifications of a pension fund.

QUANTITATIVE METHODOLOGY

This Ph.D. research analyses business model innovation and utilizes the firm-level of analysis. In accordance with the presented research setting, the unit of analysis is represented by the single pension fund itself.

In order to test for business model reconfiguration and innovation, an operationalization of the construct is needed. The establishment of a change of the business model requires an understanding of the original business model of the firm. The definition of a business model utilized in this work focuses on a component analysis (Massa et al., 2013). The different components are independent parts of the business model of a fund. They can lie within the boundaries of a fund or transcend the boundaries and engage players on the outside. It is hence necessary to apprehend the key components relevant to Australian pension funds. Past research has shown that the understanding of the core elements of a firm is not a simple task (Porter, 1985; 1996; Stigler, 1951; Zott et al., 2010). In order to overcome this difficulty and achieve a profound comprehension of the key components of a pension fund, this research builds on field interviews with practitioners and regulators in the industry[3].

The components that were identified through the conducted interviews span the value creation and appropriation mechanism of a firm. Past research has seen these as being the core of the business model framework (Gambardella et al., 2010).

Hence, the analysis includes the internal operations, such as administrative systems, but also external transactions, such as the interaction with third-party providers. This

[3] A list of the interview partners is provided in the appendix C.

approach to defining the business model ensures that the conducted research is in line with past work, but simultaneously moves it forward.

In order to allow for a quantitative analysis of business model innovation this research draws on the NK-model framework, as a metaphor, to develop its methodology. The NK-model was first introduced among evolutionary biologists trying to understand the search process of species across a space (fitness landscape) of possible genotypes coming to a higher state of being through mutation and recombination (Kauffman, 1993; Kauffman & Weinberger, 1989). Kauffman (1993) showed that the fitness landscape describing the solution space depends on the number of attributes or components, N, and the number of interactions, K, between the attributes. Movements along this landscape equate the optimization of a complex combinatorial process that leads to evolution. The length of the process depends on the ruggedness of the landscape. The higher the number of interactions K between the components, the more rugged the landscape becomes. The ruggedness of the landscape corresponds to a higher level of local optima available on the landscape. Hence, movements to these local optima are shorter as K increases. In a simulation environment K is then chosen to best reflect the number of steps observed in reality before a species reaches a local optimum and hence a higher state of being. Simulation runs can then mimic the behavior observed in reality and give indication on what factors can influence the success of reaching an optimum (Kauffman et al., 1989).

NK fitness models have been introduced into strategic decision-making as theoretical representation of complex problems (Kauffman et al., 2000; Levinthal, 1997; Rivkin et al., 2002; Westhoff, Yarbrough, & Yarbrough, 1996). The concept of fitness landscapes, as solution space for optimization problems, has also been taken up by the social sciences to

model a variety of problems, for example hierarchical decision processes (Rivkin et al., 2002) or corporate strategy (Caldart & Ricart, 2004).

The work involving NK-models has focused on simulation studies of real-world processes, modeling decision routines and averaging over multiple simulation runs. This Ph.D. thesis uses the ideas of the fitness landscape to calculate business model innovation in a real world domain. In order to better understand why the NK-model family is a useful tool in developing my methodology, I give a short introduction to the functioning of a NK-model and the similarities with the business model reconfiguration and innovation idea below.

The fitness landscape of the NK-model is designed by deciding on the state of N components and the amount of interaction K between them. Business model innovation is defined as the "modification or introduction of a new set of key components". The N components of the NK-model can thus be defined as the possible innovation options a firm has for its business model. During a pre-specified time span each firm makes N decisions [d_1 d_2 … d_N] = **d**, one for each of the components (Rivkin et al., 2002). Each decision consists of choosing the state of each component. With respect to business model innovation two states are possible: 1=innovation option implemented, 0=innovation option not implemented, leading to a binary (0;1) decision. The string of decisions taken at each point in time reflects the decision path taken by each individual firm over time. In a next step, the model assigns a fitness value to each configuration. An algorithm allocates contribution values (c) to each decision. The overall fitness value of the decision stream is then the sum over all contribution values of all decisions taken within that stream.

Business model innovation

This Ph.D. research utilizes two different methods for calculating business model innovation. Both use the NK-model metaphor introduced above. They differ in their complexity of the calculation. In the simple version of the calculation of business model innovation the difference in fitness values is calculated by counting the component changes between one year and the next. No interaction is assumed. Thus, in line with most empirical research involving NK-models within the social sciences (Levinthal, 1997) no interaction (K) between the components, hence K=0. This means that the individual components of the business model can be innovated independent of each other and that the contribution value of each individual decision does not depend on decisions taken with respect to other components. This results in an additive fitness structure. This limitation is especially strong in the case of highly dependent components. In the case of independent components the interaction effect between the components can be assumed to be limited outright. Figure 2 shows a fitness landscape with six components and no assumed interaction between the components.

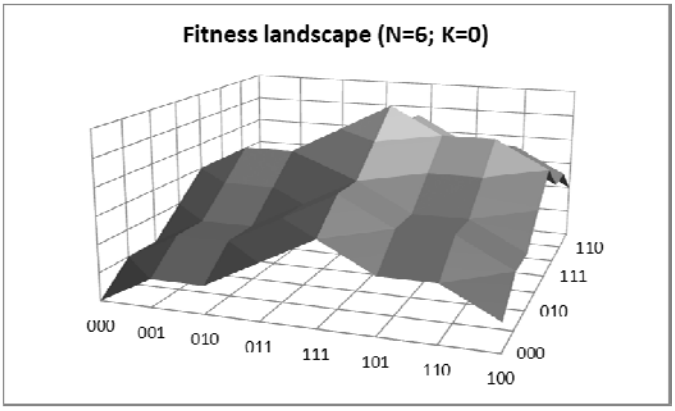

Figure 2 - NK-model fitness landscape (N=6, K=0)

This simple landscape is characterized by a single peak derived from no assumed interaction between the individual decisions a firm can make. Firms move along the fitness landscape, increasing their value incrementally or jumping between different fitness values. I

am interested in finding a quantitative representation of business model innovation. The difference between two fitness values at two points in time gives the introduction of new or modification of existent components and hence a value for business model innovation between these time periods.

Movements along the fitness landscape represent the time path a firm has taken to reach its current position in the market. In order to understand how a firm has evolved between two points in time it is necessary to look at the distance between two fitness values at two different time points. In the case of this dataset one can see a strong difference between firms in the industry. Figure 3 shows the difference in fitness values at each point in time for a select number of firms in the industry.

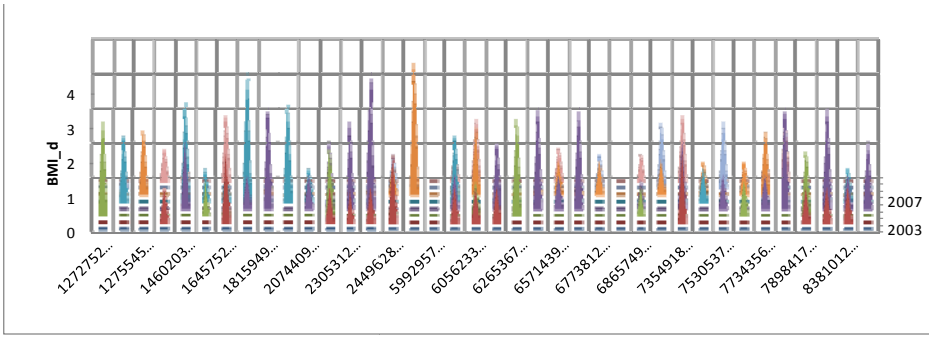

Figure 3 - Differences in fitness values per fund (excerpt shown) over time

The figure shows that some firms manage to innovate their business model throughout the time periods. Other firms innovate once in the time frame under study, but alter multiple components at a time. A third group of firms does not innovate at all during the time frame analyzed. No difference in fitness values can be noted for these types of firms. The third research paper uses this simple methodology, as it is interested in the individual decisions taken by the leaders and stakeholders of the fund.

In a second step I modify the methodology and increase complexity by introducing interaction between the components (Massa et al., 2013), as well as a different functional form.

This calculation of the business model innovation value is based on a change of at least two components at a time. The more components are changed simultaneously, the higher the business model innovation value is. This is achieved by defining the business model innovation value as an exponential function that increases in value in accordance with the quantity of changes conducted and the frequency of the same combination of change present in the dataset in that same year. This setup ensures that more novel innovation and innovation that includes more components results in a higher business model reconfiguration/innovation value. The increase is however not linear, as in the previous case, but takes on an exponential growth pattern.

The exponential function has the advantage of fulfilling the non-negativity constraints that characterizes innovation. Furthermore, business model innovation is linked to the idea of super-additivity. A change in multiple components is a stronger effort than a change in only one component. The construct of super-additivity was introduced into the work on synergy (Davis & Thomas, 1993) and explorative activity (Vassolo, Anand, & Folta, 2004).

The simple and complex operationalizations of business model innovation assume a continuous measure of business model innovation. In this it departs from previous research that promoted a 0/1 approach to business model innovation. Firms either innovated their business model or not. In contrast, here, the departure from the status quo is assumed to happen in various steps. This means that some firms are further away from the extant

business model, whereas others remain closer to their old business model (Massa et al., 2013).

The operationalization of the business model innovation construct now allows the empirical analysis of developed hypotheses and derived relationships. In the next section I present the three papers that form the core of my research work.

REFERENCES

Afuah, A. 2004. ***Business models: A strategic management approach***. New York: Irwin/McGraw-Hill.

Afuah, A., & Tucci, C. 2001. ***Internet business models and strategies: Text and cases***. New York: McGraw-Hill.

Afuah, A., & Tucci, C. L. 2012. Crowdsourcing as a Solution to Distant Search. ***Academy of Management Review***, 37(3): 355-375.

Amit, R., & Zott, C. 2001. Value Creation in e-business. ***Strategic Management Journal***, 22: 493-520.

Amit, R., & Zott, C. 2010. Business Model Innovation: Creating value in times of change: 1-15: Working paper no. 870, IESE Business School, University of Navarra.

APRA. 2007. Celebrating 10 Years of Superannuation Data Collection, ***APRA Insight***, Vol. Issue 2: Australian Prudential Regulation Authority.

APRA. 2013. Annual Superannuation Bulletin, June 2012, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

Aragón-Correa, J. A., & Sharma, S. 2003. A Contingent Resouce-based View of Proactive Corporate Environmental Strategy. ***Academy of Management Review***, 28(1): 71-88.

Baden-Fuller, C., & Morgan, M. 2010. Business Models as Models. ***Long Range Planning***, 43: 156-171.

Bateman, H., & Mitchell, O. 2004. New evidence on pension plan design and administrative expenses: the Australian experience. ***Journal of Pension Economics and Finance***, 3(01): 63-76.

Ben-Porath, Y. 1980. The F-Connection: Families, Friends, and Firms and the Organization of Exchange. ***Population and Development Review***, 6(1): 1-30.

Benson, K., Hutchinson, M., & Sriram, A. 2011. Governance in the Australian Superannuation Industry. ***Journal of Business Ethics***, 99(2): 183-200.

Caldart, A. A., & Ricart, J. E. 2004. Corporate strategy revisited: a view from complexity theory. ***European Management Review***, 1(1): 96-104.

Casadesus-Masanell, R., & Ricart, J. E. 2010. From Strategy to Business Models and onto Tactics. ***Long Range Planning***, 43: 195-215.

Chandler, A. D. J. 1962. ***Strategy and Structure***. Cambridge, Mass.: M.I.T. Press.

Chesbrough, H. 2010. Business Model Innovation: Opportunities and Barriers. ***Long Range Planning***, 43: 354-363.

Chesbrough, H., & Rosenbloom, R. 2002. The role of the business model in capturing value from innovation: evidence from the Xerox Corporation's technology spin-off companies. ***Industrial and Corporate Change***, 11(3): 529-555.

Commons, J. 1932. The Problem of Correlating Law Economics and Ethics. ***Wisconsin Law Review***, 8: 3-26.

Cooper, J., Casey, K., Evans, G., Grant, S., Gruen, D., Heffron, M., Martin, I., & Wilson, B. 2010. Super System Review Final Report Part One: Overview and Recommendations. In A. G. s. Department (Ed.): 1-168: Commonwealth Copyright Administration.

Crossan, M., & Apaydin, M. 2010. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. ***Journal of Management Studies***, 47: 1154-1191.

Davis, R., & Thomas, L. G. 1993. Direct Estimation of Synergy: A New Approach to the Diversity-Performance Debate. ***Management Science***, 39(11): 1334-1346.

Demil, B., & Lecocq, X. 2010. Business Model Evolution: In Search of Dynamic Consistency. ***Long Range Planning***, 43: 227-246.

Desyllas, P., & Sako, M. 2013. Profiting from business model innovation: Evidence from Pay-As-You-Drive auto insurance. ***Research Policy***, 42(1): 101-116.

Dosi, G. 1982. Technological Paradigms and Technological Trajectories. ***Research Policy***, 11: 147-162.

Drew, M. E., & Stanford, J. D. 2003. Principal and Agent Problems in Superannuation Funds. ***Australian Economic Review***, 36(1): 98-107.

Economist, T. 2011. Super-duper supers. In Australia's superannuation scheme, everyone's a winner, ***The Economist Newspaper Limited***, Vol. 403: 6.

Gambardella, A., & McGahan, A. 2010. Business-Model Innovation: General Purpose Technologies and their Implications for Industry Structure. ***Long Range Planning***, 43: 262-271.

Garcia, R., & Calantone, R. 2002. A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review. ***The Journal of Product Innovation Management***, 19: 110-132.

George, G., & Bock, A. 2011. The Business Model in Practice and its Implications for Entrepreneurship Research. ***Entrepreneurship Theory and Practice***, 35: 83-111.

Gupta, V., Jin, H., Orszag, M., & Piggott, J. 2008. How Do Australian Superannuation Fund Trustees Perceive Their Role and Effectiveness? In J. Evans, M. Orszag, & J. Piggott (Eds.), ***Pension fund governance: a global perspective on financial regulation***: 178-197. Cheltenham: Edward Elgar Publishing Limited.

Hargadon, A., & Douglas, Y. 2001. When innovations meet institutions: Edison and the design of the electric light. ***Administrative Science Quarterly***, 46: 476-501.

Helfat, C. 1997. Know-how and Asset Complemenatriy and Dynamic Capability Accumulation: The Case of R&D. ***Strategic Management Journal***, 18(5): 339-360.

Higgs, H., & Worthington, A. C. 2012. Economies of scale and scope in Australian superannuation (pension) funds. ***Pensions Int J***, 17(4): 252-259.

Howell, J., & Higgins, C. 1990. Champions of Technological Innovation. ***Administrative Science Quarterly***, 35(2): 317-341.

Howells, J. 2006. Intermediation and the role of intermediaries in innovation. ***Research Policy***, 35: 715-728.

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

Kauffman, S. 1993. ***The Origins of Order: Self-organization and Selection in Evolution***. New York: Oxford University Press.

Kauffman, S., Lobo, J., & Macready, W. G. 2000. Optimal search on a technology landscape. ***Journal of Economic Behavior & Organization***, 43: 141-166.

Kauffman, S., & Weinberger, E. 1989. The NK model of rugged fitness landscapes and its application to maturation of the immune response. ***Journal of Theoretical Biology***, 141: 211-245.

Kraatz, M. S., & Zajac, E. J. 2001. How Organizational Resources Affect Strategic Change and Performance in Turbulent Environments: Theory and Evidence. ***Organization Science***, 12: 632-657.

Laursen, K., & Salter, A. 2006. Open for Innovation: The Role of Openness in Explaining Innovation Performance Among U.K. Manufacturing Firms. ***Strategic Management Journal***, 27: 131-150.

Levinthal, D. 1997. Adaptation on Rugged Landscapes. ***Management Science***, 43: 934-950.

Lounsbury, M. 2007. A Tale of Two Cities: Competing Logics and Practice Variation in the Professionalizing of Mutual Funds. ***Academy of Management Journal***, 50: 289-307.

Magretta, J. 2002. Why Business Models Matter. ***Harvard Business Review***, 80(5): 86-92.

Massa, L., & Tucci, C. 2013. Business Model Innovation. In M. Dodgson, D. Gann, & N. Phillips (Eds.), ***The Oxford Handbook of Innovation Management***: forthcoming. New York: Oxford University Press.

Moore, J. H., & Kraatz, M. S. 2011 Governance Form and Organizational Adaptation: Lessons from the Savings and Loan Industry in the 1980s. ***Organization Science***, 22(4): 850-868.

Morris, M., Schindehutte, M., & Allen, J. 2005. The entrepreneur's business model: Toward a unified perspective. ***Journal of Business Research***, 24: 15-21.

Nguyen, T., Tan, M., & Cam, M.-A. 2012. Fund Governance, Fees and Performance in Australian Corporate Superannuation Funds: A Non-Parametric Analysis. ***Journal of Law and Financial Management***, 11(2).

Patzelt, H., Zu Knyphausen-Aufseß, D., & 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.

Pauwels, K., & Weiss, A. 2008. Moving from Free to Fee: How Online Firms Market to Change Their Business Model Successfully. ***Journal of Marketing***, 72(3): 14-31.

Peteraf, M., & Reed, R. 2007. Managerial discretion and internal alignment under regulatory constraints and change. ***Strategic Management Journal***, 28(11): 1089-1112.

Poppo, L., & Zenger, T. 1998. Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based and Measurement Explanations for Make-or-buy Decisions in Information Services. ***Strategic Management Journal***, 19: 853-877.

Porter, M. 1985. ***Competitive Advantage: Creating and Sustaining Superior Performance***: Free Press.

Porter, M. 1996. What is Strategy? ***Harvard Business Review***, 74.

Quélin, B., & Duhamel, F. 2003. Bringing Together Strategic Outsourcing and Corporate Strategy: Outsourcing Motives and Risks. ***European Management Journal***, 21(5): 647-661.

Quinn, J. B., & Hilmer, F. 1994. Strategic Outsourcing. ***Sloan Management Review***, 35(4): 43-55.

Rivkin, J. W., & Siggelkow, N. 2002. Organizational sticking points on NK Landscapes. ***Complexity***, 7(5): 31-43.

Sabatier, V., Mangematin, V., & Rousselle, T. 2010. From Recipe to Dinner: Business Model Portfolios in the European Biopharmaceutical Industry. ***Long Range Planning***, 43: 431-447.

Santos, J., Spector, B., & Van der Heyden, L. 2009. Toward a Theory of Business Model Innovation within Incumbent Firms. ***Faculty & Research Working Paper, INSEAD***, 16: 1-54.

Seelos, C., & Mair, J. 2007. Profitable business models and market creation in the context of deep poverty: A strategic view. ***Academy of Management Perspectives***, 21: 49-63.

Stewart, D., & Zhao, Q. 2000. Internet marketing, business models and public policy. ***Journal of Public Policy and Marketing***, 19: 287-296.

Stigler, G. 1951. The Division of Labor is Limited by the Extent of the Market. ***The Journal of Political Economy***, 59(3): 185-193.

Svejenova, S., Planellas, M., & Vives, L. 2010. An Individual Business Model in the Making: a Chef's Quest for Creative Freedom. ***Long Range Planning***, 43: 408-430.

Sy, W., Esho, N., & Sane, R. 2008. Superannuation fund governance: trustee policies and practices. ***APRA Insight***, 1: 2-17.

Tatum, D. 2007. Innovating the Development of Innovation. ***Research-Technology Management***, 50(3): 15-18 (14).

Teece, D. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***, 43: 172-194.

Teece, D., Pisano, G., & Shuen, A. 1997. Dynamic Capabilities and Strategic Management. ***Strategic Management Journal***, 18: 509-533.

Thompson, J., & MacMillan, I. 2010. Business Models: Creating New Markets and Societal Wealth. ***Long Range Planning***, 43: 291-307.

Utterback, J. 1971. The Process of Technological Innovation Within the Firm. ***Academy of Management Journal***, 14(1): 75-88.

Van de Ven, A. H. 1986. Central Problems in the Management of Innovation. ***Management Science***, 32: 590-607.

Vassolo, R. S., Anand, J., & Folta, T. B. 2004. Non-additivity in portfolios of exploration activities: a real options-based analysis of equity alliances in biotechnology. ***Strategic Management Journal***, 25(11): 1045-1061.

Westhoff, F. H., Yarbrough, B. V., & Yarbrough, R. M. 1996. Complexity, organization, and Stuart Kauffman's The Origins of Order. ***Journal of Economic Behavior & Organization***, 29: 1-25.

Whitley, R. 2000. The institutional structuring of innovation strategies: Business Systems, firm types and patterns of technical change in different market economies. ***Organization Studies***, 21(5): 855-886.

Williamson, P. 2010. Cost innovation: Preparing for a 'Value-for-Money' Revolution. ***Long Range Planning***, 43: 343-353.

Wirtz, B., Schilke, O., & Ullrich, S. 2010. Strategic Development of Business Models. ***Long Range Planning***, 43: 272-290.

Yunus, M., Moingeon, B., & Lehmann-Ortega, L. 2010. Building Social Business Models: Lessons from the Grameen Experience. ***Long Range Planning***, 43: 308-325.

Zott, C., & Amit, R. 2007. Business Model Design and the Performance of Entrepreneurial Firms. ***Organization Science***, 18: 181-199.

Zott, C., & Amit, R. 2008. The Fit Between Product Market Strategy and Business Model: Implications for Firm Performance. ***Strategic Management Journal***, 29: 1-26.

Zott, C., & Amit, R. 2010. Business Model Design: Activity System Perspective. ***Long Range Planning***, 43: 216-226.

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

RESEARCH PAPERS

INTRODUCTION

The following section comprises the three research papers that are at the core of my thesis. In preparation of these papers it was necessary to conduct secondary and primary data collection. This data then allowed the development of a unique dataset that underlies all three papers. The usage of three data sources to form the dataset mitigates common method bias.

In order to actually conduct the empirical analysis it was also necessary to develop a proprietary methodology to measure business model innovation. Only with this tool in hand was it possible to conduct the presented analysis and answer posed research questions.

The three papers all revolve around the theme of business model innovation. All three papers are empirical papers. The first paper deals with what enables business model innovation and looks at the antecedents to this form of innovation within incumbent firms. The second paper looks at what comes after business model innovation. Namely, the performance effect of business model innovation and the conditions in which this performance effect is more or less pronounced for a firm. The third paper takes a detailed look at the empirical setting that was chosen for this research. In particular it looks at the Australian superannuation industry and the leaders and stakeholders of the funds within this industry. It answers the question of how the leaders and stakeholder influence the innovative behavior of funds.

Paper 1

EXPLORING THE ANTECEDENTS TO BUSINESS MODEL RECONFIGURATION: AN EMPIRICAL ANALYSIS OF PENSION FUNDS

Presented at conference: AoM 2013, Orlando, FL (USA)

SEI Consortium 2013, London, UK

Author 1: M. Hartmann (LUISS Guido Carli, Rome)

Author 2: Prof. R. Oriani (LUISS Guido Carli, Rome)

Author 3: Prof. H. Bateman (UNSW, Sydney)

Title:

Exploring the Antecedents to Business Model Reconfiguration: An Analysis of the Pension Fund Industry

Abstract

This study explores antecedents to business model reconfiguration and empirically tests theoretical findings. We relate firm characteristics to the intensity of business model reconfiguration. In order to test our hypotheses, we develop a quantitative model for developing and analyzing a unique dataset of incumbent Australian pension funds between 2003–2010. The empirical results indicate that changes within the top management team and the ability to recombine resources positively impact the intensity of business model reconfiguration of a firm. In addition, the heterogeneity of industry experience on the top management team produces a positive, albeit u-shaped effect. In contrast, dependence on an old business model has a significant negative influence on the intensity of a firm's business model reconfiguration.

Keywords: business model, innovation, reconfiguration, pension funds, incumbent firms

INTRODUCTION

In recent years innovation efforts made by firms in search of a competitive advantage have encompassed not only the product or process space, but also the business model. The Global CEO Pulse Survey on Innovation conducted by PwC emphasizes that business model innovation is a top priority for CEOs, coming second only to product innovation (PwC, 2013). Business models have been described by several authors as systems of interdependent activities (e.g., Markides, 2013). In this sense, their analysis adds value to strategy research by describing the value creation, delivery and capture arising from multiple sources and recognizing their interdependencies (Amit et al., 2001; 2012; Baden-Fuller et al., 2010; Massa et al., 2013). Therefore, business model innovation is a construct set apart from other forms of innovation, but it can also complement them (Teece, 2010; Zott et al., 2007).

The importance of business model innovation has been extensively noted in practitioner-related publications and academic research alike (e.g., Casadesus-Masanell & Zhu, 2013; Chesbrough et al., 2002; Markides, 2013; Reeves & Deimler, 2011; Zott et al., 2007). One focus of past work has been the relationship between business models and successful technology exploitation (Chesbrough, 2010; Chesbrough et al., 2002; Gambardella et al., 2010). New technologies can operate more successfully if brought to market via a different business model than that prevalent within the firm. Other research has focused on the performance effect of different business model types in emerging firms entering a new market (e.g., Amit et al., 2001; Zott et al., 2007). Recent work on business model innovation and competitive games (Casadesus-Masanell et al., 2013) has introduced a formal model of business model innovation related to the monetization effort of firms.

The studies mentioned above are examples of the growing body of research regarding business model innovation. Past work, however, has focused mainly on entrepreneurial firms and their design of the business model. The antecedents of business model innovation of incumbent firms in established industries have not yet been studied due in part to the difficulty of measuring the construct empirically (for an exception presenting a case study example, please see Sosna, Trevinyo-Rodrìguez, and Velamuri, 2010). An initial step in this direction has focused on a specific type of business model innovation, namely sponsor-based business models (Casadesus-Masanell et al., 2013), but this work remains theoretical in nature. Most importantly, although it provides interesting insights into the decision of incumbent firms to innovate their business model, this work assumes that a new business model can be adopted without constraints. Our work in contrast, insists precisely on the antecedents that trigger changes in the business model of incumbent firms.

Recently, business model innovation has been defined as a subset of two different types of activities: design and reconfiguration (Massa et al., 2013). The former relates to the design of novel business models for newly formed organizations, the latter to the change of the existing business models of incumbent firms. Given our specific interest in incumbent firms, in this paper we focus on business model reconfiguration, intended as "the phenomenon by which managers reconfigure organizational resources (and acquire new ones) to change an existing business model" (Massa and Tucci, 2013)[4].

It is important to note that there are different key factors when considering business model reconfiguration and innovation compared to those affecting product or process innovation (Chesbrough, 2010). Technological innovation gains from the order and focus of

[4] Following the definition provided by Massa and Tucci (2013), we recognize that business model reconfiguration includes business model innovation, but it may also refer to changes with a lower degree of radicalism.

the dominant logic of the firm (Prahalad & Bettis, 1986). Business model reconfiguration, in contrast, implies developing a new cognitive logic within the firm (Chesbrough et al., 2002; Massa et al., 2013). This differentiation is underlined by the fact that incumbent firms may be very successful technological innovators, but fail to reconfigure their business model (Chesbrough et al., 2002). We therefore pose the following research question: What are the antecedents of business model reconfiguration in incumbent firms?

To test our model and hypotheses, we constructed a unique database of firm characteristics for pension funds in the Australian pension industry, spanning the period 2003–2010. The choice of this setting is justified by the presence of a multiplicity of business models and frequent innovations. We use this database to test our model of business model reconfiguration over time, and generate a measure of business model reconfiguration for each firm at each point in time. This variable is then used as a dependent in the regression of the influence played by specific firm characteristics on the intensity of business model reconfiguration.

This paper provides theoretical and empirical contributions to the existing literature on business model innovation. Firstly, differently from existing work, it analyzes business model reconfiguration in incumbent firms within established industries by exploring the organizational and managerial antecedents. Past work has emphasized the need for further understanding of the forces that facilitate and shape extant business model designs and the mechanisms and process behind business model innovation (Chesbrough et al., 2002; George et al., 2011; Wirtz et al., 2010; Zott et al., 2007). We build on work within the organizational theory and strategy literature, focusing on a selected number of factors to be analyzed. In doing so, we recognize that not all incumbent firms have the same perception of the need to

change the business model and that not all the firms which decide to search for a new business model are then able to act on their decision. This paper also extends the quantitative and empirical work regarding the measurement of business model reconfiguration. To address this issue, we develop a dynamic approach to business model reconfiguration that maps the intensity of renewal over time. This makes it possible to integrate descriptive work done in previous research with a quantitative methodology.

The body of the paper is organized as follows. Firstly, we define the construct of business model reconfiguration and develop hypotheses regarding relevant antecedents that influence the intensity of business model reconfiguration. Secondly, we present our research design and introduce methodology to empirically analyze business model reconfiguration. Next, we present the results of our empirical analysis before closing with a discussion of our results and avenues for future research.

THEORY AND HYPOTHESES DEVELOPMENT

Definition of business model reconfiguration

The academic literature does not provide a single definition of a business model (George et al., 2011; Massa et al., 2013; Zott et al., 2011). A multitude of definitions have been brought forward, depending on the nature of the research (e.g., Afuah et al., 2001; Amit et al., 2001; Baden-Fuller et al., 2010; Chesbrough et al., 2002; Williamson, 2010). Our definition of a business model draws heavily on the activity-based perspective of a business model (Zott et

al., 2010), but at the same time acknowledges the linkage and interrelatedness between transactions and activities (Afuah et al., 2001; Ben-Porath, 1980; Commons, 1932). Accordingly, we consider the business model to consist of a set of different components (see also Seelos et al., 2007) with a stronger internal or external focus. Internal components are set within the boundaries of the firm. External components span the boundaries of the firm. These components interact with each other and have complex interdependencies (Massa et al., 2013). The following definition of a business model is thus put forward: 'The business model of a firm is defined by a set of key interdependent components – internally focused or externally engaging – that enable the firm to create, deliver and capture value.'

On this basis, business model reconfiguration can be defined as the 'modification or introduction of a set of key interdependent components – internally focused or externally engaging – that enable the firm to create and appropriate value.'

Antecedents of business model reconfiguration

Past work has seen incumbents rethink their business model as a result of new ventures entering their market with new business models (Casadesus-Masanell et al., 2013). Under this circumstance, incumbent firms need to find the best solution to the altered competitive environment and can react through business model reconfiguration (Johnson, 2010; Massa et al., 2013).

Scholars have successfully made the point that organizational and behavioral considerations need to be taken into account when considering changes within incumbents (Gilbert, 2005; Kaplan & Henderson, 2005; Rajagopalan & Spreitzer, 1997). Numerous

researchers have analyzed organizational rigidity in response to external change. This inertia has been attributed to competency traps (Leonard-Barton, 1992; Nelson & Winter, 1982b), myopia (Levinthal & March, 1993), or cognitive limits (Barr, Stimpert, & Huff, 1992; Tripsas & Gavetti, 2000).

Accordingly, by drawing on organizational theory and strategy literature, we classify antecedents to business model reconfiguration within two groups. On the managerial level, we recognize the importance of the top management team in the process of recognizing the need for resource reconfiguration (Doz & Kosonen, 2010). Top management has been shown to be essential for the future strategic positioning of the firm (Hambrick & Mason, 1984), as well as the adoption of innovations (Bantel & Jackson, 1989). At the organizational level, we focus on the organization's dependence on the old business model and its ability to redeploy resources (e.g., Chesbrough et al., 2002; Sosna et al., 2010) . Each antecedent allows us to address the steps involved in achieving business model reconfiguration, from engaging in search to relevant capabilities.

Hypotheses

Research in strategy has shown the importance of the members of the top management team and specifically their experience in determining the policies of a firm (Bertrand & Schoar, 2003; Kaplan, Klebanov, & Sorensen, 2008; Xuan, 2009). They are the ultimate decision-making body that sets the course for the firm and decides on its positioning in the industry and market (Eisenhardt & Zbaracki, 1992). Research on resource reconfiguration has seen the importance of strategic sensitivity among the top management team (Doz et al., 2010).

In particular, a top management team with extensive experience within the same firm influences the perception of necessary changes and reduces the willingness to stray from the path of past success (Pisano, 2006). The search scope is reduced to known solutions (Cyert & March, 1963; Katila & Ahuja, 2002; Nelson & Winter, 1982a). Moreover, a cognitive bias towards the old business model exists, reducing the appeal of business model reconfiguration. This can lead to the continuation of business as usual and hence inertia. Thus, changes in the top management team can serve to break up the inertial forces and pave the way for business model reconfiguration. In formal terms:

> *HYPOTHESIS 1: Previous changes within the top management team are positively associated with the intensity of business model reconfiguration*

In order to make the search process fruitful, a decisive top management team is essential (Doz et al., 2010). Resistance can take the form of cognitive barriers, such as uncertainty avoidance, mental closure, or accepted routines and traditions. Some scholars purport that heterogeneity can increase political fractioning among the top management team, and so have a detrimental effect on the ability to decide on the future path of the firm (Richard, Barnett, Dwyer, & Chadwick, 2004). Others have noted, however, that heterogeneity brings different views and constructive conflict to decision makers (Eisenhardt & Schoonhoven, 1990; Wagner, Pfeffer, & O'Reilly, 1984), thus helping to overcome cognitive barriers and accelerate decision-making.

Accordingly, we postulate a curvilinear effect for heterogeneity on subsequent engagement in business model reconfiguration. At first, heterogeneity can create cliques or in/out-groups that promote negative politics within the firm (Eisenhardt & Bourgeois, 1988;

Richard et al., 2004). This political tension will negatively influence the propensity to decide on the reconfiguration of the business model. Only as heterogeneity increases further can cliques or groups no longer be sustained, and political fractioning is reduced, as group members will be more evenly distributed over different categories of diversity. Furthermore the clashes of belonging inside or outside a group are diminished (Richard et al., 2004). Hence, power structures can be assumed to be more balanced, and arising conflict more constructive (Eisenhardt, Kahwajy, & Bourgeois, 1997). More balanced power structures reduce political stalemates and private disagreements within the top management team leading to unity in leadership, that is a collective commitment to stand by difficult decisions involving the business of the firm (Doz et al., 2010; Sosna et al., 2010).

Business model reconfiguration is a decision that involves the whole firm and thus necessitates unity in the top management team. Therefore, we expect that until a certain level, heterogeneity will have a negative effect on business model reconfiguration due to political fractioning in the top management team. However, beyond that level, the effect of heterogeneity will become positive thanks to stronger leadership unity. Thus, a u-shaped relationship with the intensity of business model reconfiguration is expected. In formal terms:

> *HYPOTHESIS 2: A U-shaped relationship exists between the heterogeneity of industry experience among a firm's top management team and the intensity of business model reconfiguration*

Even if a firm has managed to conduct search for a new business model, it must still be able to pursue that path. Firms, however, are often faced with a reliance on the old business model coming for example from customer dependence. A common barrier to

business model reconfiguration is conflict with existing assets (Chesbrough, 2010; Sosna et al., 2010). The propensity to redeploy resources currently used within the old business model is limited (Doz et al., 2010), and tension develops between competing business models (Amit et al., 2001). In particular the customer base associated with the old model may restrict the activities of the firm. Managers strongly focusing on a firm's existing assets will then miss the opportunity to change the business model and exploit future possibilities (Christensen & Bower, 1996). We can then formulate the following hypothesis:

> *HYPOTHESIS 3: The higher the customer dependence on the old business model, the lower the intensity of business model reconfiguration*

Lastly, once firms manage to unleash the resources employed by the old business model, they must still have the internal capability to recombine those resources. This means that a firm is capable of recombining different elements of the existing business model to fit a changed future environment (Doz et al., 2010). Business model reconfiguration, indeed, is a trial-and-error process (Sosna et al., 2010). In order to successfully embark on business model reconfiguration, firms must activate change processes. The presence of such processes increases the agility of a firm through the gained resource flexibility (Massa et al., 2013). The actors can then draw upon these processes when faced with similar complex experiences (Pennings, Barkema, & Douma, 1994). Therefore, a firm's ability to recombine resources should be associated with a higher intensity of business model reconfiguration. We can thus hypothesize the following:

> *HYPOTHESIS 4: The greater the ability to recombine resources, the higher the intensity of business model reconfiguration*

RESEARCH DESIGN

Empirical setting and data collection

Previous research on business models has focused mainly on the high-tech industry and newly- founded firms. Incumbent firms outside the high-tech realm have yet to be the focus of quantitative studies. This research addresses this gap and proposes the pension fund industry as a research setting, with particular reference to firms in the Australian pension fund industry[5].

The Australian pension fund industry possesses many desirable characteristics for testing our hypotheses. First, it is an established industry that has grown into an AUD 1.4 trillion business as of 30 June 2012, as well as the biggest retirement income system of its kind on a per capita basis worldwide (APRA, 2012a). The market has been active since the 1980s (APRA, 2007), with a multitude of firms taking different approaches to servicing its members. Firms need to stay on top in order to survive and avoid being taken over by other firms. Thus, the industry satisfies the need for research outside entrepreneurial firms and makes it possible to analyze business model reconfiguration in contrast with new business model design. Secondly, the industry offers room for multiple business models, and is characterized by a multitude of firms with different organizational attributes. Innovation in this industry is centered on internal, operational improvements and external, customer-offering and experience. Components reflecting the internal operations of a pension fund firms are for example the administrative systems relating to how contributions and payouts

[5] Australia's pension fund industry is locally referred to as superannuation industry. The superannuation industry is the pension system of Australia with mandatory membership for working individuals and compulsory contributions through employers. Further information on the Australian pension industry is summarized in the appendix.

are handled and how the individual money balances are administrated. The board of the firm must decide which structures to use and which operational innovations to implement. External elements relate for example to the contact channel for firm members providing connections with the customer or the service offering provided by the firm. In both cases the firm's board has the power to decide on the level of engagement and service it intends to provide to its customers.

Thirdly, industry regulation entails close observation by the regulator, the Australian Prudential Regulatory Authority (APRA). The regulatory framework that surrounds the pension fund firms is an advantage for the proposed research. It allows the analysis to take place in a uniform environment where business boundaries are government regulated, and every firm must comply with the rules. Environmental uncertainties affect all firms in the same way. In particular, regulation changes trigger modifications in market structure which firms must comply with. Such a major regulation change occurred from 2003-2010, affecting all firms. Competition rules were relaxed, but business standards were raised at the same time (Taylor, 2011). This environment lends itself particularly well to the analysis of the search behavior of firms and the antecedents to business model reconfiguration. Lastly, data collection efforts within the industry are extensive, spanning government-collected data, industry body publications, and firm specific communications.

The data set underlying the empirical analysis combines various data sources, namely a regulator-developed database (APRA, 2012b), surveys conducted by the industry body ASFA (Association of Superannuation Funds of Australia) (ASFA, 2003-2011), and an analysis of the individual fund's annual reports undertaken by the authors. This data set constitutes a subset of the overall industry. Through the use of multiple data sources,

common method bias is avoided. The database is an unbalanced panel spanning the period from 2003 to 2010, with a total of 64 funds.

Quantifying business model reconfiguration

We develop a quantitative methodology to measure business model reconfiguration over time in a real-life setting. Firms engage in a search process when faced with strong market changes that could lead to business model reconfiguration. Thus, we draw on the NK-model literature as a metaphor (Afuah et al., 2012) to develop our own methodology. The NK-model was first introduced among evolutionary biologists trying to understand the search process of species across a space (fitness landscape) of possible genotypes coming to a higher state of being through mutation and recombination (Kauffman, 1993; Kauffman et al., 1989). Kauffman (1993) showed that the fitness landscape describing the solution space depends on the number of attributes or components, N, and the number of interactions, K, between the attributes. NK fitness models have been introduced into strategic decision-making as theoretical representations of complex problems (e.g., Kauffman et al., 2000; Levinthal, 1997; Rivkin et al., 2002). In our paper, we apply the metaphor of the fitness landscape to a real world domain and track firm progress along the virtual landscape dependent on actual decision-making.

The fitness landscape of the NK-model is designed by deciding on the state of N components and the amount of interaction K between them. The specific values of N and K decide a firm's fitness value and thus its position on the landscape. We use this idea as the basis for the development of our method as it is consistent with our theoretical construct. We previously defined business model reconfiguration as the ‘modification or introduction of a

set of key interdependent components.' The N components of the NK-model can be defined as the possible change options a firm may choose from for its business model. In hindsight, the definition of these options is possible via an analysis of industry developments over time. During a pre-specified time span, each firm makes N decisions $[d_1\ d_2\ \ldots\ d_N] = \mathbf{d}$, one for each of the components (Rivkin et al., 2002). Each decision consists of choosing the state of each component. With respect to our context, two states are possible for each key component of the business model: 1= option implemented, 0= option not implemented, leading to a binary (0;1) decision for each component. The string of decisions taken at each point in time reflects the decision path taken by each individual firm over time.

Each decision taken by a firm at a specific moment in time is connected to a given *contribution value* (*c*). The contribution value is a numerical value that reflects the intensity of the change effort from that decision. An algorithm is used to allocate contribution values to each decision. The contribution values depend not only on the decision for the component under analysis, but consistently with our construct, also on the interaction with other components. The overall value of the decision stream is then the sum of all contribution values of the decisions taken within that stream. This overall value, or *fitness value* in the NK-terminology, reflects the business model reconfiguration effort undertaken by the firm at each point in time. To calculate business model reconfiguration, we only consider the modification of two or more components sufficient to count as business model reconfiguration, given that our definition of business model reconfiguration refers to a 'set of components.' Thus, each contribution value belongs not to a single decision, but to a combination (*i*) of decisions regarding the specific components.

The contribution value of each combination *i* of components at time *t* (c_{it}) depends on the change in the state of business model components and their interdependencies. The contribution value of each combination of decisions regarding individual components is calculated as the exponential of the inverse frequency (1/freq) of the specific combination *i* in the population of the firms under study $c_{it} = e_{it}^{1/freq_t(d_{jt;-jt})}$ at time *t*.

In the case of a two-component combination, for example, the contribution value (c_{it}) of this combination *i* at time *t* is calculated as:

$c_{it} = e_{it}^{1/freq_t(d_{lt;kt})}$ with:

d_{lt} = decision regarding component l at time t

d_{kt} = decision regarding component k at time t

$freq_t(d_{lt;kt})$ = frequency of the combination (d_{lt}; d_{kt}) with d_{lt} =1 and d_{kt} =1 appearing in the dataset for a given year t.

The interdependency of components changes the value of business model reconfiguration. The number (*m*) of possible combinations (*i*=1… *m*) depends on the number of implemented components. The higher is the number of implemented components, the higher are the possible interdependencies between these components and thus the number *m* of possible combinations. In the case of multiple interdependencies, the individual c_{it} values are added to create a single value of business model reconfiguration. More specifically, the overall value of ***business model reconfiguration (BMR)*** is calculated as the simple additive sum over all contribution values of each firm and combination of decisions at a specific point in time *t*. In formal terms:

BMR= $\sum_{i=1}^{m} c_{it}$ with

c_{it}= contribution value of combination *i at time t*

m = number of possible combinations from the N components

For example, the modification of two components creates only one interdependency, whereas the modification of three components creates four interdependencies. Different decision streams result in different business model reconfiguration values. The values vary depending on the frequency and quantity of change. The more novel (lower frequency) and the more complex (more simultaneous component changes) a reconfiguration of the business model is, the higher the assigned value. This functional form is advantageous for our analysis. It fulfills the non-negativity constraint deriving from the positive definition of change. Furthermore, the construct of business model reconfiguration is based on the notion of interdependency and super-additivity. Interdependent change is worth more than independent change. Functions from the exponential family have been in use in innovation studies since the 1950s (e.g., Dodd, 1955; Kelly, 1967)[6].

In order to calculate the variable, we needed to define the key components of the business model of a pension fund. To this purpose, we conducted field interviews with practitioners, academics, and regulators in the industry[7]. The interviews were structured in open form using general and broad questions in order to avoid focusing on elements pre-selected by the interviewer. We identified the main themes apparent in the interviews. These were then validated against previous research on business model reconfiguration and innovation (for an overview of the literature please see: George et al., 2011; Zott et al., 2011) and again discussed with selected interview partners. Thus, the components reflect an

[6] We also analyzed an alternative functional form of our dependent variable, namely a count model specification. Results however do not change significantly. These are available upon request.
[7] The list of interview partners is available on request.

intersecting set between research on business models and specific knowledge of industry developments, but remain industry-specific in nature.

As result of this analysis, we have focused on the following seven components for pension fund firms in our analysis of business model reconfiguration: transition to retirement product, in-house administration, unit pricing, online account access, online transactions, alternative investments, and financial planning affiliate. The first component, transition to retirement products, is an allocated pension that allows a member to access an income stream prior to full retirement. This product changes the role the firm plays for the customer, from sole custodian of money to provider of complex pension services. The second, in-house administration, consists of administration services performed by employees of the firm. They reflect a more sophisticated firm as this task is typically carried out by a third party. The third component, unit pricing, is the unitization of pension accounts. The balance in accounts is expressed in units, and value changes are reflected in the market price of each individual unit. This differs from the historically used end-of-year interest crediting. The fourth component, online account access, is a computer-user interface that allows pension fund firm members to access their pension account electronically, and change their asset allocation, for example. The fifth, online transactions are electronic money transfers to a pension account which are authorized and conducted by the account holder, a novelty for an industry often accepting only checks as payment. Alternative investments, the sixth component, are monetary investments in absolute-return products such as venture capital funding. Finally, the financial planning affiliate is a financial planning firm set up by the pension fund firm to serve its members with financial planning advice, and is directly related to the fund. These seven components constitute the major business model changes introduced in the industry from 2003 to 2010, and hence form the basis of our investigation.

An example of successful business model reconfiguration within this industry, including several of the mentioned components, is the Retail Employees Superannuation Trust. In 2005, this trust decided to reconfigure its business model and reposition itself as a financial firm and not simply a custodian of money. Hence, it shifted its customer interaction to a more proactive approach by offering financial planning advice to new and young customers that were previously forced to go elsewhere. Simultaneously, it increased product scope to elderly and retiring members by introducing a transition to retirement product, and thus the possibility of receiving a pension stream instead of a lump-sum payment. To round off the move, it also introduced online account access, bringing the fund into the digital age. This reconfiguration changed the role the pension fund firm plays in its customers' lives, how it approaches the market, and how it organizes its operations.

Independent variables

In this section we describe the independent variables that have been defined to test our hypotheses.

Change among the top management team refers to the new members on the trustee board. In this industry, the trustee board is the ultimate decision-making body for the firm. The board meets regularly to be updated on recent developments affecting the firm and to decide on any issues that may arise, as well as on the future path of the firm. The variable is calculated as a dummy variable equal to 1 if at least one new member or chairman was introduced to the trustee board in a specific year and 0 otherwise. The variable is introduced with a one-year lag.

Heterogeneity of experience relates to the diverse industry experience of the board members. In this industry, board composition tends to be homogeneous, with board members

coming from the same industry background originally giving birth to the firm e.g., the transport industry. However, new board members in some firms led to the introduction of members or chairmen with backgrounds in an industry different from the original one of the firm, especially from financial services. The integration of members from different backgrounds tends to create conflict in an otherwise homogeneous group. Hence, we include the number of representatives from an industry different from that of the firm as proxy for the heterogeneity of experience. Total board size is included as a control variable.

In this industry, ***dependence on the old business model*** is connected to the membership base of the firm. Firms with an older membership base must follow a more continuous approach as payouts to retired and retiring members are needed. Firms with a younger membership base, on the other hand, have more room for experimentation, as liquidity payouts are not as imminent (Gerrans, Clark-Murphy, & Speelman, 2010). The recovery time for an experimental decision gone awry is hence greater. Accordingly, we calculate the variable as the percentage of members in retirement. This variable enters the regression with a lag of one year.

Finally, we operationalised ***the ability to recombine resources*** via the previous merger and acquisition experience of the pension fund firm. Mergers and acquisitions involving major adaptations of firm operations establish a positive set of skills and routines within the whole firm (Lubatkin, 1983) which can allow the focal firm to learn how to recombine elements of its business model in a changing environment. This transaction experience teaches the employees of the firm how to cope with changing structures and new administrative and operational routines (Zollo & Singh, 2004). Thus, a firm can learn how resources can be employed in different contexts. Literature on firm acquisitions has noted the

relevance of acquisitions for firm adaptation (Capron & Mitchell, 1998a; Capron, Mitchell, & Swaminathan, 2001). In particular, it has been shown that the ability to recombine resources is enhanced within firms that had engaged in an acquisition process (Capron et al., 1998a; 1998b). Hence, here, previous merger and acquisition experience serves as a proxy for a firm's ability to recombine resources. A dummy variable equal to one is generated if at least one transaction is completed the year before the focal year.

The lag structure of the independent variables also serves to mitigate causality concerns to the extent that a temporal sequence can be analyzed.

Control variables. Further factors are included in the regression that could influence the behavior of the firms and mitigate a possible omitted variable bias. It has been shown that the resource endowments of firms can influence their strategic decision-making (Gilbert, 2005; Kraatz et al., 2001; Snow & Hrebiniak, 1980). This paper includes the past performance, log of total assets, member growth, total board size, as well as the component number of the pension fund in 2003. The component number indicates the amount of components already present in the business model of the firm in the year 2003. It is important in so far as the design of the model hinders reconfiguration outside pre-specified components. Hence, the higher the component number of a firm at the outset, the less renewal will be seen. The inclusion of this variable also allows for the consideration of possible reconfiguration activity prior to the starting date of data collection in 2003. Moreover, the regression includes single year dummy variables in order to account for possible time-specific fixed effects. All control variables are taken from government data apart from the total board size which is drawn from firm annual reports.

Econometric modeling and estimation approach

In order to empirically test our research design, we estimate a generalized linear model utilizing a gamma function that takes the panel data structure of the data base into account by accommodating grouping on the firm identifier. The gamma distribution accounts for the exponential form of the dependent variable, while the panel estimation corrects the regression for possible unobserved firm effects. In order to ensure adequacy of p-values in a panel data setting, the model was modified to take clustering of data points on the firm identifier into account when calculating standard errors (Cameron & Trivedi, 2010). We correct for possible heteroskedasticity by using robust standard errors. We tested for multicollinearity among the independent variables by calculating variance inflation factors (VIF) (Kleinbaum, Kupper, Nizam, & Muller, 2008). VIF is acceptable for all variables individually. VIF remains within acceptable levels when considering the overall mean value of 2.07. We also tested for serial correlation of first order via a Wooldridge test. The null hypothesis of no first order autocorrelation cannot be rejected at 5 percent (p-value=0.1819), hence we sustain no autocorrelation of first order within the model. Overall, we conclude that our model is valid and robust for the conducted analysis.

RESULTS

Descriptive statistics Table 1 provides descriptive statistics for the variables used in the regression analysis. The amount of introduced components present in the year 2003 ranges from zero to five. The value of the business model reconfiguration variable ranges from zero

to 25.04. A median of zero and mean of 0.51 shows that the majority of firms in the sample did not reconfigure the business model in most time periods although reconfiguration is relatively frequent. This evidence supports the idea that business model reconfiguration is a very costly experience for established firms and is hence not easily conducted. The range of values also shows that some firms modify multiple components at a time, confirming the interdependencies among them[8].

INSERT TABLE 1 ABOUT HERE

Furthermore, we see that the median of firms not originating from the finance industry had at least one representative with relevant industry experience (variable heterogeneity) and changed a board member or chairman at least once in the time frame. Most firms in the sample have a low dependence on the previous business model, with the percentage of pension members showing a mean of 4.73 percent and median of 0.94 percent. However, the standard deviation and range of values shows that there are wide differences between the individual entities. In terms of conducted transactions, it is interesting to note that most firms in the sample (mean=0.07, median=0) did not conduct a transaction of either kind in the years under analysis. As expected this is an unusual event.

INSERT TABLE 2 ABOUT HERE

[8] Please note that once a firm has implemented all seven possible components in the time period, the model currently does not allow for further modifications of the business model. Outside the time frame under study, a firm can reassess individual components and modify or introduce new components. In the time frame of our analysis, this was not the case. The seven elements constitute the most important business model reconfiguration efforts displayed in the time span under study. However, considering that only 4 of seven possible components were changed simultaneously, the second argument seems less dominant in comparison to the first. Most firms would still have had enough degrees of freedom in the model to continue to reconfigure the business model.

Table 2 depicts the Pearson correlation coefficients among the explanatory variables used in the regression analysis. Multicollinearity issues do not arise, as variance inflation factors (VIF) are low.

Hypotheses tested Table 3 depicts the results of the regression model regarding antecedents to business model reconfiguration. Three models are tested, starting with a base model as model 1 and followed by two full models (model 2 and model 3) that test our hypotheses. Models 2 and 3 differ in their treatment of the merger and acquisition experience (variable resource recombination), with model 3 splitting the experience into a simple and complex type. The complex type better aligns with our theoretical construct of internal ability to recombine resources.

Model 1 includes only control variables and their effect on the dependent variable. The component number of the firm in year 2003 is significant at 5 percent, with a negative effect on business model reconfiguration, as expected. Total pension fund firm assets have a positive effect on business model reconfiguration in model 1, significant at 5 percent. Member growth shows a slight positive effect with significance at 0.1 percent. Past performance shows a positive effect at a one-year lag. This is however not significant. Total board size has a negative effect with significance at 1 percent. Directions of effects are retained for all variables, apart from total pension fund firm assets in all models, while significance levels increase for most variables.

In model 2 and model 3 we test our hypotheses. There is support for hypothesis 1 (regarding top management team change) in model 3. The coefficient relating to the changes in the top management team is positive, as expected, with high significance. The variable captures changes to the top management team in the previous year. We can hence sustain that one or several new top management team members introduce fresh ideas to the top management team, thus making a difference with respect to engaging with the search process and so ultimately increasing the intensity of business model reconfiguration.

Hypothesis 2 (regarding heterogeneity on the top management team) receives significant support from the data in both models. The variable shows a positive u-shaped effect with the coefficient on the direct effect being negative, while that on the quadratic is positive[9]. Hence, we assume a positive, u-shaped influence on the propensity to reconfigure the business model. Low values may relate to firms that have homogeneous top management teams and introduce specialists in order to broaden their search scope to include business model reconfiguration. High values imply a widely specialized top management team with very low clique building and a balanced power structure. Hence, the top management team can leverage its strong expertise in the field to discover and push through business model reconfiguration. The middle ground shows excessive conflict, as expected, that does not allow bold decision-making essential to business model reconfiguration.

INSERT TABLE 3 ABOUT HERE
---

[9] This effect is retained even if a ratio of finance representatives to total board size is used instead of the exact number of representative. In this scenario only Hypothesis Two loses significance, whereas the other variables are significant at a higher percentage.

Hypothesis 3 (regarding dependence on the old business model) is also sustained by the regression analysis. In the full model 3, the dependence on the old business model at a one-year lag has a significant negative effect on business model reconfiguration. This confirms our reasoning and further validates past research on business model reconfiguration (Amit et al., 2001; Chesbrough et al., 2002) that the pull from the existing business model may have a substantial effect on the intensity of business model reconfiguration.

Hypothesis 4 (the ability to recombine resources) is supported by the analysis. As shown in table 3, the coefficient for recombination ability is positive and significant, although the underlying transaction variable is not split according to the intensity of the transaction process. The observed effect is robust to changes in the model specification, and increasingly significant from 5 percent in model 2 to 1 percent in model 3. It is especially interesting to note that splitting the transaction experience into two types shows two distinct effects (see model 3): a large positive coefficient for complex transactions which is significant and a smaller negative coefficient for simple transactions that is not. This finding underlines the hypothesis that only strongly complex change enables the development of relevant capabilities which are beneficial for subsequent business model reconfiguration. If no real disruption of the status quo is perceived, the transaction has no influence on capability development needed for business model reconfiguration.

DISCUSSION AND CONCLUSION

In recent times, business models and business model innovation have received increased attention in theory and practice. Promoted as a unifying perspective that captures the essence of how a firm conducts business (e.g., Amit et al., 2001), the business model relates to the

key components managed by the firm to create, deliver and capture value. We look at business model reconfiguration within incumbent firms. Past research attempted to explain factors that hinder the innovation of the business model (Amit et al., 2001; Chesbrough, 2010; Chesbrough et al., 2002; Sosna et al., 2010). Here we take a different approach and develop a theoretical framework focusing on antecedents of the reconfiguration of existing business models undertaken by incumbent firms. While the difficulty of business model innovation has been noted, a detailed analysis of factors influencing the search and the completion of a change in existing business models has not been conducted. One possible reason for this is the current lack in methods for analyzing business model reconfiguration empirically. Here we aim to close this gap. Our analysis of the antecedents of business model reconfiguration is set in the pension fund industry.

Our findings show that business model reconfiguration is facilitated by changes within the top management team. We also show that heterogeneity among the top management team, and thus varying degrees of leadership unity, has a u-shaped effect on the intensity of business model reconfiguration. Organizational factors that influence the way a firm can react to a business model reconfiguration decision have shown two distinct effects. Resource dependence on the old business model shows a negative effect on the intensity of business model reconfiguration. In contrast, the internal ability to recombine resources has a positive effect on the intensity of business model reconfiguration.

The paper contributes to current research in a variety of ways. Firstly, it advances business model research into the realm of incumbent firms within established industries (Zott et al., 2007). Previous work focused mainly on the high-tech sector and newly founded firms (e.g., Amit et al., 2001; Zott et al., 2007). It was more concerned with different types of

business models (e.g., Zott et al., 2007) promoted by new ventures and did not consider the specific circumstances facing incumbent firms. Secondly, we analyzed the antecedents of business model reconfiguration within incumbent firms, hereby extending previous research on business model innovation which focused mainly on barriers to business model innovation (Amit et al., 2001; Chesbrough, 2010; Chesbrough et al., 2002; Sosna et al., 2010; Tripsas et al., 2000), as opposed to factors which enhance the propensity to reconfigure the business model. We also contribute to the recent work of Casadesus-Masanell and Zhu (2013) which analyses economic incentives of incumbents to innovate the business model, but assumes no cost or organizational barriers. The current analysis gives insight into the organizational and managerial factors which influence the intensity of business model reconfiguration within an incumbent. Thirdly, our methodological contribution is the introduction of a novel method to quantitatively measure business model reconfiguration and empirically test our hypotheses. To the best of our knowledge, this has not been done previously. Unlike previous work, our method enables a regression analysis of business model reconfiguration and so constitutes a departure from the case-study and more qualitative approaches used in previous work (e.g., Desyllas et al., 2013; Sosna et al., 2010; Zott et al., 2007).

The conducted study sheds light on the broader mechanisms at work when firms consider business model reconfiguration, and thus also aims to contribute to managerial practice. The importance of an open mindset to successfully engage in and bring to a close a search process is essential. This research also shows that managers gain from learning to cope with the pull of assets strongly ingrained in the old business model. Hence, we hope to highlight this dependency and create awareness amongst managers. Existing assets can be a strong deterrent for a new business model to the extent that they can be less valuable in the new business model. Specific processes and measures need to be employed in order to foster

business model reconfiguration. Furthermore, this research highlights the importance of the ability to recombine resources. Inferences and learning after disruptive change can pay off when firms are faced with similar situations of uncertainty in the future. Codification of knowledge could further embed the learning from past events, thus easing business model reconfiguration.

Limitations to the conducted analysis exist. The developed method is a good approximation for the business model reconfiguration effort seen in the firm. However, it simplifies the complexities of a business. The actual calculation of the fitness landscape and the path taken by a firm could further enhance the understanding of business model reconfiguration.

Furthermore, the theoretical framework focuses on a select number of variables as the key factors in enabling business model reconfiguration. Further potential elements that could moderate the effects such as firm liquidity or the innovative capability of the firm are not explicitly considered. The somewhat uniform research environment also reduces the possibility of inferences for more dynamic business settings, such as the IT industry for example. Technological advances are tools implemented in the pension fund industry, but not its central feature. Conclusions regarding the interdependence of business model reconfiguration and technological innovation cannot be drawn.

REFERENCES

Afuah A, Tucci C. 2001. *Internet business models and strategies: Text and cases*. McGraw-Hill: New York

Afuah A, Tucci C. 2012. Crowdsourcing as a solution to distant search. *Academy of Management Review* **37**(3): 355-375

Amit R, Zott C. 2001. Value creation in e-business. *Strategic Management Journal* **22**: 493-520

Amit R, Zott C. 2012. Creating value through business model innovation. *MIT Sloan Management Review* **53**(3): 41-49

Apra. 2007. Celebrating 10 years of superannuation data collection, *APRA Insight*, Vol. Issue 2. Australian Prudential Regulation Authority

Apra. 2012a. Annual superannuation bulletin, june 2011, *APRA Statistics*. Australian Prudential Regulation Authority: Sydney

Apra. 2012b. Superannuation fund-level profiles and financial performance, june 2011, *APRA Statistics*. Australian Prudential Regulation Authority: Sydney

Asfa. 2003-2011. Annual fund surveys, *Superfunds*. ASFA - the Association of Superannuation Funds of Australia Limited

Baden-Fuller C, Morgan M. 2010. Business models as models. *Long Range Planning* **43**: 156-171

Bantel K, Jackson S. 1989. Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal* **10**(S1): 107-124

Barr P, Stimpert J, Huff A. 1992. Cognitive change, strategic action, and organizational renewal. *Strategic Management Journal* **13**: 15-36

Ben-Porath Y. 1980. The f-connection: Families, friends, and firms and the organization of exchange. *Population and Development Review* **6**(1): 1-30

Bertrand M, Schoar A. 2003. Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics* **118**(4): 1169-1208

Cameron C, Trivedi P. 2010. *Microeconometrics using stata*. Stata Press: USA

Capron L, Mitchell W. 1998a. Bilateral resource redeployment and capabilities improvement following horizontal acquisitions. *Industrial and Corporate Change* **7**(3): 453-484

Capron L, Mitchell W. 1998b. The role of acquisitions in reshaping business capabilities in the international telecommunications industry. *Industrial and Corporate Change* **7**(4): 715-730

Capron L, Mitchell W, Swaminathan A. 2001. Asset divestiture following horizontal acquisitions: A dynamic view. *Strategic Management Journal* **22**(9): 817-844

Casadesus-Masanell R, Zhu F. 2013. Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal* **34**(4): 464-482

Chesbrough H. 2010. Business model innovation: Opportunities and barriers. *Long Range Planning* **43**: 354-363

Chesbrough H, Rosenbloom R. 2002. The role of the business model in capturing value from innovation: Evidence from the xerox corporation's technology spin-off companies. *Industrial and Corporate Change* **11**(3): 529-555

Christensen C, Bower J. 1996. Customer power, strategic investment, and the failure of leading firms. *Strategic Management Journal* **17**(3): 197-218

Commons J. 1932. The problem of correlating law economics and ethics. *Wisconsin Law Review* **8**: 3-26

Cyert R, March J. 1963. A behavioral theory of the firm. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*

Desyllas P, Sako M. 2013. Profiting from business model innovation: Evidence from pay-as-you-drive auto insurance. *Research Policy* **42**(1): 101-116

Dodd S. 1955. Diffusion is predictable: Testing probability models for laws of interaction. *American Sociological Review* **20**(4): 392-401

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

Eisenhardt K, Bourgeois L. 1988. Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal* **31**: 737-770

Eisenhardt K, Kahwajy J, Bourgeois L. 1997. Conflict and strategic choice: How top management teams disagree. *California Management Review* **39**(2): 42-62

Eisenhardt K, Schoonhoven C. 1990. Organizational growth: Linking founding team, strategy, environment, and growth among u.S. Semiconductor ventures, 1978-1988. *Administrative Science Quarterly* **35**: 504-529

Eisenhardt K, Zbaracki M. 1992. Strategic decision making. *Strategic Management Journal* **13**(S2): 17-37

Gambardella A, Mcgahan A. 2010. Business-model innovation: General purpose technologies and their implications for industry structure. *Long Range Planning* **43**: 262-271

George G, Bock A. 2011. The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice* **35**: 83-111

Gerrans P, Clark-Murphy M, Speelman C. 2010. Asset allocation and age effects in retirement savings choices. *Accounting & Finance* **50**(2): 301-319

Gilbert C. 2005. Unbundling the structure of inertia: Resource versus routine rigidity. *Academy of Management Journal* **48**: 741-763

Hambrick D, Mason P. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review* **9**(2): 193-206

Johnson M. 2010. *Seizing the white space. Business model innovation for growth and renewal*. Harvard Business Press: Boston, Massachussetts

Kaplan S, Henderson R. 2005. Inertia and incentives: Bridging organizational economics and organizational theory. *Organization Science* **16**: 509-521

Kaplan S, Klebanov M, Sorensen M. 2008. Which ceo characteristics and abilities matter? Nber working paper 14195, national bureau of economic research, cambridge, ma. Available at: http://www.nber.org/papers/w14195.

Katila R, Ahuja G. 2002. Something old, something new: A longitudinal study of search behavior and new product introduction. *Academy of Management Journal* **45**(6): 1183-1194

Kauffman S. 1993. *The origins of order: Self-organization and selection in evolution*. Oxford University Press: New York

Kauffman S, Lobo J, Macready W. 2000. Optimal search on a technology landscape. *Journal of Economic Behavior & Organization* **43**: 141-166

Kauffman S, Weinberger E. 1989. The nk model of rugged fitness landscapes and its application to maturation of the immune response. *Journal of Theoretical Biology* **141**: 211-245

Kelly R. 1967. Estimating ultimate performance levels of new retail outlets. *Journal of Marketing Research (JMR)* **4**(1): 13-19

Kleinbaum D, Kupper L, Nizam A, Muller K. 2008. *Applied regression analysis and other multivariable methods* (4th ed.). Duxbury: Belmont, CA

Kraatz M, Zajac E. 2001. How organizational resources affect strategic change and performance in turbulent environments: Theory and evidence. *Organization Science* **12**: 632-657

Leonard-Barton D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal* **13**: 111-125

Levinthal D. 1997. Adaptation on rugged landscapes. *Management Science* **43**: 934-950

Levinthal D, March J. 1993. The myopia of learning. *Strategic Management Journal* **14**: 95-112

Liu K, Arnold B. 2010. Superannuation landscape. *APRA Working Paper*: 1-22

Lubatkin M. 1983. Mergers and the performance of the acquiring firm. *Academy of Management Review* **8**: 218-225

Markides C. 2013. Business model innovation: What can the ambidexterity literature teach us? *The Academy of Management Perspectives* **doi: 10.5465/amp.2012.0172**

Massa L, Tucci C. 2013. Business model innovation. In Dodgson M, Gann D, Phillips N (Eds.), *The oxford handbook of innovation management*: forthcoming. Oxford University Press: New York

Nelson R, Winter S. 1982a. *An evolutionary theory of economic change*. Belknap Press of Harvard University Press: Cambridge, MA

Nelson Rr, Winter Sg. 1982b. The schumpeterian tradeoff revisited. *The American Economic Review* **72**(1): 114-132

Pennings J, Barkema H, Douma S. 1994. Organizational learning and diversification. *Academy of Management Journal* **37**: 608-640

Pisano G. 2006. Profiting from innovation and the intellectual property revolution. *Research Policy* **35**: 1122-1130

Prahalad C, Bettis R. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal* **7**(6): 485-501

Pwc. 2013. Unleashing the power of innovation. In Percival D, Shelton R (Eds.), Vol. 2013: 1-14. pwc: London

Rajagopalan N, Spreitzer G. 1997. Toward a theory of strategic change: A multi-lens perspective and integrative framework. *Academy of Management Review* **22**: 48-79

Reeves M, Deimler M. 2011. Adaptability: The new competitive advantage. *Harvard Business Review* **89**: 134-141

Richard O, Barnett T, Dwyer S, Chadwick K. 2004. Cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation dimensions. *Academy of Management Journal* **47**(2): 255-266

Rivkin J, Siggelkow N. 2002. Organizational sticking points on nk landscapes. *Complexity* **7**(5): 31-43

Seelos C, Mair J. 2007. Profitable business models and market creation in the context of deep poverty: A strategic view. *Academy of Management Perspectives* **21**: 49-63

Snow C, Hrebiniak L. 1980. Strategy, distinctive competence, and organizational performance. *Administrative Science Quarterly* **25**: 317-336

Sosna M, Trevinyo-Rodrìguez N, Velamuri R. 2010. Business model innovation through trial-and-error learning. *Long Range Planning* **43**: 383-407

Taylor S. 2011. Captured legislators and their twenty billion dollar annual superannuation cost legacy. *Australian Accounting Review* **21**(3): 266-281

Teece D. 2010. Business models, business strategy and innovation. *Long Range Planning* **43**: 172-194

Tripsas M, Gavetti G. 2000. Capabilities, cognition and inertia: Evidence from digital imaging. *Strategic Management Journal* **21**: 1147-1161

Wagner W, Pfeffer J, O'reilly C. 1984. Organizational demography and turnover in top-management group. *Administrative Science Quarterly* **29**: 74-92

Williamson P. 2010. Cost innovation: Preparing for a 'value-for-money' revolution. *Long Range Planning* **43**: 343-353

Wirtz B, Schilke O, Ullrich S. 2010. Strategic development of business models. *Long Range Planning* **43**: 272-290

Xuan Y. 2009. Empire-building or bridge-building? Evidence from new ceos' internal capital allocation decisions. *Review of Financial Studies* **22**: 4919-4948

Zollo M, Singh H. 2004. Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in u.S. Bank mergers. *Strategic Management Journal* **25**: 1233-1256

Zott C, Amit R. 2007. Business model design and the performance of entrepreneurial firms. *Organization Science* **18**: 181-199

Zott C, Amit R. 2010. Business model design: Activity system perspective. *Long Range Planning* **43**: 216-226

Zott C, Amit R, Massa L. 2011. The business model: Recent developments and future research. *Journal of Management* **37**: 1019-1042

TABLES

Table 1 Descriptive statistics

Variable name	Mean	Median	Standard deviation	Min	Max	No. obser-vations
BMR	0.51	0.00	2.45	0.00	25.04	332
Component number (2003)	1.50	1.00	1.02	0.00	5.00	332
Heterogeneity	1.01	0,00	1.54	0.00	7.00	332
Heterogeneity (sq)	3.39	0.00	8.87	0.00	49.00	332
TMT change	0.64	1.00	0.48	0.00	1.00	331
Resource recombination	0.07	0.00	0.25	0.00	1.00	331
Resource recombination (complex)	0.03	0.00	0.17	0.00	1.00	331
Resource recombination (simple)	0.04	0.00	0.19	0.00	1.00	331
BM dependence	4.73	0.94	12.55	0.00	80.35	331
Total assets (log)	14.33	14.41	1.24	10.82	17.31	318
Past performance (%)	5.12	9.85	11.15	-26.17	21.38	332
Member growth (%)	3.31	0.04	59.33	-0.34	1081.13	332
Total board size	8.65	8.00	2.29	4.00	17.00	332

Table 2 Pearson correlation coefficients of model variables

Variable name	Business model reconfiguration	Resource recomb. (lag1)	Resource recomb. (complex) lag1	Resource recomb. (simple) lag1	TMT change	Heterogeneity	Heterogeneity (squared)	BM dependence	Component nr. (2003)	Total assets (log)	Member growth (%)	Past Performance (%) lag1	Total board size
Business model reconfiguration	1.00												
Resource recomb. (lag1)	-0.021	1.00											
Resource recomb. (complex) lag1	0.01	0.72	1.00										
Resource recomb. (simple) lag1	-0.04	0.66	-0.04	1.00									
TMT change (lag1)	-0.02	0.11	0.07	0.08	1.00								
Heterogeneity	-0.002	-0.02	0.02	-0.04	0.01	1.00							
Heterogeneity (squared)	0.04	-0.02	0.02	-0.06	0.02	0.92	1.00						
BM dependence (lag1)	0.01	-0.01	0.05	-0.07	0.02	0.02	-0.02	1.00					
Component nr. (2003)	0.01	0.02	0.001	0.03	0.02	-0.07	-0.03	-0.14	1.00				
Total assets (log)	0.01	0.09	0.07	0.05	0.10	0.04	0.02	-0.01	0.23	1.00			
Member growth (%)	0.02	-0.02	-0.01	-0.01	0.04	-0.001	-0.01	-0.02	0.08	-0.01	1.00		
Past performance (%) lag1	0.10	0.07	0.05	0.05	-0.004	-0.03	-0.01	0.01	-0.01	-0.03	0.02	1.00	
Total board size	0.09	0.11	0.06	0.09	0.12	-0.25	-0.19	-0.04	-0.06	0.20	-0.02	-0.03	1.00

Table 3 Regression results with cluster-robust standard errors

	Dependent variable: business model reconfiguration		
Variable name	Model 1 Value (st. err.)	Model 2 Value (st. err.)	Model 3 Value (st. err.)
Constant	-0.42 (0.67)	2.77 (1.70)	5.11† (2.91)
TMT change (lag1)		0.16 (0.14)	0.92** (0.34)
Heterogeneity		-0.85* (0.33)	-1.07** (0.31)
Heterogeneity (squared)		0.12** (0.04)	0.16*** (0.04)
BM dependence (lag1)		-0.13** (0.04)	-0.08*** (0.02)
Resource recomb. (lag1)		5.52* (2.48)	
Resource recomb. (complex) lag1			3.01**(1.04)
Resource recomb. (simple) lag1			-0.23 (0.57)
Component nr. (2003)	-0.88* (0.34)	-0.76** (0.26)	-0.60** (0.20)
Total assets (log)	0.34* (0.14)	-0.40** (0.13)	-0.56** (0.20)
Member growth (%)	0.0007*** (0.0001)	0.002*** (0.0005)	0.002** (0.0005)
Past performance (%) lag1	0.03 (0.03)	0.76*** (0.20)	0.70*** (0.18)
Total board size	-0.48** (0.18)	-0.53*** (0.14)	-0.54** (0.16)
N	332	332	332
Groups	64	64	64

†0.05 ≤p<0.1, *0.01 ≤p<0.05, **0.05 ≤p<0.01, ***p<0.001.

APPENDIX - A

Background on the Australian pension industry

Australian pension funds, analyzed in this paper, are part of the Australian Retirement Savings System. The Superannuation Guarantee Administration Act 1992 and Industry Supervision Act 1993 established this system of private retirement accounts, funded by compulsory wage or salary-based contributions (Liu & Arnold, 2010).

Many funds in this industry predate the introduction of a compulsory system. Four groups of funds can be distinguished: Industry funds were established to provide retirement benefits to unionized workers in a single industry, corporate funds were intertwined with a specific corporation and public sector funds held benefits for certain groups of government employees. Historically, membership was closed and mutually exclusive, making these funds nonpublic offer funds. A fourth group of retail funds catered for individuals not eligible to join the other fund types or provided post-retirement pensions often not provided by the other funds. Since 1993, restrictions to membership no longer apply and funds can choose to freely compete on the market. The different categories also influenced the set-up of the fund, its membership, and composition of the trustee board. The management of Australian pension funds is given to a board of trustees that acts in the best interest of the members and is bound by a trust deed. The trust deed regulates the actions a fund can take and for example limits the membership of the fund. Changes to the trust deed have to be signed off by the whole fund board.

The requirements for funds were further tightened in 2006 with the introduction of a licensing requirement from the regulator APRA. This license was introduced predominantly

to ensure better management of risk within the trustee, the fund, as well as service providers, and the fitness and propriety of responsible officers.

Paper 2

DOES BUSINESS MODEL RECONFIGURATION LEAD TO BETTER PERFORMANCE IN INCUMBENTS? AN EMPIRICAL ANALYSIS OF AUSTRALIAN PENSION FUNDS

Presented at conferences: DRUID 2013, Barcelona (Spain)

AOM 2014, Philadelphia, PA (USA)

Author 1: M. Hartmann (LUISS Guido Carli, Rome)

Author 2: Prof. R. Oriani (LUISS Guido Carli, Rome)

Author 3: Prof. H. Bateman (UNSW, Sydney)

Title: *Does business model reconfiguration lead to better performance in incumbents? An empirical analysis of Australian pension funds*

Abstract

This paper focuses on the performance effect of business model reconfiguration in incumbent firms in an environment where IP protection is not an option. We utilize a direct measure of business model reconfiguration to test the performance effect. Furthermore, we look at the influence of contingency factors on this relationship. Business model reconfiguration is operationalised quantitatively and tested empirically. We use a panel dataset consisting of single, incumbent firms to test our hypotheses. The empirical setting is the Australian pension industry, an established and fast growing industry. The panel spans the years 2003-2010 and consists of a total of 63 firms. The empirical analysis shows a positive, inverse u-shaped effect of business model reconfiguration within incumbents on their operational performance. This effect is moderated by the size of the firm and the resource munificence of the firm. Smaller sized firms are better able to exploit the opportunities of business model reconfiguration and show a reinforcement of the effect. Firms with low resource munificence show a lower ability to exploit the opportunities of business model reconfiguration.

INTRODUCTION

Business model innovation is seen as an important form of innovation among incumbent firms (PwC, 2013). New business models are implemented with the expectation of so achieving financial outperformance (Giesen, Berman, Bell, & Blitz, 2007). For new ventures, a positive performance effect has been seen for novelty-centered business models (Zott et al., 2007). Other studies have looked at the performance effect for specific types of business model innovation. Some focused on the shift from free to fee business models in the digital domain (Pauwels et al., 2008) or the comparison of different business models in the biotechnology industry (Patzelt et al., 2008). The recent study of Desyllas and Sako (2013) focuses on a pay-as-you-go insurance business model and looks at possible profits a firm can derive from business method patents.

Nevertheless, past research leaves open the issues of the performance effect of changes in the business model of incumbent firms when no patenting can be applied and hence a firm cannot create any legal first mover advantage. In the case of incumbent firms past research has introduced the term business model reconfiguration to better describe the process of modification of an existent business model within the firm (Massa et al., 2013). In the following, we will hence also refer to business model reconfiguration.

Firm-specific contingencies that could further influence the relationship also merit attention. Past work has selectively looked at contingency factors of the business model innovation to performance relationship. That is, broader environmental regimes have been analyzed (Zott et al., 2007), as well as specific complementary assets that help the new business model to succeed (Desyllas et al., 2013). Overall, we see a gap in understanding if the performance gains of business model reconfiguration are retained, even if IP protection

mechanisms cannot be employed. Therefore, in this paper, we strive to answer the following research questions: What is the performance effect of business model reconfiguration within incumbent firms? Under what conditions does business model reconfiguration have a stronger effect on the performance of a firm?

In addressing these questions, we recognize that not all changes of business model are equal and that not all the incumbent firms have the same ability to implement successful changes in the business model. In particular, we advance that the effect of business model reconfiguration on firm performance depends on its intensity. Moreover, we analyze firm contingencies that can influence the performance effect of business model reconfiguration. Hereby we focus on two contingency factors that may have a critical impact on the performance of business model reconfiguration. First, the performance of new ventures competing on the market with new business models has been shown to have a positive relation with the size of the firm (Zott et al., 2007). However, while a direct effect of size on performance was found, a possible moderating effect on the link between business model reconfiguration and performance was not analyzed. Hence, it is unclear, if size is an important factor in moderating the performance effect of business model reconfiguration. Second, business model reconfiguration in incumbent firms also entails a large resource commitment (Desyllas et al., 2013; Sosna et al., 2010). Thus, firm-specific resource munificence could be an important moderator, as business model reconfiguration is a strong drain on scarce resources.

To test our model and hypotheses, we use a proprietary database of firm characteristics of pension fund firms in the Australian pension industry, spanning the years

2003-2010. This setting is particularly appropriate for our analysis as a multitude of firms exist that compete on the market with over time changing business models.

This paper contributes to extant research in several ways. Firstly, it provides an analysis of the effect of business model reconfiguration in incumbents on their performance irrespective of patenting options. Here, we extend past work and go beyond partly patentable business models (Desyllas et al., 2013) when analyzing the business model reconfiguration to performance link. Secondly, we propose that performance effects depend on the intensity of the business model reconfiguration conducted. In doing this, we recognize that the magnitude of business model reconfiguration matters and that there is a threshold over which its positive impact is significantly reduced. Thirdly, we provide an analysis of firm size and resource munificence as possible contingency factors of the relationship between business model reconfiguration and the performance of the firm. Finally, while previous empirical analyses of the performance of business model reconfiguration generally look at case studies or are theoretical in nature, we provide quantitative results from a sample of firms over a period of eight years.

The remainder of the paper is organized as follows. Firstly, we reflect on the business model construct and its definition. Secondly, we describe our theoretical considerations and develop our hypotheses. Thirdly, we specify our methodology and data. Next, we present the results of our empirical analysis before, lastly, discussing results and avenues for future research.

THEORY AND HYPOTHESIS DEVELOPMENT

The Business Model Reconfiguration Construct

Business model reconfiguration has been widely discussed and defined in the literature but no consensus for a precise definition of the construct has been achieved (George et al., 2011; Massa et al., 2013; Zott et al., 2011). Multiple definitions have been presented, each with a different angle on business model reconfiguration (e.g., Afuah et al., 2001; Amit et al., 2001; Baden-Fuller et al., 2010; Casadesus-Masanell et al., 2010; Chesbrough et al., 2002; Teece, 2010).

We build on a recently presented definition of business model reconfiguration for empirical analysis. Business model reconfiguration is defined as the 'modification or introduction of a new set of key components – internally focused or externally engaging – that enable the firm to create, deliver and capture value' (Hartmann, Oriani, & Bateman, 2013, p. 5). This definition builds on the recent work by Massa and colleagues (2013) that introduced the notion of business model reconfiguration for changes in the business model of incumbent firms. Here, as we focus on incumbent firms and their modification of an existing business model, we also refer to business model reconfiguration

The definition above of business model reconfiguration draws upon research on business models from an activity-based perspective (Zott et al., 2010) as well as including a component approach (see also Seelos et al., 2007). It recognizes the importance of components and the interdependencies between them (Massa et al., 2013). The definition allows a general view of the business model construct and builds on recent work of analyzing the construct in settings outside of the e-business and entrepreneurship literature (Desyllas et al., 2013). Innovation is regarded as absolute, as well as relative novelty (Crossan et al., 2010;

Van de Ven, 1986). This is in accordance with past work on innovation (Amit et al., 2010; Garcia et al., 2002).

The Performance Effect of Business Model Reconfiguration

Incumbents strive to defend their competitive advantages and find ways to better compete against their rivals. Innovation and renewal can help a firm find a new competitive edge. However, a sole focus on R&D and new product development does not guarantee a sustained competitive advantage. A firm must also look towards its business model to find innovation that can have an impact on the performance of the firm (Chesbrough, 2007; PwC, 2013). For incumbent firms, business model reconfiguration can be a means of renewal and adaptation to a changing market (Bock, Opsahl, & George, 2010). Business model reconfiguration allows the firm to enhance value creation and appropriation and it is an opportunity that can result in a competitive advantage (Massa et al., 2013; Reeves et al., 2011; Teece, 2010). Past research on different business model designs has seen positive performance effects for novel business models (Zott et al., 2007) and for firms that prioritize business model reconfiguration and innovation (Giesen et al., 2007). Other work has noted that the potential of technologies can often only be tapped by utilizing a new business model (Chesbrough et al., 2002). Nonetheless, if the firm succeeds in reconfiguring its business model we expect a positive effect on the performance of the firm. In formal terms:

Hypothesis 1: Business model reconfiguration has a positive effect on the performance of a firm

However, business model reconfiguration is a complex task for a firm to achieve as it reworks the most basic routines ingrained within the firm. High risk and uncertainty are also associated with business model reconfiguration (Massa et al., 2013). Barriers can hinder the renewal of the business model (McGrath, 2010). The renewal conducted by a firm can then differ in intensity of the reconfiguration effort (Massa et al., 2013).

Accordingly, we advance that business model reconfiguration can vary in terms of reconfiguration magnitude. Lower business model reconfiguration is seen as a change of a limited number of components involving few interdependencies. Higher business model reconfiguration is seen as a change of more components involving a disproportionately higher number of interdependencies. Thus, high business model reconfiguration establishes a stronger distance to the status quo.

In light of this distinction, we consider a difference in the performance effect of business model reconfiguration depending on the intensity of the reconfiguration effort. Low business model reconfiguration is a change of smaller magnitude and hence less complexity in reconfiguring the business model can be assumed. An easier absorption into existing structures is expected and hence a stronger utilization of the value creating possibilities of the new business model. High business model reconfiguration in contrast, is a change of large magnitude involving higher complexity. Significant resources are needed to achieve the implementation and a higher degree of uncertainty of success can be assumed. Hence, while a positive effect on performance is still expected, the larger drain on resources and uncertainty will lower the effect.

Thus, we assume an inverse u-shaped effect of business model reconfiguration on performance. A strong increase in performance is expected for business model reconfiguration up to an inflection point from which the positive effect decreases in size, as we move towards high business model reconfiguration. In formal terms:

Hypothesis 2: An inverted u-shaped relationship exists between the intensity of business model reconfiguration and the performance of the firm

A variety of research has associated the size of the firm with firm innovation (e.g., Cohen & Klepper, 1996; Damanpour, 1991). We are interested in understanding if firm size influences an incumbent's ability to exploit the opportunities presented by business model reconfiguration and hence moderates the business model reconfiguration to performance link. Research on innovation however notes that small firms tend to better cope with more disruptive innovation than large firms (Cohen et al., 1996; Ettlie, Bridges, & O'Keefe, 1984). This results from their differing structural setup and incentive structure. Operational improvements from business model reconfiguration have a stronger impact on the business of a small firm, due to its lower complexity and simplified structures (Ettlie et al., 1984). This is underlined by the work of Chesbrough and Rosenbloom (2002) that showed that large firms have stronger difficulty in exploiting the possibilities new business models present and realizing their full potential in contrast to smaller firms (Chesbrough et al., 2002). Thus, small firms are at an advantage in making business model reconfiguration work and exploiting the possibilities it presents. Starting from a disadvantage in terms of performance in contrast to large firms, business model reconfiguration helps a small firm overcome this disadvantage

more easily. Hence, for small firms the positive effect of business model reconfiguration on performance is further enhanced. In formal terms:

Hypothesis 3: The effect of business model reconfiguration on performance is more pronounced for smaller firms

Previous work has highlighted the high financial and psychological cost involved in establishing a new business model (Desyllas et al., 2013; Sosna et al., 2010). Hence, while a struggling firm can push for business model reconfiguration in order to improve its position, it might not have the ability to fully utilize all possible gains business model reconfiguration can provide. In particular, firm-specific resource munificence plays an important role with respect to providing the necessary resources for making business model reconfiguration a performance success. Trying to integrate and fully utilize business model reconfiguration in economically difficult times for the firm is challenging as the cross-subsidy of a new business model through resources from the extant business model is not possible (Sosna et al., 2010). A firm that is faced with low resource munificence due to poor performance, hence, struggles to make business model reconfiguration a success. Thus, while a firm can engage in business model reconfiguration the performance effect will be reduced. In formal terms:

Hypothesis 4: The effect of business model reconfiguration on performance will be less pronounced for firms with lower resource munificence

RESEARCH DESIGN

Empirical Setting and Data Collection

The business model literature has analyzed firm performance in the context of entrepreneurial ventures and new business model design (Pauwels et al., 2008; Zott et al., 2007). Recently, other industrial settings have entered the research space (Desyllas et al., 2013). Traditional industry settings and mature firms however continue to receive little attention in an empirical and quantitative way. Here, we contribute to close this gap and depart from the emphasis on new ventures within the high-tech industry and focus on incumbent firms in a more traditional business space. Specifically, the empirical analysis looks at firms in the Australian pension fund industry[10].

Performance analysis of business model reconfiguration must overcome several possible pitfalls. In order to gain the most comprehensive view of the impact of a reconfiguration of the business model, it is important to not only look at the development over time for an individual firm, but to be able to compare across firms. This necessitates a dataset of single firms faced with the same environmental conditions and limited diversification into other industries. In particular, it is important to be able to directly measure the performance of the single firm. Problems arise when conglomerates or firms with multiple business units are considered that are also active in multiple industries (Dess & Robinson, 1984).

An analysis of the Australian pension fund industry over time allows this comparison. The Australian pension fund industry has grown into a AUD 1.4 trillion business (as of June

[10] Australia's pension fund industry is locally referred to as superannuation industry. The superannuation industry is the pension system of Australia with mandatory membership for working individuals and compulsory contributions through employers.

2012) and biggest retirement income system of this kind on a per capita basis in the world (APRA, 2012a). It is an established industry that has been growing continuously since its inception in the 1980s (APRA, 2007). A multitude of firms exist that compete on the market with over time changing business models. Hence, the empirical setting allows the analysis of incumbent firms in contrast to entrepreneurial new ventures. Furthermore, this enables us to focus on business model reconfiguration in contrast to new business model design without having to reduce our analysis to a specific business model.

The Australian pension fund industry is regulated by the Australian Prudential Regulatory Authority (APRA). The regulatory framework envelopes all pension fund firms within the industry. It is an advantage for the proposed research as it creates a uniform environment in which firms must compete on the market. This ensures that firm strategies that could distort our analysis, such as diversification efforts or internationalization of the business (Desyllas et al., 2013) are not existent or kept to a minimum. Hence, businesses remain highly comparable over time, allowing a more precise estimate of the effect of business model reconfiguration on the performance of the firm. However, it is important to note that regulation also poses a challenge to the proposed research. Regulation changes and new laws alter the environment for firms and can influence the performance of the firms. But, the changes affect all firms in the same way. For example, a new tax will be felt by all pension fund firms, not just a select few.

Data collection is good for the presented research setting, with government collected data, industrial group publications and firm specific communication publicly available. The dataset combines information from various sources and tracks firm performance and other firm characteristics over time. Specifically, a regulator developed database (APRA, 2012b),

surveys published by the industry organization ASFA (ASFA, 2003-2011) and single firm annual reports are combined. Firms contained in the dataset are a randomly selected subset of the total industry. The multiple data sources avoid common method bias. In total, the database is an unbalanced panel over the years 2003-2010 with a total of 63 firms.

Explanation of model variables

We wish to empirically test our theoretical hypotheses regarding the performance effect of business model innovation and moderating variables. In order to set up the empirical analysis, we define relevant variables for the regression.

Dependent variable. The dependent variable was chosen in order to reflect the *operational performance* of the firms under analysis. An important aspect of variable selection was the reflection of not only investment performance, but also operational improvements. The inclusion of the operational side is important for this research, as business model reconfiguration can manifest itself in all areas of the firm, including its operations. This is sustained by past work that explicitly included efficiency considerations into the typology of new business models (Zott et al., 2007). Hence, we utilize the net operational performance of the firm after tax as dependent variable in the regression. For all firms and years in the analysis the same data source is used, namely government provided data (APRA, 2012b).

Independent variables. *Business model reconfiguration* is operationalised in a quantitative way that allows regression analysis. We utilize the same method as in the research conducted by Hartmann *et al.* (2013) which analyzes the same industry. The methodology draws on the ideas of the NK-models utilized in the strategic management literature for the theoretical

representation of complex problems (Kauffman et al., 2000; Levinthal, 1997; Westhoff et al., 1996). Strategic problems, such as hierarchical decision processes (Rivkin et al., 2002) or corporate strategy (Caldart et al., 2004) have been analyzed under a NK-model framework.

The NK-model consists of N components and K levels of interaction between the components to generate a fitness landscape that reflects the solution space of an optimization problem. Firms move around this space as they consider different solutions for a problem at hand. Each solution equates to a position on the landscape and is given a fitness value. The fitness value changes, as the firm moves along the landscape.

This NK 'metaphor' (Afuah et al., 2012; Hartmann et al., 2013) underlies the quantification of business model reconfiguration in this paper. The N components of the business model reflect the reconfiguration options of a firm. Seven options are considered within the empirical setting[11]. The options constitute the major activities that impacted the business models of pension fund firms in the time frame under study. None of the derived options are patentable business methods under current law (Australian Government, 2003). The following seven options are considered: transition to retirement product, in-house administration, unit pricing, online account access, online transactions, alternative investments, financial planning affiliate.

A transition to retirement product relates to a pension stream that can be granted to members close to retirement age. The introduction of such a product strongly changes the value proposition of a firm. Secondly, in-house administration relates to administration services performed by a firm’s own staff, hence implying a stronger sophistication of the firm.

[11] The different components were derived from interviews with academics, the regulator and fund representatives. Results were then summarized, mapped against previous research before again being discussed. The list of interview partners can be obtained from the authors upon request.

Next, unit pricing relates to the valuation of member balances and stands in contrast to a crediting approach typically used. Unit pricing evaluates each balance individually on the basis of bought units representing the balance of the account. Crediting looks at the whole firm and distributes profits/losses proportionally to the money held by a member. Fourthly, online account access enhances the value proposition for members and leads to more sophisticated operations. Fifth, online transactions allow members to pay into their accounts electronically and are a significant step up from the usual payment by physical check. Next, alternative investments refer to the usage of alternative investment vehicles in the investment of assets and show a stronger expertise of the firm. Lastly, a financial planning affiliate provides financial planning advice to members through own staff and shows a stronger evolution of a pension fund firm to a financial services firm.

In the case of business model reconfiguration, a firm makes a decision regarding the implementation of each component. In order to generate a business model reconfiguration value a set of components, i.e. at least two components, must be changed simultaneously. Each set or combination of introduced components results in a different business model reconfiguration value. The business model reconfiguration value per year is calculated according to the frequency of the combination and its complexity. In a first step, the frequency of each possible combination is calculated by defining a contribution value for each combination of introduced component. This contribution value belongs not to a single decision, but to a combination (i) of decisions regarding the specific components. The contribution value at time t (c_{it}) then depends on the decision taken regarding each individual business model components and the interdependencies between them. For example, the contribution value (c_{it}) of a two component combination i at time t is then calculated as follows:

$c_{it} = e_{it}^{1/freq_t(d_{lt;kt})}$ with:

d_{lt} = decision regarding component l at time t

d_{kt} = decision regarding component k at time t

$freq_t(d_{lt;kt})$ = frequency of the combination (d_{lt}; d_{kt}) with d_{lt} =1 and d_{kt} =1 appearing in the dataset for a given year t.

The method in a second step explicitly considers the interdependency between the components and so the complexity of the introduced combination of components (Hartmann et al., 2013). The quantity (m) of possible combinations (i=1… m) increases with the number of implemented components. The more components are implemented, the more interdependencies exist, and subsequently, the higher is the business model reconfiguration value, as multiple individual c_{it} values are added to create a single value

The overall value of ***business model reconfiguration (BMR)*** at a specific point in time *t* is then calculated as:

BMR= $\sum_{i=1}^{m} c_{it}$ with

c_{it}= contribution value of combination *i at time t*

m = number of possible combinations from the N components

The business model reconfiguration value enters the regression analysis with time lag of two years[12]. The data underlying the business model reconfiguration value was taken from industry body surveys (ASFA, 2003-2011) combined with firm annual reports.

We define the *size of the firm* as the amount of members of the pension fund firm. We utilize a definition of firm size as the "scale of an organization's operations" (Aldrich, 1972,

[12] In order to establish the correct lag structure we use an iterative approach of lag elimination. Hence, we started by looking at a three lag length model, which is the longest feasible lag length for the time frame of our data. The regression model did not show significance at lag three, did however at lag two. Hence, we eliminated the third lag and tested the model again with only two lag lengths. Here we found significance for the second lag and hence refrained from reducing lags further. The results for the three lag model are available from the authors upon request.

p. 33; Kimberly, 1976). The quantity of members hence fits our needs very well. Member size is a good reflection of a firm's operations, as each member needs to be administrated by the firm, independent of the balance in the member account. Assets under management do not necessitate this work by the firm. To invest 1 dollar or 1000 dollars does not make a big difference, but to adequately service 1 member or 1000 members is a game-changer. Hence, we utilize firm size by members to reflect the scale of the pension fund firms' operations. In order to distinguish between different sized firms in an unbiased way we divide the sample into three groups of firms by membership size. This allows us to be certain to be looking at the small firms in the sample and not introducing bias by deciding when a firm can no longer be defined as small. In order to refrain from introducing bias into the selection of threshold values for each group, we use a mathematical procedure that independently of user input splits the relevant variable into three groups with approximately equal observations in each group. In doing so, it automatically assigns the threshold values. We then include the small and medium group dummy variable in the regression analysis, excluding the large category. The values for the size of the firm are taken from government provided data (APRA, 2012b).

Firm resource munificence is operationalised by looking at the past rates of return (ror) achieved by the firm on their invested assets in order to assess resource availability. This measure describes whether or not a firm is making money on its invested assets and hence growing the asset pool. A high ror means positive investment performance and so a positive resource climate within the firm. Resource munificence is high through a higher fee intake, as fees are calculated as a percentage of the asset base (ChantWest, 2008). Hence, a low ror portrays a negative climate and low resource endowment for the firm. In order to assess the resource munificence of each firm we split the sample into three groups using the same methodology as for the size of the firm. The dummy variable for the low resource

munificence is then included in the regression analysis. All data is taken from government provided data (APRA, 2012b).

Control variables. We include further variables in the regression analysis that could influence the operational performance of pension fund firms. In this, we also aim to reduce omitted variable bias in the regression. The regression includes the asset size of a firm as a dummy of small or large asset size (excluding the middle group), as well as member growth between two given years. We also include the industrial background of a firm in the regression. The industrial background of the firm is a relic from the beginnings of the pension fund industry in Australia. Originally, pension fund firms were started for the employees of a specific industry and were restricted in their membership. The top management team of the firm then also derived from the original industry, this can often be seen until this day. A firm founded for employees of the financial service industry can thus be assumed to have had a more financially knowledgeable top management team from its inception.[13] Hence, we include if the firm has a background in the financial service industry in our regression analysis in order to account for this firm difference. This is a dummy variable. Furthermore, we include the proportion of financial service experts on the board of the firm. This variable aims to distinguish between firms with more/less experience in the market. A further variable included is a dummy relating to the merger activity of the firm in the previous year. A merger activity could achieve changes in a firm's operational performance just because of the joining of the firms. Lastly, we include individual year dummy variables in the analysis in order to

[13] Please see APRA. 2007. Celebrating 10 Years of Superannuation Data Collection, ***APRA Insight***, Vol. Issue 2: Australian Prudential Regulation Authority. for a brief history of the industry.

mitigate year effects. The above variables are taken from government supplied data, industry body surveys and an analysis of firm annual reports.

Econometric modeling and estimation approach

Data analysis and model testing preceded the selection of an appropriate regression model for the described analysis. We analyze the data using a generalized linear model. This model is preferred, as it takes the within-subject correlation into account without necessitating a direct specification of the correlation (Liang & Zeger, 1986; Zeger & Liang, 1986). Furthermore, it recognizes the panel structure of the data by accommodating grouping on the firm identifier. This corrects the regression for possible unobserved firm effects. Furthermore, year dummy variables are included to cater for time effects in the regression. Both together ensure validity of variable coefficients. Standard errors and p-values are corrected for the panel data by taking clustering of data points on the firm identifier into account (Cameron et al., 2010). We calculated variance inflation factors (VIF) to test for multicollinearity among the independent variables (Kleinbaum et al., 2008). VIF is acceptable at all levels with mean VIF at 3.90 for the general measure of business model reconfiguration including the squared term and time-lags of the business model reconfiguration measure and all control variables.

Moderation is tested in the regression analysis by including the moderator variable, as well as an interaction term between the moderator and the linear business model reconfiguration value. The interaction is only built with the linear business model reconfiguration value, as we theorized a reinforcement or reduction in the size of the effect of business model reconfiguration on performance, but not the shape of the relationship between business model reconfiguration and performance (Aiken & West, 1991). Interaction terms are

included with a lag structure. A value of mean VIF at 12.10 is reached for the full model. We do not mean-centre the interaction terms as the business model reconfiguration variable has a significant meaning for a value of zero which would otherwise be distorted. We conclude VIF to be within acceptable levels. Furthermore, we tested for serial correlation of first order using a Wooldridge test and found no indication of serial correlation (p-value 0.37) for the full model including interaction effects and time-lags. Overall, we find our model to be valid and robust for the conducted analysis.

RESULTS

Descriptive statistics

Table 1 provides descriptive statistics for the variables used in the regression analysis at no lag length. The dependent variable is the log of the operational performance of a firm. It ranges from a minimum of 5.21 to a maximum of 16.48 with the mean value at 12.16. Hence, ample variation exists between funds to allow an analysis of different performance effects.

The value of business model reconfiguration (BMR) ranges between 0 and 22.65. A mean of 0.54 shows that most firms do not reconfigure the business model in most time periods. This is in line with expected results, as business model reconfiguration is a costly experience for firms and will hence not be conducted in every time period. It remains an unusual event for a firm.

INSERT TABLE 1 ABOUT HERE

The variable for firm size ranges from 917 to ca. 1.97 million, with a mean of ca. 182 thousand members. We split this range into three groups using the methodology described previously. Each group has approximately the same number of observations. The regression only considers the small and medium size group dummies, and excludes the large group. The variable relating to the resource munificence of a firm, rate of return (ror), shows a range from -12.97% to 21.38%. We split this variable in three groups using the methodology described earlier in the paper. Each group has approximately the same number of observations. Only the smallest group is considered for negative resource munificence of the firm and is included in the analysis. Firm financial service background shows a mean of 0.06. This indicates a high amount of firms not originating from the financial service industry in the dataset. The ratio of financial service experts ranges from 0 to 100 per cent of total board size. The total amount of assets shows a median of A$1,832,406,000. Member growth takes a mean value of 5.15%. The merger dummy variable shows a mean of 0.07, indicating the low occurrence of mergers in the dataset.

INSERT TABLE 2 ABOUT HERE

Table 2 shows the Pearson correlation coefficients between the main variables in the regression. Correlations are increased between the different lags of the same variable, as well as the interaction terms and the business model reconfiguration variable. Correlation levels between the size of the firm and business model reconfiguration are negligible. The same is valid for the correlation between low resource munificence and the business model

reconfiguration variable. This again underlines the fact that multicollinearity should not be a cause for concern. VIF factors within acceptable levels also support this claim mathematically.

Hypotheses Tested

Table 3 shows the results of the regression analysis regarding business model reconfiguration and the effect on firm performance. Four models are tested, starting with a base model as model 1 and followed by a model testing the effect of business model reconfiguration on performance (model 2). A third model adds the moderator variables, but not yet the interaction terms. Lastly, a fourth model is run that includes all independent and control variables to test our hypotheses regarding business model reconfiguration and firm performance under consideration of firm contingency factors of this relationship.

Model 1 is a baseline model that consists only of the dependent variable and control variables. The asset groups are significant at <0.1% level. The financial service background shows a negative and the percentage of financial service experts on the board shows a positive influence. The lagged merger activity and the member growth variables show a close to zero effect on the performance of the firm. These variables are however not significant.

INSERT TABLE 3 ABOUT HERE

Model 2 tests our hypotheses relating business model reconfiguration to the operational performance of the firm. We also include the quadratic term in order to test our hypothesis of the inverse u-shape of this relationship. Model 2 allows us to test hypothesis 1 (regarding the performance effect of business model reconfiguration). The regression results support hypothesis 1. Business model reconfiguration, measured as simultaneous changes in components shows a positive coefficient in the regression at a two year lag. The coefficient is significant at <0.1%. Furthermore, we test hypothesis 2 (regarding the inverse u-shaped effect of reconfiguration intensity on performance). The coefficient of the quadratic term is slightly negative and the linear effect is positive indicating an inverted u-shaped effect between the intensity of business model reconfiguration and performance. The relationship is significant at <0.1 % confirming the hypothesis.

All control variables show the same direction of effect and significance levels on operational performance as in model 1.

Model 3 adds the moderator variables to model 2 without including the interaction terms. We note that both moderator variables, small firm size and low firm resource munificence, have a significant, negative effect on the dependent variable. The control variables retain the direction of effect and significance level as in the baseline model (Model 1). Only the financial service expert and member growth variables change significance levels. In particular, model 3 shows that the business model reconfiguration variable retains its influence on firm performance, even if the direct effect of the moderating variables is included. The model shows a lower operational performance for small firms as expected, which is significant at <0.1%. Medium firms also show a negative performance in comparison to the reference category that is significant at 10%. Large firms are the reference category.

The direct effect of low resource munificence on the performance of the firm is negative, as expected, and significant at 10%.

In model 4 we look at contingency factors that moderate the linear relationship between business model reconfiguration and firm performance. As noted previously, we postulate a moderation of the size of the effect, not however the shape of the relationship. Hence, we only include a moderation of the linear term of the business model reconfiguration variable (Aiken et al., 1991). The model continues to include the quadratic business model reconfiguration value.

Hypothesis 3 (regarding the size of the firm) is supported by the regression. The interaction term included in model 4 reflects the moderating effect of firm size. It shows a significant (1% level), positive effect on the performance of the firm at lag length 2. This positive effect indicates that for small firms the effect of business model reconfiguration on performance is enhanced. It is important to note that this influence exists, notwithstanding the overall reduced performance for smaller firms. This effect is in relation to the reference category of large firms.

Model 4 also shows support for hypothesis 4 (regarding low resource munificence). The interaction effect is negative with a significance level of 10%. This sustains our hypothesis that firms in a low resource munificent situation find it more difficult to materialize the positive effect of business model reconfiguration on performance. The effect is negatively moderated. Furthermore, a direct effect of business model reconfiguration on performance remains positive and with significance at 0.1% on the linear term and 5% on the negative quadratic term.

As a robustness check, we also estimated this model only including lag two for the relevant variables and results are retained with significance at similar levels. Results can be obtained from the authors on request.

DISCUSSION AND CONCLUSION

Business model reconfiguration has found strong support as option for firms to generate a competitive advantage (PwC, 2013; Reeves et al., 2011; Teece, 2010) and as an instrument to adapt to a dynamic environment (Giesen et al., 2007). The performance effect of business model reconfiguration for incumbent firms has however so far not seen extensive empirical study. In particular, we focus on the general case of business models that do not fall under intellectual property protection. The empirical analysis shows that business model reconfiguration has a positive effect on the performance of the firm. The effect of business model reconfiguration on performance shows an inverse u-shaped relationship when considering the intensity of the business model reconfiguration effort. We find a stronger performance effect of business model reconfiguration for small sized firms, with large firms as the reference category. Furthermore, we find that for firms with low resource munificence the effect of business model reconfiguration on performance is reduced. Here, the reference group is firms enjoying medium and high resource munificence.

This paper contributes to the extant literature in multiple ways. Firstly, this analysis allows a view on the effect of business model reconfiguration on the operational performance of a firm independent of IP protection mechanisms. Hence, it enables us to answer the question if business model reconfiguration actually pays off for an incumbent. In this, this paper departs from previous work, as it does not limit the analysis to proxy vehicles, such as

patent profits (Desyllas et al., 2013), but directly enters a business model reconfiguration variable into the regression analysis.

Secondly, we recognize contingency factors that moderate the relationship between business model reconfiguration within incumbents and the performance of these firms. We acknowledge that firm characteristics can moderate the ability to fully exploit all options business model reconfiguration presents to the firm. In particular, we look at firm size as moderator of this relationship. This helps to better understand the role size plays for firms undergoing business model reconfiguration that previous research failed to analyze (Zott et al., 2007). Furthermore, the moderator of low firm resource munificence is seen as reducing the ability of a firm to fully utilize business model reconfiguration. Hence, this could be a reason for the missing influence found of environmental resource munificence on the performance of business model reconfiguration (Zott et al., 2007) and highlights the importance of sufficient resource availability within the firm in order to make business model reconfiguration a success.

Lastly, we propose a classification to differentiate between different degrees of business model reconfiguration and show that the intensity of the business model reconfiguration effort changes the influence of business model reconfiguration on the performance of the firm leading to an inverse u-shaped effect.

We also aim for managerial contribution. Our analysis hopes to give managers an introduction to expected performance effects of business model reconfiguration and in particular possible contingency factors. It underlines that the performance effect depends on a multitude of factors. Namely, the intensity of the renewal, the size of the firm and the resource munificence of the firm can influence the performance effect. Hence, it is necessary for a firm

to strongly evaluate its specific situation in order to take appropriate measures to increase the effect of business model reconfiguration on performance. Business model reconfiguration should not be seen as the savior of the day when the firm is facing troubled times, as indicated by low resource munificence.

The conducted analysis also shows specific limitations. The empirical analysis focuses only on a limited number of contingency factors. For example, it does not consider the influence of a new, breakthrough technology on the performance effect of business model reconfiguration or the market entry of an aggressive new rival. This extension of the research could be an interesting future step.

REFERENCES

Afuah, A., & Tucci, C. 2001. ***Internet business models and strategies: Text and cases***. New York: McGraw-Hill.

Afuah, A., & Tucci, C. 2012. Crowdsourcing as a Solution to Distant Search. ***Academy of Management Review***, 37(3): 355-375.

Aiken, L. S., & West, S. G. 1991. ***Multiple regression: Testing and interpreting interactions***: Sage.

Aldrich, H. E. 1972. Technology and Organizational Structure: A Reexamination of the Findings of the Aston Group. ***Administrative Science Quarterly***, 17(1): 26-43.

Amit, R., & Zott, C. 2001. Value Creation in e-business. ***Strategic Management Journal***, 22: 493-520.

Amit, R., & Zott, C. 2010. Business Model Innovation: Creating value in times of change: 1-15: Working paper no. 870, IESE Business School, University of Navarra.

APRA. 2007. Celebrating 10 Years of Superannuation Data Collection, ***APRA Insight***, Vol. Issue 2: Australian Prudential Regulation Authority.

APRA. 2012a. Annual Superannuation Bulletin, June 2011, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

APRA. 2012b. Superannuation Fund-level Profiles and Financial Performance, June 2011, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

ASFA. 2003-2011. Annual fund surveys, ***Superfunds***: ASFA - the Association of Superannuation Funds of Australia Limited.

Australian Government, I. P. 2003. Patents for Business Methods, Vol. 2013.

Baden-Fuller, C., & Morgan, M. 2010. Business Models as Models. ***Long Range Planning***, 43: 156-171.

Bock, A., Opsahl, T., & George, G. 2010. Business model innovations and strategic flexibility: A study of the effects of informal and formal organization: Working paper no. SSRN 1533742, Imperial College, London, United Kingdom.

Caldart, A. A., & Ricart, J. E. 2004. Corporate strategy revisited: a view from complexity theory. ***European Management Review***, 1(1): 96-104.

Cameron, C., & Trivedi, P. 2010. ***Microeconometrics Using STATA***. USA: Stata Press.

Casadesus-Masanell, R., & Ricart, J. E. 2010. From Strategy to Business Models and onto Tactics. ***Long Range Planning***, 43: 195-215.

ChantWest. 2008. Superannuation Industry Fee Comparison, ***Chant West Research Report***: 1-29. Sydney.

Chesbrough, H. 2007. Business model innovation: it's not just about technology anymore. ***Strategy & Leadership***, 35(6): 12-17.

Chesbrough, H., & Rosenbloom, R. 2002. The role of the business model in capturing value from innovation: evidence from the Xerox Corporation's technology spin-off companies. ***Industrial and Corporate Change***, 11(3): 529-555.

Cohen, W. M., & Klepper, S. 1996. Firm Size and the Nature of Innovation within Industries: The Case of Process and Product R&D. ***The Review of Economics and Statistics***, 78(2): 232-243.

Crossan, M., & Apaydin, M. 2010. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. ***Journal of Management Studies***, 47: 1154-1191.

Damanpour, F. 1991. Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. ***The Academy of Management Journal***, 34(3): 555-590.

Dess, G. G., & Robinson, R. B. 1984. Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. ***Strategic Management Journal***, 5(3): 265-273.

Desyllas, P., & Sako, M. 2013. Profiting from business model innovation: Evidence from Pay-As-You-Drive auto insurance. ***Research Policy***, 42(1): 101-116.

Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. 1984. Organization Strategy and Structural Differences for Radical Versus Incremental Innovation. ***Management Science***, 30(6): 682-695.

Garcia, R., & Calantone, R. 2002. A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review. ***The Journal of Product Innovation Management***, 19: 110-132.

George, G., & Bock, A. 2011. The Business Model in Practice and its Implications for Entrepreneurship Research. ***Entrepreneurship Theory and Practice***, 35: 83-111.

Giesen, E., Berman, S. J., Bell, R., & Blitz, A. 2007. Three ways to successfully innovate your business model. ***Strategy & Leadership***, 35(6): 27-33.

Hartmann, M., Oriani, R., & Bateman, H. 2013. ***Exploring the Antecedents to Business Model Innovation: An Empirical Analysis of Pension Funds***. Paper presented at the Academy of Management, Orlando, FL.

Kauffman, S., Lobo, J., & Macready, W. 2000. Optimal search on a technology landscape. ***Journal of Economic Behavior & Organization***, 43: 141-166.

Kimberly, J. R. 1976. Organizational Size and the Structuralist Perspective: A Review, Critique, and Proposal. ***Administrative Science Quarterly***, 21(4): 571-597.

Kleinbaum, D., Kupper, L., Nizam, A., & Muller, K. 2008. ***Applied regression analysis and other multivariable methods*** (4th ed.). Belmont, CA: Duxbury.

Levinthal, D. 1997. Adaptation on Rugged Landscapes. ***Management Science***, 43: 934-950.

Liang, K.-Y., & Zeger, S. L. 1986. Longitudinal data analysis using generalized linear models. ***Biometrika***, 73(1): 13-22.

Massa, L., & Tucci, C. 2013. Business Model Innovation. In M. Dodgson, D. Gann, & N. Phillips (Eds.), ***The Oxford Handbook of Innovation Management***: forthcoming. New York: Oxford University Press.

McGrath, R. 2010. Busines Model: A Discovery Driven Approach. ***Long Range Planning***, 43: 247-261.

Patzelt, H., Zu Knyphausen-Aufseß, D., & 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.

Pauwels, K., & Weiss, A. 2008. Moving from Free to Fee: How Online Firms Market to Change Their Business Model Successfully. ***Journal of Marketing***, 72(3): 14-31.

PwC. 2013. Unleashing the Power of Innovation. In D. Percival, & R. Shelton (Eds.), Vol. 2013: 1-14. London: pwc.

Reeves, M., & Deimler, M. 2011. Adaptability: The New Competitive Advantage. ***Harvard Business Review***, 89: 134-141.

Rivkin, J., & Siggelkow, N. 2002. Organizational sticking points on NK Landscapes. ***Complexity***, 7(5): 31-43.

Seelos, C., & Mair, J. 2007. Profitable business models and market creation in the context of deep poverty: A strategic view. ***Academy of Management Perspectives***, 21: 49-63.

Sosna, M., Trevinyo-Rodrìguez, N., & Velamuri, R. 2010. Business Model Innovation through Trial-and-Error Learning. ***Long Range Planning***, 43: 383-407.

Teece, D. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***, 43: 172-194.

Van de Ven, A. H. 1986. Central Problems in the Management of Innovation. ***Management Science***, 32: 590-607.

Westhoff, F. H., Yarbrough, B. V., & Yarbrough, R. M. 1996. Complexity, organization, and Stuart Kauffman's The Origins of Order. ***Journal of Economic Behavior & Organization***, 29: 1-25.

Zeger, S. L., & Liang, K.-Y. 1986. Longitudinal Data Analysis for Discrete and Continuous Outcomes. ***Biometrics***, 42(1): 121-130.

Zott, C., & Amit, R. 2007. Business Model Design and the Performance of Entrepreneurial Firms. ***Organization Science***, 18: 181-199.

Zott, C., & Amit, R. 2010. Business Model Design: Activity System Perspective. ***Long Range Planning***, 43: 216-226.

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

Tables

Table 1 Descriptive Statistics

Variable name	Mean	Median	Standard deviation	Min	Max	No. obser-vations
Operat. performance (log)	12.16	12.40	1.59	5.21	16.48	212
BMR	0.54	0.00	2.42	0.00	22.65	212
Nr. of members	182,477	36,897	375,555	917	1,965,511	212
ROR (%)	10.19	12.62	7.28	-12.97	21.38	212
Total assets (AUD '000s)	3,647,195	1,832,406	5,245,274	59,028	33,000,000	212
Financial serv. fund	0.06	0.00	0.24	0.00	1.00	212
Financ. serv. expert ratio	0.14	0.00	0.22	0.00	1.00	212
Merger (dummy)	0.07	0.00	0.25	0.00	1.00	211
Member growth (%)	5.15	0.03	74.25	-0.34	1081.13	212

Table 2 Pearson correlation coefficients of model variables (without lags)

Variable name	Operational performance	BMR	BMR^2	Firm size (small)	Firm size (small)*BMR	Firm size (medium)	Firm size (medium)*BMR	Ror (low) (%)	Ror (low)*BMR	Total assets (small)	Total assets (large)	Financial serv. fund	Financ. serv. expert ratio	Merger (dummy)	Member growth (%)
Oper. performance	1.00														
BMR	0.05	1.00													
BMR^2	0.03	0.94	1.00												
Firm size (small)	-0.52	-0.06	-0.06	1.00											
Firm size (small)*BMR	-0.01	0.27	0.12	0.21	1.00										
Firm size (medium)	0.04	0.12	0.13	-0.45	-0.09	1.00									
Firm size (medium)*BMR	0.02	0.90	0.96	-0.09	-0.02	0.20	1.00								
Ror (low) (%)	-0.18	-0.11	-0.07	-0.17	-0.08	-0.02	-0.08	1.00							
Ror (low)*BMR	0.04	0.07	0.00	-0.07	-0.01	-0.08	-0.02	0.19	1.00						
Total assets (small)	-0.61	0.01	0.03	0.58	0.03	-0.08	0.04	-0.09	-0.07	1.00					
Total assets (large)	0.61	0.04	0.04	-0.52	-0.11	0.08	0.03	0.10	0.08	-0.49	1.00				
Financial serv. fund	0.11	0.13	0.18	-0.17	-0.03	0.37	0.17	-0.11	-0.03	-0.16	0.16	1.00			
Financ. serv. expert ratio	-0.01	-0.06	-0.06	0.26	-0.01	-0.20	-0.06	0.05	-0.07	-0.03	-0.07	-0.16	1.00		
Merger (dummy)	0.15	-0.04	-0.03	-0.13	-0.04	0.6	-0.03	0.02	-0.03	-0.12	0.06	-0.07	-0.03	1.00	
Member growth (%)	0.01	0.02	-0.01	-0.05	-0.01	-0.05	-0.01	-0.04	-0.01	-0.04	-0.06	-0.02	-0.004	-0.26	1.00

Table 3

Dependent variable: operational performance

Variable name	Model 1 Value (st. err.)	Model 2 Value (st. err.)	Model 3 Value (st. err.)	Model 4 Value (st. err.)
Constant	11.89*** (0.48)	11.86*** (0.46)	11.80*** (0.56)	11.94*** (0.61)
BMR		0.03 (0.04)	0.06† (0.03)	-0.01 (0.05)
BMR lag1		0.04 (0.05)	0.07† (0.04)	0.06 (0.03)
BMR lag2		0.17*** (0.05)	0.15** (0.04)	0.20*** (0.06)
BMR^2		-0.001 (0.002)	-0.003 (0.002)	0.001 (0.002)
BMR^2 lag1		-0.001 (0.002)	-0.002 (0.002)	0.002 (0.003)
BMR^2 lag2		-0.007*** (0.002)	-0.006** (0.002)	-0.01* (0.004)
Firm size (small)			-2.66*** (0.67)	-2.74*** (0.72)
Firm size (small) lag1			2.12** (0.78)	2.19** (0.79)
Firm size (small) lag2			-0.53 (0.40)	-0.64 (0.41)
Firm size (s)* BMR				0.12† (0.06)
Firm size (s)* (BMR lag1)				0.01 (0.06)
Firm size (s)* (BMR lag2)				0.15** (0.06)
Firm size (medium)			-0.92† (0.51)	-0.83 (0.52)
Firm size (m) lag1			0.72 (0.59)	0.75 (0.60)
Firm size (m) lag2			-0.36 (0.31)	-0.42 (0.32)
Firm size (m)* BMR				0.004 (0.06)
Firm size (m)* (BMR lag1)				-0.08* (0.04)
Firm size (m)* (BMRlag2)				-0.10† (0.06)
Ror (low)			-0.38† (0.20)	-0.43* (0.20)
Ror (low) lag1			0.40 (0.26)	0.32 (0.30)
Ror (low) lag2			-0.07 (0.27)	-0.11 (0.33)
Ror (low)* BMR				0.31† (0.19)
Ror (low)* (BMR lag1)				0.06 (0.13)
Ror (low)* (BMR lag2)				-0.13† (0.07)

Table 3 (continued)

Dependent variable: operational performance				
	Model 1	Model 2	Model 3	Model 4
Variable name	Value (st. err.)	Value (st. err.)	Value (st. err.)	Value (st. err.)
Total assets (small)	-1.65*** (0.21)	-1.62*** (0.20)	-1.04*** (0.17)	-1.01*** (0.17)
Total assets (large)	1.26*** (0.21)	1.30*** (0.20)	1.15*** (0.20)	1.14*** (0.19)
Financial serv. fund	-0.33 (0.29)	-0.31 (0.32)	0.05 (0.30)	-0.02 (0.29)
Financ. serv. expert ratio	0.08 (0.24)	0.13 (0.23)	0.60** (0.21)	0.68** (0.21)
Merger lag1	-0.001 (0.20)	-0.06 (0.19)	0.12 (0.24)	0.18 (0.26)
Member growth	-0.0001 (0.0001)	0.0001 (0.0001)	-0.002** (0.001)	-0.002** (0.001)
N	212	212	212	212
Groups	63	63	63	63

† p<0.1
* p<0.05
** p<0.01
*** p<0.001
Year dummy variables included in the regression, but coefficients not shown. Standard errors in parentheses.

Paper 3

FUND EVOLUTION IN THE AUSTRALIAN SUPERANNUATION INDUSTRY: THE ROLE OF LEADERS AND STAKEHOLDERS FOR SUPERANNUATION FUNDS

Presented at: 21st Annual Colloquium of Superannuation Researchers

Sydney (Australia)

Author 1: M. Hartmann (LUISS Guido Carli, Rome)

Author 2: Prof. H. Bateman (UNSW, Sydney)

Title: Fund evolution in the Australian superannuation industry: The role of leaders and stakeholders for superannuation funds

Abstract

This paper focuses on fund evolution in the Australian superannuation industry. We look at the role leaders and stakeholders play in influencing fund evolution over time. The renewal and innovation within the funds is analyzed by drawing on the business model innovation framework and tracking the changes in the business model of the funds. This paper focuses on two main factors as potential drivers of change and renewal of fund structures. Firstly, it considers governance issues related to trustee board characteristics and secondly, the regulatory influences, namely the licensing requirement, on the funds. The empirical analysis uses a panel data sample of 59 superannuation funds that spans the year 2003-2010. Results show that member elected trustees, when compared to union trustees, increase the propensity of a fund to alter its approach to doing business. Trustee board size shows an inverse u-shaped effect on the propensity of a fund to evolve, indicating the advantage of a limit when introducing more trustees to the board. The licensing requirement is also found to be a catalyst for funds to introduce changes to their business model.

Keywords: business model innovation, superannuation industry, trustee board, governance

INTRODUCTION

The Australian superannuation industry has undergone many changes in recent years. The leaders of superannuation funds have had to adapt to a changing environment and exploit chances of renewal and change. Stakeholders in the superannuation industry can influence the environment surrounding the fund and hence also play a strong role in shaping a funds course.

Australian superannuation funds form part of the Australian Retirement Savings System that was established through the superannuation guarantee administration Act 1992 and Industry Supervision Act 1993. This system of private retirement accounts is funded by compulsory wage or salary-based contributions (APRA, 2007). In the years since its establishment it has grown into a AUD$ 1.40 trillion industry, as of June 2012 (APRA, 2013).

In the past 20 years funds had to adapt to a changing landscape and evolve with respect to the way they compete on the market place. Many funds predate the introduction of a compulsory system. Five groups of funds can be distinguished: Industry funds were established to provide retirement benefits to unionized workers in a single industry, corporate funds were intertwined with a specific corporation and public sector funds held benefits for certain groups of government employees. Historically, membership was closed and mutually exclusive, making these funds non-public offer funds. A fourth group of retail funds catered for individuals not eligible to join the other fund types or provided post-retirement pensions often not provided by the other funds (APRA, 2005). Since 1993, restrictions to membership no longer apply and funds can choose to freely compete on the market. The removal of membership restrictions led to a shift from non-public offer funds to public offer funds (Sy,

2008). Public offer funds have the open membership that allows anyone to join. This shift has also led to a removal of the strict lines between the different historically grown fund types. The fifth group of funds is self-managed superannuation funds that are set up and run by individuals for their retirement savings. This group of funds is outside the scope of our analysis.

Fund evolution is strongly dependent on the leaders and stakeholders of a fund. The decision makers of a superannuation fund can be clearly defined as the trustee board of a fund. The board of trustees manages the fund, is bound by a trust deed and obliged to act in the best interest of the members of the fund (Barrett & Chapman, 2001). The trust deed regulates the actions a fund can take and for example defines the types of members of a fund. Changes to the trust deed have to be signed off by the whole fund board. The fund board can show different representation structures, often reflecting the history and background of the fund. In particular, four types of board members can be present, namely employer representatives, union representatives, member representatives and independent trustees. Most funds show a mix of the four groups on their board (Sy, 2008). The composition of the trustee board also depends on whether or not “equal representation” is mandated. Equal representation means that the same amount of employer representatives and union/member representatives are called to serve on the board (Sy et al., 2008). In the past, all non-public offer funds were obliged to have equal representation as soon as they had more than 50 members. Public offer funds on the other hand did not fall under the obligation of equal representation. In recent times, the lines have become more blurry with many non-public offer funds applying for public offer licenses, but retaining the equal representation structure on the trustee board.

Here, in a first step we are interested in the role that the leaders of the fund play in enabling the evolution of the fund. Past work regarding the leadership team of superannuation funds in Australia predominantly focused on governance issues (Benson et al., 2011; Drew et al., 2003; Gupta et al., 2008; Nguyen et al., 2012; Sy, 2008). It concentrated on describing the governance landscape in the superannuation industry and highlighting the principal-agent relationships that exist (Benson et al., 2011; Drew et al., 2003).

The evolution of funds has also gained stronger research interest in recent years (Gray & Watson, 2011; Higgs et al., 2012). Work has been done with respect to possible economies of scale and scope in the industry (Bateman et al., 2004; Higgs et al., 2012). In a different approach, the rationalization of the industry is discussed as opportunity to modernize funds (Gray et al., 2011).

Work has tried to link governance principles to performance and volatility of returns (Benson et al., 2011), it has so far however failed to look at the influence on the evolution of the fund itself. Here, we focus specifically on the leaders of the funds, namely its trustees, and the trustee characteristics. So far, there has been limited research regarding the influence of leaders and specific board-level characteristics on the evolution of the fund as a whole.

We address this gap and ask the following research question: How do trustee board characteristics influence fund evolution over time?

The superannuation industry is the retirement savings vehicle for all Australians. Thus, many stakeholders exist that are connected to the development of the superannuation

funds. A major stakeholder set to look out for the proper functioning of the industry is the regulator APRA. The safety and security of the retirement savings of fund members are APRA's major concern (Bateman, 2003). Throughout the years APRA updates the regulatory environment that funds face and influences the funds through its actions. Of particular note is the introduction of a licensing requirement in the year 2004 that was implemented as part of the Super Safety Reform Act 2004 (APRA, 2012c). The licensing requirement was introduced predominantly to ensure better management of risk within the trustee, the fund, as well as service providers and the fitness and propriety of responsible officers. The licensing requirement was also assumed to alter the industry landscape with corporate funds expected to refrain from seeking a license (Treasury, 2003). The licensing requirement provoked strong unrest within the industry as the requirements to gain a license were costly and time-consuming (Taylor, 2011). Funds were given two years to comply with the new regulation and apply for a license. Elements that needed to be introduced related to risk management practices, requirements to asset management or capital adequacy (Hu & Stewart, 2009).

Past work has considered stakeholder impact in terms of the cost of regulation for funds (Taylor, 2011), as well as the effect on the industry as a whole (Sy et al., 2008). Here, we extend this work by analyzing stakeholder impact on the funds themselves and their business model. In particular, we focus on the regulator APRA and the results from the introduction of the licensing requirement of 2006. This allows us to formulate the second research question: What role does the licensing requirement play in promoting fund evolution over time?

In order to answer these questions and test our hypotheses, we use a dataset that consists of a representative sample of Australian superannuation funds that are tracked from the year 2003 to 2010. The dataset is analyzed by introducing a construct into superannuation research that will allow the quantitative and empirical analysis of superannuation funds. Specifically, superannuation funds will be analyzed by utilizing the construct of business model innovation (Amit et al., 2012; Teece, 2010). Business model innovation has been introduced into the management literature to describe the value creation and value capture mechanisms of a firm (Amit et al., 2012). Here, we utilize this construct to aid us in the analysis of the changes a fund has undergone over time and how its business model evolved.

This paper advances research in superannuation in a number of ways. Firstly, it promotes research on leaders and their characteristics in the Australian superannuation industry. This paper looks at the effect of different trustee board characteristics on the propensity to innovate the business model. Secondly, it considers the changes that stakeholders can provoke within the industry. In particular, it looks at the influence of the regulator APRA through the introduced licensing requirement and its impact on the behavior of the funds. We aim to provide a better understanding of fund evolution over time by looking at these two important influencing factors. Lastly, this paper introduces the academic construct of business model innovation into superannuation research to track the evolution of funds over time.

The remainder of the paper is organized as follows. Firstly, we take a closer look at how to measure fund evolution with the business model innovation construct, then we develop our hypotheses about leaders and stakeholders and their role in influencing the

evolution of superannuation funds. Thirdly, we introduce our database and research design. Next, we present our results before, lastly, discussing results and avenues for further research.

THEORY AND HYPOTHESIS DEVELOPMENT

Analyzing the evolution of superannuation funds: the role of business model innovation

The superannuation industry in Australia has changed considerably since the inception of the superannuation guarantee legislation in 1993. The players now active in the market have evolved to adapt to new market needs and changes in regulation. Past work that looked at the individual superannuation funds was mainly interested in assessing their performance and cost (Bateman et al., 2004; Coleman, Esho, & Wong, 2006; Drew & Stanford, 2001; Ellis, Tobin, & Tracey, 2008). While this work considers the individual fund, it retains a dominant focus on their financials.

Practitioner and consumer oriented service providers depart from focusing only on financials and have looked at funds from a broader perspective. They try to combine various factors in order to give consumers a more formed opinion regarding the choice of fund for their retirement savings (e.g., Chant West). However, an academic construct, more suitable to help understand the evolution of the funds has so far not been employed.

Hence, we propose the business model innovation construct as measure to evaluate funds. The analysis of the innovation of the business model determines the evolution of funds over time.

The business model innovation construct has been chosen for this task as it allows the analysis of the fund as a whole and does not only focus on individual elements of fund

organization. The business model construct allows the analysis of the value creation and appropriation of a firm. In this it is set apart from just looking at the strategy of a firm (Amit et al., 2012; Teece, 2010). The business model allows the analysis and description of business phenomena in an interdisciplinary way. It captures the multiple sources that firms tap into when building their business and so best describes the complexities of a modern business world (Amit et al., 2001). Other management constructs do not show this characteristic to analyzing a firms approach to value creation and capture.

Business model innovation has been extensively discussed in academic and practitioner work (e.g., Casadesus-Masanell et al., 2013; Chesbrough et al., 2002; Reeves et al., 2011; Zott et al., 2007). This has led to a proliferation of definitions of business model innovation (George et al., 2011; Zott et al., 2011). We draw on previous work conducted on the antecedents to business model innovation (Hartmann et al., 2013) to define the construct. The definition utilized in this work is well suited for our scope of analyzing the evolution of funds over time. Accordingly we define business model innovation as "the modification or introduction of a new set of key components – internally focused or externally engaging – that enable a firm to create and appropriate value." (Hartmann et al., 2013, p.6).

Innovation is here seen as absolute, as well as relative novelty (Crossan et al., 2010). Hence, it encompasses innovation that is new to the industry as a whole and, more importantly, that is new to the fund under analysis.

This definition of business model innovation allows us to describe fund evolution according to a set of components and to track the innovation of this set over time. In a next step we now look at the factors that can influence this evolution of the superannuation funds.

Influence of leaders on the evolution of superannuation funds

The analysis of the role that leaders play in managing a fund have so far been concentrated on governance issues (e.g., Benson et al., 2011; Sy, 2008). Interest in this topic is growing, as the superannuation industry takes on an ever increasing role as the retirement system of Australia. Work on governance has in particular noted that no legislation exists that prescribes funds to comply to specific governance standards (e.g., board independence, board committees, accountability of managers) (Benson et al., 2011). This research has looked at the level of voluntary adoption of governance principles by fund leaders, as well as possible performance effects. Positive performance was related to the board size and frequency of conflict review (Benson et al., 2011). Other work raised issues regarding the principal-agent relationship between trustees and members (Drew et al., 2003).

Leaders of funds have been surveyed in order to understand their satisfaction with the trustee role (Sy et al., 2008). However, there is little work that looks at the role of leaders in enabling an innovation of the business model. Trustees, as leaders of the fund, have the power to decide on the direction a fund will take in order to remain competitive on the market. The trustee board is the custodian of members' money in the fund and the ultimate decision making body. Fund evolution and hence business model innovation within a fund will only proceed with the support of the trustee board. The decision will not be delegated to someone else. Research has noted that even when governing committees are in place, they are not independent of the board (Benson et al., 2011). Trustees set the agenda of their board meetings (Gupta et al., 2008). They decide whether or not it is time to discuss and consider a change of how a fund conducts its business. Different trustees have been seen to perceive the

job differently (Gupta et al., 2008). Thus, the characteristics of the leaders of the fund can play a pivotal role in enabling business model innovation.

We build on past governance work and consider three different aspects of the leadership composition of a fund. Firstly, we address the misalignment between trustees and members (Drew et al., 2003) by looking at the affiliation of the leaders to sponsoring bodies. Secondly, we take the recurrently seen impact of board size on fund performance (Benson et al., 2011; Useem & Mitchell, 2000) and see whether the influence of board size extends to the evolution of the whole fund. Lastly, we reflect on the recently seen implementation of remuneration committees in funds (Benson et al., 2011) and analyze the role remuneration of leaders plays in promoting fund evolution.

In line with principal-agent theory, a strong misalignment between trustees and members was found in the superannuation industry (Drew et al., 2003). Trustees can put their own interest or the interest of their primary employer ahead of the best interest of the members of the fund. This misalignment has in part been reduced through licensing and member choice. However, a stronger stake in the fund for trustee directors could further reduce the principal-agent problems (Carpenter, Pollock, & Leary, 2003).

Research found that only some trustees have their assets invested in the fund. In a sample of large funds spanning industry, corporate, public sector and retail funds on average 30% of trustees had all of their superannuation invested in the fund they govern. Overall trustees invest ca. 40% of their own superannuation in the fund they govern (Sy et al., 2008). The misalignment of principal and agent can be influenced through the sponsors of the trustees. Trustees are often affiliated with an organization that elects them to the board of the fund (Drew et al., 2003). The strong decision making abilities of the board convert into high

influence on the fund for an organization that is affiliated with one or multiple trustees to the board.

A member-elected trustee is per default a member of the fund and hence has a vested interest in the fund performing well. This benefit of having invested in the fund has also been underlined by work seeing a positive connection between board members with stock in a company and their commitment to the company (Zahra, Neubaum, & Huse, 2000). Furthermore, being member elected, these trustees do not per se have strong links to other organizations that chose them for this position. Hence, their loyalty is more likely to lie solely with the members of the fund.

Ultimately a superannuation fund should always have a members' best interest in mind. This should be the aim of all trustees. However, especially the merger of funds has shown that trustee positions are sometimes bartered between electing bodies (Gray et al., 2011). Fully member voted trustees should per definition stand outside of this mechanism and be more strongly inclined to take decisions independent of supporting bodies, where loyalties could lie.

Business model innovation influences the value members receive from the fund. Trustees that are more closely connected to the membership base could hence be more inclined to make this value available to the members and thus pursue business model innovation. Hence, the presence of a larger percentage of member representatives on the trustee board of a superannuation fund should positively influence the propensity to innovate the business model. In formal terms:

Hypothesis 1: Firms with a higher percentage of member elected trustees have a stronger propensity to innovate the business model

The quantity of leaders can also change the way a firm approaches business model innovation. Past research has seen board size to have a positive effect on the performance of the firm (Benson et al., 2011). Board size influences the decision-making processes of a firm (Forbes & Milliken, 1999; Goodstein, Gautam, & Boeker, 1994). Increasing board size brings a broader range of experience onto the management of the fund. This allows more opinions to be voiced and discussed and hence stronger discussion on for example the evolution of the fund's business model. Larger board size should thus increase the propensity to innovate the business model. However, multiple research also shows that large board size can lead to a dysfunctional board (Eisenberg, Sundgren, & Wells, 1998; Forbes et al., 1999). Decision processes take longer and different opinions are harder to reconcile. Hence, a decrease of the propensity to innovate the business model is expected as board size increases further. Board size is thus expected to have an inverse u-shaped relationship with the evolution of a fund's business model over time. In formal terms:

Hypothesis 2: An inverse u-shaped relationship exists between board size and propensity to innovate the business model

The members of trustee boards or their governing body receive remuneration for the time and effort spent in helping to run the fund. The size of the remuneration differs strongly between

funds in the industry (Sy et al., 2008). The majority of work done regarding board remuneration focuses on top management teams or chief executive compensation (e.g., Gomez-Mejia, 1992). Work looking at not publicly listed companies or trustee structures is less prominent (e.g., O'Regan & Oster, 2005; Tufano & Sevick, 1997). It focuses on fund-raising or the relationship between trustees and service providers. It has been shown that compensation strategies influence individuals commitment to the organization (Jerez-Gómez, Céspedes-Lorente, & Valle-Cabrera, 2005). In particular, a competitive compensation level is seen as a signal of appraisal for the work done and hence reinforces the motivation of an employee and his commitment to the organization (Arthur, 1994; Montemayor, 1996). In a superannuation fund the trustee board decides on the appropriate remuneration for its trustees. This distorts the influence of remuneration on the commitment of the board. This is further reinforced by the fact that remuneration is often paid as a yearly fee with no relation to performance indicators. The lack of linkage between pay and performance can reduce the motivation and make talent retention more difficult (e.g., Zenger, 1992) This can also lead to complacency and reduced incentives to modify the firm business model for fear of harming the achieved comfortable compensation standard. In particular, the higher the present remuneration is, the higher is the risk of loss in the case of change. The incentive to modify the business model of a fund can be influenced both ways through the remuneration of the board. Hence, we postulate the existence of an influence, but do not specify the direction of effect as past research shows contradicting evidence. In formal terms:

Hypothesis 3: Fees of trustee board members influence the propensity to innovate the business model

The second part of this research focuses on the importance stakeholders play in promoting fund evolution and hence business model innovation. We focus on the role of the regulator APRA and the results of its intervention in the market environment that superannuation funds are faced with. Specifically we look at the introduction of the licensing agreement in 2004. Past research has often stressed the need for stricter regulation (Bateman, 2003) prior to our period of analysis. Regulation in the superannuation industry is set through the government body APRA. The results of APRA intervention in the market hence merits research attention. Deregulation and the introduction of the licensing requirement promoted by APRA in 2004 (APRA, 2004) were a major upheaval in the industry. On the one side, this allowed the funds to compete more freely on the market, while on the other side obliged them to make a choice on how they wanted to compete on the market. Hence, funds had to strongly weigh off if and how to continue the fund activity under consideration of the licensing requirement. Previous work regarding the licensing requirement has focused on analyzing overall industry trends (e.g., APRA, 2012c). The licensing requirement had the effect of increasing consolidation within the industry, especially reducing the number of corporate funds (APRA, 2007, , 2012c). Corporate funds with small member numbers and limited potential to grow felt the cost-burden of the licensing requirement especially strong (Treasury, 2003). Consolidation with a larger fund is then a utilized exit option.

Furthermore, the choice for funds was made most visible by the necessity of applying for a public offer or non-public offer license. The licensing requirement can be seen as a trigger point that forced trustee boards to rethink the operations of their fund (APRA, 2007) and hence the business model. The stakeholder APRA thus influences the funds not only

through direct actions, but also through indirect forces. Surveys amongst trustee board members held in 2004/2005 & 2006 found that increased regulation was seen as a burden to their work (Gupta et al., 2008; Sy et al., 2008). This regulatory change played a role in the decision-making of the trustees at the time. New regulation and in particular the introduced licensing arrangement falls exactly into the time of the survey. Thus, stakeholders introduce momentum into the industry by changing the rules of the game. Through the license application process, the fund is already put in a state of change with employees knowing and ready to embrace the new philosophy. The need to comply with the regulation can reduce barriers towards the innovation of the fund's business model. Stakeholders would then have influenced funds not only directly through the introduction of the licensing requirement, but also indirectly through the influence of the behavior of the fund.

Hence, we would expect heightened business model innovation after the announcement of the new licensing requirement. In formal terms:

Hypothesis 4: Licensing requirement increases the propensity of a fund to innovate the business model

RESEARCH DESIGN

Empirical setting and data collection

Our research is firmly set within the Australian superannuation industry. The industry affects the lives of all Australians and is a profound part of the Australian economy. Nonetheless, research regarding the superannuation funds themselves has been scarce so far

(e.g., Gray et al., 2011; Higgs et al., 2012). Here, we reduce this gap by looking at the funds directly and specifically their business models. In particular, we exploit the fact that comparisons between funds are possible over time, as regulation has hindered a strong diversification of players into other industries.

The dataset underlying the empirical analysis combines multiple data sources, namely APRA collected data (APRA, 2012b), surveys conducted by the industry body ASFA (ASFA, 2003-2011) and an analysis of fund annual reports conducted by the authors. Through the usage of multiple data sources common method bias is avoided. The funds included in the dataset are a subset of the whole industry, excluding retail funds and self-managed superannuation funds. Retail funds are specifically not included in the analysis in order to avoid distortion. This is the case as retail funds are embedded within a bigger financial services firm. They have a direct link to another large firm and can hence not be considered a single, individual firm. The theoretical framework and analysis require the empirical investigation to focus on single, incumbent firms.

Across the remaining fund categories, an equal spread is achieved. Table 1 shows the distribution of funds in the dataset across the different categories. In total 59 funds are included in the dataset spanning the years 2003 – 2010. Hereby the sample covers the full range of fund sizes, measured by net assets at year end. Only funds that are present in the industry for the length of the period of analysis are considered. Funds that drop out of the market at any stage are not included in the analysis. Table 1 gives more detail on the composition of the sample by fund type, offer status and benefit structure.

INSERT TABLE 1 ABOUT HERE

Business model innovation measure

In order to assess the business model innovation behavior of funds in the Australian superannuation industry we apply a measure of business model innovation introduced in previous work by the authors (Hartmann et al., 2013). The business model construct is operationalised by utilizing the NK model metaphor (Afuah et al., 2012).

The NK-model was introduced to the social sciences as mathematical representation of complex problems (Kauffman et al., 2000; Levinthal, 1997; Rivkin et al., 2002; Westhoff et al., 1996). The NK-model originates from evolutionary biology where it described the evolutionary process of species across a space of possible genotypes leading to a higher state of being (Kauffman, 1993; Kauffman et al., 1989). The application of this metaphor to superannuation research is done by equating species with funds. The solution space is then set equal to a fitness landscape that describes different variations in the business model of funds. The landscape is defined through the number of attributes or components N and the interaction between these components K. The different combinations of N and K then describe different possible landscapes that a firm could be faced with. A variety of problems have been modeled using this approach, for example hierarchical decision processes (Rivkin et al., 2002) or corporate strategy (Caldart et al., 2004). Here we apply this concept as a metaphor to the area of business model innovation. Hereby, we build on the definition of a

business model as a set of components. We track the movement of a fund over time across a fitness landscape by looking at the innovations of its business model components and hence evolution of its business model.

In order to follow the steps, multiple elements are needed. Firstly, the components of the landscape must be chosen. In order to best describe the evolution of funds over time. We focus on major innovations of the business model of funds that happened in the industry in the relevant time frame. The choice of components was driven by interviews with managers, the regulator and industry body representatives. The conducted interviews were structured in open form with broad questions asked in order to avoid a focus on items preselected by the interviewer. Main themes were then distilled and validated through further discussion with industry experts.

Secondly, the possible decision states of these components must be chosen. In our case a fund can choose to implement a component or not. It is a binary (0;1) decision, with the state one being assigned to a decision if the fund implemented a particular innovation component. At each point in time, the fund makes a decision regarding each individual component, leading to a decision vector for each point in time $\mathbf{d}=[d_1, d_2, \ldots, d_n]$ that reflects the decision taken for each component (Rivkin et al., 2002).

Thirdly, each decision is assigned a contribution value that reflects the contribution of that decision in reaching a higher state on the fitness landscape. The combination of all contribution values then constitutes the fitness value for the decision stream taken at a precise point in time. This fitness value reflects the state of the business model at that point in time. The contribution value of each individual decision is set as equaling its decision state. Thus,

the contribution value one is given to a decision to implement a component, while the contribution value zero is given to a decision that does not implement the component.

Fourthly, we decide on a fitness function that will combine the individual contribution values to one aggregate value. In order to define the fitness function we decide on the interaction K between the components. Hereby, we follow previous work done in the social sciences (Levinthal, 1997) and assume no interaction between the components. Hence, each component enters the fitness function with exactly its contribution value and is not influenced by other components. Thus, all the contribution values are added with same weight resulting in an additive fitness function. An additive fitness function means that each innovation component has the same power, and hence weight, in improving the fitness value of a firm. Each component contributes individually to the fitness value and is not influenced by the inclusion or exclusion of other components.

The aforementioned steps allow us to, lastly, operationalise business model innovation and look at the evolution of superannuation funds over time. Business model innovation was defined as the modification or introduction of a new set of components. Hence, it constitutes a departure from the status quo. In the NK-model framework, the status quo is the fitness value assigned to each fund at each point in time. Hence, in applying this metaphor to our setting, the difference in fitness values in our landscape then constitutes a departure from the status quo and hence gives a quantitative measure of business model innovation within superannuation funds over time. Business model innovation is hence analyzed on the fund-level of analysis. The unit of analysis is the single superannuation fund.

Quantifying business model innovation within the Australian superannuation industry

The scope of this paper focuses on analyzing the influence of leader characteristics and stakeholder influence on the propensity of a superannuation fund to innovate the business model. In particular, it looks at trustee board characteristics and the licensing requirement when analyzing changes in the business model of the fund. In order to do so, we quantify business model innovation within the Australian superannuation industry. Firstly, we distil the most important innovation components of the business model of superannuation funds that were introduced in the years 2003-2010. Interviews conducted in the industry led to the selection of the following seven components: in-house administration, unit pricing, online account access, online transactions, alternative investments, financial planning affiliate, and transition to retirement product. In-house administration relates to administration services being conducted by the fund itself. Unit pricing describes the move of funds towards pricing fund balances according to units bought in contrast to end-of-year crediting of interest. Online account access refers to the possibility of members to access their account via a computer-user interface. Online transactions refer to the possibility of money transfers into a superannuation account authorized and conducted electronically by the account holder. Alternative investments describe monetary investments made by the fund into absolute return products. Financial planning affiliate refers to a firm set up by the fund to offer financial planning advice directly to fund members. Lastly, a transition to retirement product is like an allocated pension that members can access when transitioning into retirement by reducing full-time work load.

At each point in time, every fund must decide whether or not to innovate its business model. The resulting decision stream allows the calculation of the fitness value of the fund. Subsequently, the business model innovation value is calculated by taking the difference between the fitness values of the business model at two subsequent points in time.

Influencing factors of business model innovation

Our regression model looks at the influence of independent variables on the propensity of superannuation funds to innovate their business model. Below we define the variables needed to test our hypotheses.

Dependent variable. The dependent variable of our regression analysis is derived from our operationalization of the business model innovation construct. Business model innovation is calculated as the difference of fitness values at two points in time. It reflects the innovation of the business model of a superannuation fund.

Independent variables. We operationalise *member-elected trustees* by looking at the composition of the trustee board for each individual fund at each point in time. Hereby, we focus on the percentage of board members directly elected by members and hence not appointed by the union, employer-sponsor or as independent (i.e. voted in by the remaining board). The information is acquired through analysis of fund annual reports by the authors.

We operationalise *board size* as the total number of trustee members on the board of a superannuation fund. This is independent of the body that elected the trustee to the fund board. The variable is included at a one year lag. The number of board members is established through the analysis of fund annual reports.

We operationalise the *fees of the trustee board* as the total compensation paid by the fund to its trustees or the appointing body (e.g., AustralianSuper; AGEST) in lieu of their appointment to the board. The variable is included at a one year lag. The amount of fees paid is taken from the values submitted to APRA and noted in their database under the heading of "Director/trustee fees and expenses" (APRA, 2012b)[14].

In order to assess the *impact of licensing* on the propensity to innovate the business model we firstly consider the timing of deregulation and licensing requirement. The licensing requirement was introduced in the year 2004 with a transition phase of two years, making it obligatory for funds to be licensed by 2006 (APRA, 2012c). In the empirical analysis we hence look at the year dummy variable for the year 2006 to see an indication for a regulatory effect. We chose the last year of the licensing period, as funds take time to decide on the licensing option to pursue.

Control variables. Lastly, the regression includes various control variables. The following control variables are included in the regression: transaction experience, defined as one if at least one merger and acquisition transaction was completed by the fund in that year and zero if no transaction was completed. The industry experience on the board is also included in the analysis in its simple and quadratic form. Industry experience is defined as the quantity of financial services representatives on the trustee board. This variable is only relevant for funds that do not originate from the financial services sector. This value is taken from government provided data. Furthermore, we include the fitness value of the fund at year 2003 in the analysis. This value allows an indication of the innovation activity prior to the time frame

[14] The APRA data was corrected for values where trustee fees were not reported individually and only an aggregate value of administration expenses was shown.

under study. Hereby it is important to note that a fund can innovate a maximum of seven components over the time frame[15].

Fund size is included through the log of total members and membership composition via the percentage of pension members. Lastly, we include the gender of the trustee board chairman, the performance of the firm with a one year lag, as well as the differentiation of funds into public offer/non-public offer and industry funds in the regression analysis. All values are taken from government provided data (APRA, 2012b).

Methodology and empirical analysis

The empirical analysis of the proposed hypotheses necessitates a decision regarding the econometric model underlying the analysis. The dependent variable is a count variable and hence our model comes from the count variable family. We tested for overdispersion and found a positive result leading us to prefer a negative binomial distribution over a Poisson distribution. The multivariate regression is run as a generalized linear model under consideration of the necessary negative binomial distribution. Furthermore, the model takes the panel data structure into account by clustering on the fund identifier. Hence, unobserved firm effects are avoided. The clustering on the fund identifier also guarantees the calculation of robust standard errors. (Cameron et al., 2010). This also mitigates possible concerns regarding heteroskedasticity in the data and ensures that standard errors are reported

[15] Please note that once a firm has implemented all seven possible components in the time period, the model currently does not allow for further modifications of the business model. Outside of the time frame under study a firm can revisit individual components and modify or introduce new components. In the time frame of our analysis this was not the case. The seven considered elements constitute the most important business model innovation efforts in the time span under study. However, considering that only 4 of seven possible components were changed simultaneously, the second argument seems to stand back in comparison to the first. Most firms would still have had enough degrees of freedom in the model to continue to innovate the business model.

correctly. Furthermore, we test for multicollinearity among independent variables. Multicollinearity is within acceptable levels (Kleinbaum et al., 2008) with overall mean VIF of 7.03. First order serial correlation also does not pose a problem as a Wooldridge test shows no sign of autocorrelation of first order (p-value of 0.18). Overall, we see the model as valid and adequate for our analysis.

RESULTS

Descriptive statistics

Descriptive statistics of regression variables are provided in table 2. The fitness value reflects the state of the business model of a fund. Values of the variable range from zero to seven, hence across the whole range of possible values. The business model innovation variable shows the changes in the business model of a fund over time. It ranges from zero to four. Hence, funds innovated a maximum of four components at a time in any given year. Business model innovation remains an unusual event as the median of 0 and mean of 0.5 show. It is costly for funds to undergo business model innovation and is not easily conducted. However, some firms still manage to innovate multiple components at a time. The percentage of member representatives on the trustee board ranges from 0 to 50% with mean at 25% and median at 38%. Remuneration of trustees shows an average for the whole board of 73,000$ with median at 127,000$. Total board size ranges from 4 to 17 members with mean at 9 and median at 8 members.

INSERT TABLE 2 ABOUT HERE

The Pearson correlation coefficients are shown in table 3. We do not see a problem of multicollinearity as mean VIF is within acceptable levels.

INSERT TABLE 3 ABOUT HERE

Hypotheses tested

Table 4 depicts our regression results. In total we run two regressions. Model 1 is a baseline model with only the control variables. Model 2 is the full model with all variables needed to test our hypotheses.

Model 1 shows that we can replicate the results found in previous work (Hartmann et al., 2013) as the control variables included in the regression indicate. Industry experience shows a significant u-shaped effect with a negative coefficient on the simple effect and a positive on the quadratic. Both effects are significant at 1% and 0.1% respectively. This allows the interpretation that only limited amounts of heterogeneity on the trustee board are favorable for business model innovation. Specifically, it underlines the fact that the introduction of expertise into the trustee board can have a positive effect on the evolution of the fund.

We also see that experience from past transactions influence business model innovation behavior favorably especially for non-public offer funds. The coefficient is significant at 0.1%. These funds underwent more difficulties to enable the merger and hence

it suggests a greater learning experience than for public offer funds. Public offer funds have evolved less over time with a negative effect on business model innovation that is however not significant. Industry funds show a positive propensity to innovate the business model. The coefficient is significant at 1% level. This result could relate to the fact that industry funds communicate strongly amongst each other through the industry fund network. This could lead to extensive knowledge sharing through the network resulting in individual industry fund capabilities to evolve more strongly. This again can lead to an adaptation of the business model of the fund.

The fitness value of the business model in the year 2003 has a negative influence on the propensity to innovate the business model at a significance level of 1%. This is in line with expected results, as funds that innovated extensively in the past can be assumed to retain this innovated business model for some time.

The percentage of pension members also has a negative influence on the propensity to innovate the business model (significance level 0.1%). The gender of the chairman shows a negative effect for males which is significant at 1%. Lastly, the log of total members shows a positive effect, while the past performance shows a negative effect, both are however not significant. The negative effect of past performance can be an indication of the reduced propensity to innovate the business model out of a well-functioning old business model. Furthermore, the model contains year dummy variables to capture time effects and avoid omitted variable bias.

INSERT TABLE 4 ABOUT HERE

Model 2 tests the full model including all variables needed to test the hypotheses regarding the role of leaders and stakeholders can play in influencing the evolution of funds and their business models over time.

Hypothesis 1 (on the influence of member affiliated trustees) is supported by the analysis. Model 2 shows a positive coefficient at 1% level for percentage of member elected trustees on the trustee board. The coefficient has to be seen against the omitted category of the percentage of union elected trustees[16]. The analysis shows that in comparison to union elected trustees, a stronger percentage of member elected trustees will positively influence the propensity to innovate the business model. The contrary can be said for independent and employer elected trustees where negative coefficients are derived that are however not significant.

Model 2 also shows support for hypothesis 2 (regarding the influence of the quantity of leaders). The regression analysis supports the theoretical finding of an inverse u-shaped relationship between total board size and the propensity to innovate the business model. The direct effect of total board size shows a positive coefficient that is significant at 1%, whereas the squared variable shows a negative coefficient that is also significant at 1%. Hence, the model supports the fact that increasing board size is beneficial up to an inflection point. After the inflection point the propensity to innovate the business model reduces again.

Hypothesis 3 (regarding remuneration of leaders) is supported by the regression analysis. A slight negative coefficient is seen at a one-year lag that is significant at 1%. The

[16] The change of the reference category to any of the other three categories (member, independent, employer) changes the results. No significant differences in effect can be found when the reference category is modified.

model supports the reasoning of higher fees decreasing the commitment of board members and hence a lower propensity to move the fund to the forefront of innovation by promoting an innovative business model. The coefficient however is close to zero indicating ambivalence of the effect. In some cases higher compensation levels could also lead to stronger commitment to the fund and a higher level of experimentation (Jerez-Gómez et al., 2005). Further research into this topic could help clarify this relationship.

Lastly, hypothesis 4 (regarding the influence of stakeholders) finds support in the model. The year dummy variable for the year 2006 can be associated with the end of the licensing period. The year 2006 is the last year licensing was possible and funds considered what license to acquire. The variable shows a positive coefficient that is significant at 5%. This result gives indication of the influence of licensing on the propensity to innovate the business model. Licensing seems to influence the evolution of superannuation funds.

All control variables retain the same direction of effect as in model 1. Significance levels however, change slightly.

DISCUSSION AND FUTURE DEVELOPMENTS

This paper focuses on analyzing the influence of leaders and stakeholders on the evolution of superannuation funds over time. We introduce the construct of business model innovation to aid us in our empirical analysis. We look at the role different characteristics of the leadership board and introduced licensing by stakeholders play on the propensity of a superannuation fund to innovate its business model and hence change the way it works.

Regression results show that the changes seen within funds over time were influenced by a variety of factors. In particular, the affiliation of trustees can influence the developments undertaken by funds. Member elected trustees, when compared to union trustees, increase the propensity of a fund to innovate the business model. Independents or employer elected trustees do not portray any difference in effect. The significant effect of member-elected trustees could be related to the election process behind trustee appointment. Potential trustees must show a high degree of commitment for the role in order to be elected and will be held responsible for their actions at the next election round. The same does not hold for union trustees or any of the other categories.

Furthermore, our research showed that in line with past work, quantity of leaders and thus board size are important. Increasing board size shapes the evolution of funds up to an inflection point. Once the inflection point is reached, the board starts to become dysfunctional and increases in board size are no longer a positive input for the evolution of a fund. Remuneration of leaders also plays a role in forming a fund's business model. The analysis shows a small negative effect of trustee fees on the propensity of a fund to change its business model. The negative coefficient reflects the fact that higher fees are not a measure of trustee quality. This is further underlined by the fact that remuneration of the board is set by the board itself and no requirement for disclosure or transparency is in place. Members of a fund have little to no possibility to gain knowledge of the board remuneration via the annual report, one of the main communication devices between the fund and its members. This situation exists notwithstanding member fees paying for board remuneration.

A further element that merits consideration is the practice of director remuneration being paid to the electing body and not the trustee director himself. This practice undermines

the incentive effect of pay on an employee seen in management research (e.g., Jerez-Gómez et al., 2005).

Lastly, we look at one particular stakeholder APRA and analyze the influence of the licensing regime on the development of superannuation funds. The empirical analysis shows a positive effect of the licensing on improving the business model of a fund.

This paper contributes to the literature on superannuation research by firstly, focusing the analyses on the funds themselves and introducing business model innovation into research on superannuation funds. Secondly, it addresses the role leaders can play in promoting business model innovation by considering the influence of different trustee characteristics on the evolution of funds. Lastly, we open the discussion on the effect stakeholder induced change through an analysis of the licensing regulation brought into the superannuation industry, a field that merits further research.

This paper also aims to inform industry professionals on past drivers of fund-level developments. The difference that member elected trustees can have for the development of the fund and the influence of the size of their board on the ability of a fund to change over time are food for thought. Lastly, we wish to highlight that regulation changes and in particular the licensing regime can be an opportunity for a superannuation fund to embark on a new path and rethink its business model.

Future work could dig deeper into the analysis of the impact of other regulatory changes on the development of superannuation funds. Furthermore, we hope to have sparked interest into the development of the funds themselves and their operations. The importance of

superannuation funds for the Australian economy is growing by the day and hence it should be in the interest of the wider community to better understand how these funds work and evolve.

REFERENCES

Amit R and Zott C (2001) Value Creation in e-business. *Strategic Management Journal* 22**:** 493-520.

Amit R and Zott C (2012) Creating Value Through Business Model Innovation. *MIT Sloan Management Review* 53 (3)**:** 41-49.

Apra (2004) Superannuation Licensing: New Requirements for the Superannuation Industry. *APRA Insight.* Australian Prudential Regulation Authority.

Apra (2005) Classification of Superannuation Entities. *APRA Statistics.* Australian Prudential Regulation Authority.

Apra (2007) Celebrating 10 Years of Superannuation Data Collection. *APRA Insight.* Australian Prudential Regulation Authority.

Apra (2012a) Superannuation Industry Overview. *APRA Insight.* Australian Prudential Regulation Authority.

Apra (2012b) Superannuation Fund-level Profiles and Financial Performance, June 2011. *APRA Statistics.* Sydney: Australian Prudential Regulation Authority.

Apra (2013) Annual Superannuation Bulletin, June 2012. *APRA Statistics.* Sydney: Australian Prudential Regulation Authority.

Arthur JB (1994) Effects of Human Resource Systems on Manufacturing Performance and Turnover. *Academy of Management Journal* 37 (3)**:** 670-687.

Asfa (2003-2011) Annual fund surveys. *Superfunds.* ASFA - the Association of Superannuation Funds of Australia Limited.

Barrett J and Chapman K (2001) The Australian superannuation system. *Organisation for Economic Co-operation and Development, Private pensions systems: administrative costs and reforms***:** 185-200.

Bateman H (2003) Regulation of Australian Superannuation. *Australian Economic Review* 36 (1)**:** 118-127.

Bateman H and Mitchell O (2004) New evidence on pension plan design and administrative expenses: the Australian experience. *Journal of Pension Economics and Finance* 3 (01)**:** 63-76.

Benson K, Hutchinson M and Sriram A (2011) Governance in the Australian Superannuation Industry. *Journal of Business Ethics* 99 (2)**:** 183-200.

Caldart AA and Ricart JE (2004) Corporate strategy revisited: a view from complexity theory. *European Management Review* 1 (1)**:** 96-104.

Cameron C and Trivedi P (2010) *Microeconometrics Using STATA.* USA: Stata Press.

Carpenter MA, Pollock TG and Leary MM (2003) Testing a model of reasoned risk-taking: governance, the experience of principals and agents, and global strategy in high-technology IPO firms. *Strategic Management Journal* 24 (9)**:** 803-820.

Casadesus-Masanell R and Zhu F (2013) Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal* 34 (4)**:** 464-482.

Chesbrough H and Rosenbloom R (2002) The role of the business model in capturing value from innovation: evidence from the Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change* 11 (3)**:** 529-555.

Coleman AD, Esho N and Wong M (2006) The impact of agency costs on the investment performance of Australian pension funds. *Journal of Pension Economics and Finance* 5 (3)**:** 299.

Crossan M and Apaydin M (2010) A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of Management Studies* 47**:** 1154-1191.

Drew ME and Stanford JD (2001) Asset Selection and Superannuation Fund Performance: A Note for Trustees. *Economic Papers: A journal of applied economics and policy* 20 (1)**:** 57-65.

Drew ME and Stanford JD (2003) Principal and Agent Problems in Superannuation Funds. *Australian Economic Review* 36 (1)**:** 98-107.

Eisenberg T, Sundgren S and Wells MT (1998) Larger board size and decreasing firm value in small firms. *Journal of Financial Economics* 48 (1)**:** 35-54.

Ellis K, Tobin A and Tracey B (2008) Investment Performance, Asset Allocation, and Expenses of Large Superannuation Funds. *APRA Working Paper***:** 1-59.

Forbes DP and Milliken FJ (1999) Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups. *Academy of Management Review* 24 (3)**:** 489-505.

George G and Bock A (2011) The Business Model in Practice and its Implications for Entrepreneurship Research. *Entrepreneurship Theory and Practice* 35**:** 83-111.

Gomez-Mejia LR (1992) Structure and process of diversification, compensation strategy, and firm performance. *Strategic Management Journal* 13 (5)**:** 381-397.

Goodstein J, Gautam K and Boeker W (1994) The effects of board size and diversity on strategic change. *Strategic Management Journal* 15 (3)**:** 241-250.

Gray J and Watson B (2011) Buttoning Up Australian Superannuation. *Rotman International Journal of Pension Management* 4 (2)**:** 38-44.

Gupta V, Jin H, Orszag M, et al. (2008) How Do Australian Superannuation Fund Trustees Perceive Their Role and Effectiveness? *In:* Evans J, Orszag M and Piggott J (eds.) *Pension fund governance: a global perspective on financial regulation.* Cheltenham: Edward Elgar Publishing Limited.

Hartmann M, Oriani R and Bateman H (2013) Exploring the Antecedents to Business Model Innovation: An Empirical Analysis of Pension Funds. *Working Paper.* Rome: LUISS University.

Higgs H and Worthington AC (2012) Economies of scale and scope in Australian superannuation (pension) funds. *Pensions Int J* 17 (4)**:** 252-259.

Hu Y-W and Stewart F (2009) Licensing Regulation and the Supervisory Structure of Private Pensions: International Experience and Implications for China. *OECD Working Papers on Insurance and Private Pensions* No. 33.

Jerez-Gómez P, Céspedes-Lorente J and Valle-Cabrera R (2005) Organizational learning and compensation strategies: Evidence from the Spanish chemical industry. *Human Resource Management* 44 (3)**:** 279-299.

Kauffman S and Weinberger E (1989) The NK model of rugged fitness landscapes and its application to maturation of the immune response. *Journal of Theoretical Biology* 141**:** 211-245.

Kauffman S (1993) *The Origins of Order: Self-organization and Selection in Evolution.* New York: Oxford University Press.

Kauffman S, Lobo J and Macready WG (2000) Optimal search on a technology landscape. *Journal of Economic Behavior & Organization* 43**:** 141-166.

Kleinbaum DG, Kupper LL, Nizam A, et al. (2008) *Applied regression analysis and other multivariable methods.* Belmont, CA: Duxbury.

Levinthal D (1997) Adaptation on Rugged Landscapes. *Management Science* 43**:** 934-950.

Montemayor EF (1996) Congruence Between Pay Policy and Competitive Strategy in High-Performing Firms. *Journal of Management* 22 (6)**:** 889-908.

Nguyen T, Tan M and Cam M-A (2012) Fund Governance, Fees and Performance in Australian Corporate Superannuation Funds: A Non-Parametric Analysis. *Journal of Law and Financial Management* 11 (2).

O'regan K and Oster SM (2005) Does the Structure and Composition of the Board Matter? The Case of Nonprofit Organizations. *Journal of Law, Economics, and Organization* 21 (1)**:** 205-227.

Reeves M and Deimler M (2011) Adaptability: The New Competitive Advantage. *Harvard Business Review* 89**:** 134-141.

Rivkin JW and Siggelkow N (2002) Organizational sticking points on NK Landscapes. *Complexity* 7 (5)**:** 31-43.

Sy W (2008) Superannuation Fund Governance: An interpretation. *APRA Working Paper*.

Sy W, Esho N and Sane R (2008) Superannuation fund governance: trustee policies and practices. *APRA Insight* 1**:** 2-17.

Taylor S (2011) Captured Legislators and Their Twenty Billion Dollar Annual Superannuation Cost Legacy. *Australian Accounting Review* 21 (3)**:** 266-281.

Teece D (2010) Business Models, Business Strategy and Innovation. *Long Range Planning* 43**:** 172-194.

Treasury (2003) Superannuation Safety Amendment Act 2003: Explanatory Memorandum. Canberra, Australia.

Tufano P and Sevick M (1997) Board structure and fee-setting in the U.S. mutual fund industry. *Journal of Financial Economics* 46 (3)**:** 321-355.

Useem M and Mitchell OS (2000) Holders of the Purse Strings: Governance and Performance of Public Retirement Systems. *Social Science Quarterly (University of Texas Press)* 81 (2)**:** 489-506.

Westhoff FH, Yarbrough BV and Yarbrough RM (1996) Complexity, organization, and Stuart Kauffman's The Origins of Order. *Journal of Economic Behavior & Organization* 29**:** 1-25.

Zahra SA, Neubaum DO and Huse M (2000) Entrepreneurship in Medium-Size Companies: Exploring the Effects of Ownership and Governance Systems. *Journal of Management* 26 (5)**:** 947-976.

Zenger TR (1992) Why Do Employers Only Reward Extreme Performance? Examining the Relationships Among Performance, Pay, and Turnover. *Administrative Science Quarterly* 37 (2)**:** 198-219.

Zott C and Amit R (2007) Business Model Design and the Performance of Entrepreneurial Firms. *Organization Science* 18**:** 181-199.

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

TABLES

Table 1: Composition of the dataset (SAMPLE) and overall market (INDUSTRY, excluding retail funds, SMSF and ERF) over all the years in the sample

		SAMPLE			INDUSTRY	
Variable name	**Freq.**	**Percent**	**Cum. %**	**Freq.**	**Percent**	**Cum. %**
Fund type						
Corporate	99	31.23	21.23	1520	73.71	73.71
Industry	162	51.10	82.33	416	20.17	93.89
Public Sector	56	17.67	100.00	126	6.11	100.00
Offer status						
Public offer	205	64.47	64.47	1603	77.78	77.78
Non-public offer	113	35.53	100.00	458	22.22	100.00
Benefit structure						
Accumulation	137	43.08	43.08	1031	50.02	50.02
Defined benefit	13	4.09	47.17	168	8.15	58.18
Hybrid	168	52.83	100.00	862	41.82	100.00

			SAMPLE			% of
Variable name	**Obs.**	**Mean ('000)**	**Min**	**Max ('000)**	**Sum ('000)**	**Industry**
Size of the fund						
Membership nr.	318	114	115	1,502	36,222	46.7%
Total assets	318	3,048	49,843	32,958	969,300	52.7%

			INDUSTRY		
Variable name	**Obs.**	**Mean ('000)**	**Min**	**Max**	**Sum**
Size of the fund					
Membership nr.	1428	54	25	1,966	77,530
Total assets	1427	1,289	0	32,958	1,839,655

Table 2: Descriptive statistics

Variable name	Mean	Median	Standard deviation	Min	Max	No. obs.
BMI	0.51	0.00	0.79	0.00	4.00	318
Fitness value (2003)	1.51	1.00	1.02	0.00	5.00	318
Board members – indep. (%)	0.09	0.00	0.19	0.00	1.00	318
Board members - members (%)	0.25	0.38	0.23	0.00	0.50	318
Board members - employer (%)	0.46	0.50	0.11	0.00	0.80	318
Board members - union (%)	0.20	0.00	0.22	0.00	0.53	318
Trustee fees ('000$)	232,91	118,50	311,71	0,00	2123	314
Board size	8.71	8.00	2.30	4.00	17.00	318
Board size (sq)	81.11	64.00	45.54	16.00	289.00	318
Industry experience (number of trustees)	1.06	0.00	1.56	0.00	7.00	318
Industry experience (sq)	3.55	0.00	9.10	0.00	49.00	318
Transaction experience (non-public)	0.03	0.00	0.17	0.00	1.00	317
Transaction experience (public)	0.03	0.00	0.18	0.00	1.00	317
Public offer fund	0.35	0.00	0.48	0.00	1.00	318
Industry fund	0.57	1.00	0.50	0.00	1.00	318
Gender of chairman (male)	0.86	1.00	0.35	0.00	1.00	318
Pension members (%)	4.59	0.87	12.40	0.00	80.35	318
Past performance (%)	5.26	9.90	11.15	-26.17	21.38	317
Number of members (log)	10.57	10.49	1.63	4.74	14.22	318

Table 3 Pearson correlation coefficients of model variables

Variable name	B. model innovation	Board members - members (%)	Board members – ind. (%)	Board members - employer (%)	Board members - union (%)	Total board (lag1)	Total board ^2 (lag1)	Trustee fees (lag1)	Regulation (yr 2006)	Transaction exp. (non-public offer) lag1	Transaction exp. (public offer) lag1	Industry experience	Industry experience (squared)	Public offer fund (lag1)	Industry fund	Pension members (%)	Fitness value (2003)	Gender of chairman (male)	Number of members (log)	Past Performance (%) lag1
Bus. model inno.	1.00																			
Board m.–mem. (%)	-0.01	1.00																		
Board m.–ind. (%)	0.03	-0.32	1.00																	
Board m.–emp. (%)	-0.06	0.26	-0.92	1.00																
Board m.–union (%)	0.02	-0.89	-0.10	0.05	1.00															
Total board (lag1)	0.07	-0.16	-0.19	0.09	0.29	1.00														
Total board ^2 (lag1)	0.07	-0.18	-0.19	0.11	0.30	0.98	1.00													
Trustee fees (lag1)	-0.01	-0.20	-0.05	0.15	0.18	0.17	0.18	1.00												
Regulation (yr '06)	0.29	0.01	0.00	0.00	-0.01	-0.01	-0.01	-0.05	1.00											
Trans. exp. (n-p o) lag1	0.11	0.02	-0.03	0.01	0.00	0.07	0.05	-0.07	0.08	1.00										
Trans. exp. (po) lag1	0.02	-0.12	0.00	-0.01	0.13	0.10	0.09	0.16	0.00	-0.04	1.00									
Ind. Exp.	0.02	-0.17	0.72	-0.62	-0.16	-0.28	-0.27	-0.08	-0.01	-0.04	-0.06	1.00								
Ind. Exp. (sq)	0.05	-0.20	0.82	-0.73	-0.16	-0.20	-0.20	-0.14	-0.01	-0.04	-0.06	0.92	1.00							
Public offer fund (lag1)	-0.04	-0.08	-0.01	-0.02	0.11	0.11	0.08	0.37	-0.09	-0.13	0.31	-0.03	-0.06	1.00						
Industry fund	0.07	-0.28	-0.21	0.14	0.41	0.22	0.24	0.31	-0.06	-0.07	0.14	-0.28	-0.25	0.53	1.00					
Pension memb. (%)	-0.05	0.00	0.02	-0.02	0.00	-0.05	-0.06	-0.16	-0.01	0.06	-0.07	0.00	-0.03	-0.21	-0.30	1.00				
Fitness value (2003)	-0.09	-0.08	-0.02	-0.02	0.11	-0.05	-0.09	0.01	-0.01	0.00	0.05	-0.07	-0.03	0.10	0.02	-0.13	1.00			
Gender of chair (m)	-0.09	-0.01	0.08	-0.04	-0.04	-0.06	-0.05	0.02	-0.04	-0.10	0.03	-0.04	0.01	0.10	0.17	-0.17	0.09	1.00		
Nr of memb. (log)	0.06	-0.41	-0.04	0.08	0.42	0.22	0.22	0.58	-0.04	0.00	0.16	-0.05	-0.09	0.46	0.42	-0.14	0.02	-0.06	1.00	
Past Perf. (%) lag1	0.17	0.00	0.02	-0.02	0.00	-0.02	-0.01	-0.14	0.26	0.06	0.05	-0.01	0.01	-0.18	-0.12	0.00	-0.02	0.00	-0.10	1.00

Table 4 Negative-binomial regression results with cluster-robust standard errors

	Dependent variable: business model innovation	
	Model 1	Model 2
Variable name	Value (st. err.)	Value (st. err.)
Constant	0.158 (0.66)	-4.95*** (1.08)
Board members - members (%)		0.84** (0.26)
Board members – ind. (%)		1.05 (0.82)
Board members - employer (%)		1.0 (1.11)
Total board (lag1)		0.43** (0.13)
Total board ^2 (lag1)		-0.02** (0.01)
Trustee fees (lag1)		-0.001** (0.0002)
Regulation (yr 2006)		1.85* (0.86)
Transaction exp. (non-public offer) lag1	1.29*** (0.25)	1.22*** (0.25)
Transaction exp. (public offer) lag1	-0.02 (0.31)	0.38 (0.26)
Industry experience	-0.24* (0.10)	-0.17* (0.08)
Industry experience (squared)	0.05*** (0.01)	0.04** (0.25)
Public offer fund (lag1)	-0.10 (0.17)	-0.43** (0.13)
Industry fund	0.41* (0.17)	0.69*** (0.15)
Pension members (%)	-0.01*** (0.003)	-0.01*** (0.003)
Fitness value (2003)	-0.17** (0.06)	-0.18** (0.05)
Gender of chairman (male)	-0.58** (0.18)	-0.57*** (0.13)
Number of members (log)	0.02 (0.04)	0.12* (0.06)
Past Performance (%) lag1	-0.03 (0.03)	-0.04 (0.03)
N	318	318
Groups	59	59

†0.05≤p<0.10, *0.01 ≤p<0.05, **p<0.01, ***p<0.001.
Year dummy variables are included in both models.

CONCLUDING SECTION

SUMMARY

This Ph.D. thesis is the result of extensive research conducted in the realm of business model innovation. Business model innovation was chosen as a research topic for its importance in the current industrial landscape. Firms are constantly faced with new challenges and consumers expect ever better service and quality. The factors that distinguish a successful firm from an unsuccessful firm can trigger survival of a firm or not. Here, I aim to shed light on what allows survival of firms through the innovation of their business model. Furthermore, I try to understand if business model innovation pays off for a firm and if firms are better off after undergoing the arduous task of innovating their business model. This thesis thus analyses the construct of business model innovation from various angles and gives an answer as to why some firms succeed in achieving business model innovation and if it pays off for them.

Business models are set apart from other management constructs. They allow a deep insight into the mechanisms of value creation and appropriation within a firm (Teece, 2010). Business model innovation allows the understanding of how a firm changed, modified and innovated its business model to fit a new market and survive as a firm. This thesis contributes to the extant literature by proposing a definition of the business model and business model innovation that allows easy empirical analysis. The definition of business model innovation employed here builds heavily on previous definitions presented in the literature (Afuah et al., 2001; Amit et al., 2001; Baden-Fuller et al., 2010; Casadesus-Masanell et al., 2010; Chesbrough et al., 2002; Demil et al., 2010; Johnson et al., 2008; Morris et al., 2005; Seelos et al., 2007; Stewart et al., 2000; Teece, 2010; Williamson, 2010). In particular the activity-

based perspective of a business model is drawn upon (Zott et al., 2010). My definition differs from this one by focusing more clearly not only on activities, but also on transactions. It looks at the components of the business model and in this makes it easier to understand and delineate the business model of a firm.

Furthermore, I contribute to extant research on business model innovation by developing a methodology that allows the empirical analysis of business model innovation. The methodology uses the NK-model framework as a metaphor to quantify business model innovation. In this I depart from the previous strong focus on case studies of individual firms. The thesis introduces two different types of calculation of business model innovation in the various papers. The first is a simple, additive function, where every component of the business model takes equal weight. The second variation of the methodology introduces an exponential innovation function. Here, the value of business model innovation increases exponentially with the novelty and complexity of the approach. Both methods of calculation also introduce the notion of business model innovation as a continuous concept. This is a departure from the typically seen 0/1 notion of business model innovation. Here, I postulate that business model innovation can occur to differing degrees depending on the distance to the extant business model (Massa et al., 2013). In accordance with recent work (Massa et al., 2013) this thesis considers the relationship between business model innovation and business model reconfiguration. Business model reconfiguration is the modification of an existing business model in incumbent firms. Business model innovation can occur as business model reconfiguration, but also in new business model design.

The core of the thesis gives answers to three research questions. Firstly, I analyze the antecedents that influence the propensity to reconfigure the business model, before, secondly,

focusing on the performance effect of business model reconfiguration and moderating factors. Lastly, I look at the more specific topic of the role of leaders and stakeholders in promoting business model innovation in the specific research setting of Australian superannuation funds.

The first research paper focuses on antecedents to business model reconfiguration. It shows that board change, heterogeneity on the management board, as well as the ability to reconfigure resources have a positive influence on the propensity to reconfigure the business model. In contrast, the pull from the old business model reduces the propensity of a firm to progress on the path of renewal. This paper aims to go beyond the sole assertion that business model reconfiguration is present and also give an insight into factors that influence firms in embarking on the process of business model reconfiguration. This contributes to the research on business model reconfiguration and innovation in a number of ways. The research focuses on incumbent firms that have to fight against the urge of business as usual and hence inertia. In contrast, previous research looked predominantly at entrepreneurial new ventures. The research uses a quantitative methodology and produces regression results, a step forward in the qualitatively dominated business model reconfiguration and innovation literature. The research highlights that different factors have the potential to make business model reconfiguration more or less likely in an incumbent firm. Lastly, it also aims to give managers food for thought when considering business model reconfiguration. I had the chance to present a previous version of this paper at the 2013 Academy of Management Conference in Orlando, Florida. The paper is seen as making a potentially ground-breaking contribution and was hence included as a discussion paper. Furthermore, I presented previous versions of this paper at the Vienna conference of strategic management in 2013 and the SEI consortium in London in 2013.

The second research paper looks at the second part of the equation and answers the question as to whether or not business model reconfiguration pays off for a firm. Past research has focused on the performance of new ventures. Here, I extend this research and contribute to the field by looking at the effect of business model reconfiguration on performance for incumbent firms. The paper goes a step deeper and also considers moderating variables of the business model reconfiguration to performance link. Business model reconfiguration is shown to have a positive effect on the performance of incumbent firms. Furthermore, the size of the firm and the firm specific resource munificence influence the success of business model reconfiguration. This paper was accepted to the 2014 Academy of Management Conference held in Philadelphia, USA. I also had the chance to present a previous version of this paper at the 2013 DRUID conference held in Barcelona, Spain.

The third research paper delves deeper into the specific topic of the role leaders and stakeholders play in promoting business model innovation within the Australian superannuation industry. It focuses on a specific topic that goes beyond overcoming barriers found in previous research. It contributes to this literature by being the first to look at the role of leaders and in particular the characteristics of the board on business model innovation within the Australian superannuation industry. Furthermore, it gives first evidence on the influence important stakeholders can have in promoting renewal and change within the firm. This paper was presented at the 21st Annual Colloquium of Superannuation Researchers in Sydney, Australia by my external advisor Prof. Hazel Bateman.

Overall, this thesis contributes to the management literature and in particular business model innovation research. It looks at business model innovation from various angles

describing factors that lead to the innovation effort and the impact business model innovation can have on a firm.

Appendix B – List of available variables

List of available variables: "2011 Superannuation Fund Level Profiles and Performance"

Nr.	Available variables				
1	Fund name	34	Doubtful debts/bad debt expense ($'000)	67	Number of members
2	Fund trustee	35	Investment income/dist after doubtful debt expense	68	Pension members
3	Fund year-end #	36	Other investment income ($'000)	69	Percentage of pension members (%)
4	Fund ABN	37	Investment income/dist after doubtful debt expense + Other investment income ($'000)	70	<35 female
5	Fund type	38	Total foreign exchange gains/losses (realised and unrealised) ($'000)	71	<35 male
6	Public offer status	39	Total unrealised gains/losses on investments ($'000)	72	35-49 female
7	Benefit structure	40	Total realised gains/losses on investments ($'000)	73	35-49 male
8	Wind-up date	41	Total gains/losses on investments ($'000)	74	50-59 female
9	Net assets at beginning of period ($'000)	42	Total Investment Income ($'000)	75	50-59 male
10	Net operating performance after tax ($'000)	43	Investment management fees ($'000)	76	60-65 female
11	Net assets at end of period ($'000)	44	Custodian fees ($'000)	77	60-65 male
12	Total assets at end of period ($'000)	45	Property maintenance costs ($'000)	78	66 + female
13	Total liabilities at end of period ($'000)	46	Asset consultant fees ($'000)	79	66 + male
14	Employer contributions ($'000)	47	Other investment expenses ($'000)	80	<35 female
15	Personal member contributions ($'000)	48	Total investment expenses ($'000)	81	<35 male
16	Other contributions ($'000)	49	Net investment income ($'000)	82	35-49 female
17	Total contributions ($'000)	50	Interest expense ($'000)	83	35-49 male
18	Contributions tax and surcharge ($'000)	51	Management fees ($'000)	84	50-59 female
19	Inward rollovers ($'000)	52	Administration fees ($'000)	85	50-59 male
20	Outward rollovers ($'000)	53	Actuary fees ($'000)	86	60-65 female
21	Net rollovers ($'000)	54	Director/trustee fees and expenses ($'000)	87	60-65 male
22	Repatriation to employer sponsor ($'000)	55	Total fees paid to audit firm ($'000)	88	66 + female
23	Lump sum benefit payments ($'000)	56	Other operating expenses ($'000)	89	66 + male
24	Pension benefit payments ($'000)	57	Total operating expenses ($'000)	90	Number of investment options
25	Total benefit payments ($'000)	58	Other income ($'000)	91	Australian Equities (%)
26	Net contribution flows ($'000)	59	Fees and commissions ($'000)	92	International Equities (%)
27	Total proceeds on insurance policies ($'000)	60	Other income + Fees and commissions ($'000)	93	Listed Property (%)
28	Net cost of member benefit insurance ($'000)	61	Reconciling item ($'000)	94	Unlisted Property (%)
29	Insurance policy proceeds - net cost of insurance ($'000)	62	Net earnings ($'000)	95	Australian Fixed Interest (%)
30	Interest ($'000)	63	Tax expense on earnings ($'000)	96	International Fixed Interest (%)
31	Dividends ($'000)	64	Net earnings after tax ($'000)	97	Cash (%)
32	Rent ($'000)	65	Cash flow adjusted net assets ($'000)	98	Other (%)
33	Trust Distributions ($'000)	66	Rate of return # (%)	99	Assets in default strategy ($'000)
				100	Proportion of assets in default strategy (%)

Appendix C – List of interview partners

List of interview partners in the Australian superannuation industry (excludes academics)

Date of interview	Last name	First name	Position	Company
16.02.2012	Arnold	Bruce	Head of Research (Acting) — Policy, Research, and Statistics	APRA
08.03.2012	Coombe	John	Executive Director	JANA Investment Advisers Pty Ltd
28.03.2012	Cooper	Jeremy	Chairman, Retirement Income	Challenger Ltd.
15.02.2012	Donald	Scott	Lecturer -Law	Attorney/ UNSW
13.03.2012	Dwyer	Michael	CEO	First State Super
17.02.2012	Ellis	Katrina	Head of Research — Policy, Research, and Statistics	APRA
10.02.2012	Liu	Kevin	Lecturer, School of Actuarial Studies	APRA /UNSW
27.03.2012	Rice	Michael	CEO	Rice Warner
27.03.2012	Rubinsztein	Nicolette	Head of Strategy	Colonial First State
22.03.2012	Vamos	Pauline	CEO	ASFA
20.03.2012	Vidler	Sacha	Head of Research	Industry super network
18.02.2012	Wilder	Courtney	Consultant	JANA Investment Advisers Pty Ltd

REFERENCES

COMPLETE LIST OF REFERENCES

Afuah, A. 2004. ***Business models: A strategic management approach***. New York: Irwin/McGraw-Hill.

Afuah, A., & Tucci, C. 2001. ***Internet business models and strategies: Text and cases***. New York: McGraw-Hill.

Afuah, A., & Tucci, C. 2012. Crowdsourcing as a Solution to Distant Search. ***Academy of Management Review***, 37(3): 355-375.

Aiken, L. S., & West, S. G. 1991. ***Multiple regression: Testing and interpreting interactions***: Sage.

Aldrich, H. E. 1972. Technology and Organizational Structure: A Reexamination of the Findings of the Aston Group. ***Administrative Science Quarterly***, 17(1): 26-43.

Amit, R., & Zott, C. 2001. Value Creation in e-business. ***Strategic Management Journal***, 22: 493-520.

Amit, R., & Zott, C. 2010. Business Model Innovation: Creating value in times of change: 1-15: Working paper no. 870, IESE Business School, University of Navarra.

Amit, R., & Zott, C. 2012. Creating Value Through Business Model Innovation. ***MIT Sloan Management Review***, 53(3): 41-49.

APRA. 2004. Superannuation Licensing: New Requirements for the Superannuation Industry, ***APRA Insight***, Vol. 3rd Quarter 2004: Australian Prudential Regulation Authority.

APRA. 2005. Classification of Superannuation Entities, ***APRA Statistics***, Vol. APRA Statistics: Australian Prudential Regulation Authority.

APRA. 2007. Celebrating 10 Years of Superannuation Data Collection, ***APRA Insight***, Vol. Issue 2: Australian Prudential Regulation Authority.

APRA. 2012a. Annual Superannuation Bulletin, June 2011, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

APRA. 2012b. Superannuation Fund-level Profiles and Financial Performance, June 2011, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

APRA. 2012c. Superannuation Industry Overview, ***APRA Insight***, Vol. Issue 1: Australian Prudential Regulation Authority.

APRA. 2013. Annual Superannuation Bulletin, June 2012, ***APRA Statistics***. Sydney: Australian Prudential Regulation Authority.

Aragón-Correa, J. A., & Sharma, S. 2003. A Contingent Resouce-based View of Proactive Corporate Environmental Strategy. ***Academy of Management Review***, 28(1): 71-88.

Arthur, J. B. 1994. Effects of Human Resource Systems on Manufacturing Performance and Turnover. ***Academy of Management Journal***, 37(3): 670-687.

ASFA. 2003-2011. Annual fund surveys, ***Superfunds***: ASFA - the Association of Superannuation Funds of Australia Limited.

Australian Government, I. P. 2003. Patents for Business Methods, Vol. 2013.

Baden-Fuller, C., & Morgan, M. 2010. Business Models as Models. ***Long Range Planning***, 43: 156-171.

Bantel, K., & Jackson, S. 1989. Top management and innovations in banking: Does the composition of the top team make a difference? ***Strategic Management Journal***, 10(S1): 107-124.

Barr, P., Stimpert, J., & Huff, A. 1992. Cognitive change, strategic action, and organizational renewal. ***Strategic Management Journal***, 13: 15-36.

Barrett, J., & Chapman, K. 2001. The Australian superannuation system. ***Organisation for Economic Co-operation and Development, Private pensions systems: administrative costs and reforms***: 185-200.

Bateman, H. 2003. Regulation of Australian Superannuation. ***Australian Economic Review***, 36(1): 118-127.

Bateman, H., & Mitchell, O. 2004. New evidence on pension plan design and administrative expenses: the Australian experience. ***Journal of Pension Economics and Finance***, 3(01): 63-76.

Ben-Porath, Y. 1980. The F-Connection: Families, Friends, and Firms and the Organization of Exchange. ***Population and Development Review***, 6(1): 1-30.

Benson, K., Hutchinson, M., & Sriram, A. 2011. Governance in the Australian Superannuation Industry. ***Journal of Business Ethics***, 99(2): 183-200.

Bertrand, M., & Schoar, A. 2003. Managing with Style: The Effect of Managers on Firm Policies. ***The Quarterly Journal of Economics***, 118(4): 1169-1208.

Bock, A., Opsahl, T., & George, G. 2010. Business model innovations and strategic flexibility: A study of the effects of informal and formal organization: Working paper no. SSRN 1533742, Imperial College, London, United Kingdom.

Caldart, A. A., & Ricart, J. E. 2004. Corporate strategy revisited: a view from complexity theory. ***European Management Review***, 1(1): 96-104.

Cameron, C., & Trivedi, P. 2010. ***Microeconometrics Using STATA***. USA: Stata Press.

Capron, L., & Mitchell, W. 1998a. Bilateral resource redeployment and capabilities improvement following horizontal acquisitions. ***Industrial and Corporate Change***, 7(3): 453-484.

Capron, L., & Mitchell, W. 1998b. The role of acquisitions in reshaping business capabilities in the international telecommunications industry. ***Industrial and Corporate Change***, 7(4): 715-730.

Capron, L., Mitchell, W., & Swaminathan, A. 2001. Asset divestiture following horizontal acquisitions: A dynamic view. ***Strategic Management Journal***, 22(9): 817-844.

Carpenter, M. A., Pollock, T. G., & Leary, M. M. 2003. Testing a model of reasoned risk-taking: governance, the experience of principals and agents, and global strategy in high-technology IPO firms. ***Strategic Management Journal***, 24(9): 803-820.

Casadesus-Masanell, R., & Ricart, J. E. 2010. From Strategy to Business Models and onto Tactics. ***Long Range Planning***, 43: 195-215.

Casadesus-Masanell, R., & Zhu, F. 2013. Business model innovation and competitive imitation: The case of sponsor-based business models. ***Strategic Management Journal***, 34(4): 464-482.

Chandler, A. D. J. 1962. ***Strategy and Structure***. Cambridge, Mass.: M.I.T. Press.

ChantWest. 2008. Superannuation Industry Fee Comparison, ***Chant West Research Report***: 1-29. Sydney.

Chesbrough, H. 2007. Business model innovation: it's not just about technology anymore. ***Strategy & Leadership***, 35(6): 12-17.

Chesbrough, H. 2010. Business Model Innovation: Opportunities and Barriers. ***Long Range Planning***, 43: 354-363.

Chesbrough, H., & Rosenbloom, R. 2002. The role of the business model in capturing value from innovation: evidence from the Xerox Corporation's technology spin-off companies. ***Industrial and Corporate Change***, 11(3): 529-555.

Christensen, C., & Bower, J. 1996. Customer Power, Strategic Investment, and the Failure of Leading Firms. ***Strategic Management Journal***, 17(3): 197-218.

Cohen, W. M., & Klepper, S. 1996. Firm Size and the Nature of Innovation within Industries: The Case of Process and Product R&D. ***The Review of Economics and Statistics***, 78(2): 232-243.

Coleman, A. D., Esho, N., & Wong, M. 2006. The impact of agency costs on the investment performance of Australian pension funds. ***Journal of Pension Economics and Finance***, 5(3): 299.

Commons, J. 1932. The Problem of Correlating Law Economics and Ethics. ***Wisconsin Law Review***, 8: 3-26.

Cooper, J., Casey, K., Evans, G., Grant, S., Gruen, D., Heffron, M., Martin, I., & Wilson, B. 2010. Super System Review Final Report Part One: Overview and Recommendations. In A. G. s. Department (Ed.): 1-168: Commonwealth Copyright Administration.

Crossan, M., & Apaydin, M. 2010. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. ***Journal of Management Studies***, 47: 1154-1191.

Cyert, R., & March, J. 1963. A behavioral theory of the firm. ***University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship***.

Damanpour, F. 1991. Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. ***The Academy of Management Journal***, 34(3): 555-590.

Davis, R., & Thomas, L. G. 1993. Direct Estimation of Synergy: A New Approach to the Diversity-Performance Debate. ***Management Science***, 39(11): 1334-1346.

Demil, B., & Lecocq, X. 2010. Business Model Evolution: In Search of Dynamic Consistency. ***Long Range Planning***, 43: 227-246.

Dess, G. G., & Robinson, R. B. 1984. Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. ***Strategic Management Journal***, 5(3): 265-273.

Desyllas, P., & Sako, M. 2013. Profiting from business model innovation: Evidence from Pay-As-You-Drive auto insurance. ***Research Policy***, 42(1): 101-116.

Dodd, S. 1955. Diffusion is Predictable: Testing Probability Models for Laws of Interaction. ***American Sociological Review***, 20(4): 392-401.

Dosi, G. 1982. Technological Paradigms and Technological Trajectories. ***Research Policy***, 11: 147-162.

Doz, Y., & Kosonen, M. 2010. Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal. ***Long Range Planning***, 43: 370-382.

Drew, M. E., & Stanford, J. D. 2001. Asset Selection and Superannuation Fund Performance: A Note for Trustees. ***Economic Papers: A journal of applied economics and policy***, 20(1): 57-65.

Drew, M. E., & Stanford, J. D. 2003. Principal and Agent Problems in Superannuation Funds. ***Australian Economic Review***, 36(1): 98-107.

Economist, T. 2011. Super-duper supers. In Australia's superannuation scheme, everyone's a winner, ***The Economist Newspaper Limited***, Vol. 403: 6.

Eisenberg, T., Sundgren, S., & Wells, M. T. 1998. Larger board size and decreasing firm value in small firms. ***Journal of Financial Economics***, 48(1): 35-54.

Eisenhardt, K., & Bourgeois, L. 1988. Politics of Strategic Decision Making in High-Velocity Environments: Toward a Midrange Theory. ***Academy of Management Journal***, 31: 737-770.

Eisenhardt, K., Kahwajy, J., & Bourgeois, L. 1997. Conflict and strategic choice: How top management teams disagree. ***California Management Review***, 39(2): 42-62.

Eisenhardt, K., & Schoonhoven, C. 1990. Organizational Growth: Linking Founding Team, Strategy, Environment, and Growth Among U.S. Semiconductor Ventures, 1978-1988. ***Administrative Science Quarterly***, 35: 504-529.

Eisenhardt, K., & Zbaracki, M. 1992. Strategic decision making. ***Strategic Management Journal***, 13(S2): 17-37.

Ellis, K., Tobin, A., & Tracey, B. 2008. Investment Performance, Asset Allocation, and Expenses of Large Superannuation Funds. ***APRA Working Paper***: 1-59.

Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. 1984. Organization Strategy and Structural Differences for Radical Versus Incremental Innovation. ***Management Science***, 30(6): 682-695.

Forbes, D. P., & Milliken, F. J. 1999. Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups. ***Academy of Management Review***, 24(3): 489-505.

Gambardella, A., & McGahan, A. 2010. Business-Model Innovation: General Purpose Technologies and their Implications for Industry Structure. ***Long Range Planning***, 43: 262-271.

Garcia, R., & Calantone, R. 2002. A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review. ***The Journal of Product Innovation Management***, 19: 110-132.

George, G., & Bock, A. 2011. The Business Model in Practice and its Implications for Entrepreneurship Research. ***Entrepreneurship Theory and Practice***, 35: 83-111.

Gerrans, P., Clark-Murphy, M., & Speelman, C. 2010. Asset allocation and age effects in retirement savings choices. ***Accounting & Finance***, 50(2): 301-319.

Giesen, E., Berman, S. J., Bell, R., & Blitz, A. 2007. Three ways to successfully innovate your business model. ***Strategy & Leadership***, 35(6): 27-33.

Gilbert, C. 2005. Unbundling the Structure of Inertia: Resource Versus Routine Rigidity. ***Academy of Management Journal***, 48: 741-763.

Gomez-Mejia, L. R. 1992. Structure and process of diversification, compensation strategy, and firm performance. ***Strategic Management Journal***, 13(5): 381-397.

Goodstein, J., Gautam, K., & Boeker, W. 1994. The effects of board size and diversity on strategic change. ***Strategic Management Journal***, 15(3): 241-250.

Gray, J., & Watson, B. 2011. Buttoning Up Australian Superannuation. ***Rotman International Journal of Pension Management***, 4(2): 38-44.

Gupta, V., Jin, H., Orszag, M., & Piggott, J. 2008. How Do Australian Superannuation Fund Trustees Perceive Their Role and Effectiveness? In J. Evans, M. Orszag, & J. Piggott (Eds.), ***Pension fund governance: a global perspective on financial regulation***: 178-197. Cheltenham: Edward Elgar Publishing Limited.

Hambrick, D., & Mason, P. 1984. Upper Echelons: The Organization as a Reflection of Its Top Managers. ***Academy of Management Review***, 9(2): 193-206.

Hargadon, A., & Douglas, Y. 2001. When innovations meet institutions: Edison and the design of the electric light. ***Administrative Science Quarterly***, 46: 476-501.

Hartmann, M., Oriani, R., & Bateman, H. 2013. ***Exploring the Antecedents to Business Model Innovation: An Empirical Analysis of Pension Funds***. Paper presented at the Academy of Management, Orlando, FL.

Helfat, C. 1997. Know-how and Asset Complemenatriy and Dynamic Capability Accumulation: The Case of R&D. ***Strategic Management Journal***, 18(5): 339-360.

Higgs, H., & Worthington, A. C. 2012. Economies of scale and scope in Australian superannuation (pension) funds. ***Pensions Int J***, 17(4): 252-259.

Howell, J., & Higgins, C. 1990. Champions of Technological Innovation. ***Administrative Science Quarterly***, 35(2): 317-341.

Howells, J. 2006. Intermediation and the role of intermediaries in innovation. ***Research Policy***, 35: 715-728.

Hu, Y.-W., & Stewart, F. 2009. Licensing Regulation and the Supervisory Structure of Private Pensions: International Experience and Implications for China. ***OECD Working Papers on Insurance and Private Pensions***, No. 33.

Jerez-Gómez, P., Céspedes-Lorente, J., & Valle-Cabrera, R. 2005. Organizational learning and compensation strategies: Evidence from the Spanish chemical industry. ***Human Resource Management***, 44(3): 279-299.

Johnson, M. 2010. ***Seizing the White Space. Business Model Innovation for Growth and Renewal***. Boston, Massachussetts: Harvard Business Press.

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

Kaplan, S., & Henderson, R. 2005. Inertia and Incentives: Bridging Organizational Economics and Organizational Theory. ***Organization Science***, 16: 509-521.

Kaplan, S., Klebanov, M., & Sorensen, M. 2008. Which CEO Characteristics and Abilities Matter? NBER working paper 14195, National Bureau of Economic Research, Cambridge, MA. Available at: http://www.nber.org/papers/w14195.

Katila, R., & Ahuja, G. 2002. Something Old, Something New: A Longitudinal Study of Search Behavior and New Product Introduction. ***Academy of Management Journal***, 45(6): 1183-1194.

Kauffman, S. 1993. ***The Origins of Order: Self-organization and Selection in Evolution***. New York: Oxford University Press.

Kauffman, S., Lobo, J., & Macready, W. 2000. Optimal search on a technology landscape. ***Journal of Economic Behavior & Organization***, 43: 141-166.

Kauffman, S., & Weinberger, E. 1989. The NK model of rugged fitness landscapes and its application to maturation of the immune response. ***Journal of Theoretical Biology***, 141: 211-245.

Kelly, R. 1967. Estimating Ultimate Performance Levels of New Retail Outlets. ***Journal of Marketing Research (JMR)***, 4(1): 13-19.

Kimberly, J. R. 1976. Organizational Size and the Structuralist Perspective: A Review, Critique, and Proposal. ***Administrative Science Quarterly***, 21(4): 571-597.

Kleinbaum, D., Kupper, L., Nizam, A., & Muller, K. 2008. ***Applied regression analysis and other multivariable methods*** (4th ed.). Belmont, CA: Duxbury.

Kraatz, M., & Zajac, E. 2001. How Organizational Resources Affect Strategic Change and Performance in Turbulent Environments: Theory and Evidence. ***Organization Science***, 12: 632-657.

Laursen, K., & Salter, A. 2006. Open for Innovation: The Role of Openness in Explaining Innovation Performance Among U.K. Manufacturing Firms. ***Strategic Management Journal***, 27: 131-150.

Leonard-Barton, D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. ***Strategic Management Journal***, 13: 111-125.

Levinthal, D. 1997. Adaptation on Rugged Landscapes. ***Management Science***, 43: 934-950.

Levinthal, D., & March, J. 1993. The Myopia of Learning. ***Strategic Management Journal***, 14: 95-112.

Liang, K.-Y., & Zeger, S. L. 1986. Longitudinal data analysis using generalized linear models. ***Biometrika***, 73(1): 13-22.

Liu, K., & Arnold, B. 2010. Superannuation landscape. ***APRA Working Paper***: 1-22.

Lounsbury, M. 2007. A Tale of Two Cities: Competing Logics and Practice Variation in the Professionalizing of Mutual Funds. ***Academy of Management Journal***, 50: 289-307.

Lubatkin, M. 1983. Mergers and the Performance of the Acquiring Firm. ***Academy of Management Review***, 8: 218-225.

Magretta, J. 2002. Why Business Models Matter. ***Harvard Business Review***, 80(5): 86-92.

Markides, C. 2013. Business Model Innovation: What can the Ambidexterity Literature Teach us? ***The Academy of Management Perspectives***, doi: 10.5465/amp.2012.0172.

Massa, L., & Tucci, C. 2013. Business Model Innovation. In M. Dodgson, D. Gann, & N. Phillips (Eds.), ***The Oxford Handbook of Innovation Management***: forthcoming. New York: Oxford University Press.

McGrath, R. 2010. Busines Model: A Discovery Driven Approach. ***Long Range Planning***, 43: 247-261.

Montemayor, E. F. 1996. Congruence Between Pay Policy and Competitive Strategy in High-Performing Firms. ***Journal of Management***, 22(6): 889-908.

Moore, J. H., & Kraatz, M. S. 2011 Governance Form and Organizational Adaptation: Lessons from the Savings and Loan Industry in the 1980s. ***Organization Science***, 22(4): 850-868.

Morris, M., Schindehutte, M., & Allen, J. 2005. The entrepreneur's business model: Toward a unified perspective. ***Journal of Business Research***, 24: 15-21.

Nelson, R., & Winter, S. 1982a. ***An Evolutionary Theory of Economic Change***. Cambridge, MA: Belknap Press of Harvard University Press.

Nelson, R. R., & Winter, S. G. 1982b. The Schumpeterian Tradeoff Revisited. ***The American Economic Review***, 72(1): 114-132.

Nguyen, T., Tan, M., & Cam, M.-A. 2012. Fund Governance, Fees and Performance in Australian Corporate Superannuation Funds: A Non-Parametric Analysis. ***Journal of Law and Financial Management***, 11(2).

O'Regan, K., & Oster, S. M. 2005. Does the Structure and Composition of the Board Matter? The Case of Nonprofit Organizations. ***Journal of Law, Economics, and Organization***, 21(1): 205-227.

Patzelt, H., Zu Knyphausen-Aufseß, D., & 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.

Pauwels, K., & Weiss, A. 2008. Moving from Free to Fee: How Online Firms Market to Change Their Business Model Successfully. ***Journal of Marketing***, 72(3): 14-31.

Pennings, J., Barkema, H., & Douma, S. 1994. Organizational Learning and Diversification. ***Academy of Management Journal***, 37: 608-640.

Peteraf, M., & Reed, R. 2007. Managerial discretion and internal alignment under regulatory constraints and change. ***Strategic Management Journal***, 28(11): 1089-1112.

Pisano, G. 2006. Profiting from Innovation and the Intellectual Property Revolution. ***Research Policy***, 35: 1122-1130.

Poppo, L., & Zenger, T. 1998. Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based and Measurement Explanations for Make-or-buy Decisions in Information Services. ***Strategic Management Journal***, 19: 853-877.

Porter, M. 1985. ***Competitive Advantage: Creating and Sustaining Superior Performance***: Free Press.

Porter, M. 1996. What is Strategy? ***Harvard Business Review***, 74.

Prahalad, C., & Bettis, R. 1986. The dominant logic: A new linkage between diversity and performance. ***Strategic Management Journal***, 7(6): 485-501.

PwC. 2013. Unleashing the Power of Innovation. In D. Percival, & R. Shelton (Eds.), Vol. 2013: 1-14. London: pwc.

Quélin, B., & Duhamel, F. 2003. Bringing Together Strategic Outsourcing and Corporate Strategy: Outsourcing Motives and Risks. ***European Management Journal***, 21(5): 647-661.

Quinn, J. B., & Hilmer, F. 1994. Strategic Outsourcing. ***Sloan Management Review***, 35(4): 43-55.

Rajagopalan, N., & Spreitzer, G. 1997. Toward a Theory of Strategic Change: A Multi-lens Perspective and Integrative Framework. ***Academy of Management Review***, 22: 48-79.

Reeves, M., & Deimler, M. 2011. Adaptability: The New Competitive Advantage. ***Harvard Business Review***, 89: 134-141.

Richard, O., Barnett, T., Dwyer, S., & Chadwick, K. 2004. Cultural Diversity in Management, Firm Performance, and the Moderating Role of Entrepreneurial Orientation Dimensions. ***Academy of Management Journal***, 47(2): 255-266.

Rivkin, J., & Siggelkow, N. 2002. Organizational sticking points on NK Landscapes. ***Complexity***, 7(5): 31-43.

Sabatier, V., Mangematin, V., & Rousselle, T. 2010. From Recipe to Dinner: Business Model Portfolios in the European Biopharmaceutical Industry. ***Long Range Planning***, 43: 431-447.

Santos, J., Spector, B., & Van der Heyden, L. 2009. Toward a Theory of Business Model Innovation within Incumbent Firms. ***Faculty & Research Working Paper, INSEAD***, 16: 1-54.

Seelos, C., & Mair, J. 2007. Profitable business models and market creation in the context of deep poverty: A strategic view. ***Academy of Management Perspectives***, 21: 49-63.

Snow, C., & Hrebiniak, L. 1980. Strategy, Distinctive Competence, and Organizational Performance. ***Administrative Science Quarterly***, 25: 317-336.

Sosna, M., Trevinyo-Rodrìguez, N., & Velamuri, R. 2010. Business Model Innovation through Trial-and-Error Learning. ***Long Range Planning***, 43: 383-407.

Stewart, D., & Zhao, Q. 2000. Internet marketing, business models and public policy. ***Journal of Public Policy and Marketing***, 19: 287-296.

Stigler, G. 1951. The Division of Labor is Limited by the Extent of the Market. ***The Journal of Political Economy***, 59(3): 185-193.

Svejenova, S., Planellas, M., & Vives, L. 2010. An Individual Business Model in the Making: a Chef's Quest for Creative Freedom. ***Long Range Planning***, 43: 408-430.

Sy, W. 2008. Superannuation Fund Governance: An interpretation. ***APRA Working Paper***.

Sy, W., Esho, N., & Sane, R. 2008. Superannuation fund governance: trustee policies and practices. ***APRA Insight***, 1: 2-17.

Tatum, D. 2007. Innovating the Development of Innovation. ***Research-Technology Management***, 50(3): 15-18 (14).

Taylor, S. 2011. Captured Legislators and Their Twenty Billion Dollar Annual Superannuation Cost Legacy. ***Australian Accounting Review***, 21(3): 266-281.

Teece, D. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***, 43: 172-194.

Teece, D., Pisano, G., & Shuen, A. 1997. Dynamic Capabilities and Strategic Management. ***Strategic Management Journal***, 18: 509-533.

Thompson, J., & MacMillan, I. 2010. Business Models: Creating New Markets and Societal Wealth. ***Long Range Planning***, 43: 291-307.

Treasury. 2003. Superannuation Safety Amendment Act 2003: Explanatory Memorandum: 1-75. Canberra, Australia.

Tripsas, M., & Gavetti, G. 2000. Capabilities, Cognition and Inertia: Evidence from Digital Imaging. ***Strategic Management Journal***, 21: 1147-1161.

Tufano, P., & Sevick, M. 1997. Board structure and fee-setting in the U.S. mutual fund industry. ***Journal of Financial Economics***, 46(3): 321-355.

Useem, M., & Mitchell, O. S. 2000. Holders of the Purse Strings: Governance and Performance of Public Retirement Systems. ***Social Science Quarterly (University of Texas Press)***, 81(2): 489-506.

Utterback, J. 1971. The Process of Technological Innovation Within the Firm. ***Academy of Management Journal***, 14(1): 75-88.

Van de Ven, A. H. 1986. Central Problems in the Management of Innovation. ***Management Science***, 32: 590-607.

Vassolo, R. S., Anand, J., & Folta, T. B. 2004. Non-additivity in portfolios of exploration activities: a real options-based analysis of equity alliances in biotechnology. ***Strategic Management Journal***, 25(11): 1045-1061.

Wagner, W., Pfeffer, J., & O'Reilly, C. 1984. Organizational Demography and Turnover in Top-Management Group. ***Administrative Science Quarterly***, 29: 74-92.

Westhoff, F. H., Yarbrough, B. V., & Yarbrough, R. M. 1996. Complexity, organization, and Stuart Kauffman's The Origins of Order. ***Journal of Economic Behavior & Organization***, 29: 1-25.

Whitley, R. 2000. The institutional structuring of innovation strategies: Business Systems, firm types and patterns of technical change in different market economies. ***Organization Studies***, 21(5): 855-886.

Williamson, P. 2010. Cost innovation: Preparing for a 'Value-for-Money' Revolution. ***Long Range Planning***, 43: 343-353.

Wirtz, B., Schilke, O., & Ullrich, S. 2010. Strategic Development of Business Models. ***Long Range Planning***, 43: 272-290.

Xuan, Y. 2009. Empire-Building or Bridge-Building? Evidence from New CEOs' Internal Capital Allocation Decisions. ***Review of Financial Studies***, 22: 4919-4948.

Yunus, M., Moingeon, B., & Lehmann-Ortega, L. 2010. Building Social Business Models: Lessons from the Grameen Experience. ***Long Range Planning***, 43: 308-325.

Zahra, S. A., Neubaum, D. O., & Huse, M. 2000. Entrepreneurship in Medium-Size Companies: Exploring the Effects of Ownership and Governance Systems. ***Journal of Management***, 26(5): 947-976.

Zeger, S. L., & Liang, K.-Y. 1986. Longitudinal Data Analysis for Discrete and Continuous Outcomes. ***Biometrics***, 42(1): 121-130.

Zenger, T. R. 1992. Why Do Employers Only Reward Extreme Performance? Examining the Relationships Among Performance, Pay, and Turnover. ***Administrative Science Quarterly***, 37(2): 198-219.

Zollo, M., & Singh, H. 2004. Deliberate learning in corporate acquisitions: post-acquisition strategies and integration capability in U.S. bank mergers. ***Strategic Management Journal***, 25: 1233-1256.

Zott, C., & Amit, R. 2007. Business Model Design and the Performance of Entrepreneurial Firms. ***Organization Science***, 18: 181-199.

Zott, C., & Amit, R. 2008. The Fit Between Product Market Strategy and Business Model: Implications for Firm Performance. ***Strategic Management Journal***, 29: 1-26.

Zott, C., & Amit, R. 2010. Business Model Design: Activity System Perspective. ***Long Range Planning***, 43: 216-226.

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