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... IN THIS ISSUE

1-21 Old but sexy: Value creation of old technology-based businesses models

Oke Christian Beckmann, Susanne Royer, Francesco Schiavone

22-41 The Unfolding of Value Sources During Online Business Model Transformation

Nadja Hoßbach, Martin Wiener, Carol S. Saunders

42-59 Toward Ecosystemic Business Models in the Context of Industrial Internet

Marika Miriam Iivari, Petri Ahokangas, Marjaana Komi, Maarit Tihinen, Kristiina Valtanen

60-80 Futures Business Models for an IoT Enabled Healthcare Sector: A Causal Layered Analysis Perspective

Julius Francis Gomes and Sara Moqaddemerad

Old but sexy: Value creation of old technology-based businesses models

Oke Christian Beckmann¹, Susanne Royer¹, Francesco Schiavone²

Abstract

The purpose of this study is to contribute to a better understanding of the strategic and organisational configurations that companies can use to generate value with product-market systems and their business models that have been dominant in the past but forced back into niche positions by innovation.

The former dominant music format vinyl was rapidly substituted after the introduction of digital music. However, still nowadays some customers use and buy old technology-based products – vinyl sales boom again since 2007. Due to the two-sided nature of the market, customers have to get access to complementary goods. We are thus interested in technologies which have been outdated by the emergence of new technologies. The originality lies in the combination of the two areas: business models and old technologies. Furthermore, vinyl is an example not analysed in depth by scholars so far.

We approached this by undertaking an in-depth literature review to generate hypotheses regarding the value-adding activities of old-technology based businesses as a basis for further research in this area. In addition the paper gives first insights into the constellations to be expected over time for old technology-based businesses models in platform markets.

We here focus on a neglected topic in the strategy literature which, however, bears relevance for many businesses locked into product-market systems which make it hard for them to (completely) switch to a new technology emerging in the market. It is especially valuable to describe the consequences in a systematic fashion.

Keywords: Value Creation Architecture; Business Model; Old Technology; Competitive Advantage; Resources; Platform Market

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Introduction: Can old technologies create value?

In the strategy field implications of a dynamically changing environment are widely researched: Innovative technologies in new and quickly changing markets are the drivers to investigate questions of efficient and effective organisational forms and relevant underlying resources and/or capabilities (e.g., Bosch et al., 1999; Chatterjee, 2013; Ismail et al., 2014). Such organisational forms may include market-related, cooperative and hierarchical elements. In more established marketplaces similar questions stay relevant with the industry going through the more mature phases of the lifecycle (e.g., McDermott et al., 2013, p. 3). Technological change greatly affects the structures of industries (Schumpeter, 1942) and therefore is also suggested to impact business models and related exchange partners.

As soon as an industry context is on the decline due to the emergence of a revolutionary new technology, management research seems to somewhat lose interest, at least in business models which are locked into the production and/ or distribution of the outdated product (for exceptions see Cooper and Schendel, 1976; Adner and Snow 2010). At the same time it can be observed that usually some firms in declining industries (e.g., analogous photography, typewriters, mechanical watches and vinyl records) go on to exist with the old product focus for a relatively long time span after it is clear that new technologies would make the sustainability of the success at least highly questionable. Understanding how businesses may be able to create as much value as possible in a declining industry context in which they are locked into by their product-system-specific investments thus is an interesting and relevant question.

The research deficit sketched is the point of reference for this paper and the emerging literature on business models (e.g., Amit and Zott, 2012; Teece, 2010; Zott and Amit, 2013; Yrjölä, 2014; Ahokangas and Myllykoski, 2014; Lund and Nielsen, 2014) is suggested to deliver fruitful input. Based on the work of Afuah and Tucci (2001), Osterwalder et al. (2005) and Zott et al. (2011), Massa and Tucci suggest to conceptualize business models broadly “as depicting the rationale of how

an organization (a firm or other type of organization) creates, delivers, and captures value (economic, social, or other forms of value) in relationship with a network of exchange partners” (Massa and Tucci, 2014, p. 423). This understanding of business models – as one among a vast number of existing business model definitions (Ahokangas and Myllykoski, 2014) – guides us in this paper. Value creation by old technology driven players requires a long-term perspective. Since “[b]usiness model choices define the architecture of the business, and expansion paths develop from there on out” (Teece, 2010, p. 181) a certain path dependency has to be taken into account: This on the one hand side can form an isolating mechanism against competitors, on the other hand, however, it also may lock a focal player into a particular structure hard to change after once being established (Teece, 2010). Thus, it is interesting to investigate if and how business models in a certain market change after revolutionary technological innovations. While Teece (2010) wants to investigate how business models bring firms in a position to capture value from technological innovation, this article addresses the issue of value creation and appropriation of old technology-based firms.

We use one aspect of the broad concept of business models here: Value creation architectures (VCA). In this paper we understand value creation architectures as “the structure and relationships of all the value-adding activities that are carried out by various actors and companies to bring a particular product or service to market” (Dietl et al., 2009, p. 26). VCA thus can be understood as a specification of the broad concept of a business model, which leads to a more in-depth understanding of how value creation is embedded into different intra- and inter-firm organisational structures. Over the last decades a trend towards disintegrated value chains could be observed in many industry contexts (McDermott et al., 2013, p. 1; Lund and Nielsen, 2014, p. 106) and VCAs can range on a continuum from highly disintegrated to very much integrated forms with different hybrid/cooperative forms in-between. To understand strategic advantages of firms it is not sufficient anymore to stop at firm boundaries but a functional perspective appears more appropriate to compare different value-creating structures competing in bringing a certain type of product into the market. Choosing this perspective enables the inclusion of

a loose network of small players into analysis in the same way as a large, highly integrated player. We here follow the understanding of Sah and Stiglitz (1986, p. 716) who suggest that the performance of an organisation should not solely be put in relation to the internal structures but that the underlying architecture should be taken into account.

Competitive advantage is rooted in the ability of a firm to create customer willingness to pay for a product or service. Therefore the offered service or product in the marketplace is our starting point. We identify the value creation activities necessary to offer the service or product to come to an understanding of the VCA. The field of strategy delivers the fundament here with different conceptualisations of competitive advantage from a resource-oriented (e.g., Peteraf, 1993), a dynamic capabilities-based (e.g., Teece, Pisano and Shuen, 1997) and a relational perspective (Dyer and Singh, 1998). The performance of the VCA in the relevant competitive environment can be assessed building on a market-based perspective (e.g., Porter, 2008) complemented by taking further market specificities into account: Market contexts where the quality and availability of complements is strategically relevant became known as platform markets and recently have been intensely investigated regarding useful strategy and organizational design (e.g., Parker and van Alstyne, 2014). In the current literature it is in focus how an actor may be successful in starting a superior product-market-system in such a two-sided market or remain a platform leader (e.g., Eisenmann et al., 2011; Gawer and Cusumano, 2014; Suarez and Kirtley, 2012; Lund and Nielsen, 2014, p. 115-116). The consequences for the incumbents in the then inferior product-market system (which has been dominant previously) are of less interest and thus reflect that a research deficit exists here. Incumbents competing with an old technology in a platform market are in the focus of this research.

As the areas of business models, value creation architectures and platform markets are still under development, scholars did not pay much attention to date on how firms, after technological change, arrange their value creation activities to support the survival of an old declining product. However, it is not uncommon to see old technological products (for instance, analogue cameras and turntables or also mechanical watches) that, even after the rise of a new superior technology,

survive for very long time and go on generating value for some firms. However, the inner “creative destruction” of technological change (Schumpeter, 1942) will be likely to lead firms to modify the traditional implementation of their business processes, for example in terms of integration and/or disintegration. Various scholars analysed the strategic reactions of established companies to technological change (Cooper and Smith, 1992; Adner and Snow, 2010; Schiavone, 2011; Schiavone and Borzillo, 2014). Great emphasis was given to the reasons leading firms to failure (Christensen, 1997). Conversely, scarce attention was paid to the evolution of VCA (as a specification of business models) of incumbent firms after new technology emerges and their products suddenly became old and obsolete. Therefore, the core research question of this study is:

How do companies (re-) design their value creation architectures for old technology-based products where demand declined after technological change?

The article is organised as follows: The next section reviews the main literature about VCAs and the strategizing of old technology-based companies after technological change in order to form the conceptual fundament for the study. Implications of the existence of complete product-market systems that became old fashioned are taken into account. The third section describes propositions for future research in this area and illustrates in some detail possible research strategies to investigate this further. The fourth section summarises the main conclusions. To come to fruitful avenues for future research, considerations are developed for a case-based analysis of remaining players in the vinyl industry as one prominent example of old technology.

Towards a useful conceptualisation: Competitive advantage, value creation architectures and old technology-based firms

The following sections highlight core findings of the literature regarding competitive advantage realisation of different VCAs as well as the effects of technological changes on old-technology-based businesses. The literature review results in a conceptual fundament for further investigations.

Value creation architectures and competitive advantage

Creating value for the customers is central for firms in order to generate returns for the firm owners (Porter, 1996; Hambrick and Fredrickson, 2001). The fundamental question in the field of strategy is how do firms achieve and sustain competitive advantage (Royer, 2005). "Strategic management, in both theory and practice, tries to understand how firms may improve their performance in competitive interactions with other firms" (Sanchez and Heene, 1997, p. 303). Strategic management thus wants to understand why some firms perform better than others with regard to this objective.

Performance in terms of competitive advantage realisation in the economic strategic management approaches is conceptualised in different types of rents: Firms may earn monopolistic rents on the basis of positioning strategies in imperfect markets (Porter, 1980). Taking into account resource heterogeneity, Ricardian rents accrue from the possession of scarce resources (Peteraf, 1993). While such Ricardian rents may lead to sustainable competitive advantage, Schumpeterian or entrepreneurial rents (Teece et al., 1997) rather imply temporary advantage. Firms realise them on the basis of certain capabilities and through risk taking and entrepreneurial insights in an uncertain or complex environment. Over time the underlying capabilities diffuse into the market and become best practice. In cooperative ventures relationship-specific assets, knowledge-sharing routines, complementary resources and capabilities as well as effective governance may generate relational rents for the partners (Dyer and Singh, 1998). Especially the recent developments in the strategy literature regarding relational rent generation highlight that it is acknowledged that an internal firm analysis is not sufficient for understanding strategic opportunities (Dyer and Singh, 1998; Lavie, 2006). It also has to be understood where cooperative core competencies (Duschek, 2004) or network resources (Gulati, 1999) may be used to generate competitive advantage. Isolating mechanisms such as causal ambiguity (Dierickx and Cool, 1989; Barney, 1991), inter-organisational asset interconnectedness, scarcity of partners, indivisibility of resources and certain institutional environments are suggested to protect such relational rents against imitation (Dyer and Singh, 1998, p. 672). However, coop-

eration partners may also face a danger in what Lavie (2006, p. 647) calls spillover rents. Such rents may be generated by one partner in an opportunistic fashion on the basis of network resources.

On the basis of the strategy literature with economic roots we want to take into account competitive advantage generated on the basis of network resources as well as firm-internal resources and capabilities. We do extend our perspective beyond firm boundaries and focus on a VCA competing in a certain market to bring a particular product or service to the customer (Dietl et al., 2009). "[T]emplates that emerge in a sector and circumscribe the division of labor among a set of co-specialized firms" are called industry architectures (Jacobides, Knudsen and Augier, 2006, p. 1201). Since we assume different architectures in the same industry context, we here use the term VCA and suggest that different degrees of (dis)integration compete against each other in the same market. Findings from case studies of the European automotive industry back this view (see Dietl et al., 2009 and Stratmann, 2010). Two levels of competition become relevant for our analysis: (1) the competition between different VCAs (inter-architecture competition) and (2) the competition between the actors in the same VCA to appropriate a high share of the resulting rents within that particular system (intra-architecture competition). Figure 1 summarises the VCA approach we are using for this analysis.

Thereafter the analysis of VCAs deals with the level of integration in production (production depth and production control) and the level of integration of distribution (distribution depth and distribution control). Both, the choice of a certain level of depth of production and distribution, can lead to value creation and competitive advantage of the focal actor at the intra- and inter-architectural level (Dietl et al., 2009). Hence different VCAs can have significantly different characteristics which are, as an extension of Coase's (1937) differentiation of internal production and the use of the market and the transaction cost economics' view by Williamson (1985), grouped in three distinct generic categories: Integrated, disintegrated and quasi-integrated forms of VCAs.

Referring to Figure 1 'integrated' means a high level of

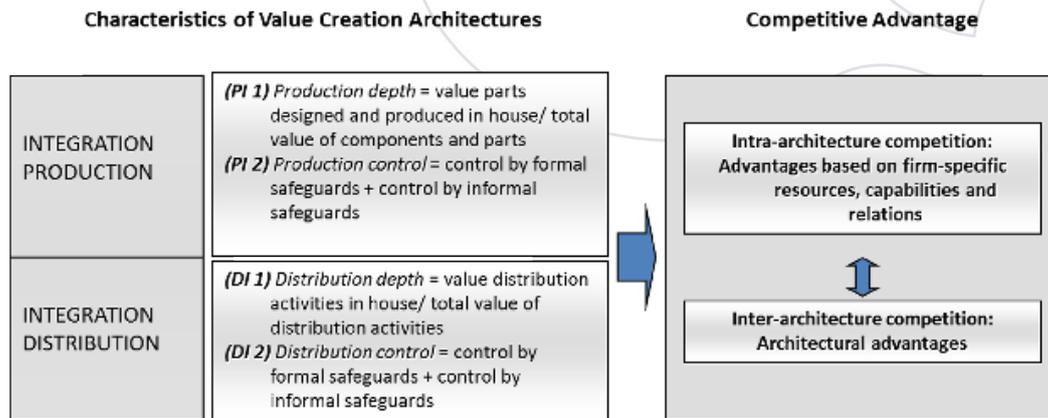


Figure 1: Conceptual framework linking value creation architectures with competitive advantage

production and distribution depth. On the other side of this continuum disintegrated VCAs can be found: this form is characterised by a low level of production and distribution depth and therewith the usage of markets to procure inputs (Jacobides and Billinger, 2006; Dietl et al., 2009). In between mixed forms can be found which are characterised by low production and distribution depth combined with a certain level of control and coordination for the other actors of the same VCA. Such control and coordination mechanism may include self-enforcing safeguards (e.g., trust or hostages) and third-party safeguards (e.g., legal contracts) and potentially generate relational rents (Dyer and Singh, 1998). When we use the term ‘control’ here, we are interested in how close the focal actors’ relationships with external partners via formal and/or informal mechanisms are. Product innovations often are not sufficient for gaining competitive advantage as competitors are in many cases quickly able to copy these (Cliffe, 2011; Matzler et al., 2013). Hence VCA innovation (as part of BM innovation) is an opportunity to build sustainable competitive advantage (Teece, 2010). This can be achieved if customer value increases and a new value creation and revenue model gets established so that a new way of value appropriation is possible (Matzler et al., 2013). For multinational corporations, for example, it is in a fast changing global environment suggested to be important to repeatedly re-evaluate and reconfigure their value chains to gain competitive advantage and to stay ahead of the competitors (Maitland and Sammartino, 2012).

The American computer manufacturer IBM at a certain time had valuable resources and excellent capabilities

to build PCs and hence was able to create great value with its PC business. Looking at a distinction made by Gawer and Cusumano (2014) who suggest to differentiate between different types of platforms in terms of internal (firm or product) platforms as well as external (industry) platforms one may say that IBM was even able to establish their product as an industry platform (Gawer and Cusumano, 2014, pp. 417). However, their value creation architecture put suppliers such as Microsoft and Intel into such strong positions that the focal player of the VCA, IBM, failed to appropriate the value created and to build a long-term competitive advantage in this field and industry/architectural leadership in the 1980s shifted to Intel and Microsoft (Gawer and Cusumano, 2014, pp. 423). The example shows the importance of the design of VCAs and the link to competitive advantage. Questions of how to find a balance between competition and cooperation thus seem to be highly relevant, especially in areas where we have dynamic technological change.

However, what about old-technology-based industries such as the vinyl pressing industry? Here, the environment seems to be more stable making a vertically integrated structure more likely to lead to benefits (McDermott, 2013, p. 3). Comparing e.g. the vinyl pressing industry with other audio segments such as CDs, the sales numbers are relatively small, yet increasing. The number of players still in the market thus also can be assumed to be declining. This decline leads – next to other implications – to a lack of potential cooperation partners on a horizontal as well as vertical level.

On the basis of this reasoning we assume that firm

1: Source: Dietl et al., 2009, p. 31.

internal resources play a central role in old technology (niche) markets as for example the vinyl industry to come into a position to generate competitive advantage. The relevance of shared and network resources may be lower. The underlying reasoning is that a relatively integrated VCA would be beneficial in old technology markets while a disintegrated structure may be favourable in new technology contexts. When analysing old technology VCAs, the aspect of competition between rivaling VCAs (inter-architecture competition) thus is more in our focus than competition and competitive advantage realisation in a single VCA (intra-architecture competition).

Old technology-based firms after technological change

A review of the literature about the main strategic reactions of incumbent firms during or after technological change outlines different behaviours for preserving and/or renewing their VCAs. Adner and Snow (2010a) analyse old technology firms that do not want to exit from the market or switch to a new technology. This strategy of maintaining the focus on the old technology implies the creation of “coexistence between obsolete and superior technologies” (De Liso and Filatrella, 2008, p. 593). In this context it can be differentiated between mainly two strategies called racing and retreat strategies.

A racing strategy implies that firms behave in a way that is sometimes labelled as the sailing ship effect (Cooper and Schendel, 1976; Gilfillan, 1935; De Liso and Filatrella, 2008 and 2011; Liesenkötter and Schewe, 2013; for a critical perspective see Howells, 2002 and Mendoca, 2013). The key element of this reaction is the improvement of the performance and the characteristics of old-technology – the companies hence continue to invest in the old technology and “technologies diffuse slowly” (Chari and Hopenhayn, 1991, p. 1161). Gilfillan (1935) shaped the term sailing ship effect when he described how the sailing ship was heavily improved as soon as the steam ships emerged during the 19th century (Gilfillan, 1935, pp. 156).

The model of competing technology S curves goes back to Foster (1986, pp. 101). Figure 2 shows an established, now old, technology (T_0) that has secured its position over other available technologies (T_{0x}) and from a cer-

2:Source: Own figure based on Adner and Snow (2010a) and Sandström (2013)

tain time on was confronted with a new technology (TN) with a technology which was superior from time t^* on. However, the old technology improved (T_{0+1}) with the introduction of the new technology. This effect is a “process whereby the advent of a new technology engenders a response aimed at improving the incumbent technology” (De Liso and Filatrella 2008, p. 593).

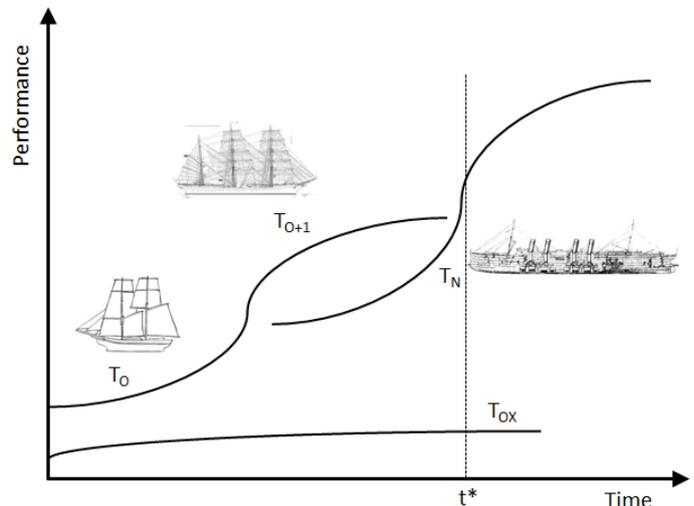


Figure 2: Scheme of technology competition: The sailing-ship effect

The case of sailing ships first described by Gilfillan (1935) shows how at the beginning of the 1900s the rate of technological innovation of sailing ships, after the introduction of steam ships, lasted for over 30 years (since 1850 up to the 1880s) and the period of substitution between the two competing technologies lasted for over 70 years. The sailing ship producers perceived the steam ships as a threat and, thus, improved the performance and innovated their traditional products: “It is paradoxical, but on examination logical, that this noble flowering of the sailing ship, this apotheosis during her decline and just before extermination, was partly vouchsafed by her supplanter, the steamer” (Gilfillan, 1935, pp. 156).

Some scholars (Howells, 2002 and Mendoca, 2013) analysed in detail the sailing ship effect and, overall, criticised the conclusions by Gilfillan. The results of their studies show that the real existence of this phenomenon is questionable. Howells (2002) argues that in practice the sailing ship effect is the output of superficial knowledge about the cases analysed. Such misleading view is supported (Howells, 2002, p. 903) by (1) the coexistence of apparently substituting technolo-

gies through long periods of time and (2) the confusion of continuous innovation in the old technology with innovation induced by the threat of substitution.

Similarly, the historical analysis by Mendoca (2013) shows that the technological competition between sailing ships and steam boats was a distortion of what really happened. For instance, when new technology emerged, sailing ships were already in the most innovative phase of their history and that both technologies rather complemented each other even hybrid forms existed for some time (Mendonca, 2013, p. 1732). However, Mendonca also concludes that “the ‘sailing ship effect’ may hold true for other industries” (Mendonca, 2013, p. 1735). These arguments, however, highlight various endemic problems of conceptualisations and empirical research about the so-called sailing ship effect.

Howells (2002) attempts to find proofs for the sailing-ship effect as one of three possible generic responses (exist, switch, sailing-ship effect) to substitution by analysing the two cases of sail and alkali (Howells, 2002, p. 887). For these cases Howells could not find strong evidence but emphasized the radical notion of change of these examples (Howells, 2002, p. 905). Rather other cases should be analysed (Howells, 2002, p. 905). He even describes the most cited source of the sailing-ship effect, Gilfillan (1935), as misinterpreted: “Not only does Gilfillan not make an explicit claim for the ‘sailing-ship effect’ as private sector phenomenon, he provides persuasive evidence that government was the more important funding agency [...]” (Howells, 2002, p. 892). Howells (2002) thus states that switch or exit are the dominant strategies for old tech firms. However, there is another possibility: stick to the old technology to be able to create value from a niche position.

Despite the real existence of the sailing ship effect it is hard to clearly identify in the available empirical patterns; this technological concept anyway outlines a number of interesting strategic implications when companies face technological change:

- Companies have used their R&D efforts and innovation resources to analyse/develop both old and new technology over the transition phase.

- The emergence of new superior technology reshapes the old industry. Differences in reaction by users and producers might lead to industry-specific strategic and competitive configurations - more complex than the classifications by Howells (2002).
- The destiny of old technologies may be to disappear from the market in the long term but in the short-medium term they can still provide room for value creation, niche companies may even be able to sustain their competitive position in the long run.

Another example of technology race between old and new technologies is the case of carburettors: With the introduction of electronic fuel injection (EFI) the number of cars sold with carburettors declined sharply by 1984 whereas the fuel economy (measured in miles per gallon, MPG) increased heavily at the same time. However, various other industry examples of this phenomenon are provided in the literature (Utterback, 1994; Snow, 2008), e.g. vacuum tubes vs. transistors, steam locomotives vs. diesel-electric, fountain pens vs. ball-point pen, fossil fuel power plants vs. nuclear power plants, safety razors vs. electric razors, aircraft propellers vs. jet engines, leather vs. polyvinyl chloride plastics (Cooper and Schendel, 1976, p. 64-65). All these examples were studied by Cooper and Schendel (1976) and they concluded that “[i]n every industry studied, the old technology continued to be improved and reached its highest stage of technical development after the new technology was introduced [...]” (Cooper and Schendel, 1976, p. 67).

Furthermore, Cooper and Schendel (1976) found out that most firms followed a dual strategy, divided their resources and were active in both the new and the old technology. Their commitments to the old technology stayed substantial. “Perhaps this demonstrates the difficulty of changing the patterns of resource allocation in an established organization” (Cooper and Schendel, 1976, pp. 67). Where the old technology continued growing the companies could keep their competitive and financial advantages especially as the new technology firms never entered the old technologies market (Cooper and Schendel, 1976, p. 68). In a later study Cooper and Smith (1992) studied eight young industries and 27 firms that were threatened by that new technology to analyse the respond strategies, espe-

cially the case of entering the emerging young industry (Cooper and Smith, 1992, pp. 55). The limited number of successful examples, however, made it only possible to come up with the problems associated with a strategy of participation in the new industry and suggest ways how to avoid them rather than to develop success formulas (Cooper and Smith, 1992, pp. 67).

One key point is that it is not the challenge to also introduce the new product but to being able to further improve performance, quality and costs which is necessary for the commercial success (which is easier if the company has very strong R&D and financial resources or competition does not yet exist). They also saw a tendency of trying to fold the new product into the old strategy and were slow in trying out new concepts rather than to allow new experimental strategies and to carefully analyse the strategies of the new technology firms which often have different resources, skills, and ideas and do not care about the status quo (Cooper and Smith, 1992, pp. 68).

Technological retreat (Adner and Snow, 2010) is a strategic approach by which old technology companies re-trench their products in a niche position within their traditional market and/or search for new market applications (see Figure 3). Hence the goal is not growth and expansion but rather survival and contraction which is “contrary to traditionally assumed firm objectives” (Adner and Snow, 2010, p. 1657).

If an old technology loses the mainstream this does not necessarily mean that it loses the entire market. Even though it is possible that all customers uniformly prefer the new technology, it is a matter of evaluation

criteria. There exist “several drivers for variance that may lead parts of the market to continue to prefer the old technology to the new” (Adner and Snow, 2010, p. 1662). Reasons might be budget constraints, heterogeneity of preferences over attribute bundles or emotional/ nostalgic elements of the old technology (Adner and Snow, 2010, p. 1662).

Another reason might be lock-in by an industry which Arthur shows on the examples of nuclear-reactor technology and petrol-versus-steam cars (Arthur, 1989, pp. 126.). Farrell and Saloner (1986) describe the lock-in from the customer side: customers who decided to adopt a technology that became old through the introduction of a new technology are described as installed base that are “somewhat tied to the old technology” (Farrell and Saloner, 1986, p. 954), also described as stranding effect (Farrell and Saloner, 1986, p. 941) and quite common in platform markets. Liesenkötter and Schewe (2013) follow the idea of lock-in of industries by combining the concept of path dependency with the sailing-ship effect and an analysis of patents for different car engine types to explain why it does not make sense for the car manufacturer to immediately change technology to electric or hybrid cars (Liesenkötter and Schewe, 2013, p. 276). The vehicle manufacturers as the focal actors of the current automotive industry have their core competences in the design and production of combustion engines (Dietl, Royer and Beckmann, 2013, p. 23). This means that they are somewhat locked into this bundle of resources specific to cars that need fuel and not electricity. These types of reactions imply changes on both the production-side and the demand-side for companies.

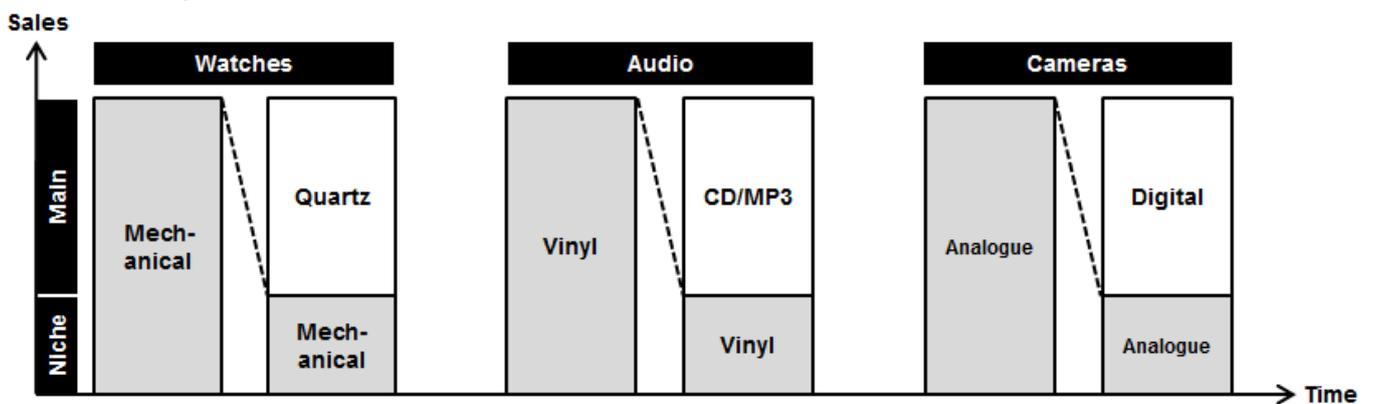


Figure 3³: Technological retreat

3: Source: Own figure.

This reviewed body of literature focuses mainly on the innovation, marketing and/or strategy of old technology-based companies reacting to technological change. An in depth analysis of how the companies underlying VCAs may change (or not) due to new technology still lacks in the literature. However, technological races and technological retreats have different and deep implications within and outside organisations. Firms have to develop new marketing, manufacturing and engineering capabilities despite they keep focusing on the old technology. The first concern is to develop these internally or by integration of new and necessary capabilities.

Referring to the internal development, acquisitions are a typical but risky way to coping with change by disruptive technology and creating capabilities (Christensen, 1997). A well-known example of such risks is the 1984 acquisition of Rolm by IBM in the PC industry. The IBM mistake to push Rolm resources into its original large computer business destroyed a large part of the value of the acquired company in few years (Christensen, 1997). Referring to the external environment, the usual reduction of the market size of old products entails the traditional economies of scale are not achievable anymore by companies. Old technology firms must search for flexibility (Adner and Snow, 2010). The inclusion of new technology-based components in the old declining products should reduce, therefore, the extent of integration of the production process of retrofitted (improved) old technological products.

A critical issue of old technology-based companies and their competitive advantage, thus, is to keep legitimacy in their business ecosystem (Adner and Snow, 2010). When a technology starts declining the firm has to face the issue of revising its set of suppliers. Many of them might decide to exit from the industry or switch to new technology. Companies performing technological retreats, thus, should try to keep the best suppliers and redesign their VCA accordingly with the new components.

The repositioning of old technology products from mass to niche market could affect also the selection of distribution partners and channels. For instance, after the rise of quartz watches some firms manufacturing mechanical watches repositioned and sold their

products by new distribution partners. General purpose technologies might introduce new technological competencies and distribution channels or partners into the industry which affect old technology and its (retrofitted or not) products. For instance, the widespread of e-commerce pushed old technology firms in many industries to extend their VCAs by integrating reliable e-commerce providers and global shipping companies. It can also be a possible move to establish own brick-and-mortar-outlets to compensate for a decreasing number of attractive sales outlets in the market. Sellers of high end cutlery or porcelain may lose their established sales infrastructure due to the decline of certain types of shops for exclusive homeware or jewellery stores and follow the sketched avenue.

Conceptualising relevant elements of VCAs of old technology firms

After the discussion of relevant elements from the literature the further research process shall be fuelled with propositions which may be contrasted with reality in the course of future research. The aim of this paper is to come to a sound conceptualisation of propositions about VCAs for providers of old technology on the chain of arguments developed from the literature. The propositions are elaborated with the explicit objective to develop them further towards testable hypotheses. Therefore, next to a thorough description of the variables in the propositions, we want to sketch first concrete ideas for the operationalisation of these constructs.

From the literature on old-technology firms and value creation architectures we have derived several propositions: Building on the reasoning developed from the literature and showed above we deduced that two levels of competition are relevant for our analysis, i.e. the competition between different VCAs (inter-architecture competition) as well as the competition between the actors in the same VCA to appropriate a high share of the resulting rents within that particular system (intra-architecture competition) (see Dietl et al., 2009).

Due to the specificities of old technology firms – as outlined above and using Adner and Snow's (2010) considerations as a point of reference – we in the first step of research propose to focus on inter-architecture competition as intra-architecture competition seems to play

a minor role due to the assumed decreasing number of suppliers and other potential partners in the VCA.

When we want to understand value creation possibilities for old-technology firms we suggest that we have to come to an understanding of the situation before and after the dominance of a superior new technology. Therefore the analysis of the process of technological change can be – similar to what is shown in Figure 1 building on Adner and Snow (2010a) and Sandström (2013) - split into two relevant time periods: (1) time period 1 [tp1] as the time span when old-technology firms see their possibilities to realise rents threatened by the emergence of a superior technology, and (2) time period 2 [tp2] as the time span after new technology became dominant, some old-technology firms were forced to leave the market and only a smaller number of niche players competes on the basis of the old technology (see Figure 3 again).

We assume that old-technology firms usually have to fight hard against also threatened old-technology competitors when a superior technology emerges in a market in tp1 when they are locked into the old technology product-market system and cannot switch to the new technology. This assumption is in line with Porter's (2008, p. 85) understanding of a high intensity of rivalry in a given industry being pushed by fights of incumbents for market share in an environment characterised by declining growth and exit barriers due to specific investments. Competition between the incumbents (and therewith between their VCAs) is fierce in this point in time since they all have a lot to lose and they are all due to their specific investment into the whole platform forced to fight hard or leave the market with high investment ruins. They basically fight for their survival in a marketplace where the expected total rents to be gained are shrinking. This reasoning leads to the first proposition:

Proposition 1: Old-technology firms focus on out-competing other old technology-based rivals in tp1 so that a fierce (inter-architecture) rivalry between the incumbents comes into being.

However, from the perspective of an old-technology incumbent the rivalry in tp1 is not limited to the other old-technology competitors. Further, obviously the new-

technology firms are a major threat to profitability for an old-technology player as well. After reviewing the literature on old technologies and the strategic reactions of race and retreat (e.g., Adner and Snow, 2010a; de Liso and Filatrella, 2008) a link between these two may be assumed: before a technology retreats in a niche market in tp2, it races with the new emerging technology and therewith improves (see Cooper and Schendel, 1976; Gilfillan, 1935; De Liso and Filatrella, 2008 and 2011 for an elaboration of this sailing ship effect). It thus may be assumed that an old technology gets improved through the pressure of the introduction of a new technology (i.e., a race gets started):

Proposition 2: Old technology firms facing the introduction of a superior technology into the market show a high level of product innovation in tp1.

Building on that chain of assumptions as well as the assumption that just companies with strong (however, locked-into the old technology) resources (e.g., patents and/or R&D capabilities) stay into the old technology market, we - on the basis of Adner and Snow's (2010) considerations on retreat strategies- suggest the following: The old-technology firms with a high level of innovations in the first phase are also the later old-tech survivors in the second analysed phase. In this phase they then retrench into a market niche. Furthermore, we assume that they will gain significant market share/ importance in this specific niche as the number of players will be increasingly limited with the structural market changes. These assumptions are phrased in the following two propositions:

Proposition 3a: Old technology firms with a high level of product innovation in tp1, are likely to survive in tp2.

Proposition 3b: Old technology firms with a high level of product innovation in tp1, follow differentiation strategies in tp2 and thereby retrench into strategic niche positions of the overall market.

On the basis of the VCA concept (Dietl et al. 2009) we suggest that old-technology firms which are successful in surviving the introduction of a superior technology into their markets face a situation which is characterised by a small number of competing niche players in the old-technology segment in tp2. By having retreated to a niche there is also a certain protection against

new-technology firms as well as against new entrants. Thus, we assume that the old-tech survivors usually lay respectively have to lay major focus on competitive advantage realisation inside the borders of their VCA. We suggest that old technology firms have to concentrate on their own resources and capabilities since the number of vertical and horizontal partners and competitors is declining with the decline of the old technology. Since their products can be characterised as niche products it can be assumed that old-technology based firms are more likely to compete in a relatively stable industry context once the number of other old-tech providers is relatively small. In such a market they are able to appropriate value and build long-term competitive advantage with an integrated value creation architecture. From this reasoning a further proposition arises:

Proposition 4: Old-technology firms surviving the introduction of a new technology build highly integrated value creation architectures for the old technology in tp2.

Furthermore, old technology firms in platform markets are usually locked-in to the old product, e.g. through resource allocation and path dependency as well as compatibility issues (see Arthur, 1989 for an elaboration of the lock-in phenomenon).

Old-tech companies may in addition find it hard to totally giving up the old technology due to economic as well as emotional lock-ins. This may have the implication that they stick to the old technology, even when they make parallel efforts to switch to the new technology, i.e. follow a dual strategy.

Proposition 5: Old-technology firms with sufficient resources often follow a dual strategy with the old and the new technology after tp2.

Conclusions and implications for further research about VCAs in the vinyl market

Within this piece of research we focused an area which often is not regarded by scholars even though it is important and highly interesting: the area of old-technology firms which survived and still operate today. We therefore reviewed the main literature about VCAs and the strategies of old technology-based companies after technological change. Based on these analyses we elaborated the following six propositions (see Table 1 for a summary of the propositions) for further research in this area.

Table 1⁴: Propositions about the structure and strategy of old-tech providers in platform markets

| | |
|----------------|--|
| Proposition 1 | Old-technology firms focus on out-competing other old technology-based rivals in tp1 so that a fierce (inter-architecture) rivalry between the incumbents comes into being. |
| Proposition 2 | Old technology firms facing the introduction of a superior technology into the market show a high level of product innovation in tp1. |
| Proposition 3a | Old technology firms with a high level of product innovation in tp1, are likely to survive in tp2. |
| Proposition 3b | Old technology firms with a high level of product innovation in tp1, follow differentiation strategies in tp2 and thereby retrench into strategic niche positions of the overall market. |

4: tp1 = time span when old-technology firms see their possibilities to realise rents threatened by the emergence of a superior technology; tp2 = time span after new technology became dominant and only a smaller number of niche players competes in old technology segment

| | |
|---------------|--|
| Proposition 4 | Old-technology firms surviving the introduction of a new technology build highly integrated value creation architectures for the old technology in tp2 |
| Proposition 5 | Old-technology firms with sufficient resources often follow a dual strategy with the old and the new technology after tp2. |

Further research is needed to discuss these propositions and contrast them with the reality e.g. by applying a case study research strategy. We suggest the case of the vinyl industry in Europe to be a good example and worth to study in-depth as it shows interesting market characteristics with its boom after many years of decline of sales. There still exists a good number of vinyl pressing companies with different degree of integration of their value creation architectures.

The next step in this research regarding VCAs in old technology context in our eyes thus has to be an empirical investigation. A case study approach may be developed to contrast for instances our Proposition 4 which suggests that a relatively integrated VCA would be beneficial in old technology markets with the reality. We plan to explore this in a case study where we apply the concept to analyse value creation architectures in the industry context of vinyl, focusing on the vinyl pressing businesses as the focal actors.

Vinyl seems to be an attractive example to investigate: A vinyl revival occurred over the last ten years. Latest statistics report that the amount of vinyl purchased in the U.S. in 2012 reached 4.6 million units which is an increase of 17.7% compared to 2011 (Nielsen, 2012). Even though 2014 was a bad year for the U.S. music industry overall, vinyl stayed a noteworthy trend with its 51.8% rise in sales compared to 2013 which means 9.2 million vinyl sales and 6% of all physical music sales. Compact disc sales on the other hand declined by 14.9%. (Nielsen, 2015). Physical formats still account for more than half of all global revenues, vinyl here grows as a nice product (IFPI, 2014, p. 7).

The vinyl sales in the U.S. in 2012 accounted for 177 million USD, while it was only 166 million USD in 1997

(IFPI, 2013). One of the motivations explaining the current purchase of vinyl by end-users and the current value creation in this industry lies in the fact that vinyl became popular and trendy between young artists as well as music listeners (e.g., Pankinkis, 2012). The sound quality of vinyl is perceived to be much higher than of CDs or MP3s by these customers. Some labels or stores (e.g., Amazon) meanwhile offer to download the songs for free as MP3 when buying the vinyl album and therewith combine the best of both worlds. Another motivation relates to the on-going use of turntables by some (vintage) communities of DJs (e.g., Schiavone, 2013). When put in relation to the music market vinyl album sales have accounted for 1.4% (2.3%) of all album sales (all physical album sales) (Hughes, 2013, p. 27). The market share documents that it is a niche market (Christman, 2013). Music companies foster this niche by producing a limited number of vinyl records as a deluxe product (James and Grogan, 2011, p.51).

To analyse the theoretical approach in a real-life context a multiple case design may be useful (Yin, 2003, p. 39). Case studies are a useful approach to illustrate general facts or theoretical concepts (Boos, 1992). They are an “[...] empirical inquiry that investigates a contemporary phenomenon within its real-life context [...]” (Yin, 2003, p. 13) and “copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to coverage in a triangulating fashion [...]” (Yin, 2003, pp. 13-14).

We here suggest to use a cases study strategy further since the research subject in terms of the complex variables and the interdependencies between them can only be sufficiently analysed when data from different

sources are taken into account and in-depth interviews are conducted with industry experts which excludes analysing a large number of cases (Weber, Mayrhofer, Nienhüser, Rodehuth & Rüther, 1994, p. 55). We suggest a nomothetic case study research design here to be able to actually contrast the propositions with the reality and thereby test them. Nomothetic in this context refers to the fact that each of the cases of old tech players investigated in the vinyl market is to be classified on the basis of the theoretical considerations from the developed propositions. Data maybe collected with quantitative as well as qualitative methods which both can be useful. The aim of a hypotheses testing nomothetic case study lies in eliminating implausible hypotheses in a process of comparing them with the characteristics the variables show in the different cases investigated (Fisch and Boos, 1987, p. 356; Weber et al., 1994, p. 51).

After setting up the propositions as an outcome of the theoretical discussion of the VCA of old-technology firms one tricky part therefore lies in operationalising the complex constructs used in the variables. We thus here want to come up with first ideas regarding the operationalization of them with regard to a cases study research of different remaining players in the European vinyl market(see Table 2).

Within further research the propositions are to be tested with the help of a case study analysis in the vinyl industry (or other fitting industry contexts). We think that it is fruitful to analyse the vinyl pressing industry which in our view is a good example of an old-technology based industry which survived building a niche market for some players and even grows nowadays. As cases we would choose remaining players (respectively their VCAs) in the European vinyl market.

Limitations of our approach lie in the fact that so far we have no empirical data included. However, due to the complexity of the field we saw it as highly relevant to focus on a sound conceptualisation of propositions in the first step and test them in follow up studies.

The aim of this paper was to generate propositions regarding the companies' value-adding activities in order to sustain an old platform or establish new platforms for old products in decline. Thereby we focus on a neglected topic in the strategy literature which, however,

bears relevance for many businesses locked into product-market systems which make it hard for them to (completely) switch to a new technology emerging in the market. It is relevant to describe the consequences in a systematic fashion and this is what we did on the basis of the strategic literature used. In addition, we wanted to come to a deeper understanding of the relationships between different elements in that context which led us to the formulation of the propositions summarised in Table 1. These are a good fundament for future research in this area as well as first insights into the constellations to be expected over time for old tech businesses in platform markets.

Table 2: Avenues towards operationalising the relevant variables

| Variables | Time | Possible measures |
|----------------------|------|---|
| tp1 | - | - relevant time period suggested for the vinyl market 1981 – 1989 |
| tp2 | - | - relevant time period suggested for the vinyl market 2006 – 2012 |
| rivalry/ competition | tp1 | <ul style="list-style-type: none"> - price discounting (Porter, 2008, p. 32) - [number] of new product introductions (Porter, 2008, p. 32) - [number] of advertising campaigns (Porter, 2008, p. 32) - service improvements (Porter, 2008, p. 32) - industry growth in % (slow growth precipitates fights for market share; Porter, 2008: 32) - industry decline in % - [number] of relevant companies offering the product/ competitors |
| product innovation | tp1 | <ul style="list-style-type: none"> - [number] of old products revitalised; - [number] of new products developed; - [number] of new patents |
| survival | tp2 | - [years] of existence (year of closure/ today minus founding year) |
| niche position | tp2 | - market share in overall market in [%] |

| | | |
|------------------------|------------|--|
| <p>differentiation</p> | <p>tp2</p> | <ul style="list-style-type: none"> - focus on special sales [price level], e.g. high-end/ luxury, compared to new technology, quality focus - [number] of distribution channels/ distribution partners - [number] raising and creating elements the industry has never offered (Porter, 2008) - Differences in [quality] which are usually accompanied by differences in [price] - Differences in functional features or design - Ignorance of buyers regarding the essential characteristics and qualities of goods they are purchasing → [buyer behaviour] - Sales promotion activities of sellers and, in particular, advertising, e.g. [number] of campaigns - Differences in availability (e.g., timing and location) (Sharp and Dawes, 2001) |
| <p>integration</p> | <p>tp2</p> | <ul style="list-style-type: none"> - Production depth: ideally [%] of in-house processes compared to outsourced ones (production steps) - Production control: duration in [years] and sustainability of relationships in [number] of suppliers (multiple sourcing vs. exclusive supplier); [level] of location-specific investments (geographic proximity of supplier plants), integration of direct suppliers – focus on direct tier 1 supplier - Distribution depth: ideally [%] of direct sales/ direct involvement and intervention compared to sales via third parties - Distribution control: [type] of sales and contracts with dealers (e.g., franchise); [level] of specific investments at dealers – focus on relationships with direct distributors |

References

- Adner R. and Snow D. (2010), Old Technology Responses to New Technology Threats: Demand Heterogeneity and Graceful Technology Retreats, in: *Industrial and Corporate Change* 19 (5), pp. 1655-1675.
- Afuah, A. and Tucci, C. L. (2001): *Internet Business Models and Strategies*, New York: McGraw-Hill.
- Ahokangas, P. and Myllykoski, J. (2014): The Practice of Creating and Transforming a Business Model, in: *Journal of Business Models* 2 (1), pp. 6-18.
- Amit, R. and Zott, C. (2012): Creating Value through Business Model Innovation, in: *Sloan Management Review* 53 (3), pp. 41-49.
- Arthur, W. B. (1989), Competing Technologies, Increasing Returns, and Lock-In by Historical Events, *The Economic Journal* 99 (394), pp. 116-131.
- Barney, J. B. (1991), Firm Resources and Sustained Competitive Advantage, in: *Journal of Management* 17 (1), pp. 99-120.
- Boos, M. (1992), *A Typology of Case Studies, Research on Cases and Theories*, Vol. 1.
- Bosch, F. A. J. van den, Volberda, H. W. and Boer, M. de (1999), Coevolution of Firm Absorptive Capacity and Knowledge Environment: Organizational Forms and Combinative Capabilities, in: *Organization Science* 10 (5), pp. 551-568.
- Business Wire (2013), Amazon AutoRip extends to vinyl, in: *Business Wire (English)* 04/03/2013.
- Chari, V. V. and Hopenhayn, H. (1991), Vintage Human Capital, Growth, and the Diffusion of New Technology, in: *Journal of Political Economy* 99 (6), pp. 1142-1165.
- Chatterjee, S. (2013), Simple Rules for Designing Business Models, in: *California Management Review* 55 (2), pp. 97-124.
- Christensen L. M. (1997), *The innovator's dilemma: when new technologies cause great firms to fail*, Boston, MA: Harvard Business School Press.
- Christman, E. (2013), Vinyl Resurgence, in: *Billboard*, April 20, p. 28.
- Cliffe, S. (2011), When your business model is in trouble - Interview with Rita G. McGrath, in: *Harvard Business Review*, Jan-Feb, pp. 96-98.
- Coase, R. H. (1937), The nature of the firm, in: *Economica* 4, pp. 386-405.
- Cooper, A. C. and Schendel, D. (1976), Strategic Responses to Technological Threats, in: *Business Horizons*, February 1976, pp. 61-69.
- Cooper A.C. and Smith C. G. (1992), How established firms respond to threatening technologies, in: *Academy of Management Executive* 6 (2), pp. 56-69.

- De Liso, N. and Filatrella, G. (2008), On Technology Competition: A formal analysis of the "Sailing-Ship-Effect", *Econ. Innov. New Technology* 17(6), pp. 593-610.
- De Liso, N. and Filatrella, G. (2011), Technological persistence through R&D on an old technology: the "sailing ship effect", in: De Liso, N. and Leoncini, R. (Eds.), *Internationalization, Technological Change and the Theory of the Firm*, London: Routledge, Chapter 3.
- Dietl H., Royer S. and Stratmann U., (2009), Value Creation Architectures and Competitive Advantage: Lessons from the European Automobile Industry, in: *California Management Review* 51 (3), pp. 24-48.
- Dietl, H.M., Royer, S. and Beckmann, O.C. (2013), Die Bedeutung von Netzwerkkreuzeffekten für den Erfolg der Elektromobilität - Strategische Überlegungen zu möglichen Distributionsarchitekturen, in: *Zeitschrift für die gesamte Wertschöpfungskette Automobilwirtschaft (ZfaW)* 16 (3), pp. 14-26.
- Duscheck, S. (2014), Inter-Firm Resources and Sustained Competitive Advantage, in: *management revue* 15 (1), pp. 53-73.
- Dyer, J. H. and Singh, H. (1998), The Relational View: Cooperative Strategies and Sources of Interorganizational Competitive Advantage, in: *Academy of Management Review* 23 (4), 1998: 660-679.
- Eisenmann, T., Parker, G. and van Alstyne, M. (2011), Platform Envelopment, in: *Strategic Management Journal* 32, pp. 1270-1285.
- Farell, J. and Saloner, G. (1986), Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation, *The American Economic Review*, 76 (5), pp.940-955.
- Fisch, R. and Boos, M. (1985): Die Fallstudie in der Organisationsforschung, Arbeitsbericht Nr. 5 des Sonderforschungsbereichs 221: Verwaltung im Wandel, Universität Konstanz 1985.
- Foster, R. N. (1986), *Innovation: The Attacker's Advantage*, New York: Summit Books.
- Gawer, A. and Cusumano, M. A. (2014), Industry Platforms and Ecosystem Innovation, in: *Journal of Product Innovation Management* 31 (3), pp. 417-433.
- Gilfillan, S. C. (1935), *Inventing the Ship*, Chicago: Follet Publishing Company.
- Gulati, R. (1999), Network Location and Learning: The Influence of Network Resources and Firm Capabilities on Alliance Formation, in: *Strategic Management Journal* 20 (5), pp. 397-420.
- Hambrick, D. and Fredrickson, J. (2001), Are you sure you have a strategy? In: *The Academy of Management Executive* 15 (4), pp. 48-59.
- Howells J. (2002), The Response of Old Technology Incumbents to Technological Competition: Does the Sailing Ship Effect exist? In: *Journal of Management Studies* 39 (7), pp. 887-906.
- Hughes, H. (2013), Vinyl Mania, in: *Billboard*, April 20, pp. 26-28.
- IFPI (2014), IFPI Digital Music Report 2014, <http://www.ifpi.org/downloads/Digital-Music-Report-2014.pdf> (ac-

cessed 22 February 2015).

IFPI (2013), Recording Industry Annual Report.

Ismail, S., Malone, M. S. and van Geest, Y. (2014), *Exponential Organizations*, New York: Diversion Books.

James, T. and Grogan, A. (2011), Back in the groove, in: *Engineering & Technology*, pp. 50-53.

Jacobides, M. G. and Billinger, S. (2006), Designing the boundaries of the Firm: "Make, buy, or Ally" to the Dynamic Benefits of Vertical Architecture, in: *Organization Science* 17 (2), pp. 249-261.

Jacobides, M. G., Knudsen, T. and Augier, M. (2006), Benefiting from innovation: Value creation, value appropriation and the role of industry architectures, in: *Research Policy* 35 (8), pp. 1200-1221.

Lavie, D. (2006), The Competitive Advantage of Interconnected Firms: An Extension of the Resource-based View, in: *Academy of Management Review* 31 (3), pp. 638-658.

Liesenkötter, B. and Schewe, G. (2013), Der Sailing-Ship-Effect in der Automobilwirtschaft, in: Proff, H., Pascha, W., Schönhartig, J. and Schramm, D. (Eds.): *Schritte in die künftige Mobilität – Technische und betriebswirtschaftliche Aspekte*, Springer Gabler: Wiesbaden, pp. 273-286.

Lund, M. and Nielsen, C. (2014): The Evolution of Network-based Business Models Illustrated Through the Case Study of an Entrepreneurship Project, in: *Journal of Business Models* 2 (1), pp. 105-121.

Maitland and Sammartino (2012), Flexible Footprints: Reconfiguring for new value opportunities, in: *California Management Review* 54 (2), pp. 92-117.

Massa, L. and Tucci, C. L. (2014), Business Model Innovation, in: Dodgson, M., Gann, D. M. and Phillips, N. (Eds.), *The Oxford Handbook of Innovation Management*, Oxford University Press, pp. 420-441.

Matzler, K., Bailom, F., von der Eichen, S. F. and Kohler, T. (2013), Business model innovation: coffee triumphs for Nespresso, in: *Journal of Business Strategy* 34 (2), pp. 30-37.

McDermott, G., Mudambi, R. and Parente, R. (2013), Strategic Modularity and the Architecture of Multinational Firm, in: *Global Strategy Journal* 3 (1), pp. 1-7.

Mendoca, S. (2013), The „sailing ship effect“: Reassessing history as a source of insight into technical change, in: *Research Policy* 42, pp. 1724-1738.

Nielsen (2015), 2014 Nielsen Music U.S. Report, <http://www.nielsen.com/content/dam/corporate/us/en/public%20factsheets/Soundscan/nielsen-2014-year-end-music-report-us.pdf> (accessed 22 February 2015).

Nielsen (2012), Soundscan Annual Report.

Osterwalder, A., Pigneur, Y and Tucci, C.L. (2005), Clarifying Business Models: 'Origins, Present and Future of the Concept', in: *Communications of the Association for Information Science (CAIS)* 16, pp. 1-25.

Parker, G. and van Alstyne, M. (2014), Platform Strategy Survey, Electronic copy available at: <http://ssrn.com/ab->

stract=2439323.

Peteraf, M. A. (1993), The Cornerstones of Competitive Advantage: A Resource Based View, in: Strategic Management Journal 14 (3), pp. 179-91.

Porter, M. E. (1980), Competitive Strategy, Boston MA: The Free Press.

Porter, M. E. (1996), What is Strategy? In: Harvard Business Review 74 (6), pp. 61-78.

Porter, M. E. (2008), The Five Competitive Forces that Shape Strategy, in: Harvard Business Review, January 2008, pp. 78-93.

Royer, S. (2005), Strategic Management and Online-Selling: Creating Competitive Advantage with Intangible Web Goods, London/New York: Routledge.

Sah, R. and Stiglitz, J. (1986), The architecture of economic systems: hierarchies and polyarchies, in: American Economic Review 76 (4), pp. 716-727.

Sanchez, R. and Heene, A. (1997), Reinventing Strategic Management: New Theory and Practice for Competence-based Competition, in: European Management Journal 15 (3), pp. 303-17.

Sandström (2013), "The Sailing Ship Effect", SlideShare presentation, <http://de.slideshare.net/Christiansandstrom/technology-sailing-effects> (last accessed 22 December 2015).

Schiavone F. (2011), Strategic Reactions to Technology Competition. A Decision-Making Model, in Management Decision 49 (5), pp. 801-809.

Schiavone F. (2013), Communities of Practice and Vintage Innovation, Berlin: Springer.

Schiavone, F. and Borzillo, S. (2014): Creating technological knowledge in vintage communities of practice", Journal of Knowledge Management 18 (5), pp. 991 - 1003.

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

Snow, D.C. (2008), Beware of Old Technologies' Last Gasps, in: Harvard Business Review (January 2008), pp. 17-18.

Suarez, F.F. and Kirtley, J. (2012), Dethroning an Established Platform, in: Sloan Management Review 53(4), pp. 35-41.

Teece, D. J., Pisano, G. and Shuen, A. (1997), Dynamic Capabilities and Strategic Management, in: Strategic Management Journal 18 (7), pp. 509-33.

Teece, D. J. (2010), Business models, business strategy and innovation, in: Long Range Planning 23, pp. 172-194.

Utterback, J. M. (1994), Mastering the Dynamics of Innovation, Boston: Harvard Business School Press.

Utterback, J. M. and Akee, H. J. (2005), Disruptive Technologies: An expanded view, in: International Journal of Innovation Management 9 (1), pp. 1-17.

Weber, W., Mayrhofer, W., Nienhüser, W., Rodehuth, M. and Rüter, B. (1994): Betriebliche Bildungsentscheidungen – Entscheidungsverläufe und Entscheidungsergebnisse, München/Mering: Hampp.

Williamson, O. E. (1985), The economic institutions of capitalism: Firms, markets, relative contracting, New York: The Free Press.

Yin, R. (2003), Case study research: Design and methods, Beverly Hills, CA: Sage Publishing.

Yrjölä, M. (2014): Value Creation Challenges in Multichannel Retail Business Models, in: Journal of Business Models 2 (1), pp. 89-104.

Zott, C. and Amit, R. (2013): The Business Model: A Theoretically Anchored Robust Construct for Strategic Analysis, in: Strategic Organization 11 (4), 2013: 403-411.

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The Unfolding of Value Sources During Online Business Model Transformation

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Abstract

Purpose: In the magazine publishing industry, viable online business models are still rare to absent. To prepare for the 'digital future' and safeguard their long-term survival, many publishers are currently in the process of transforming their online business model. Against this backdrop, this study aims to develop a deeper understanding of (1) how the different building blocks of an online business model are transformed over time and (2) how sources of value creation unfold during this transformation process.

Methodology: To answer our research question, we conducted a longitudinal case study with a leading German business magazine publisher (called BIZ). Data was triangulated from multiple sources including interviews, internal documents, and direct observations.

Findings: Based on our case study, we find that BIZ used the transformation process to differentiate its online business model from its traditional print business model along several dimensions, and that BIZ's online business model changed from an efficiency- to a complementarity- to a novelty-based model during this process.

Research implications: Our findings suggest that different business model transformation phases relate to different value sources, questioning the appropriateness of value source-based approaches for classifying business models.

Practical implications: The results of our case study highlight the need for online-offline business model differentiation and point to the important distinction between service and product differentiation.

Originality: Our study contributes to the business model literature by applying a dynamic and holistic perspective on the link between online business model changes and unfolding value sources.

Keywords: Online business model, Business model dimensions and elements, Transformation process, Value sources, Magazine publishing industry, Case study.

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Introduction

Rapid advances in Internet-based technologies have provided companies with new business opportunities (Rayport and Sviokla, 1995) and prompted many to supplement their traditional offline business models (BMs) with new online BMs. An online BM can be described as a “*blueprint of how a company does business [on the Internet]*” (Osterwalder et al., 2005, p. 2). In many industries such as entertainment, media, retail and software, the relative importance of online BMs is continuously increasing (e.g., Chan-Olmsted and Ha, 2003; Gebauer and Ginsburg, 2010; Swatman et al., 2006). This is particularly true for the magazine publishing industry, where changing customer demands led to a steady decrease in print copy sales and print advertising revenues (e.g., Krüger et al., 2004; Mottweiler et al., 2013). To prepare for the ‘digital’ future and to cushion the decrease in print revenues, magazine publishers introduced new online BMs by offering free content on ad-financed websites (Wellbrock and Schnittka, 2014). Nonetheless, most publishers continue to rely heavily on their offline BM since profitable online BMs are still rare to absent (Silva, 2011). The struggle for profitability is mainly driven by the unwillingness of users to pay for online content (Chyi, 2005). Against this backdrop, many magazine publishers are currently transforming their online BM in an effort to make it profitable and to safeguard their long-term survival and success.

Over the last fifteen years, research on (online) BM transformation has accumulated a growing body of knowledge. Specifically, existing studies contribute to a deeper understanding of the barriers and drivers (e.g., Chesbrough, 2010), the types (e.g., Cavalcante et al., 2011), and the phases of BM transformation (e.g., Kuivainen et al., 2009) as well as the role of capabilities (e.g., Khanagha et al., 2014) and experimentation (e.g., Sosna et al., 2010) in transforming BMs. Moreover, earlier research establishes the link between BM innovation and value creation in terms of organizational performance (e.g., Heij et al., 2014).

Despite these considerable advances, two gaps in the extant literature are particularly noteworthy. First, existing BM research tends to “*only consider one or a few pieces of the whole*” (Al-Debei and Avison, 2010, p. 364). This shortcoming also applies to prior research in the specific context of the publishing industry, where stud-

ies often focus on online revenue models (e.g., Chyi, 2005; Fetscherin and Knolmayer, 2004; Gallaughier et al., 2001). Although the revenue model clearly represents a focal element of any BM, it still represents only one element among many (Al-Debei and Avison, 2010; Osterwalder et al., 2005). Existing research therefore partly fails to provide a more comprehensive understanding of how the different and interrelated building blocks of a BM are affected by transformation processes.

Second, existing research predominantly studies the link between BM transformation and value creation on an aggregated level and from a rather static perspective (e.g., Amit and Zott, 2012; Aspara et al., 2010; Heij et al., 2014; Schief, 2013). In other words, prior studies typically focus on assessing final outcomes (e.g., firm performance) of BM transformation processes at a particular point in time. In contrast, a more dynamic perspective that takes into account how BM changes relate to emerging sources of value creation is widely lacking. Consequently, our understanding of how and in what sequence value sources unfold during BM transformation is still limited.

To address the above-highlighted research gaps, we conducted a longitudinal case study with a German business magazine publisher, BIZ (pseudonym), on the transformation of its online BM. In particular, our study aims to answer the following two research questions (RQ):

- RQ1: How are the different building blocks of an online BM transformed over time?
- RQ2: How do sources of value creation unfold during the online BM transformation process?

The remainder of the paper is structured as follows: In section 2, we introduce the BM concept and review prior literature on (online) BM transformation and value creation on the Internet. Section 3 describes the research methodology and context. We then outline the initial configuration of BIZ’s online BM in section 4, and present the case results in section 5. Section 6 summarizes key case findings and discusses theoretical and practical implications. We conclude by highlighting our study’s main contributions.

Theoretical background

Business model concept

In many disciplines such as management, entrepreneurship, innovation, and information systems (IS), one can observe an increasing interest in studying BMs (e.g., Johnson et al., 2008; Veit et al., 2014; Zott et al., 2011). Nevertheless, the BM concept is still “fuzzy and vague and there is little consensus on its definition and compositional elements” (Fielt, 2013, p. 86). To address this shortcoming, Al-Debei and Avison (2010) developed a unified BM definition and framework that accounts for “the complex nature of businesses today” (p. 359). Based on their review of 22 well-established BM conceptualizations (e.g., including those by Chesbrough and Rosenbloom, 2002; Hedman and Kalling, 2003; Osterwalder et al., 2005), Al-Debei and Avison define a BM as “an abstract representation [...] of all core inter-related architectural, co-operational, and financial arrangements designed and developed by an organization [and] all core products and/or services the organization offers” (p. 372), and propose a four-dimensional BM framework (see Fig. 1).

| | | |
|------------|--|--|
| Dimensions | Products and services | Architecture |
| | <ul style="list-style-type: none"> • Core products and services • Target customer groups (and their preferences) | <ul style="list-style-type: none"> • Core resources (and their configuration) • Key activities |
| Elements | Network | Finance |
| | <ul style="list-style-type: none"> • Key external partners (and their relation to the focal firm) | <ul style="list-style-type: none"> • Cost structure • Revenue structure |

Fig. 1 Business model dimensions and elements (building blocks)

In this study, we adopt the four BM dimensions proposed by Al-Debei and Avison (2010) and tailor them to the particularities of the magazine publishing industry (e.g., Fielt, 2013):

- Product and services – captures a company’s market offerings as well as target customers and their preferences. Main customers of magazine publishers include both advertisers (B2B) and readers (B2C).
- Architecture – refers to a company’s core resources and their configuration as well as key activities required for generating the market offerings. In the publishing industry, key activities include information gathering, organizing, filtering and synthesizing, as well as con-

tent distribution (Rayport and Sviokla, 1995; Wirtz et al., 2010).

- Network – describes interactions and relationships with key external partners, such as other publishing houses, news agencies, etc.
- Finance – covers the economic configuration including a company’s cost and revenue structures.

Al-Debei and Avison’s (2010) BM framework, which originated from the Information Systems literature, seems to be well suited for understanding, guiding, and structuring our analysis in the specific context of online BM transformation. Furthermore, by adopting their framework, our study takes into the account the multidimensionality of the BM concept (e.g., Günzel and Holm, 2013; Wikström and Ellonen, 2012) and its applicability to the publishing industry. This is in clear contrast to many earlier studies, which focused on a subset of BM dimensions or even a single BM element (e.g., Giessmann and Stanoevska-Slabeva, 2012; Wirtz et al., 2010). Among others, this has led to research on publishers’ online revenue models (e.g., Chyi, 2005; Fetscherin and Knolmayer, 2004; Gallaughier et al., 2001).

Business model transformation

While early research tends to view a company’s BM as static, more recent research emphasizes that BMs are frequently revised and adapted (Sosna et al., 2010) and that they are in “a permanent state of disequilibrium” (Demil and Lecocq, 2010, p. 242). This is referred to as *BM transformation*, which describes how a company’s BM changes over time. Such changes may relate to one specific BM element (e.g., core resources) or may affect several elements (e.g., core resources and products).

Existing research contributes to our knowledge on BM transformation by bracketing the transformation process into phases (e.g., Khanagha et al., 2014; Kuivalainen et al., 2009; Sosna et al., 2010). Relatedly, Chesbrough (2010, p. 362) identifies an “*effectual attitude toward business model experimentation*” and “*internal leaders for business model change*” as key facilitators for BM innovation. This is consistent with other studies stressing the importance of experimentation and trial-and-error learning (e.g., Khanagha et al., 2014; Rindova

and Kotha, 2001) as well as dynamic capabilities (e.g., Daniel and Wilson, 2003; Johansson and Abrahamsson, 2014) in relation to BM innovation and organizational renewal. Furthermore, prior research suggests different types of BM transformation, such as creation, extension, revision, and termination (e.g., Cavalcante et al., 2011; Günzel and Holm, 2013).

Several studies also highlight the central role of a company's BM for creating customer value (e.g., Teece, 2010; Weill and Woerner, 2013), or, more generally, for creating value for each party in the company's network (Al-Debei and Avison, 2010; Amit and Zott, 2001). Relatedly, a company's BM is acknowledged as a source of competitive advantage (e.g., Casadesus-Masanell and Ricart, 2011; Markides and Charitou, 2004) and is used to explain firm performance in terms of profitability, revenue, and headcount growth (e.g., Amit and Zott, 2012; Heij et al., 2014; Schief, 2013). However, given the predominant focus on aggregated BM transformation outcomes (e.g., competitive advantage or firm performance), existing research tends to oversimplify the relationship between BM transformation and value creation. This is consistent with Amit and Zott (2001) who identify four *sources* of value creation on the Internet, thereby describing more direct outcomes of online BM transformation processes.

Sources of value creation on the Internet

Amit and Zott (2001) argue that explaining the value creation potentials of online business (models) goes beyond the scope of single entrepreneurship and strategic management theories. Drawing on and in-

tegrating different theoretical perspectives, such as the resource-based view of the firm (Barney, 1991) and Porter's (1985) value chain framework, Amit and Zott (2001) identify four key sources of value creation on the Internet: efficiency, complementarities, novelty, and lock-in (see Fig. 2).

Efficiency relates to lower transaction costs in online business and can be assessed in comparison to a company's offline business or other companies' online businesses (Amit and Zott, 2001). Specifically, the Internet helps reduce information asymmetries (Gregor et al., 2006) as well as costs related to marketing, sales, distribution, and coordination (e.g., Bakos and Treacy, 1986). It also enables improved transaction scalability, speed, and staff productivity (Amit and Zott, 2001).

Complementarities refer to the value-enhancing effect of (positive) interdependencies among companies (e.g., access to products, services, and resources of a partner company), between online and offline BMs, as well as between different online BM elements (Amit and Zott, 2012).

Novelty concerns value creation potentials that are new to a given company's (online) BM, and thus "captures the degree of BM innovation that is embodied by the activity system" (Amit and Zott, 2012, pp. 45-46). The Internet enables not only new online products and services, but also access to new customer groups and data as well as the development of new market capabilities. Furthermore, it enables new transaction structures (e.g., Ebay) and helps bring together market actors that were not previously connected (Amit and Zott, 2001).

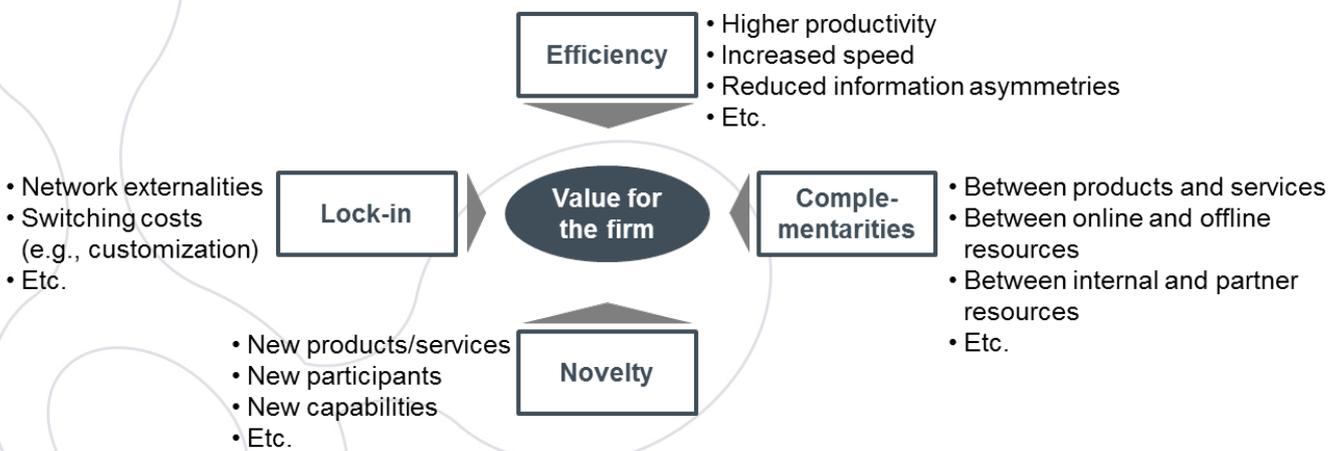


Fig. 2 Value sources in online business (based on Amit and Zott, 2001)

Lock-in refers to BM features that “create switching costs or enhanced incentives for [customers] to stay and transact within the activity system” (Amit and Zott, 2012, p. 45-46). For example, the Internet enables companies to foster customer involvement and participation (e.g., through user-generated content) and to benefit from network externalities, which occur “when the value created for customers increases with the size of the customer base” (Amit and Zott, 2001, p. 507).

It is important to note that Amit and Zott’s (2001) study adopts a broad view of value, which refers to “the total value created in [online] transactions regardless of whether it is the firm, the customer, or any other participant in the transaction who appropriates that value” (p. 503). Our study, however, adopts a more narrow view of value by focusing on value creation potentials from the perspective of the firm that runs the online BM.

In summary, our study draws on two well-established (structural) frameworks: Al Debei and Avison’s (2010) BM framework for conceptualizing the building blocks of an online BM and Amit and Zott’s (2001) value-source framework for conceptualizing the value sources that result from (changes to) the online BM configuration. ‘Continuously’ applying these two frameworks at different points in time enabled us to explore the dynamics and behavioral aspects of the online BM transformation process in a structured manner, and thus to answer our research questions. Interestingly, while several studies use Amit and Zott’s value-source framework to classify BMs in terms of their dominant source of value creation (e.g., Bornemann, 2009; Johansson and Abrahamsson, 2014; Zott and Amit, 2010), our study uses their framework to characterize online BM dynamics during the transformation process.

Research methodology

To answer our research questions, we conducted a longitudinal single-case study with a major German business magazine publisher called BIZ (pseudonym). The case-study approach is particularly suitable for studying “how” research questions (Yin, 2014), and allowed us to conduct an in-depth investigation of the transformation process of BIZ’s online BM—our focal unit of analysis—in its real-life context and over an extended period of time, 2010-2014 (Flyvbjerg, 2006; Yin, 2014).

Case context and selection

The magazine (and newspaper) industry “went through more structural changes in the past ten years than in the whole second half of [the 20th] century” (Silva, 2011, p. 301). These changes were primarily driven by the emergence of new Internet-based technologies, including smartphones and tablet PCs, web 2.0 and social media platforms, etc. (Bharadwaj et al., 2013; Wikström and Ellonen, 2012). Most importantly, these technologies provided Internet users with an unprecedented wealth of freely accessible online content, thereby reducing the incentives for customers to buy print copies and pay for content in general (Sumner, 2010). ‘Digital natives’ especially tend to have less appreciation for high-quality, research-intensive content since they often lack “the ability to read deeply and to sustain a prolonged engagement in reading” (Liu, 2005, p. 701). The rise of the Internet age thus led to shrinking print copy sales (see also Fig. 3) and print advertising revenues in the magazine publishing industry, and ultimately to massive market shakeouts. For instance, in the German market, there were 13 business magazines in 2003, while there were only six left in 2013 (IVW, 2014). In contrast, the online advertising market has been growing considerably in recent years. For instance, in Germany, online advertising budgets grew by 69.2% from 2013 to 2014 (Statista, 2014). Consequently, even though profitable online BMs are still rare to absent (Silva, 2011), the relative importance of these BMs is steadily increasing in the magazine publishing industry (Jarren et al., 2012; Mottweiler et al., 2013; Wikström and Ellonen, 2012).

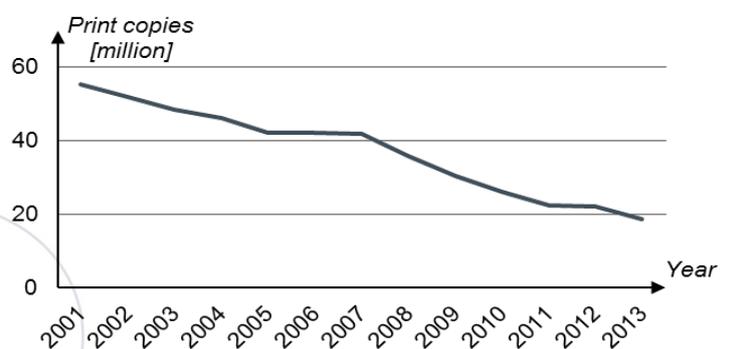


Fig. 3 Development of German business magazines’ print copy sales (IVW, 2014)

The rationale for selecting BIZ as the case company followed an information-oriented selection strategy

(Flyvbjerg, 2006). This strategy aims to maximize the utility of information from single cases by selecting a case *“on the basis of expectations about [its] information content”* (p. 230). Specifically, there were two main reasons for selecting BIZ. First, founded in the 1970s, BIZ is an established key player in the German business magazine market, and is considered to be the market leader in its segment. Second, while BIZ’s online BM had been relatively stable since its launch in the mid 2000s, a management review in 2010 triggered a series of major changes to the online BM in subsequent years.

Data collection

Consistent with established guidelines on case-study research (Eisenhardt, 1989; Yin, 2014), we collected data from multiple sources. This data triangulation allowed us to do pattern matching across data sources and helped us identify convergent lines of inquiry. First, before the main data collection, we scheduled a series of informational meetings with BIZ’s management. These meetings provided us with a solid understanding of BIZ’s history, business context and key events related to the transformation of BIZ’s online BM.

Second, we conducted ten semi-structured interviews with key BIZ representatives on different hierarchical levels and from different functional areas over an extended time period (April to September 2014). Seven interviews were carried out with the managing director of BIZ. Interviewing him multiple times enabled us to develop a detailed understanding of the online BM transformation process and progress. The other interviews were conducted with the online editor in chief (EIC), an online editor, and the senior IT manager. The interviews followed Myers and Newman’s (2007) guidelines for qualitative interviews, and lasted from 30 minutes to over two hours. Before each interview, an interview guideline with sample questions was sent to the interview partner. The interviews were tape-recorded, transcribed, enriched with case notes, and aggregated into a case study database. Follow-up emails and phone calls were used to clarify questions that arose during the interview transcription and data analysis.

Third, we regularly visited the case site, which enabled us to better understand the case context and make direct observations (Yin, 2014). For example, during one

visit, we were able to observe how the online EIC used a new website control system to access real-time performance information on BIZ’s online content offerings.

Fourth, the interview partners provided us with internal presentations, monthly management reports, and meeting minutes covering the period from April 2010 through September 2014. We also reviewed internal documentation concerning the implemented changes to the BIZ website and the historical development of the website reach dating back to early 2010.

Fifth, we retrieved external quantitative data from IVW (Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern e. V.) and AGOF (Arbeitsgemeinschaft Online Forschung e.V.). On their publicly accessible websites, these associations provide detailed performance data on the reach of BIZ’s website (e.g., website visits).

Sixth and finally, we scanned industry insider blogs and business news websites to gather external qualitative data about BIZ’s online BM developments. The main purpose for collecting such external data was to enrich and validate the data collected internally (Huber and Power, 1985).

Data analysis

We approached the analysis of our case data with a deep understanding of the theoretical domains of our study (BM transformation and value creation on the Internet). To analyze the collected data, we performed a combination of concept- and data-driven coding (Gibbs, 2010) with help of a qualitative data analysis software (Nvivo 9). We derived the initial coding scheme from the BM dimensions proposed by Al-Debei and Avison (2010) as well as the value sources identified by Amit and Zott (2001), and subsequently refined it by codes that emerged from our line-by-line coding.

The coding was done by the first author in an iterative process. Preliminary results were discussed with the other authors to resolve ambiguities and uncertainties. In these discussions, the authors alternated between constructive and critical positions (Eisenhardt, 1989) to consolidate the coding scheme and ensure consistent coding across the case data. During the coding process, we also wrote memos to document the timeline

1 Coefficient of reliability = $2m / (n1+n2)$, where m is the number of coding decisions upon which the two coders agree, and n1 and n2 are the numbers of coding decisions made by coder 1 and coder 2, respectively.

of events, capture the relationships between different codes, and link the codes with existing literature. We continued the iterative coding process until we reached theoretical saturation, which occurred when no new codes and relationships between codes emerged from our data (Yin, 2014). To ensure the reliability of the coding process, a second, independent researcher (who is not part of the author team) re-coded two randomly selected interview transcripts. We then calculated the inter-rater agreement using Holsti's (1969) coefficient of reliability¹, which was 88%. According to Neuendorf (2002), a coefficient of 90% or greater is acceptable in all, and a coefficient of 80% or greater is "acceptable in most situations" (p. 145).

To analyze the process of how BIZ transformed the different dimensions and elements of its online BM, we sorted the developed codes in chronological order. Here, we identified several critical events that triggered a set of related changes. These changes are 'bracketed' into four phases and describe the transformation of BIZ's online BM as well as the related unfolding of value sources between April 2010 (when BIZ performed a critical review of its online BM) and September 2014. According to Langley (1999), a temporal bracketing strategy is well suited for single-case studies such as ours. Finally, we compared the results of our analysis with prior research results to draw and explain conclusions, and also discussed our conclusions with BIZ management for validation purposes.

Initial configuration of BIZ's online business model

This section depicts the configuration of BIZ's online BM in early 2010, the starting point of our investigation, along the four BM dimensions (see Fig. 1 above). The main results of our case study follow in section 5. Products and services: The core products of BIZ's online BM comprised offerings for online readers and advertisers. For its readers, BIZ provided up-to-date business news and business-related articles (such as company analyses) on its website. All website content was generated by BIZ's online editorial office, and was offered free of charge. For advertisers, BIZ offered static advertising formats (e.g., online banners), either separately or combined with print advertising space. The targeted customers were middle- and upper-class business people seeking thoroughly researched, high-quality busi-

ness content. Consequently, BIZ targeted advertisers selling products and services that match with the preferences of the targeted readers, e.g., luxury goods and private wealth management services.

Architecture: In 2010, core resources of BIZ's online BM included the editorial office staffed with highly skilled business journalists as well as the brand that the BIZ website 'inherited' from the print magazine. The latter implies that BIZ's online offerings also had a reputation for high-quality, investigative business journalism. The managing director highlighted the importance of the (offline) brand for BIZ's online BM:

"The brand [BIZ] is a gift for both the print and the online advertising market because it justifies higher advertising prices and because everyone immediately understands that it addresses a premium target group..."
(Managing director)²

At this point in time, the online editorial office was part of an affiliate company whose management, along with BIZ management, were jointly responsible for BIZ's online BM. Key activities in the online BM related to data and information sourcing as well as online content creation and publication. On average, each online editor published one content item (business news/article) per day on the website.

Network: Back in 2010, the most important external partners within BIZ's online network were news agencies and freelance editors. Furthermore, BIZ outsourced most back-office activities, such as human resources management, sales of advertising space, and IT services (e.g., hosting and maintenance of the website editorial system) to external service providers. In contrast, all editorial activities were carried out by BIZ's online editorial office.

Finance: BIZ's online BM was mainly based on a single-revenue source, namely, selling advertising space to business customers. Additional revenues from selling proprietary content to other news websites were only marginal. In 2010, personnel expenses for the online editorial staff clearly dominate the cost structure of BIZ's online BM. As the advertising revenues did not cover the incurred cost, BIZ's online BM had to be cross-subsidized by the print BM.

2 All interview quotes were translated from German to English.

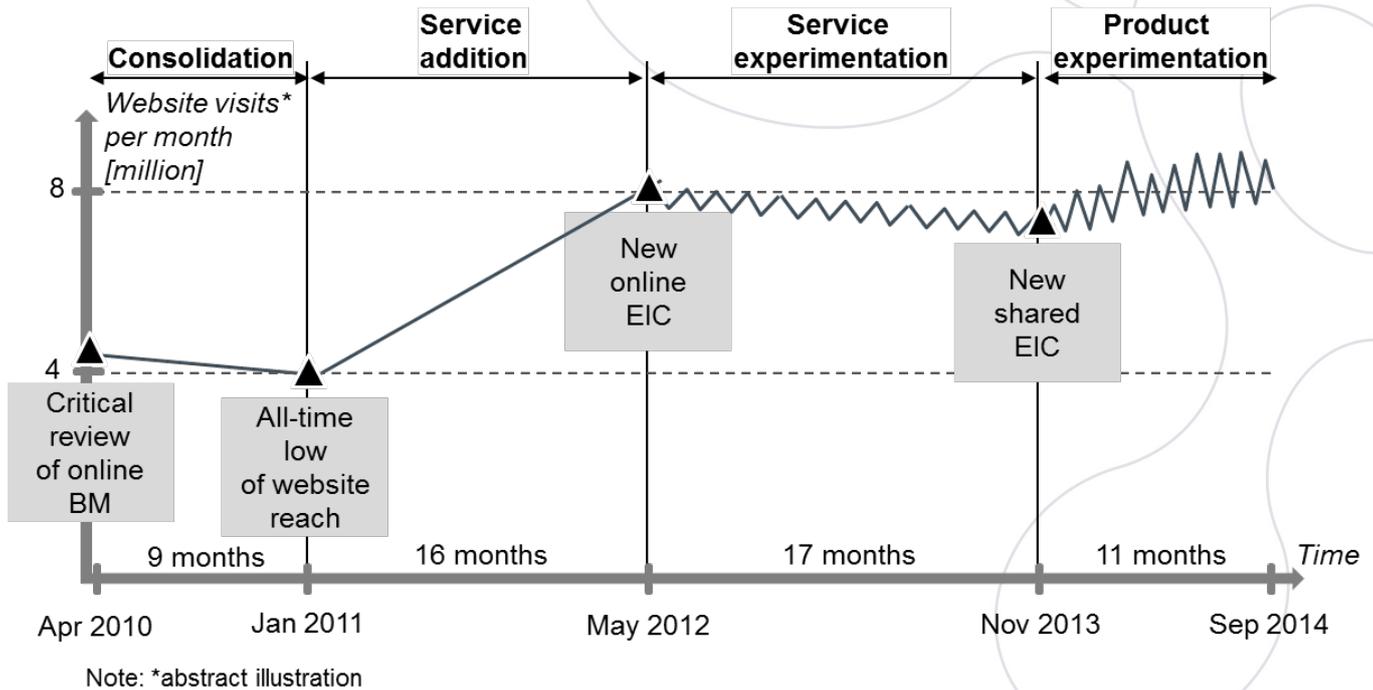


Fig. 4 Phases of BIZ's online BM transformation (and development of website reach)

Transformation and value sources of BIZ's online business model

Below we map critical events onto the development of the website reach. The transformation of BIZ's online BM can be divided into four phases, namely consolidation, service addition, service experimentation, and product experimentation (see Fig. 4).

In the following, we present a phase-by-phase account of the critical events that triggered the different BM transformation phases (see Fig. 4 for an overview), the implemented BM changes, and the resulting value sources that unfolded during the respective phases.

Consolidation phase

Since its installation in the late 1990s, BIZ's online editorial office had steadily grown to 22 editors by 2010, whereas the online reach of BIZ's website had started to decline steadily since 2008. Adding to this, in 2010, the churn rate of BIZ's print magazine reached a historical high of almost 12%, which restricted BIZ's financial ability to cross-subsidize the online BM. Given the unfavorable cost structure of the online BM and the reduced 'appetite' to subsidize this BM, BIZ manage-

ment conducted a critical review of its online strategy in April 2010, which triggered the subsequent consolidation phase. The BM changes implemented in this phase concerned the architecture and finance dimensions of BIZ's online BM, and were primarily targeted towards increasing the efficiency of BIZ's online operations.

First, BIZ's online editorial office was carved out from an affiliate company, where it had been pooled together with other online editorial offices of the publishing group. It was transferred into a separate legal entity and formally assigned to BIZ. As a consequence, BIZ management gained a clearer understanding of the cost and revenue structures of its online BM, thereby improving financial transparency (efficiency), and was able to exercise direct control over its online editorial office (efficiency). The revised company structure also enabled BIZ to strengthen the collaboration between its online and print editorial offices by providing online editors easier access to the editorial resources of the print magazine (complementarities). For example, online editors benefitted from the business and editorial knowledge as well as the informant networks of their print colleagues. The managing director and the print EIC of BIZ commented on the closer organizational in-

tegration between the online and offline BMs, thereby also highlighting the importance of considering the transformation of the online BM from a top-down perspective as well as from a bottom-up perspective:

"...we came to the conclusion that we have to consider the [digital] transformation from an overall company perspective and that we cannot operate [our offline and online businesses] completely separately."

(Managing director)

"[From now on, our] print and online editorial offices will operate in close alignment and answer our claim of 'first-hand business journalism' on all channels."

(Print EIC)³

Moreover, the reorganization of BIZ's company structure was accompanied by a cost-cutting initiative. Here, BIZ decided to lay off more than 30% of its online editors. Despite the reduced headcount, the remaining online editors managed to increase their productivity (efficiency) and limited the decline of website visits to 7% in the same time period.

Service addition phase

A continuing decline in website visits further increased the pressure on BIZ's management to find a viable BM for its online activities and triggered the second transformation phase, referred to as service addition phase. Here, BIZ initiated substantial changes that affected the products & services, network, and finance dimensions of its online BM. These changes primarily resulted in complementarities with partner firms as well as between BIZ's online content and its new online services. They enabled BIZ to double its website visits (see Fig. 4).

In 2011, BIZ entered into a joint venture with an affiliate company for the purpose of launching a career service portal, which included job postings and career-related content such as company, industry, and job portraits. This broadened BIZ's targeted customer group of middle- and upper-class business professionals to younger people with a general interest in business topics (e.g., job seekers). The online EIC highlighted the rationale of this step as follows:

"The idea behind the [career service portal] was to at-

tract people who are at the beginning of their career, who need a pension plan, who earn their first money, who want to buy their first car; who are eventually also the talents looking for a job." (Online EIC)

An affiliate company managed the design and implementation of the career service portal and an external firm with a particular focus on offering (online) career services was contracted for the underlying job database. BIZ and the affiliate supplied the service portal with career-related content:

"...there are a lot of things that we can transfer from our website [to the career portal]; for example, when we report on the top employers, or when we do a salary report." (Managing director)

The service portal was offered for free, but created an additional revenue stream in terms of service-related advertising revenues.

Regarding the value sources that unfolded during the service addition phase, the decision to offer online career services represented a novelty for BIZ. The significant increase in website visits during this phase, however, can be mainly attributed to complementarities enabled by the joint venture. First, BIZ gained access to the affiliate's editorial resources and the two pooled their editorial staff to generate or leverage content for the career portal. Second, BIZ gained access to the customer groups of both the affiliate and job database provider. Third, BIZ observed considerable 'transit' traffic on its website, i.e., website visitors who accessed the BIZ website via the service portal.

Service experimentation phase

Inspired by the positive development of the website reach, a newly hired online EIC started to experiment with additional services, triggering a new transformation phase referred to as the service experimentation phase. The related changes created a need for new capabilities (i.e., competences) and affected the products & services, architecture, and network dimensions of BIZ's online BM. Ultimately, BIZ unfolded new value sources in terms of both complementarities and novelty.

The new online EIC expanded the scope of the joint

³ Extracted from public interview in 2010.

venture with the affiliate company by an online stock information service. Furthermore, he assigned BIZ-internal staff to design and implement three additional online services. Consequently, the in-house development of service concepts became another key activity of BIZ's online BM.

One of these services was an online real estate service (novelty). The real-estate listings were sourced from another external partner firm. Herewith, BIZ not only gained access to complementary data resources, but also created synergies between this new service and the print magazine since print editors used the service data to write articles on the development of the German real-estate market (complementarities).

From a technical perspective, the other two services were more complex and BIZ experienced a series of setbacks during their implementation. After almost one year, BIZ's management finally decided to cancel the implementation of these services:

"...there was this watch service, where we failed to merge different databases. And this was exactly the point: an [online] editor in chief, who does not really have the competences of an IT guy, still tried to manage such a project." (Managing director)

Although BIZ managed to successfully implement and launch at least two new online services (real estate and stock information), these services did not result in the anticipated further growth of the website reach. Given their primary focus on BIZ's original target customer group, these services only seemed to have led to a redistribution of website traffic:

"The final outcome was [that the real estate service] did not result in a significant increase of the overall website reach. [...] The service itself was successful, but the clicks [generated by this service] were missing in other areas." (Managing director)

The failed services led to a conflict regarding the future development of BIZ's online BM: While the management was convinced that the existing core product did not have the potential to achieve a sufficient website reach, the print EIC argued that the online editorial office needed to embrace the core values of the print

magazine (i.e., investigative business journalism). To resolve this conflict, BIZ management replaced the print and online EICs and revised the editorial management structure: A new shared EIC and two Vice-EICs (one for online and one for print) were from now on responsible for BIZ's print and online activities. This change enabled synergies between BIZ's online and offline editorial resources in two ways (complementarities). First, both benefited from the editorial competences and network of the new shared EIC. Second, the new online Vice-EIC worked as print editor for about 20% of his time, thereby fostering the exchange of information between the editorial offices. Consequently, BIZ was able to leverage the complementary activities to its strategic advantage (Porter, 1996). Furthermore, with the new 'protagonists', BIZ also acquired a new organizational mindset towards digital topics (novelty). Ultimately, this led to an increased openness and willingness to experiment with new 'things'.

Product experimentation phase

The fourth transformation phase was characterized by extensive product experimentation, affecting the products & services and architecture dimensions of BIZ's online BM. It resulted in the unfolding of manifold value sources, with novelty being the dominant value source.

To broaden the targeted customer group (novelty), the new shared EIC extended the original scope of the website's core product (i.e., elaborated business articles) by including short articles on more lightweight, entertainment topics (e.g., manager rankings). This change also required new modes of content creation. First, acting as so-called 'trend scouts', online editors began to curate content. That is, they collected content from various sources (e.g., Internet blogs), verified and summarized the content, and added their own opinions or perspectives. Second, BIZ started to syndicate content, which refers to the procurement of complete articles and news items. Third, BIZ invited industry experts to publish short opinion articles on its website. The managing director and the online EIC of BIZ commented on the implemented changes:

"...we changed the 'swing' of the website, which means we changed the product. The product we had in the past was a product that consisted almost entirely of propri-

etary content [...], e.g., company analyses with an unfavorable cost-benefit ratio. We could not continue to operate like this, given that we wanted to become profitable.” (Managing director)

“...we wanted to become more trend-oriented and also more international, so we have to accept that we cannot oversee everything – this is simply not possible, this is too big. However, we can identify other persons [...] or other media.” (Online EIC)

With these change in place, the daily output per editor doubled (efficiency) since the new content formats (novelty) could be produced much faster than the proprietary ones. In addition, the online staff developed new editorial competences (novelty) to produce the new formats. Also, print editors used some trends identified by online editors as input for elaborated articles in the magazine (complementarities).

To strengthen the online marketing of its content and services, BIZ hired a social media expert (Facebook, Twitter) and a search engine optimization (SEO) consultant. The latter, for example, trained online editors on how to formulate headlines so that they are easily retrievable by search engines. Through this, BIZ acquired/developed new content marketing and IT capabilities (novelty). Furthermore, BIZ enriched its website, enabling readers to interact with online editors and to participate in discussions of articles and news with other readers (lock-in). The growing social media presence created new incentives for other readers to

participate in BIZ’s social media channels, leading to positive network externalities (lock-in).

For advertisers, BIZ offered new advertising formats (novelty) such as multi-media and native advertising. Being generated by the website’s editorial content system and therefore resembling the regular editorial content, the key advantage of native advertising is that it is not detected by advertising blocker software.

Finally, BIZ implemented a website control system for evaluating the content reach as well as the reading behaviors of online readers. A key feature was the so-called “A/B testing” functionality used for testing two alternative article and news headlines (A and B) and then selecting the headline that ‘clicked better’. Another key system feature was a control panel, which automatically rearranged the order of the articles and news items on BIZ’s website based on their popularity. The website control system provided an unprecedented amount and quality of real-time data on customer behaviors and content performance (novelty). Consequently, the responsiveness of BIZ’s online editorial office increased as they were now able to react on website traffic dips in real-time (efficiency). In addition, the real-time data helped BIZ to better forecast the traffic on its website and to steer its online advertising sales in accordance with expected traffic highs and lows.

Summary

The results of our longitudinal case study show that BIZ substantially transformed its online BM during the

Table 1 Implemented BM changes and unfolding value sources by transformation phase

| Phase | Consolidation | Service addition | Service experimentation | Product experimentation |
|---------------------|------------------------------|--|---|---|
| Trigger | Critical review of online BM | All-time low of website reach | New online EIC | New shared EIC |
| Products & services | | <ul style="list-style-type: none"> • Introduction of career service • Broadening of customer group | <ul style="list-style-type: none"> • Introduction of additional services (real estate and stock information) | <ul style="list-style-type: none"> • Extension of core product • Further broadening of customer group • Additional advertising products (e.g., native advertising) |

| | | | | |
|--------------|--|--|--|--|
| Architecture | <ul style="list-style-type: none"> • Spin-off of online editorial office in separate legal unit and assignment to BIZ | | <ul style="list-style-type: none"> • Development of service concepts • Replacement of print and online EICs and addition of shared EIC | <ul style="list-style-type: none"> • Syndication and curation of online content • Hiring of social media expert and SEO consultant • Implementation of website control system |
| Network | | <ul style="list-style-type: none"> • Setup of joint venture with affiliate company | <ul style="list-style-type: none"> • Partnership with external service provider | |
| Finance | <ul style="list-style-type: none"> • Reduction of editorial staff | <ul style="list-style-type: none"> • Addition of service-related advertising revenue stream | | |



| | | | | |
|-------------------------|---|--|---|--|
| Efficiency | <ul style="list-style-type: none"> • Direct control • Improved financial transparency • Increased staff productivity | | | <ul style="list-style-type: none"> • Increased staff productivity • Increased responsiveness |
| Complementarities | <ul style="list-style-type: none"> • Access to print editorial resources | <ul style="list-style-type: none"> • Access to affiliate's editorial resources • Access to partners' customer groups • Synergies between online content and online services ('transit' traffic) | <ul style="list-style-type: none"> • Access to partner firm's data resources • Synergies between online services and print content (real estate data) • Synergies between online and offline editorial resources | <ul style="list-style-type: none"> • Synergies between online and print content (online trend scouting) |
| Novelty | | <ul style="list-style-type: none"> • New service offering | <ul style="list-style-type: none"> • New service offerings • New organizational mindset | <ul style="list-style-type: none"> • New content formats • New customer groups • New editorial, marketing, and IT capabilities • New advertising formats • New real-time data |
| Lock-in | | | | <ul style="list-style-type: none"> • Customer participation • Positive network externalities |
| Dominant value source | Efficiency | Complementarities | Complementarities and novelty | Novelty |
| BIZ website development | Slight decrease | Strong increase | Low volatility | Moderate volatility |

studied time period (April 2010 to September 2014). Table 1 summarizes the changes implemented in the four BM dimensions (RQ1; see first half of the table below) and the unfolding value sources (RQ2; see second half) along the four phases of the online BM transformation process.

Discussion

Based on a longitudinal case study of a major German magazine publisher, BIZ, we aimed to develop a deeper understanding of (1) how different dimensions and elements of an online BM are transformed over time and (2) how value creation sources unfold during this transformation process. In the following, we discuss theoretical implications of our case findings and suggest promising areas for future research. We then highlight practical implications and discuss the limitations of our study.

Theoretical implications & Future research

Regarding our first research question, we find that the transformation of BIZ's online BM can be divided into four phases: *consolidation*, *service addition*, *service experimentation*, and *product experimentation*.

These phases closely resemble the BM transformation phases described in related studies. For example, Kuivalainen et al. (2009) identify three phases (initial steps, rapid growth and crisis, and new growth), which largely match with our phases. In particular, after the consolidation of its online BM (initial steps), BIZ managed to double the number of website visits by expanding its network of partner firms and adding a career service portal to its website (rapid growth). Experimenting with other online services, however, did not yield the expected results leading to the replacement of key managers and the revision of BIZ's management structure (crisis). Not until BIZ started to experiment with the extension of its core products did the number of website visits reach new peaks (new growth). The observed sequence of the BM transformation process suggests that setbacks ("crises") paved the way for more significant BM changes. This is consistent with the results of prior studies (e.g., Kuivalainen et al., 2009;), which suggest that "*a severe crisis can provide a strong impetus [...] to initiate deep enough reflection on the currently prevailing dominant logic and status quo of the business model design*" (Sosna et al., 2010,

p. 397). Furthermore, the transformation process sequence suggests that the BM changes implemented in earlier phases primarily concerned the cost structure, the partner network, and the service offerings, while later changes predominantly affected all elements of the products & services and architecture dimensions.

A key finding of our case study is that BIZ used the transformation process to differentiate its online BM from its traditional print BM. The importance of BM differentiation is also highlighted by prior research. For example, in their multiple-case study of Xerox subsidiaries, Chesbrough and Rosenbloom (2002) show that subsidiaries with a BM that is differentiated from the parent company's BM performed significantly better than other subsidiaries with a similar BM. Relatedly, Kuivalainen et al. (2009) find that a critical success factor of the online BM of a Finnish magazine publisher was that its "*website was established as an independent medium*" (p. 148). However, as our study's results suggest, BM differentiation is by no means limited to the product element of a BM: BIZ's decision to add new content formats also led to online-offline differentiation in terms of key activities (content sourcing vs. creation) and key capabilities (editorial vs. IT capabilities). Against this backdrop, an interesting opportunity for future research could be to develop an instrument for measuring the level of differentiation between online and offline BMs. Such an instrument may help explain the inconclusive results of prior studies as to whether online and offline BMs complement (e.g., Chyi and Huang, 2011) or cannibalize (e.g., Fetscherin and Knolmayer, 2004) each other.

Another key insight gained from our study relates to how BIZ differentiated its online BM from its offline BM. While BIZ's decision to add services to its content offerings (service addition and experimentation phases) represents an extension of the online BM, its decision to experiment with new content and formats (product experimentation phase) is a BM revision (Cavalcante et al., 2011). Interestingly, BIZ experienced more problems with extending its online BM than with revising it (e.g., in the service experimentation phase, technical problems with two additional services prompted BIZ to stop the implementation of these services). This observation stands in marked contrast to the results of Cavalcante et al. (2011), who argue that BM revision

is *“likely to involve significantly more challenges than business model extension, because it requires more fundamental changes.”* (p. 1333). A potential explanation for these contradictory findings relates to BIZ’s transformation sequence of its online BM: At first, BIZ was reluctant to revise its core product. Rather, it focused on making this product more attractive by adding complementary services. Later, BIZ started to think about major changes but this was not before experiencing problems in implementing additional services, which ultimately led to the replacement of the print and online EICs and the addition of the new shared EIC. This pattern of resistance to BM change is in line with earlier research, which finds that companies tend to adhere to organizational routines (Teece et al., 1997) and ways of thinking (Johnson et al., 2008), and that innovation barriers lie in prevailing business values (Chesbrough, 2010; Christensen and Overdorf, 2000). Furthermore, despite the challenges that BIZ experienced in the service experimentation phase, our case data shows that the addition of the career service portal was the BM change with the greatest impact on BIZ’s online performance, helping BIZ double the number of website visits in only 16 months (Fig. 4). This finding calls for future research on the characteristics that qualify a service for a given online BM as well as on the conditions under which a company should develop complementary online services in-house or involve an external partner.

Turning to our second research question, we find that, during the transformation process, BIZ’s online BM changed from an efficiency- to a complementarity- to a novelty-based model. This finding challenges the results of existing studies, which use Amit and Zott’s (2001) value-sources framework to classify the BMs (Bornemann, 2009; Johansson and Abrahamsson, 2014; Zott and Amit, 2010). More specifically, the results of our study show that this classification approach neglects BM dynamics, and is therefore only applicable for ‘static’ BM comparisons (at a particular point in time). Consequently, future research is needed to develop BM classification frameworks that better take into account the dynamic nature of BMs.

Our case results further suggest that the aforementioned dynamics in terms of value-source focus also entailed a shift from short-term considerations (e.g.,

cost-cutting and profitability) to more long-term considerations (e.g., new capabilities). In other words, the transformation of BIZ’s online BM resulted in a need for, and the development of, new editorial, marketing, and IT capabilities, which helped BIZ prepare for its ‘digital future’. This shift in focus can be explained from a knowledge-based view of the firm. For instance, Kogut and Zander (1992) highlight that *“too strong reliance on current profitability can deflect from the wider development of capabilities”* (p. 393) and that new capabilities may serve as *“platforms into new markets”* (p. 395). Our findings also relate to Tushman and Anderson’s (1986) distinction between competence-enhancing and competence-destroying technological shifts. The latter requires the development of new capabilities, which is what BIZ ended up doing when transforming its online BM. The capabilities required for the online BM were fundamentally different from those required for the print BM, and it took BIZ almost four phases to realize this. A potential explanation may be that BIZ is a leader in its industry and it hoped to exploit its offline capabilities to gain competitive advantage in the online space.

Relatedly, Markides (2013) proposes that *“managing two different and conflicting business models simultaneously can be framed as an ambidexterity challenge”* (p. 313). Hence, we argue that BIZ became more ambidextrous by developing new editorial, marketing, and IT capabilities and by differentiating the online from the offline BM. In this regard, future research could explore the conditions that favor different types of organizational ambidexterity (i.e., spatial, temporal, and contextual) as well as the organizational benefits and challenges associated with each type (Markides, 2013). For example, Gilbert (2006) finds that structural separation (i.e., spatial ambidexterity) decreases the need to integrate the online and offline BMs on the sub-unit level; but, at the same time, increases the need to manage inconsistencies across the BMs on the senior management level. This is consistent with the results of our case study, which point to the importance of considering online BM transformation from both a bottom-up and a top-down perspective. Against this backdrop, future research could also look into the level of online-offline BM integration as well as the integration capabilities and mechanisms that need to be in place to exploit synergies between the online and offline BMs (Markides, 2013; Porter, 1996). Such research

may, for example, draw on the critical role of the “*business architect*” (Hendrickx, 2015) to develop a deeper understanding of the critical capabilities required to compete with dual BMs.

Practical implications

The results of our case study provide valuable implications for companies, especially publishing companies that are currently transforming their online BM. First, for companies that consider adding complementary services to their online product offerings, our findings highlight the need to carefully select the ‘right’ services and partners since the introduction of additional services may require specific capabilities often not available in incumbent firms. For example, BIZ management had to stop the development of more sophisticated online services due to a lack of internal IT capabilities.

Second, our case results indicate that high-quality website content does not necessarily require exclusive reliance on proprietary, research-intensive content. For example, by involving external partners in content creation (e.g., industry experts for opinion articles) and relying on new modes of content creation, BIZ reduced its level of vertical integration without cutting back on the desired level of quality or harming the strong print brand. In addition, leveraging the resources of partner firms facilitated the introduction of new online services, which, in turn, also served the offline BM.

Third, the findings from our case study support the results of earlier studies, which find that focusing on immediate revenues and profitability is too shortsighted and may, in the worst case, jeopardize the company’s long-term survival. Thus, when transforming their online BM, incumbent firms need to make a careful trade-off between ensuring short-term cash inflows by leveraging existing offline capabilities and ensuring long-term competitiveness by developing new online capabilities (Lee and Baskerville, 2003). A particularly effective way to expand a company’s capability base seems to be the engagement in experimentation and trial-and-error learning processes as well as the involvement of consultants to facilitate the former.

Fourth, our case findings provide insight on how to compete with dual BMs. Specifically, our findings point to the importance of differentiating an incumbent firm’s

online BM from its traditional offline BM. BM differentiation not only helped BIZ increase the attractiveness of its website but also helped mitigate the risk of cannibalization effects between its ‘free’ website and its print magazine (e.g., Fetscherin and Knolmayer, 2004; Simon and Kadiyali, 2007). In line with prior research results (e.g., Christensen and Overdorf, 2000; Koen et al., 2011; Markides and Charitou, 2004), we found that online BMs require their own ‘playground’ in terms of organizational decision-making and values.

Limitations

Our case study results should be interpreted with the following limitations in mind. First, they are based on a single-case study in a specific industry, the magazine publishing industry. To address the problem of results generalizability, we followed established guidelines on conducting single-case study research (Yin, 2014). In particular, our study sheds new empirical light on existing theoretical concepts (Al-Debei and Avison, 2010; Amit and Zott, 2001) for the purpose of analytical generalization as opposed to statistical generalization. Our study also provides a ‘thick’ description of the case context, which allows other researchers to assess to what extent our results can be translated to other company and industry contexts. Second, the four identified online BM transformation phases served primarily as a means for structuring the transformation process of BIZ’s online BM, enabling us to study how value sources unfolded during this process. In contrast, although the four phases resemble the BM transformation phases identified in other studies (e.g., Kuivalainen et al., 2009), the goal of our study was not to develop a process theory that applies to all online BM transformations. For instance, related research indicates that some online BMs take off very slowly but then grow very quickly without consolidation during the first phase. Third, drawing on Amit and Zott’s (2001) seminal article on value creation in online businesses, our case study focuses on sources of value creation (i.e., value creation drivers or potentials). In particular, we studied what and how value sources unfolded from the online BM changes implemented by BIZ. In contrast, the actual value (in terms of profitability, etc.) resulting from the identified value sources was not the focus of our study. Nevertheless, consistent with the knowledge-based view of the firm, some of the identified value sources (e.g., new capabilities) can be regarded

as actual value themselves. Fourth, to investigate how value sources unfolded during the BM transformation process, we assigned new value sources to the transformation phase in which they emerged. Using this approach, we do not know to what extent value sources that unfolded in earlier transformation phases transfer to later phases. A promising area for future research is to study whether and how value sources transfer across BM transformation phases, as well as how companies can sustain value sources once they are established.

Conclusions

Based on a longitudinal case study, we show how a leading German business magazine publisher transformed and differentiated its online BM from its traditional offline BM, and how different value sources unfolded during the transformation process. The study's main contributions are threefold:

First, earlier BM research tends to focus on single BM dimensions or elements (Al-Debei and Avison, 2010). Taking into account the multidimensionality of the BM concept, our study provides a refined understanding of how a company transforms the different building blocks of its online BM over time. A major conclusion of our study is that earlier transformation phases tend to focus on single BM elements (e.g., cost structure, partner network, and service offerings), while later changes predominantly affected all elements of the products & services and architecture dimensions. On a related

note, the results of our study also point to the important distinction between service and product differentiation, and the greater impact of the former on online BM performance.

Second, prior research typically studies the direct link between BM transformation and value creation on an aggregated level (e.g., Heij et al., 2014; Schief, 2013), thereby neglecting the actual sources of value creation. By addressing this research gap, our study contributes to a deeper understanding of how different BM changes relate to distinct value sources.

Third, most existing studies focus on rather static aspects of BM transformation and value creation. In contrast, our study applies a dynamic perspective and shows how BM transformation phases vary in terms of their dominant sources of value creation. Taken together, we believe that our results can inform future research on the ongoing transformation of online BMs in the (magazine) publishing industry as well as in other industries, such as the entertainment, media, retail and software industries, where companies face challenges akin to those in the publishing industry.

References

- Al-Debei, M. M. and Avison, D. (2010), Developing a unified framework of the business model concept, *European Journal of Information Systems*, Vol. 19, No. 3, pp. 359-376.
- Amit, R. and Zott, C. (2001), Value creation in e-business, *Strategic Management Journal*, Vol. 22, No. 6/7, pp. 493-520.
- Amit, R. and Zott, C. (2012), Creating value through business model innovation, *MIT Sloan Management Review*, Vol. 53, No. 3, pp. 41-49.
- Aspara, J., Hietanen, J. and Tikkanena, H. (2010), Business model innovation vs replication: Financial performance implications of strategic emphases, *Journal of Strategic Marketing*, Vol. 18, No. 1, pp. 39-56.
- Bakos, J. Y. and Treacy, M. E. (1986), Information technology and corporate strategy: A research perspective, *MIS Quarterly*, Vol. 10, No. 2, pp. 107-119.
- Barney, J. (1991), Firm resources and sustained competitive advantage, *Journal of Management*, Vol. 17, No. 1, pp. 99-120.

- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A. and Venkatraman, N. (2013), Digital business strategy: Toward a next generation of insights, *MIS Quarterly, Special Issue Digital Business Strategy*, Vol. 37, No. 2, pp. 471-482.
- Bornemann, M. (2009), "Performance implications of the business model and the moderating effects of the environment", in *Academy of Management Proceedings*, pp. 1-6.
- Casadesus-Masanell, R. and Ricart, J. E. (2011), How to design a winning business model, *Harvard Business Review*, Vol. 89, No. 1/2, pp. 100-107.
- Cavalcante, S., Kesting, P. and Ulhøi, J. (2011), Business model dynamics and innovation: (Re)establishing the missing linkages, *Management Decision*, Vol. 49, No. 8, pp. 1327-1342.
- Chan-Olmsted, S. M. and Ha, L. S. (2003), Internet business models for broadcasters: How television stations perceive and integrate the Internet, *Journal of Broadcasting & Electronic Media* Vol. 47, No. 4, pp. 597-616.
- Chesbrough, H. (2010), Business model innovation: Opportunities and barriers, *Long Range Planning*, Vol. 43, No. 2/3, pp. 354-363.
- Chesbrough, H. and Rosenbloom, R. S. (2002), The role of business model in capturing value from innovation: Evidence from Xerox corporation's technology spin off companies, *Industrial and Corporate Change*, Vol. 11, No. 3, pp. 529-555.
- Christensen, C. M. and Overdorf, M. (2000), Meeting the challenge of disruptive change, *Harvard Business Review*, Vol. 78, No. 2, pp. 66-76.
- Chyi, H. I. (2005), Willingness to pay for online news: An empirical study on the viability of the subscription model, *Journal of Media Economics*, Vol. 18, No. 2, pp. 131-142.
- Chyi, H. I. and Huang, J. S. (2011), Demystifying the demand relationship between online and print products under one newspaper brand: The case of Taiwan and the emergence of a universal pattern, *Asian Journal of Communication*, Vol. 21, No. 3, pp. 243-261.
- Daniel, E. M. and Wilson, H. N. (2003), The role of dynamic capabilities in e-business transformation, *European Journal of Information Systems*, Vol. 12, No. 4, 282-296.
- Demil, B. and Lecocq, X. (2010), Business model evolution: In search of dynamic consistency, *Long Range Planning*, Vol. 42, No. 2/3, pp. 227-246.
- Eisenhardt, K. M. (1989), Building theories from case study research, *The Academy of Management Review*, Vol. 14, No. 4, pp. 532-550.
- Fetscherin, M. and Knolmayer, G. (2004), Business models for content delivery: An empirical analysis of the newspaper and magazine industry, *The International Journal on Media Management*, Vol. 6, No. 1/2, pp. 4-11.
- Fielt, E. (2013), Conceptualising business models: Definitions, frameworks and classifications, *Journal of Business Models*, Vol. 1, No. 1, pp. 85-105.
- Gallaugh, J. M., Auger, P. and BarNir, A. (2001), Revenue streams and digital content providers: An empirical investigation, *Information & Management*, Vol. 38, No. 7, 473-485.
- Gebauer, J. and Ginsburg, M. (2010), The US wine industry and the Internet: An analysis of success factors for online business models, *Electronic Markets*, Vol. 13, No. 1, pp. 59-66.
- Gibbs, G. (2010), *Analyzing qualitative data*, Sage, London.
- Giessmann, A. and Stanoevska-Slabeva, K. (2012), Business models of platform as a service (PAAS) providers: Current state and future directions, *Journal of Information Technology Theory and Application*, Vol. 13, No. 4, pp. 31-55.
- Gilbert, C. G. (2006), Change in the presence of residual fit: Can competing frames coexist?, *Organization Science*, Vol. 17, No. 1, pp. 150-167.
- Gregor, S., Martin, M., Fernandez, W., Stern, S. and Vitale, M. (2006), The transformational dimension in the realization of business value from information technology, *The Journal of Strategic Information Systems*, Vol. 15, No. 3, pp. 249-270.
- Günzel, F. and Holm, A. B. (2013), One size does not fit all - understanding the front-end and back-end of business model innovation, *International Journal of Innovation Management*, Vol. 17, No. 1, pp. 1-35.
- Hedman, J. and Kalling, T. (2003), The business model concept: Theoretical underpinnings and empirical illustrations, *European Journal of Information Systems*, Vol. 12, No. 1, pp. 49-59.

Heij, C. V., Volberda, H. W. and Van den Bosch, F. A. J. (2014), "How does business model innovation influence firm performance: The effect of environmental dynamism", in Humphreys, J. (Ed.), 74th Annual Meeting of the Academy of Management, pp. 1502-1507.

Hendrickx, H. H. M. (2015), Business architect: A critical role in enterprise transformation, *Journal of Enterprise Transformation*, Vol. 5, No. 1, pp. 1-29.

Holsti, O. R. (1969), *Content analysis for the social sciences and humanities*, Addison-Wesley Reading, MA.

Huber, G. P. and Power, D. J. (1985), Retrospective reports of strategic-level managers: Guidelines for increasing their accuracy, *Strategic Management Journal*, Vol. 6, No. 2, pp. 171-180.

IVW (2014), "Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern e.V.", available at: www.iww.de (accessed 30 November 2014).

Jarren, O., Künzler, M. and Puppis, M. (2012), Medienwandel oder Medienkrise?, in Jarren, O., Künzler, M. & Puppis, M. (Eds.), *Medienwandel oder Medienkrise? Folgen für Medienstrukturen und ihre Erforschung*, Nomos, Baden-Baden, pp. 11-24.

Johansson, M. and Abrahamsson, J. T. (2014), Competing with the use of business model innovation - an exploratory case study of the journey of born global firms, *Journal of Business Models*, Vol. 2, No. 1, pp. 33-55.

Johnson, M. W., Christensen, C. C. and Kagermann, H. (2008), Reinventing your business model, *Harvard Business Review*, Vol. 86, No. 12, pp. 50-59.

Khanagha, S., Volberda, H. and Oshri, I. (2014), Business model renewal and ambidexterity: Structural alteration and strategy formation process during transition to a cloud business model, *R&D Management*, Vol. 44, No. 3, pp. 322-340.

Koen, P. A., Bertels, H. M. J. and Elsum, I. R. (2011), Three faces of business model innovation: Challenges for established firms, *Research Technology Management*, Vol. 54, No. 3, pp. 52-59.

Kogut, B. and Zander, U. (1992), Knowledge of the firm, combinative capabilities, and the replication of technology, *Organization Science*, Vol. 3, No. 3, pp. 383-397.

Krüger, C., Swatman, P. and Beek, K. v. d. (2004), "New and emerging business models for online news: A survey of 10 European countries", in *Proceedings of the 17th International Bled Electronic Commerce Conference (BLED)*, Slovenia, pp. 1-16.

Kuivalainen, O., Ellonen, H.-K. and Sainio, L.-M. (2009), Complementary role of website in business model development, in Lee, I. (Ed.),

Emergent strategies for e-business processes, services, and implications: Advancing corporate frameworks, Information Science Reference, Hershey, pp. 136-154.

Langley, A. (1999), Strategies for theorizing from process data, *The Academy of Management Review*, Vol. 24, No. 4, pp. 691-710.

Lee, A. S. and Baskerville, R. L. (2003), Generalizing generalizability in information systems research, *Information Systems Research*, Vol. 14, No. 3, pp. 221-243.

Liu, Z. (2005), Reading behavior in the digital environment: Changes in reading behavior over the past ten years, *Journal of Documentation*, Vol. 61, No. 6, pp. 700-712.

Markides, C. and Charitou, C. D. (2004), Competing with dual business models: A contingency approach, *The Academy of Management Executive*, Vol. 18, No. 3, pp. 22-36.

Markides, C. C. (2013), Business model innovation: What can the ambidexterity literature teach us?, *Academy of Management Perspectives*, Vol. 27, No. 4, pp. 313-323.

Mottweiler, H., Tünste, M. and Kulenović, D. (2013), Von "Kutschen" zu "Autos": Die Verlagsindustrie im digitalen Wandel, in Hafkesbrink, J. and Shire, K. (Eds.), *Flexibilität und Stabilität in der Verlags- und Medienbranche: Konzepte beidhändiger Unternehmensstrategien*, Eul, Lohmar, pp. 3-22.

Myers, M. D. and Newman, M. (2007), The qualitative interview in is research: Examining the craft, *Information and Organization*, Vol. 17, No. 1, pp. 2-26.

Neuendorf, K. A. (2002), *The content analysis guidebook*, SAGE, Thousand Oaks, CA.

- Osterwalder, A., Pigneur, Y. and Tucci, C. L. (2005), Clarifying business models: Origins, present, and future of the concept, *Communications of the ACM*, Vol. 16, 1-25.
- Porter, M. E. (1985), *Competitive advantage: Creating and sustaining superior performance*, Free Press, New York, NY.
- Porter, M. E. (1996), What is strategy?, *Harvard Business Review*, Vol. 74, No. 6, pp. 61-78.
- Rayport, J. F. and Sviokla, J. J. (1995), Exploiting the virtual value chain, *Harvard Business Review*, Vol. 73, No. 6, pp. 75-85.
- Rindova, V. P. and Kotha, S. (2001), Continuous "morphing": Competing through dynamic capabilities, form, and function, *Academy of Management Science*, Vol. 44, No. 6, pp. 1263-1280.
- Schief, M. (2013), "Software business model determinants of performance - insights from Germany", in *Proceedings of the 21st European Conference on Information Systems (ECIS) in Utrecht, Netherlands*, pp. 1-12.
- Silva, D. S. (2011), The future of digital magazine publishing, *Information Services & Use*, Vol. 31, No. 3/4, 66-76.
- Simon, D. H. and Kadiyali, V. (2007), The effect of a magazine's free digital content on its print circulation: Cannibalization or complementarity?, *Information Economics and Policy*, Vol. 19, No. 3/4, pp. 344-361.
- Sosna, M., Treviño-Rodríguez, R. N. and Velamuri, S. R. (2010), Business model innovation through trial-and-error learning: The Naturhouse case, *Long Range Planning*, Vol. 43, No. 2/3, pp. 383-407.
- Statista (2014), "Entwicklung der Bruttowerbespendings in den einzelnen Mediengattungen in Deutschland von Januar bis Oktober 2014 (gegenüber dem Vorjahr)", available at: <http://de.statista.com/statistik/daten/studie/160579/umfrage/bruttowerbespendings-in-den-mediengattungen-gegenueber-vorjahr/> (accessed 21 November 2014).
- Sumner, D. E. (2010), *The magazine century: American magazines since 1900*, 9, Peter Lang Publishing, New York, NY.
- Swatman, P. M. C., Krueger, C. and van der Beek, K. (2006), The changing digital content landscape: An evaluation of e-business model development in European online news and music, *Internet Research*, Vol. 16, No. 1, pp. 53-80.
- Teece, D. J. (2010), Business models, business strategy and innovation, *Long Range Planning*, Vol. 43, No. 2/3, pp. 172-194.
- Teece, D. J., Pisano, G. and Shuen, A. (1997), Dynamic capabilities and strategic management, *Strategic Management Journal*, Vol. 18, No. 7, pp. 509-533.
- Tushman, M. L. and Anderson, P. (1986), Technological discontinuities and organizational environments, *Administrative Science Quarterly*, Vol. 31, No. 3, pp. 439-465.
- Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., Leimeister, J. M., Loos, P. and Spann, M. (2014), Geschäftsmodelle: Eine Forschungsagenda für die Wirtschaftsinformatik, *Wirtschaftsinformatik*, Vol. 56, No. 1, pp. 55-64.
- Weill, P. and Woerner, S. L. (2013), Optimizing your digital business model, *MIT Sloan Management Review*, Vol. 54, No. 3, pp. 71-78.
- Wellbrock, C.-M. and Schnittka, O. (2014), Does it really hurt? Consumer reactions to content sponsorships in daily newspapers, *Journal of Business Economics*, Vol. 85, No. 2, pp. 1-22.
- Wikström, P. and Ellonen, H.-K. (2012), The impact of social media features on print media firms' online business models, *Journal of Media Business Studies*, Vol. 9, No. 3, pp. 63-80.
- Wirtz, B. W., Schilke, O. and Ullrich, S. (2010), Strategic development of business models implications of the web 2.0 for creation value on the Internet, *Long Range Planning*, Vol. 43, No. 2/3, pp. 272-290.
- Yin, R. K. (2014), *Case study research design and methods*, Sage, Los Angeles, CA.
- Zott, C. and Amit, R. (2010), Business model design: An activity system perspective, *Long Range Planning*, Vol. 43, No. 2/3, pp. 216-226.
- Zott, C., Amit, R. and Massa, L. (2011), The business model: Recent developments and future research, *Journal of Management*, Vol. 37, No. 4, pp. 1019-1042.

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Toward Ecosystemic Business Models in the Context of Industrial Internet

Marika Miriam Iivari¹, Petri Ahokangas², Marjaana Komi³, Maarit Tihinen⁴, Kristiina Valtanen⁵

Abstract

Purpose: This study explores business models within a particular domain of Industrial Internet.

Design/Methodology/Approach: Building from theory, this study is conceptual in nature.

Findings: This paper presents a business model framework for understanding the dynamics of value co-creation and co-capture from lifecycle and ecosystem configuration point of view.

Research limitations/implications: This study stresses the need to understand how the integrated, co-dependent processes of value co-creation and co-capture influence on business models of individual firms in co-evolving business ecosystems.

Practical implications: To fully benefit from the mutually connected opportunities enabled by IoT, it is important for firms to position themselves within the ecosystem in terms of the stage of product or service life cycle as well as the scale and scope of ecosystem configuration.

Originality/value: The originality of this research thus relates to expanding the business model literature from ecosystemic perspective.

Keywords: Ecosystem, Industrial Internet, Internet of Things, value co-creation, value co-capture

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Introduction

The rapid development and increasing pervasiveness of digital technologies (Turber et al., 2015) has exposed modern companies to highly dynamic, interconnected business environment. A rising trend in today's economy is digital technology being increasingly intertwined with non-digital products (Turber and Smiela, 2014). This trend is often referred to as the "Internet of Things", coined by Kevin Ashton in 1999 (Atzori et al., 2010; Gubbi et al., 2013) or "Industrial Internet" (Kantola et al., 2015; Fitzgerald, 2015; Muhonen et al., 2015). The concept of Industrial Internet can be understood as an application or business domain under the Internet of Things (Dahlberg et al., 2015; Muhonen et al., 2015). Therefore we refer to these terms interchangeably. The Internet of Things (IoT) is considered as the common paradigm of modern information and communications technology (ICT) field (Atzori et al., 2010), following the chain of personal computers, World Wide Web and mobile phones. To human-computer interaction, IoT adds the third dimension of physical objects. The IoT can therefore be defined as the network of physical objects, consumer devices and enterprise assets containing technology to communicate and sense or interact with external environment (LeHong and Velosa, 2014).

Yet, successful IoT implementations are not just the result of technology innovation, but involve the intelligently coordinated innovation of products, services, and business models (Berthelsen, 2015). Business models at a large sense can be considered to determine how an organization creates and captures value (Zott and Amit, 2010; Shafer et al., 2005; Chesbrough, 2010). Although the business model concept has gained notable momentum in academic research over the last decade, they have remained understudied in the context of IoT (Priem et al., 2013; Turber et al., 2015). In the interconnected domain of IoT, alongside the traditional business networks, new actors arise and the role of existing ones is changing. IoT is seen to offer immense potential to virtually all sectors of the economy by enabling innovative applications and services to consumers, companies and public sector alike (Pang et al., 2012; Muhonen et al., 2015). It is particularly important to highlight that "industry" in this respect refers to all fields of business, not only that of manufacturing. Yet, the literature has not provided actionable, field-tested model theories for capturing, visualizing and analyzing

firms' business models in digitally intensive business environments (Turber and Smiela, 2014). This is the first research gap this paper aims to contribute to. In a similar vein to Zott and Amit (2015, 1), we consider a business model to describe the system of interdependent activities that are performed by a focal firm and its partners and the mechanisms, which link these activities to each other. Hence, we view the business model as a boundary-spanning unit of analysis (Zott & Amit 2007).

Furthermore, organizations are also challenged with managing the complexity of business models around digitized products (Turber et al., 2015). To date, the environment for smart applications and their business models has been very complicated, with a lot of experimentation, and many failures (Schaffers et al., 2011). Technology may be there for many, but business application has remained an issue (Glova et al., 2014). Hence, firms fail to create (and capture) value beyond the physical product (Turber et al., 2015). Especially traditional product companies feel increasingly compelled to revise their existing business models in response to new competitive dynamics and to tap into IoT inspired opportunities (Turber et al., 2015; Chesbrough and Appleyard; 2007; Dahlander and Gann, 2010). Yet, the scarce studies on IoT and related business models have focused on technological platforms and single firm's business models (Mazhelis et al., 2013, Lindgren and Aagaard, 2014; Westerlund et al., 2014). These previous firm-centric business models conceptualizations and frameworks are not suitable for analyzing the interdependent nature of growth and success of companies evolving in such an interconnected context (Weiller and Neely, 2013; Westerlund et al., 2014). As a result, the exact relationship between external forces and the business model has remained limitedly explored area (de Reuver et al. 2009, Ahokangas & Myllykoski, 2014). IoT is considered to change the dynamics of value creation and value capture (Hui, 2014). Accordingly, there is a need to shift research focus from enabling technologies to business ecosystems thinking (Westerlund et al., 2014; Dahlberg et al., 2015), and particularly onto value co-creation and co-capture. In this study, these activities refer to joint efforts for synergistic value creation and capture between all stakeholders. This is the second research gap this paper seeks to address. Thus, the purpose of this study is to provide a theoretic-

cally grounded framework for the analysis of IoT business models. The research question of paper calls

how the business model can be used to understand the dynamics of value co-creation and co-capture in IoT ecosystems?

The literature starts with discussing the background of business model concept, moving onto the impact of digitalization and Internet on business models, and further expanding to ecosystemic perspective on business models. Finally, we introduce our research approach and the conceptual business model framework and address its implications for research and practice. We also discuss the limitations of this research and propose future research directions.

Business Models and the Internet

The Origins of the Business Model Concept

The business model concept became hype with the rise of electronic commerce in the 1990s (Timmers, 1998; Onetti et al., 2012; Teece, 2010; Amit and Zott, 2001; Zott et al., 2011) to explain e-business firms' value creation logic and competitive advantage issues (Aho-kangas et al., 2014; Wirtz et al., 2015). Internet-based start-ups in particular used the term to differentiate themselves from the incumbents. Since then, many forums and communities have been established around the topic, and numerous papers published within industrial and academic research during the past decades. Teece (2010, 174) claims that importance of business models is driven by factors such as "the emerging knowledge economy, the growth of the Internet and e-commerce, the outsourcing and offshoring of many business activities, and restructuring of the financial services industry around the world". Also, Veit et al., (2014, 45) emphasize that "the growth of the internet has undoubtedly created greater opportunities for digitized business transactions but this has been accompanied by an intensified competition and an accelerated pace of technological change" making formalized and conceptualized business modelling even more important. Indeed, technological innovation creates the need for business models for bringing discoveries to market and for the opportunity to satisfy unrequited customer needs (Teece, 2010; Glova et al., 2014; Chesbrough, 2010). A business model description is therefore an important starting point for business innova-

tion and transformation (Wirtz et al., 2015), as it can serve as a tool to align technology development and economic value creation (Glova et al., 2014; Chesbrough and Rosenbloom, 2002).

Despite the importance of business models, no unified definitions exist. Researchers have proposed many definitions and concepts in order to describe the essence and purpose of business models (Wirtz et al., 2015). Business models have been depicted, for instance, as an architecture (Timmers, 1998; Osterwalder and Pigneur, 2002), a description (Applegate, 2000; Weill and Vitale, 2001), a narrative (Magretta, 2002), representation (Shafer et al., 2005; Morris et al., 2005), a structural template (Amit and Zott, 2001), a method (Afuah and Tucci, 2001), a recipe (Baden-Fuller and Morgan, 2010) a framework (Afuah, 2004), a pattern (Brousseau and Penard, 2006), a set (Seelos and Mair, 2007) and a model or conceptual tool (Chesbrough, 2003; Osterwalder, 2004; Osterwalder et al., 2005). For instance Osterwalder et al. (2005, 7) define a business model as "a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenues streams". Indeed, common with all different perspectives to business models is that they tend to portray the notion on how firms create and capture value (Zott and Amit, 2010; Shafer et al., 2005; Chesbrough, 2010).

Furthermore, Osterwalder and Pigneur (2002) considered a business model as a link between strategy, business processes, and information systems, where ICT lays the foundations for how business models are built. These main elements of the business model have been illustrated by Pateli (2003), shown in Figure 1.

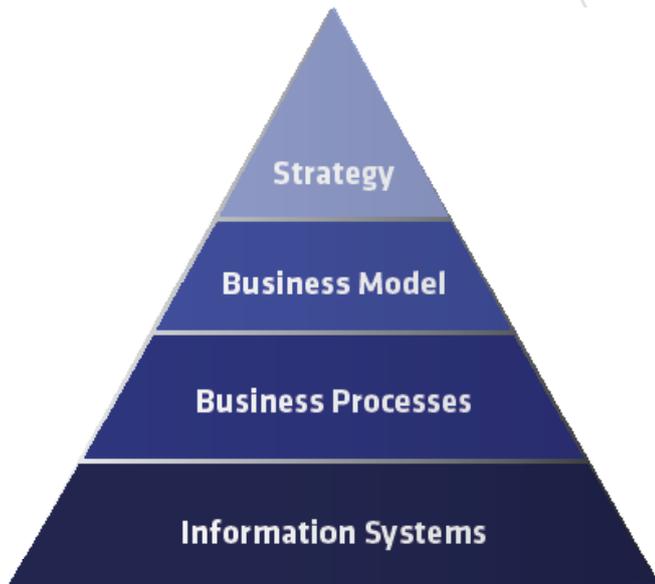


Figure 1. Business model definition framework (adapted from Pateli, 2003)

Business models can create a shared and common understanding of the ICT domain and facilitate communication between people and heterogeneous and widely spread application systems (Osterwalder and Pigneur, 2002). Even if there is a common acknowledgement that effective and efficient business models are a huge valuable asset to business, most businesses find it hard and use tremendous resources to explain and understand their business better (Lindgren and Aagaard, 2014). One explanation for this is that many of modern business model conceptualizations and frameworks are still firm-centric, and thus less suited for analyzing the interdependent nature of the growth and success of companies that are evolving in the same innovation ecosystem (Weiller and Neely, 2013; Westerlund et al., 2014). Originally, the business model concept was considered to nest between network and firm to describe a firm's position within its value network (Amit and Zott, 2001; Hedman and Kalling, 2003; Turber et al., 2015). However, during the course, the focus moved to study business models from the focus of the firm (Magretta, 2002; Casadesus-Masanell and Ricart, 2010; McGrath, 2010).

Hence, this study argues that business model research needs to draw its attention back to a dynamic approach in order to consider various influences on business model viability, business model evolution and the place of business models in the product or service lifecycle

(see also Demil and Lecocq, 2010; Ahokangas et al., 2014). Indeed, a shift is starting to take place from single-firm revenue generation towards multi-firm control and interface issues (Ballon, 2007), which we discuss further in the following parts of this study.

Business Models, Digitalization and the Industrial Internet

Early approaches to business modeling focused on the selection of the most appropriate virtual channels and revenue models within the e-business context (Ballon, 2007; Amit and Zott, 2001; Magretta, 2002). As the Internet boom of the start of the millennia subsided, the attention of business model literature shifted towards the integration of virtual activities into the real-world marketplace. Along with the rise of the mobile telecommunications industry, business models were increasingly connected with shifting firm boundaries, through vertical and horizontal integration within the industry as well as through the complex provision of new services (Ballon, 2007). This vertical and horizontal nature of the IoT is illustrated in the following Figure 2, where within IoT ecosystems, physical objects are seamlessly integrated into the information network through enabling ICT, where physical objects can become active participants in business processes (Haller et al., 2009, 15).

The vertical and horizontal integration within the digitally intensive industries means that business models were also designed to match the nature of integration (Ballon, 2007). Technical products are usually commercialized through vertical business models. Here, firms, e.g. infrastructure and technology providers, believe that competitive advantage rises from focusing on value creation within narrow segments (Ahokangas, 2015). These firms focus on offering a complete solution and thus, all technology and services are provided and controlled by the same company (Quinnell, 2013). Therefore, vertical models are slow to respond to market dynamics. (Quinnell, 2013).

Horizontal models enable fast growth and innovation in the industry, as they allow multiple providers to focus on their respective fields through a common framework (Quinnell, 2013). Horizontal business models aim to capture as much value as possible across different segments. Hence, cost awareness and short-term prof-

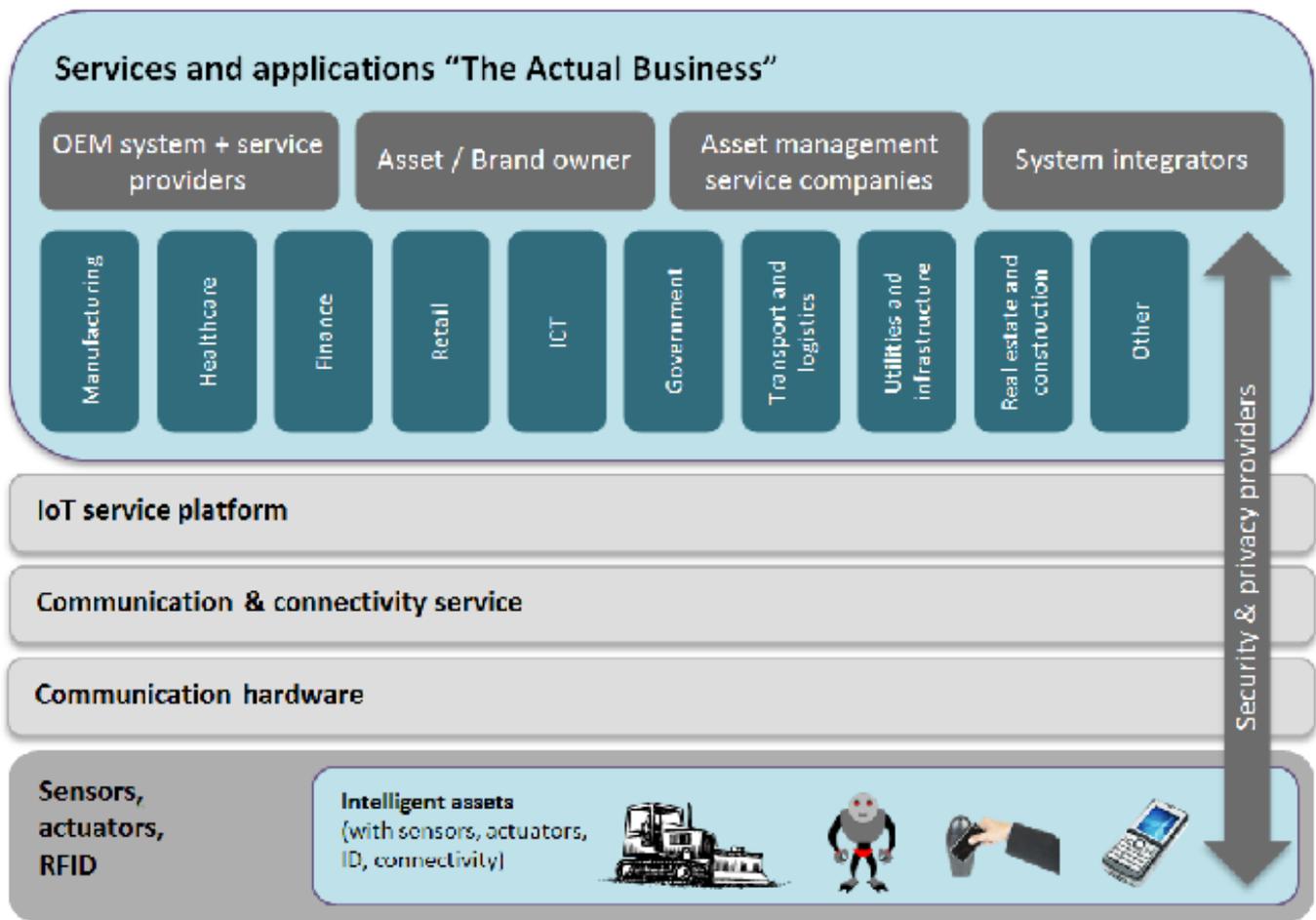


Figure 2. The IoT as a business ecosystem (adapted from Ailisto, 2015)

it potential often guide these firms (Ahokangas, 2015). However, even though horizontal models allow rapid scale-up of applications and businesses, considerable inputs from different parties are required before the system is able to run smoothly (Quinnell, 2013). Therefore, horizontal model is more heavily dependent on supporting infrastructure.

Yet, as digitalization and Industrial Internet progresses, traditional firm-centric business models are facing challenges, as product manufacturers are increasingly in the need of transforming their mode of operation to service providers. Previously independent actors are increasingly connected with each other through both technical and business ties. The introduction of new technologies such as Radiofrequency Identification (RFID), Bluetooth and smart computing has enabled many new application and business propositions in traditional industrial sectors, such as the energy sector, logistics and transport, manufacturing and production, industrial automation, environment, utilities, main-

tenance, health-care and services (Glova et al., 2014; Gubbi et al., 2013; Mazhelis et al., 2013). Connections and communications between physical items, such as sensors, mobile phones and other consumer devices, or even enterprise assets, to the Internet and to each other, make business modelling more challenging but also more valuable. Companies are recognizing the potential for faster decision making, real-time control, service time reduction, process optimization, new business models, enhanced operational efficiency, resource conservation, and the capability to do all of this location-independently, and moreover, globally (VTT Visions 3, 2013; Hui, 2014; Turber and Smiela, 2014; Mazhelis et al., 2013). The entire IoT domain is demanding for new service concepts and business models, as companies need to “fundamentally rethink their orthodoxies about value creation and value capture” (Hui, 2014). This kind of transformation requires a conversion from product to service mindset (Hui, 2014; Dahlberg et al., 2015), as illustrated in the following Table 1.

Table 1. Shifting from product to service mindset (adapted from Hui, 2014)

| | | | |
|----------------|-----------------------------|---|--|
| VALUE CREATION | Needs of customers | Existing needs and lifestyle are solved on reactive basis | Addressing real-time and emerging need in a predictive manner |
| | Offering | A stand alone product expiring over time | Over the air updates for products to enhance or correct features |
| | The role of data | Single point data will be used for future product requirements | The data is combined for creating user experience of existing products, at the same time enabling other services |
| VALUE CAPTURE | Path to profit | The next product or device will be sold | Allows recurring returns (for example monthly based billing) |
| | Control points | Intellectual Property Rights (e.g. patents) and brand | Personalization and context: network effects between products |
| | Development of capabilities | Leveraging the core competences as well as existing processes and resources | To understand how partners within ecosystem are making money |

The literature shows that researchers and practitioners have yet not researched widely on how digitization and the IoT effect on business models (Turber et al., 2015). Furthermore, IoT research from the business ecosystem perspective has been practically nonexistent, because limited research has focused on technological platform perspective and single firms' business models (Mazhelis et al., 2013; Westerlund et al., 2014). However, alongside the traditional business network of buyers, suppliers and makers of product or services, new actors arise and the role of existing ones is changing, which requires new research approaches. Successful firms do not just add value but reinvent it (Normann and Ramirez, 1993, 65). Therefore, the focus needs to shift from enabling technologies to the value-creating system itself (Normann and Ramirez, 1993) through business ecosystems thinking (Westerlund et al., 2014; Dahlberg et al., 2015), and from linear value creation

and capture to boundary-spanning value co-creation and co-capture.

The Ecosystemic Perspective on Business Models

A biological ecosystem can be defined as a community of interacting organisms and their physical environment (Oxford English Dictionary). Drawing from ecosystem analogy, a business ecosystem, as defined by Moore (1993), is an economic community that is supported by a foundation of interacting organizations and individuals – the organisms of the business world (Moore 1996: 15). Moore expanded previous supply chain network theories to include other organizations such as universities, industry associations and other (non-commercial) stakeholders, as well as the interactions between them (Rong et al., 2015). As biological ecosystems, also business ecosystems are characterized by high complexity, interdependence, co-

operation, competition and coevolution (Moore, 1996; Jansson et al., 2015; Lehto et al., 2013). The concept of business ecosystem emphasizes companies' joint utilization of complementary capabilities in pursuit of new innovations (Lehto et al., 2013; Chesbrough et al., 2014; Hirvonen-Kantola et al., 2015).

Successful IoT implementations are not just about technological solutions, but involve also the intelligently coordinated innovation of products, services, and business models (Berthelsen, 2015). In this kind of context, the business model can be viewed as a boundary-spanning unit of analysis (Zott and Amit, 2007, Ahokangas et al. 2014), as the business model shifts the focus of research on how the firm connects with its external environment. The boundary-spanning nature of business models has been acknowledged by some scholars in business model research, as discussed by Zott and Amit (2010). Zott et al., (2011), in their extensive review of the business model literature, state that even though business models are centered on a focal firm, their boundaries are wider, and business models emphasize a system-level activity approach, with also the focal firm's partners playing a role. This refers to the need to consider the activities that are performed for the focal firm but outside its boundaries by partners, suppliers or customers (Zott and Amit, 2010). Hence, the focal firm is able to rely on the resources and capabilities of third parties, and utilize the external ideas and sources of innovation through the open business model concept (see also Chesbrough, Vanhaverbeke and West, 2014).

Messerschmitt and Szyferski (2003) discussed ecosystems in ICT and presented a layered model of the ecosystem stakeholder roles. In the traditional approach, an ecosystem is based on technical infrastructure, a platform, to which other players of the ecosystem integrate (Messerschmitt and Szyferski, 2003). Products, systems and services, as well as user applications are built on this technological foundation. Wirtz et al. (2010) discussed four business models for the Web 2.0 in order to classify Internet-based business models. Each of these business models, illustrated in the following Figure 3, can be offered standalone or bundled. Yrjölä et al. (2015a) organized these models into a layered, ecosystemic model. In this perspective, it can be interpreted that the lower level business models serve as enablers and value levers for the higher layers (Yrjölä et al. 2015a). In an ecosystem, the members evolve symbiotically through simultaneous collaboration and competition (Moore, 1993; Lehto et al., 2013; Jansson et al., 2014; Rong et al., 2015, Ritala et al., 2014). Hence, this model can be used to highlight the dependencies between the ecosystem layers (Yrjölä et al., 2015a).

Onetti et al., (2012) also state that the business model needs to accommodate the spatial dimensions and organizational boundaries, as well as the role of partners. The firm's choices "can make the difference in terms of company's ability to access resources, develop competences, create a network, benefit from knowledge spill-overs and therefore excel, innovate and implement its strategy" (Onetti et al., 2012, 359). Therefore, we argue that as networks and partnerships can have a great influence on how value is (co)created and (co)



Figure 3. The 4C business model typology (Adapted from Yrjölä et al., 2015a)

captured, they need to be considered as a part of the business model itself (Wirtz et al., 2015; Chesbrough et al., 2014).

Ahokangas et al. (2014) propose a dynamic, processual framework for business models, consisting of the elements what the firm does, how the activities are organized, why do they think it can be done profitably and where the activities take place, internal or external to the firm. According to Ahokangas et al. (2014, 22) all elements of the business model can be externalized. Amit and Zott (2015, 1) also state that a “business model describes the system of interdependent activities performed by a focal firm and its partners and the mechanisms that link these activities to each other”. The authors stress that the content, structure and governance of business models are important but the antecedents of business model design need to be acknowledged as well. These antecedents are the goals for creating and capturing value, the templates used by other organizations, collaboration and the activities of stakeholders, and internal and external constraints (Amit and Zott, 2015). Their business model describes how a focal firm may tap into its ecosystem to perform the activities that are necessary to fulfill perceived customer needs, as it focuses on the activities performed by the subset of actors within the focal firm’s ecosystem. Thus, their conceptual framework alerts to the “possibilities for leveraging resources that exist within the business ecosystem (Amit and Zott, 2015, 16).

Therefore, in the development of IoT related offerings, it is essential early on to consider the underlying business opportunities that are attractive and feasible for all the key stakeholders, which emphasizes value co-creation and co-capture (Jansson et al., 2014). In the ecosystemic perspective, the logic is enabling value creation for all stakeholders, not only how it is captured by the focal firm (Zott et al., 2011, Upward and Jones, 2015). The identification of interconnections and dependencies within the ecosystem and business model synergy are particularly relevant, as in complex, interconnected ecosystems, value co-creation for the focal firm may in fact result in value co-destruction for another (Upward and Jones, 2015). This emphasizes the role of synergic business models, as it is business model synergy that enables simultaneous value co-creation and co-capture within that ecosystem (Ahokangas,

2015) among “any and all actors in the organization’s value constellation (Upward and Jones, 2015, 10). These previous discussions build the theoretical foundations of our IoT business model framework, which we elaborate in the following chapter.

Ecosystemic business model framework for IoT

Building from the literature, we propose a conceptual business model framework for understanding the dynamics of value co-creation and co-capture in the context of Industrial Internet. In deriving our framework, we extend the work by Messerschmitt and Szyperki (2003). From business perspective, this technical approach is too limited. It does not consider the integration of multiple businesses operating in a collaborative environment (Glova et al., 2014). Hence, we apply an OSI model (Open Systems Interconnection), which is a conceptual framework for understanding relationships (Rouse, 2014). Our framework is presented in the following Figure 4.

In order to answer the research question in relation to understanding the dynamics of value co-creation and value co-capture in IoT ecosystems, both the ecosystem configuration in terms of scope and scale, as well as the life cycle perspective in terms of stage need to be taken into account. The IoT ecosystem can be considered to function as an open innovation platform where joint development of innovations is highlighted (Saebi and Foss 2015; Chesbrough et al., 2014). Industrial Internet as a business ecosystem (Figure 2) sets the dimensions of scale and scope of value co-creation and co-capture. The infrastructure and hardware are needed for running IoT services. The important role of platforms and data is highlighted by the example of Google; without the platform it is not possible to collect and utilize data in value creation or capture. The actual devices and equipment, e.g. sensors that gather data, create the next layer. This is typically the layer where IoT companies start their business, only to realize that they need a platform and connectivity for efficient data acquisition and analysis. The furthest layer includes applications and user interface, aimed for end users. This would include, for instance, a web-based personal health monitoring service. In this perspective, scale and scope follow the previously presented 4C business model typology. The role of the business model in co-evolving IoT business ecosystems (Rong et

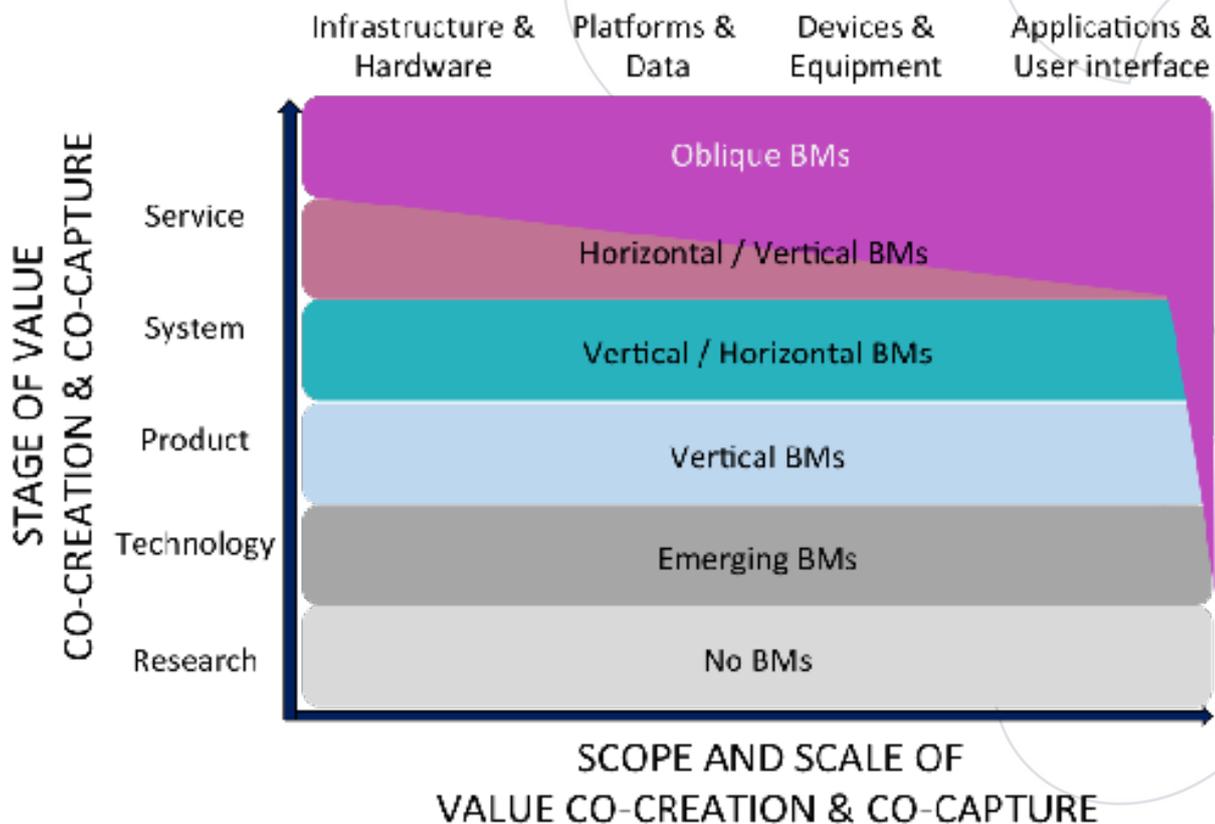


Figure 4. The IoT Business Model Framework

al., 2015) is hence to connect the firm with its external environment, customers, competitors and larger society (Teece, 2010; Ahokangas et al., 2015).

Indeed, cooperation demonstrates the linkage between the constructive elements and the ecosystem configuration, but this process of cooperation varies along the lifecycle of the business ecosystem (Rong et al., 2015). Hence, we extend the work by Messerschmitt and Szyperki (2003) to include research to life cycle stages. The stages of value co-creation and co-capture therefore include research, technology, products, systems and service. This life cycle perspective highlights that value co-creation and co-capture processes start already before any actual business models exist. Ecosystem players need to be sensitive to the goals and motives of other ecosystem stakeholders and how these impact the synergy of the ecosystem already before any actual business. This means that already research activities, either carried out by firms or specific research institutions, add value to the ecosystem through the exploration of different business opportunities. In the technology development stage, actual business models start to emerge, as at this stage, the commercialization aspects need to be considered as

well. At the earlier stages, vertical, product-focused business models appear more common, and at the later stages, as services start to emerge, horizontal models prevail.

We claim, that simultaneous value co-creation and co-capture within IoT ecosystems rises through “oblique” business models. In the context of IoT, the relationship among partners is no longer based on customer-supplier-relationship but organizations are now dependent on each other, interact in order to achieve common strategic objectives and eventually share a common fate (Iansiti and Levien, 2004; Moore, 1996; Rong et al., 2015). Therefore, organizations cannot build their business models in silos, but a synergic view requires them to consider the stage of life cycle of clients and partners as well, as the stage determines how firms should build their own business models. Whereas previous ICT-based business models have considered only one layer of the ecosystem configuration, either through horizontal or vertical business models, the oblique IoT business model views the ecosystem as a whole (Ahokangas et al. 2015; Lehto et al., 2013). An oblique business model with an evolving and loosely coupled structure (Saebi and Foss, 2015; Amit and Zott, 2015),

Table 2. Oblique business model case illustration

| | Apple | Uber | Airbnb |
|------------------------|--|--|--|
| Stage | | | |
| Service | On-demand music experience | On-demand transportation | On-demand travel accommodation |
| System | Platform-based: Apple gets a share per tune played | Platform-based: Uber gets a share per ride | Platform-based: Airbnb gets a share per rental |
| Product | Music player | Smartphone app | Website |
| Technology | Disrupting traditional music industry through mp3 technology | Disrupting traditional taxi industry through mobile application | Disrupting traditional travel industry through online service |
| Research | Based on two-sided value co-creation and co-capture for artists and listeners | Based on two-sided value co-creation and co-capture for passengers and drivers | Based on two-sided value co-creation and co-capture for guests and hosts |
| Scale and Scope | | | |
| | iPod as hardware, iTunes as platform, iPhone as device, uniform interface, service based on bundled content. | A user application that utilizes equipment of others with own technological infrastructure and platform to provide a taxi service. | An online platform that utilizes the property of others to offer accommodation for travellers. |

follows the rationales of open innovation (Chesbrough et al., 2006; Chesbrough et al., 2014). Through oblique business models, fast-growing and service-oriented companies are able to utilize external resources outside firm boundaries (Ahokangas, 2015; Bogers and West, 2012; Chesbrough et al., 2014). We extend our elaboration through the following case illustration.

Apple's iPod was among the first ones to create an oblique business model by basically combining memory stick (product) to content (service) distributed to masses: cheap hardware with very versatile content, bypassing completely the more old-fashioned music

distribution logic employed by the music industry. Uber Technologies' mobile application for fulfilling a physical need resulted in the collapse of a traditional value chain in on-demand transportation. The fast rise of companies providing local services through similar business models has even resulted in a term "uberification" (Schlafman, 2014). Airbnb developed a website for list, find and rent accommodation, without owning any real estate. Through their platform-based business model, their ability to scale up occurs basically with zero marginal cost (Moazed, 2014). These cases further ground oblique business models on sharing economy –based thinking, where business opportunities can be seen as

two-sided, i.e., simultaneous provisioning and utilization of resources (Yrjölä et al., 2015b). Thus, in addition to value co-creation and co-capture through open innovation, oblique business models also consider the possibilities for value sharing. Stephany (2015), has recently defined Sharing Economy as “the value in taking the underutilized assets and making them accessible online to a community, leading to a reduced need for ownership of those assets.” Hence, sharing economy thinking has become popular especially in peer-to-peer communities that are the source of Uber’s and Airbnb’s business opportunity.

Conclusion

Eventually the layers in the IoT ecosystem are becoming blurred or fuzzy at the firm level, as companies seek bundled or hybrid business models that combine or aggregate services from different layers. During the ecosystem’s evolution, also the specific roles of actors can change. In this kind of dynamic context, the oblique business model is the binding factor between the stage, scale and scope of value co-creation and co-capture, as it brings the focus onto the ecosystemic business opportunity itself. In this way, the business model provides synergy for mutually connected opportunities within the ecosystem. Business opportunities in the field of IoT may rise at any stage of the product or service development. The benefit of the oblique business model thus is that it does not separate the sources of value creation, capture, and sharing as they are embedded within the whole ecosystem. The famous cases of Apple, Uber and Airbnb show that the number of oblique business models is growing rapidly, winning market share and jeopardizing the established or incumbent firm’s horizontal and vertical business models (Ahokangas, 2015). Oblique business models have the power to disrupt whole industries.

The academic contribution of this paper lies within the business model literature, firstly by discussing the role of external environment within business models and secondly, by discussing the emerging ICT-based business models in the field of Internet of Things. This study stresses the need to understand the nature of integrated, co-dependent processes of value co-creation, co-capture and sharing and their impact on the business models of individual firms in co-evolving business ecosystems. We extend the research from value

creation and capture at the firm level onto how value can be co-created and co-captured at the ecosystem level. The originality of this research thus relates to expanding the business model literature from ecosystemic perspective.

The practical implications of this paper relate to the alternative business opportunities in the context of IoT. This study highlights the configuration of the IoT business ecosystems and the need to for firms to position themselves within the ecosystem in terms of the stage, scope and scale of value co-creation and co-capture. In this way, the opportunities offered by Industrial Internet and digitization can truly be exploited to build for competitive advantage especially for firms previously focused on serving the physical, product-based value chain.

The limitations of this research relate to the need to empirically test the issues we have pointed in relation to the stage, scope and scale of ecosystemic value creation and capture. Both qualitative and quantitative research is needed to build further propositions and hypotheses to validate our framework. Thus, these limitations also relate to potential future research directions and questions that arise from our research. Digitization and the Internet of Things are spreading to various new business fields and industries, ranging from private SMEs into large public organizations. Does firm size matter in this context? Are ecosystemic business models similarly applicable to large and small firms? Are the dynamics of ecosystemic business models different in different industries characterized by high levels of digitization? How do the roles of ecosystem members change and evolve within the ecosystem over time? For instance these issues we hope future research to address.

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References

- Adner, R. & Kapoor, R (2010) Value Creation In Innovation Ecosystems: How the Structure of Technological Inter-dependence affects Firm Performance in New Technology Generations. *Strategic Management Journal*, Vol. 31, pp. 306-333.
- Afuah , A. (2004) *Business Models – a Strategic Management Approach*, McGraw Hill Irwin, New York.
- Afuah, A., & Tucci, C. L. (2001) *Internet business models and strategies: Text and cases*. McGraw-Hill, New York.
- Ahokangas, P. (2015, January 29) Vertical, horizontal and oblique business models (blog) Available at: <http://tech-busstratintfutures.blogspot.fi/>
- Ahokangas,P., Alila, H., Helaakoski, H., Kyllönen, V., Lehtimäki, T., Peltomaa, I., Seppänen, V. & Tanner, H. (2015) *Collaborative Business Networks of the Future*. VTT Value Network 2.0. VTT Technical Research Centre of Finland. Grano, Kuopio.
- Ahokangas, P., Juntunen, M. & Myllykoski, J. (2014) *Cloud Computing and Transformation of International E-Business Models*. *Research in Competence-Based Management*, Vol. 7, pp. 3-28.
- Ailisto, H. (2015) *Industrial Internet – opportunity for Finland*. Keynote Presentation at Automaatio XXI Conference, 17-18 March, Helsinki
- Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, Vol. 22, No. 6-7, pp. 493-520.
- Amit, R & Zott, C. (2015) *Crafting Business Architecture: The Antecedents of Business Model Design*. *Strategic Entrepreneurship Journal*. pp. 1-20. Available at: <http://wileyonlinelibrary.com> DOI: 10.1002/sej.1200
- Applegate, L. M. 2000. E-business models: Making sense of the internet business landscape. In G. Dickson & G. De-Sanctis (Eds.), *Information technology and the future enterprise: New models for managers*, pp. 49-101. Englewood Cliffs, NJ: Prentice-Hall.
- Atzori, L., Iera, A. & Morabito, G. (2010) *The Internet of Things: a survey*. *Computer Networks*, Vol. 54, pp. 2787-2805.
- Baden-Fuller, C., & Morgan, M. S. (2010). *Business models as models*. *Long Range Planning*, Vol. 43, No. 2-3, pp. 156-171.
- Ballon, P. (2007) *Business modelling revisited: the configuration of control and value*, info, Vol. 9, No. 5, pp. 6 – 19.
- Berthelsen, E. (2015) *A new agenda item for enterprise executives: Enterprise IoT*. Machina Research. (white paper).
- Bogers, M. & West, J. (2012) *Managing Distributed Innovation: Strategic Utilization of Open and User Innovation*. *Creativity and Innovation Management*, Vol. 21. No. 1, pp. 61-75.
- Brousseau, E., & Penard, T. 2006. *The economics of digital business models: A framework for analyzing the economics of platforms*. *Review of Network Economics*, Vol. 6, No. 2, pp. 81-110.
- Casadesus-Masanell, R., & Ricart, J. E. (2010). *Competitiveness: A business model reconfiguration for innovation and internationalization*. *Management Research*, Vol. 8, No. 2, pp. 123-149.
- Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

- Chesbrough, H. (2010) Business Model Innovation: Opportunities and Barriers. *Long Range Planning*, Vol. 43, No. 2-3, pp. 354-363.
- Chesbrough, H. & Appleyard, M. (2007) Open innovation and strategy. *California Management Review*, Vol. 50, No. 1, pp. 57-74.
- Chesbrough H, & Rosenbloom R. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, Vol. 11, pp. 529-555.
- Chesbrough, H., Vanhaverbeke, W. & West, J. (2014) *New Frontiers in Open Innovation*. Oxford University Press, Oxford.
- Chesbrough, H., Vanhaverbeke, W. and West, J. (2006) *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford.
- Dahlander, L. & Gann, D. (2010). How open is innovation? *Research Policy*, Vol. 39, No. 6, pp. 699- 709.
- Dahlberg, H., Öberg, J., Glaumann, M., Gjelstrup, A. & Berntsson, G.L.(2015) *Connected Things*. Arthur DeLittle Telia-Sonera
- Demil, B. & Lecocq, X. (2010) Business Model Evolution: In Search of Dynamic Consistency. *Long Range Planning*, Vol. 43, pp. 227-246.
- De Reuver, M., Bouwman, H. & MacInnes, I. (2009) Business model dynamics: a case survey. *Journal of Theoretical and Applied Electronic Commerce Research*, Vol. 4, No. 1, pp. 1-11.
- Fitzgerald, M. (2015, January 27) *Gone Fishing – For Data*. MIT Sloan Management Review. Available at: <http://sloanreview.mit.edu/article/gone-fishing-for-data/>
- Frankenberger, K., Weiblen, T. & Gassmann, O. (2014) The antecedents of open business models: an exploratory study of incumbent firms. *R&D Management*, Vol. 44, No. 2, pp. 173-188.
- Glova, J., Sabol, T. & Vajda, V. (2014) Business Models for the Internet of Things Environment. *Procedia Economics and Finance*, vol. 15, pp. 1122-1129.
- Gubbi, J., Buyya, R., Marusic, S. & Palaniswami, M. (2013) Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Generation Computer Systems*, Vol. 29, pp. 1645-1660.
- Haller, S., Karnouskos, S., Schroth, C. (2009), *The Internet of Things in an Enterprise Context*, in J. Domingue, D. Fensel und P. Traverso (Eds.), *First Future Internet Symposium - FIS 2008*, LNCS 5468, Springer Verlag 2009, pp. 14-28.
- Hedman, J. and T. Kalling (2003). "The business model concept: Theoretical underpinnings and empirical illustrations." *European Journal of Information Systems*, Vol. 12, No. 1, pp. 49-59.
- Hirvonen-Kantola, S., Ahokangas, P., Iivari, M., Heikkilä, M. & Hentilä, H. (2015) Urban development practices as anticipatory action learning: case Arctic Smart City Living Laboratory. *Procedia Economics and Finance*, Vol. 21, pp. 337-345.
- Hui, G. (2014, July 29) *How the Internet of Things Changes Business Models*. Harvard Business Review. Available at: <https://hbr.org/2014/07/how-the-internet-of-things-changes-business-models>

- Iansiti, M., and Levien, R. (2004), *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Harvard Business Press.
- Jansson, N., Ahokangas, P., Iivari, M., Perälä-Heape, M. & Salo, S. (2014) *The Competitive Advantage of an Ecosystemic Business Model: The Case of OuluHealth*. *Interdisciplinary Studies Journal*, 3 (4), 282-294.
- Kantola, R., Llorente Santos, J. & Beijar, N. (2015) *Policy-based communications for 5G mobile with customer edge switching*. *Security and Communication Networks*, available at <http://wileyonlinelibrary.com>
- LeHong, H. & Velosa, A. (2014, July 21) *Hype Cycle for the Internet of Things*. Gartner Inc. Available at: <https://www.gartner.com/doc/2804217/hype-cycle-internet-things->
- Lehto, I., Hermes, J., Ahokangas, P. & Myllykoski, J. (2013) *Collaboration in Cloud Businesses – Value Networks and Ecosystems*. *Communications of the Cloud Software*. (discussion paper) Available at: <http://urn.fi/URN:NBN:fi-fe201303062240>
- Lindgren, P. and Aagaard, A. (2014). *The Sensing Business Model*. *Wireless personal communications*, Vol. 76, No. 2, pp. 291-309.
- Magretta, J. (2002). *Why business models matter*. *Harvard Business Review*, Vol. 80, No. 5, pp. 86-92.
- Mazhelis, O., Warma, H., Leminen, S., Ahokangas, P., Pussinen, P., Rajahonka, M., Siuruainen, R., Okkonen, H., Shveykovskiy, A. & Myllykoski, J. (2013) *Internet-of-Things Market, Value Networks, and Business Models: State of the Art Report*. Jyväskylä University Printing House, Jyväskylä.
- McGrath, R. G. (2010). *Business models: A discovery driven approach*. *Long Range Planning*, Vol. 43, No. 2-3, pp. 247-261.
- Messerschmitt, D.G. & Szyperski, C. (2003) *Software Ecosystem: Understanding an Indispensable Technology and Industry*. The MIT Press.
- Moazed, A. (2014, January 23) *What is a Platform?* Available at: <http://www.applicoinc.com/blog/what-is-a-platform-business-model/>
- Moore, J. (1993) *Predators and prey: a new ecology of competition*. *Harvard Business Review*, Vol. 71, pp. 75–86.
- Moore, J. (1996) *The death of competition*. *Fortune*, Vol. 133, No. 7, pp. 142-144.
- Morris, M., Schindehutte, M., & Allen, J. (2005). *The entrepreneur's business model: Toward a unified perspective*. *Journal of Business Research*, Vol. 58, No. 6, pp. 726-735.
- Muhonen, T., Ailisto, H. & Kess, P. (2015) *Standardization in Industrial internet (IoT) and Condition-Based Maintenance*. *Proceedings at the Automaatio XXI Conference*, 17-18 March, Helsinki
- Normann, R. & Ramirez, R. (1993) *From Value Chain to Value Constellation: Designing Interactive Strategy*. *Harvard Business Review*, Vol. 71 pp. 65-77.
- Onetti, A., Zucchella, A., Jones, M., & McDougall-Covin, P. (2012). *Internationalization, innovation and entrepreneurship: Business models for new technology-based firms*. *Journal of Management and Governance*, Vol. 16, No. 3, pp. 337-368.

- Osterwalder, A. (2004). The business model ontology – a proposition in a design science approach. Ph.D. Thesis, University of Lausanne.
- Osterwalder, A. & Pigneur, Y. (2002). An e-business model ontology for modeling e-business. Proceedings at the 15th Bled Electronic Commerce Conference, 17-19 June, Bled.
- Osterwalder, A., Pigneur, Y., and Tucci, C.L. (2005) Clarifying business models: origins, present, and future of the concept. Communications of the Association for Information Systems, Vol. 16, No. 1, pp. 1–25.
- Pang, Z., Chen, Q., Han, W. & Zheng, L. (2012) Value-centric design of the internet-of-things solution for food supply chain: Value creation, sensor portfolio and information fusion. Information Systems Frontiers, Vol. 17, No. 2, pp. 289-319.
- Pateli, A. (2003). A framework for Understanding and Analysing eBusiness Models. Proceedings at the 16th Bled eCommerce Conference, 9-11 June, Bled.
- Priem RL, Butler JE, Li S. 2013. Toward reimagining strategy research: retrospection and prospection on the 2011 AMR decade award article. Academy of Management Review Vol. 38, pp. 471–489.
- Quinnell, R. (2013, October 2) Vertical vs. horizontal: Which IoT model will thrive? Available at: <http://www.embedded.com/electronics-blogs/other/4422131/Vertical-vs--horizontal--Which-IoT-model-will-thrive->
- Ritala, P., Golnam, A. & Wegmann, A. (2014) Coopetition-based business models: The case of Amazon.com. Industrial Marketing Management, Vol. 43, pp. 236-249.
- Rong, K., Hu, G., Lin, Y., Shi, Y. & Guo, L. (2015) Understanding business ecosystem using a 6C framework in Internet-of-Things based sectors. International Journal of Production Economics, Vol. 159, pp. 41-55.
- Rouse, M (2014, August) OSI reference model (Open Systems Interconnection) Available at: <http://searchnetworking.techtarget.com/definition/OSI>
- Saebi, T. and Foss, N.J. (2015) Business Models for Open Innovation: Matching Heterogenous Open Innovation Strategies with Business Model Dimensions. European Management Journal, Vol. 33, No. 3, pp. 201-213.
- Schaffers, H., Komninos, N., Pallot, M., Trousse, B., Nilsson, M. & Oliveira, A. (2011) Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation. In: J Dominique et al. (Eds): Future Internet Assembly, LNCS 6656, pp. 431-446.
- Seelos C, Mair J. (2007). Profitable business models and market creation in the context of deep poverty: a strategic view. Academy of Management Perspectives Vol. 21, pp. 49–63.
- Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. Business Horizons, Vol. 48, No. 3, pp. 199-205.
- Schlafman, S. (2014, April 4) Uberification of the US Service Economy. Available at: <http://schlaf.me/post/81679927670>
- Stephany, A. (2015) The Business of Sharing: Making it in the New Sharing Economy. Pgrave MacMillan. Available at: <http://www.palgraveconnect.com/pc/doi/10.1057/9781137376183.0001>.
- Teece, D. J. (2010). Business models, business strategy and innovation. Long Range Planning, Vol. 43, No. 2-3, pp. 172-194.

Timmers, P. (1998). Business models for electronic markets. *Electronic Markets*, Vol. 8, No. 2, pp. 3-8.

Turber, S. & Smiela, C. (2014) A Business Model Type for the Internet of Things. *Twenty Second European Conference on Information Systems*, 9-11 June, Tel Aviv.

Turber, S., vom Brocke, J. & Gassmann, O. (2015) Designing Business Models in the age of Pervasive Digitization. *Proceedings at the Academy of Management Annual Meeting*, 7-11 August, Vancouver.

Upward A., & Jones, P.H. (2015) An Ontology for Strongly Sustainable Business Models: Defining an Enterprise Framework Compatible with Natural and Social Science. *Organization & Environment*, pp. 1-27. doi:10.1177/1086026615592933

Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Kundisch, D., Leimeister, J., Loos, P., Spann, M., (2014) Business Models: An Information Systems Research Agenda. *Business & Information Systems Engineering*, Vol. 6, No. 1, pp. Available at: <http://aisel.aisnet.org/bise/vol6/iss1/8/>

VTT Visions 3, (2013). Productivity leap with IoT. *Visions of the Internet of Things with a special focus on Global Asset Management and Smart Lighting*, VTT, Espoo. Available at: <http://www2.vtt.fi/inf/pdf/visions/2013/V3.pdf>

Weill, P. , & Vitale, M. R. (2001) *Place to Space: Migrating to e-Business Models*. Harvard Business School Press, Cambridge.

Weiller, C., & Neely, A. (2013). *Business Model Design in an Ecosystem Context*. University of Cambridge Working Papers. Cambridge Service Alliance, Cambridge.

Westerlund, M., Leminen, S., & Rajahonka, M. (2014) Designing Business Models for the Internet of Things. *Technology Innovation Management Review*. Available at: <http://timreview.ca/article/807>

Wirtz, B.W., Pistoia, A., Ullrich, S. & Göttel, V. (2015) Business Models: Origin, Development and Future Research Perspectives. *Long Range Planning*, pp. 1-19 (article in press)

Wirtz, B.W., Schilke, O. & Ullrich, S. (2010) Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet. *Long Range Planning*, Vol. 43, No. 2-3, pp. 216-226.

Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning*, Vol. 43, No. 2-3, pp. 216-226.

Zott, C., Amit, R., & Massa, L. (2011). The business model: Recent developments and future research. *Journal of Management*, Vol. 37, No. 4, pp. 1019-1042.

Yrjölä, S., Ahokangas, P. & Matinmikko, M (2015a) Evaluation of recent spectrum sharing concepts from business model scalability point of view. *Proceedings at the IEEE DySPAN 2015 – Dynamic Spectrum Access Networks*, 29 September – 2 October, Stockholm.

Yrjölä, S., Matinmikko, M., Ahokangas, P., & Mustonen, M. (2015b). Licensed Shared Access to spectrum. In: Hu, F. (ed): *Spectrum Sharing in Wireless Networks: Fairness, Efficiency, and Security*. Taylor & Francis LLC, CRC Press. (forthcoming)

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Futures Business Models for an IoT Enabled Healthcare Sector: A Causal Layered Analysis Perspective

Julius Francis Gomes¹ and Sara Moqaddamerad²

Abstract

Purpose: To facilitate futures business research by proposing a novel way to combine business models as a conceptual tool with futures research techniques.

Design: A futures perspective is adopted to foresight business models of the Internet of Things (IoT) enabled healthcare sector by using business models as a futures business research tool. In doing so, business model is coupled with one of the most prominent foresight methodology, Causal Layered Analysis (CLA). Qualitative analysis provides deeper understanding of the phenomenon through the layers of CLA; litany, social causes, worldview and myth.

Findings: It is difficult to predict the far future for a technology oriented sector like healthcare. This paper presents three scenarios for short-, medium- and long-term future. Based on these scenarios we also present a set of business model elements for different future time frames. This paper shows a way to combine business models with CLA, a foresight methodology; in order to apply business models in futures business research. Besides offering early results for futures business research, this study proposes a conceptual space to work with individual business models for managerial stakeholders.

Originality / Value: Several research on business model has offered conceptualization of the phenomenon, innovation through business model and transformation of business models. However, existing literature does not offer much on using business model as a futures research tool. Enabled by futures thinking, we collected key business model elements and building blocks for the futures market and analyzed them through the CLA framework.

Keywords: Business Models, CLA, IoT, foresight, healthcare, mhealth

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Introduction

Since the introduction of Internet for public use in the early 1990s, the sphere of technology advancements has propelled extensively till today. Internet has evolved from being only the “Internet of Computers” to be the “Internet of People”, and now to be the “Internet of Things” (IoT) by enacting possibilities of small “things” benefitting humankind with higher scale of usable information (Coetzee & Eksteen, 2011). With billions of connected devices, IoT promises to enhance decision making and data analysis to a heightened level. One major application sector of IoT identified by numerous researchers is Healthcare, since the early stage of IoT innovations (Atzori, Iera & Morabito, 2010; Domingo, 2012; Xu, He & Li, 2014), where IoT eventually combines all three perspectives of Internet, namely computers, people and things, to solve different problems.

Despite enormous hype about IoT’s contribution in healthcare from an innovation perspective, we are still to be sure about economic and business feasibility of such innovations for the longer future. To gain better sight on this ground business model as an analytical concept can play a handy role. Recent studies concerning business models suggest that industrial actors are playing more with their business models than ever to have longer lasting and efficient organizational performance across various industries (Nielsen et al., 2014). In practice, the use of business models has grown significantly in recent years by companies especially to gain and secure competitive advantage (Johnson, Christensen & Kagermann, 2008; Wirtz et al., 2015). Business model has been defined by different authors with varied attributes due to its potential multi-dimensional application. Based on significant advancement in business model research, Ahokangas et al. (2015) argues that the next generation of business model research will focus on the future centrism of the concept. Pondering on Amit & Zott’s (2001) perspective on business models as “unit of analysis”, we consider building on futures thinking, and perceive that industrial future can be foresighted by using business model as the basis of analysis

Previous researches involving IoT and healthcare mostly stress upon narrow specific healthcare context and application possibilities (Domingo, 2012; Atzori et al, 2010, & Farnandez & Pallis, 2014). On the other hand,

business model focused studies for on IoT (West-erlund, Leminen & Rajahonka, 2014) and business model focused studies for IoT-healthcare (Pang et al, 2015) hints of ecosystemic business model. Additionally, there are technical studies focusing of health care IoTs which covers part of the overall business models, but lacks the depth in analysis from a business model view point due to discipline differences (Liu & Jia, 2010; Whitmore, Agarwal & Xu, 2015). IoT is acclaimed to foster the healthcare sector for longer term throughout literature, but the lack of analytical evidence for the promised future in available texts makes it interesting to look into the issue with a longer term and big picture perspective.

According to Masini (2006), “We, in the present time, need to look at the future in ways that go beyond the creation of beautifully conceived but ultimately illusive Utopias. Our future must not only be foreseen and dreamt of, but also chosen and built.” (p:1159). Business models are often perceived to be seen as the practical implementation of abstract strategies (Richardson, 2008). From a strategy perspective, Porter (1991) claimed that many differentiation advantages that firms gain actually comes from initial conditions and managerial choices (Hedman & Kalling, 2003). These initial conditions and managerial choices are arguably covered by different business model elements. Thus, building on futures thinking we attempt to apply business model as basis of analysis to uncover future market for the longer term. This way, for individual organization business model innovation, organizations can make informed “managerial choices” for the future. This paper displays a novel way to look at industry future potential using business models combined with one of the most prominently used futures research methodologies, Causal Layered Analysis (CLA) (Inayatullah, 2004).

The objective of this paper is twofold. First, since the emerging market context of IoT enabled healthcare lacks proper attention from business perspective in the academic literature, this paper provides an interesting perspective by looking at the future. Secondly, we use the business model concept to analyze future market ecosystem combining with a scientific foresight methodology. However, since the business model as a concept has not been applied in such a way in the existing

literature so far, the key research question that we handle in this paper is as follows:

How the business model framework can be applied to CLA to study the future of an industry?

The rest of this paper is structured as follows. First, we introduce the theoretical framework surrounding discussions on the IoT enabled healthcare sector, business models and an introductory note on CLA due to lack of using this method in business research. Then the research design is presented. Next, three linear futures scenarios with three different time horizon will illustrate the conceptual and temporal space defined in the layers of CLA followed by concise discussion on the created scenarios. A list of probable business model elements for different time frames in the future is exhibited. Finally, the conclusion of the paper will discuss how the created scenarios from the CLA layers can plug into and deepen the future business models of the IoT enabled healthcare sector. Also, we briefly discuss how business model as a concept can bring additional structure to foresight methodologies for business research.

Theoretical framework

We construct the theoretical framework by first introducing the IoT enabled healthcare sector from a conceptual viewpoint, then present our perception of business models. Finally, we introduce the concept of futures research and CLA.

IoT enabled Healthcare sector

Internet has brought about and enabled numerous advancements since its introduction. One of the most significant aspects of Internet has been varied ways of its utilization. Although there are some deviated definitions of IoT within the literature (Atzori, Iera & Morabito, 2010), we use the definition from Coetzee & Eks-teen (2011). IoT, a vision where objects become part of the Internet through unique identification, accessibility to the network, position and status, where services and intelligence are added to this expanded Internet. The concept is to fuse digital and physical world to impact professional, personal and social environments.

Mobile device assisted healthcare and medical applications are believed to create the next big advancement in the health industry (Balandin et al, 2013) due

to increasing usage of mobile technologies and mobile devices (not limited to mobile phones only) in the recent years (Briggs et al, 2012). This trend is gaining momentum for longer sustainability by more and more introduction of wearables, environmental or implanted medical IoT devices and solutions (Amendola et al, 2014). A recent industry focused study about the trends and facts within mobile health (mHealth) marks business models are going to evolve and broaden (research-2guidance, 2013) as the mHealth industry has recently exited the trial phase and now entered the commercialization phase in the market (Research and Market, 2013). However, the challenge for a modern industrial firm lies in understanding the internal and external market environment to keep up with the rapid changes (Hayward, 2004). These rapid changes pose dynamic opportunities in some cases and in other cases lead to complex threats, which need to be tackled with longer term vision for sustainability.

The healthcare sector has fostered in the era of Internet with relative cost efficiency and smart solutions. The biggest advantage of health IoT solutions is perhaps personalized solutions and providing a universally accessible database for better healthcare maintenance (Xu, He & Li, 2014). Successful and wide adaptation of IoT in healthcare will present billions of sensors accumulating a robust network of data collection and sharing coupled with ubiquitous identification system; which will enable the sector with better monitoring, sensing, communicating and controlling abilities. Different types of healthcare information like logistics, diagnosis, recovery, therapy, meditation, management, finance and even daily activities can be collected through the IoT architecture (Domingo, 2012; Xu, He & Li, 2014).

The definition of healthcare innovation has changed dramatically over time, now innovations in patient care, wellness or health tech are considered as innovations in healthcare. IoT can play a substantial role in either of these scopes. Fernandez & Pallis (2014) listed existing wearable devices powered by IoT, which includes heart rate monitors, ECG monitors, glucose monitors, pulse oximeters and blood pressure monitors. A Similar notion was shared by Atzori, Iera & Morabito (2010) earlier when they spoke of four major application scope of IoT in healthcare as tracking, identification and authenti-

cation, data collection and sensing.

Business Model

The business model concept can be defined as a *description* (Applegate, 2001; Weill & Vitale, 2013), an *architecture* (Timmers, 1998; Dubosson-Torbay, Osterwalder & Pigneur, 2002), a *representation* (Morris, Schindehutte & Allen, 2005; Shafer, Smith & Linder, 2005), a *model or conceptual tool* (Osterwalder, 2004; Osterwalder, Pigneur & Tucci, 2005), a *structural template* (Amit & Zott, 2001), a *method* (Afuah & Tucci 2001), a *recipe* (Baden-Fuller & Morgan, 2010) a *framework* (Afuah, 2004) and a *set* (Seelos & Mair, 2007) for business proliferation within academic literature. This dense description of how different authors think about the phenomenon already provides readers with basic understanding of the key logics. However, at the same time it triggers the idea of definitional ambiguity (Jensen, 2014; Osterwalder, Pigneur & Tucci, 2005) among readers questions why a phenomenon should have so many single worded/phrased meanings.

In the latest stream of business models research, different tools are offered as meta-models where authors have accumulated multiple components from the definitions and constructed algorithmic or a flowing relational model. Osterwalder & Pigneur's (2010) business model canvas is one of the most popularly used tools where the author accumulated nine components; they are: value propositions, customer segments, customer relationships, channels, key activities, key resources, key partnerships, cost structure and revenue streams. The business model canvas has provided the concept of business model with tremendous momentum in practice of business model as models. Recently Ahokangas et al (2014) introduced the Business Model Wheel (BMW) where it is argued for business opportunities as the heart of business modeling instead of value proposition. Business Model Wheel as a tool is inspired by Onetti et al's (2012) Locus, Focus and Modus view on business modelling. With opportunity at the center, BMW asks what, how and why questions from the business activities of an entity.

We perceive business modeling to be an opportunity centric and cyclic process. This approach to business model considers the way a company "do business" depends on what opportunity is there in the market to

exploit. Often companies find an opportunity that suits their resources and competencies; and in some cases companies might have resources and offerings for the market which lacks a good enough market opportunity. Thus we argue aligning Ahokangas et al (2014), an opportunity should be identified or discovered first to design the most benefitting business model for an organization. Additionally, we admit that in the modern hyper-volatile technology fueled market, a single opportunity can rarely sustain for a longer period. In such cases, companies need to find newer opportunities and align their overall business model by keeping the business opportunity at the center and gain more competitive advantage by nurturing identified opportunities.

Research on how the concept of business model can be applied in practice has shown different avenues. Amit & Zott (2001) identified Business model as a new unit of analysis and a system-level, holistic approach to explain how a firm "do business" as two key streams which can be considered relevant when considering the future of an industry. Additionally, Bouwman et al (2012) discusses conceptual tools like business model road mapping and business model stress testing for future development of individual organization business model. For individual organizations both these tools seem viable. However, to study a wider sphere of an industry's future, process generalization is required. Also, the concept of business model transformation, appears to be relevant to the future, acknowledging transformation of existing organizations through positioning the core business logic by adapting newer business models into a new market place (Ahokangas & Myllykoski, 2014; Ivari, 2015). The future can be perceived as the new market place and such transformation by repositioning core business logic harnessing the possibilities of business models can take place industry wide over time.

We consider the business model as a dynamic transformational force which helps practitioners conceptualize the rationale behind the overall value creation and delivery for long term economic sustainability. We use the concept of business model to understand the future and analyze an industry development. In doing so, we apply the business model wheel coupled with a foresight technique named Causal Layered Analysis (CLA). In the following subchapter, a brief review on scientific

foresight and CLA is depicted.

Foresight and Causal Layered Analysis (CLA)

Futures studies as a discipline dates back to the Second World War. Nonetheless, since the beginning of human civilization, practice of thinking about the future regardless of exact time-extent of intervention was always present in the back of individual's mind (Masini, 2006). Futures research involves active learning and participation, timing of intervention, and deconstruction of reality in order to construct a preferred future (Inayatullah, 2000). It also enables us to consume surprise as an element and design alternative scenarios towards a vision (Masini, 2006). Foresighting gives managers and strategizers a tool for looking for alternative and probable outcomes of a given situation and act on the result they get using foresighting (Inayatullah, 2008).

In learning the potential business opportunities of the IoT enabled health care sector and probable business model elements, we applied CLA which is one of the most widely appreciated futures research methodologies. CLA involves integrating empiricist, interpretive, critical and action learning modes of knowing to unleash the future (Inayatullah, 2004). Unlike other foresight/futures methodologies, CLA involves less of predicting the future rather it focuses on creating transformative conceptual spaces to create preferable and alternative futures. CLA is usually applied to go into the deeper future as one of its specialty and longer term policy change feature (Inayatullah, 1998).

There are four layers in CLA. The first layer is known as "Litany"; here it starts from the surface level of the problem with empirical data and then it moves to a deeper level to find the reasons for the problems detected from the surface layer and analyze them; this layer is entitled as "Systemic/ Social Causes". Further down it moves to look for the causes and the developments in the worldviews and discourse of the society, known as "Worldviews". Finally, to uncover deepest logic of a problem, CLA uses "Myths and Metaphors" to translate problems often in an artistic or poetic language (Inayatullah, 2000), figure 1 illustrates these layers. We can delve into the different layers of business models of the IoT enabled healthcare sector to understand a space for future growth and sustainability.

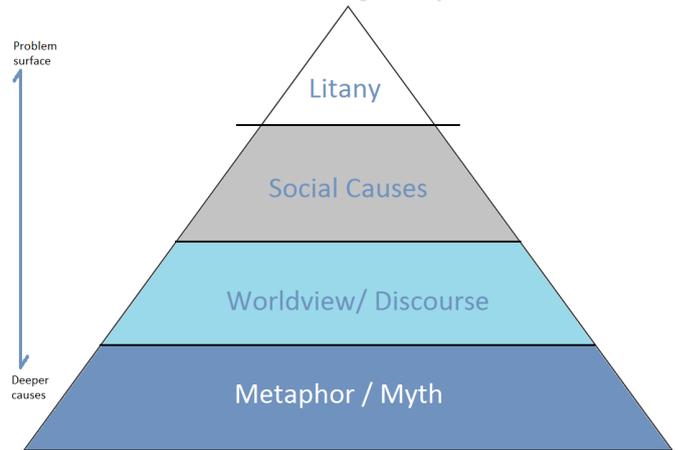


Figure 1: 4 Layers of CLA (Adapted from Inayatullah 2005)

Research design and data collection

Since the future is elusive and business opportunities are also difficult to identify sometimes, this study realizes that the most suitable methodology for conducting this research is to use qualitative approaches. To delve into deeper layers with CLA, empirical dataset should be translatable in a qualitative manner for wider and in-depth understanding. Qualitative methods provide researchers with flexibility and sensitivity to the context that has been less explored, and it can help understand how things work in a particularly complex setting (Mason 2002). Realizing the fact that the interest of this study is the near and far future of a specific sector, single qualitative case study is observed as the most suitable strategy. Additionally, as we consider the findings of previous studies on business models for IoT and business model for healthcare, we tend to look for ecosystemic developments. Thus, by not focusing on a specific company case, this study tempts to organize an industry-wide single case by accumulating different stakeholders to understand the future market.

This study deals with the contextual setting of an IoT enabled healthcare sector from an industrial/managerial perspective, besides the academic interest of this study is to find a deployment logic of business models as a futures technique. Thus it was central for the aims of the research that a network of relevant actors is located to have deep insight of the sector regarding current status and also the futures business model logics of an IoT enabled healthcare sector. The case network was chosen with the support from the extended network actors of the DIGILE Internet of Things project,

where different stakeholders from the futures industry could be interviewed.

Based on the results of the literature review conducted for this research, we focused on collecting primary data. From the case network we communicated to several specialists from the industry coming from different stakeholder background. Five face-to-face one-on-one interviews were conducted for the purposes of this research during May, 2015 and June, 2015. Each interviewee was in a leading role in their organizations and has deep understanding of the industry and its stakeholders. The interview framework was developed as a two-axis matrix, having business model components in one axis and the layers of CLA on the other. A semi-structured and themed framework was employed with a qualitative stance for the interviews. The basic framework (Appendix 1) for all of the interviews were same except for the future time horizon. While questioning about the future, respondents were given either short term, or medium term, or long term in the future. A summary of the interviews and the participants are presented in the following table.

Table 1: Interviews conducted for the research

| Interviewee | Role of the interviewee | Date | Duration |
|-------------|---|------------|----------|
| NV | CEO of a Wellness Startup company | 26/05/2015 | 75:26 |
| TK | MD of a Health Tech Association | 27/05/2015 | 88:14 |
| SH | MD of a medical research organization | 29/05/2015 | 43:50 |
| JH | Innovation and business architect, New business development, Leading network & telecommunications company | 03/06/2015 | 67:36 |
| EK | CEO of Health Innovation Academy | 30/06/2015 | 74:37 |

same interviewer. Altogether 350 minutes of primary data was recorded and transcribed. Data collection through semi-structured interviews was followed by qualitative content analysis to create congruency within the whole data set and to construct three linear futures scenarios. Upon transcription and analysis from a CLA perspective, each interviewees were shared with interview transcription and analysis, so that the validity of the analysis is maintained as superior future. These scenarios provide us with a holistic picture of the industry including different business model elements, how they evolve and change in the future from a business model perspective.

Findings and future scenarios

In this chapter, three futures scenario with a CLA perspective is illustrated. First, the surface level of each scenario is presented, then it is attempted to figure out underlying logics and relations between them in order to understand the feasibility of reaching different futures. In the created scenarios, the short-term scenario represents the business as usual future for five (5) years from now as “the ploughed field”. The medium-term scenario indicates the probable future for ten (10) years in the future from now is titled as “the breaking dawn”. Finally, the long-term future scenario is considered as the preferable future called “the ant super-colony” which indicates developments in the market for fifteen (15) years from now. On the litany layer, we tend to identify the business model elements in each scenario and then move deeper to understand the social causes and worldviews. Finally, we summarize each scenario with relevant metaphors. As a part of the semi-structured interviews, interviewees were asked for metaphorizing specific future. Once the overall dataset was combined, we deduced the three mentioned metaphors which reflects the respective futures based on the previous layers.

The BM-CLA combo aided interview framework enabled the data collection to ask questions focusing on the future. Interview outcomes were compiled and analyzed with an exploratory approach based on each time frame. Each scenario presents the futures industrial elements with four different layers of CLA to argue deeper causes and to justify feasibility of elements discussed in the litany layer.

**Short-term future:
“The ploughed field” scenario**

Litany: A lot of newly introduced technology enabled health services/ solutions will be offered besides conventional services. As an emerging technology, IoT will start marking its footprint in patient care industry, wellness and health tech in one way or another during the short term future. This is because we are spectating cuts in the social sector, thus healthcare expense will rise and an obvious way of saving is through using efficient technology. The business opportunity for the short term is more likely to come from assisted living and elderly care. To grab that, companies need to be ready with proper services through a connected society in a digital way which is easily usable by the targeted customer group.

Though there will be cuts in health benefits, Public sector as customers will still be the major payer of services in this industry for the short term future. However, different wellness services empowered by IoT will gain revenue mostly from the private consumers. Many startups are now designing health related solutions and waiting for medical acceptance for their services. Digital health information services like MyData and Kanta will gain more visibility and acceptance in the society in the short term future. Though the question of transparency and data privacy will remain high as to how the data will be used. It is being promised that the

users will own their own data and have the authority to allow access to others.

The startup scene in Finland stays active and operates within the healthcare sector and thus the search for funding will be consistent. Finding sustainable funding solutions will be one of the major operations besides innovation. Product lifetime has already shortened compared with a business context of 20-30 years earlier; companies will understand it better and start designing innovative service based offers to some extent. Basis of pricing for different services will accordingly start changing; a lot of new pricing models will appear for testing in this short-term period. In one of the interviews, TK mentioned, “Pricing will be based on the benefit we provide to customers. So, the value that customer gets from using our services, solutions and products”. It means pricing models for this sector should be well thought and value adjusted.

Wellness sector will help in gamifying individual's health and getting healthy by looking at statistics with their value proposition. The patient care sector will be offering more digital services for the young digital natives; and this will take place because of the pull from consumer need. The mentality for competing will start changing. Organizations in this sector will realize the need for partnering and taking part in a network that complements each other's need. To keep up and gain

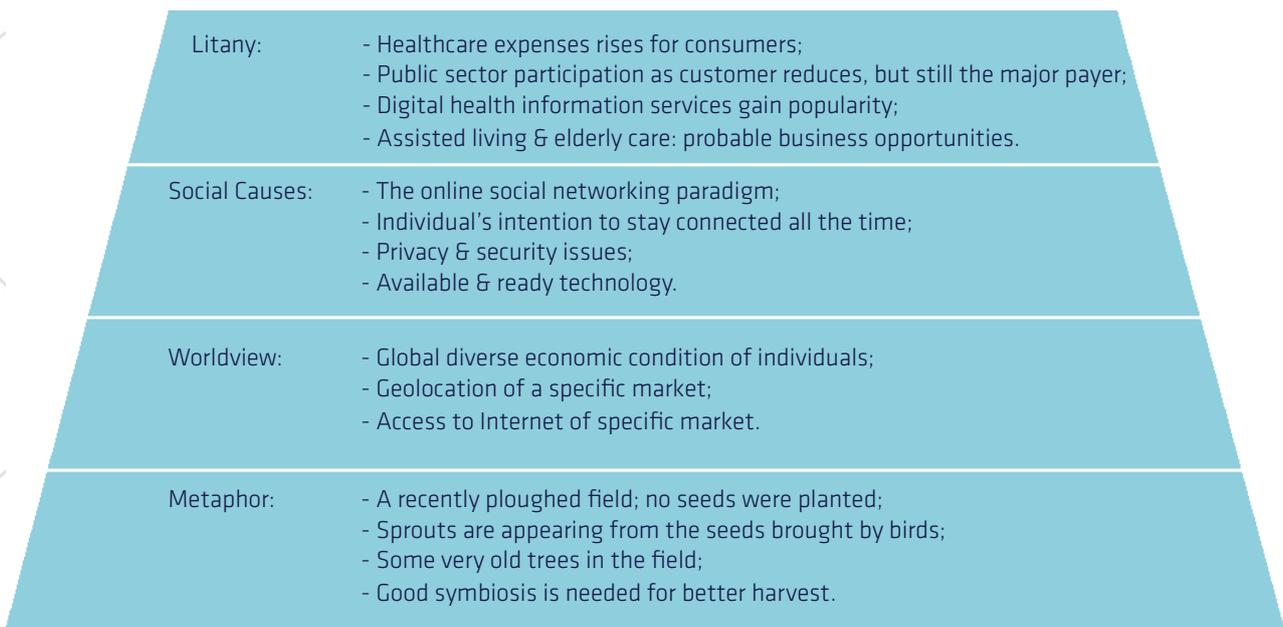


Figure 2: Summary of the Short term future “The ploughed field” scenario

competitive advantage, companies need to evolve all the time regardless of their size and functions.

Major cost drivers for this industry on the short run will be R&D for device innovation itself and the network & infrastructure cost. JH and NV, both admits that R&D costs for health IoT solutions are probably going to be much higher compared to other industries because most of the products will need medical acceptance. Perpetual sustainability is not an option for any product in a highly competitive market. Product development becomes even more vital when it is supposed to serve for human health. Additionally, there is currently a blind spot in the health industry in understanding the extent of network cost, which might come as a surprise to many smaller companies according to JH. There are network providers in the market with proper readiness for the industry but small companies might find it challenging to meet the expenses at first for a perfect connected solution with limited resources.

Social causes: The online social networking paradigm has changed the social practices to a great extent in the recent past. The concept of being connected has evolved over the past few years. Despite more and more individuals are adapting digital services more than ever but still there is a group that will stay vigilant about matters like privacy and security. On top of that, we also have the technology available, which is improving fast, that will enable companies offer more digital services and offer more jobs in Finland.

Worldview: Economic conditions of individuals, societies and countries have major impact when it comes to healthcare. Depending on location and economic condition, a person's choice of healthcare remedies varies. Access to Internet will play a vital role in the expansion of IoT healthcare services as well.

Metaphor: One of the interviewees, JH, metaphorized the short term future of the IoT enabled healthcare sector in Finland as a field that has been recently ploughed. Seeds were not planted but wind and birds brought different types of seeds to the field which has started sprouting. There are also some very old and big trees to provide shadow for smaller sprouts. Besides that, these big old trees will also need to fight for their own sustainability. Good symbiosis is needed

among the new sprouts and the older trees. Some of the sprouts will live longer term and some of them will die out. There are also a lot of good insects in the field to help trees grow faster and be fruitful. In time, this field of sprouts will be an orchard of various kinds of tasty fruits.

Thus, for the short-term future, we anticipate numbers of enthusiastic startups and SMEs coming in to the IoT enabled healthcare sector. Having global corporations thriving for similar goals, these smaller companies take lessons and reuse channels as well. For a sustainable future and profitable growth, this sector will need cooperation among participants.

Medium-term future: "The breaking dawn" scenario

Litany: IoT as a technology to boost the healthcare sector has made its mark real in this medium term future. There will be numbers of business networks working within healthcare, wellness and health tech arena. Health IoT device producers will start selling to more business entities besides actual end users. A great number of products and services which were technology based previously, but did not utilize the real power of cloud & fog technologies and Internet, will start realizing the benefits. Many services will be enabled by different software and applications where we do not see them now. Also, we will see more cooperation among companies who has medical certification for their products and hospitals.

Cooperation among companies instead of neck and neck competition will be higher in the domestic market, thus, networks will perform better. However, the stride towards something bigger than networks will be taken, which can be referred to as ecosystems. SH, another expert stated during an interview, "We have competitors working together in research projects because we do pre-commercial research. The companies believe they can build joint knowledge which they all can use in their own way. I also believe in ecosystems, not only networks. Because companies only participate in networks when they need something. But in the ecosystem they will do something together."

The evidence indicates that at the moment, the concept of an ecosystem is still somewhat abstract. By the

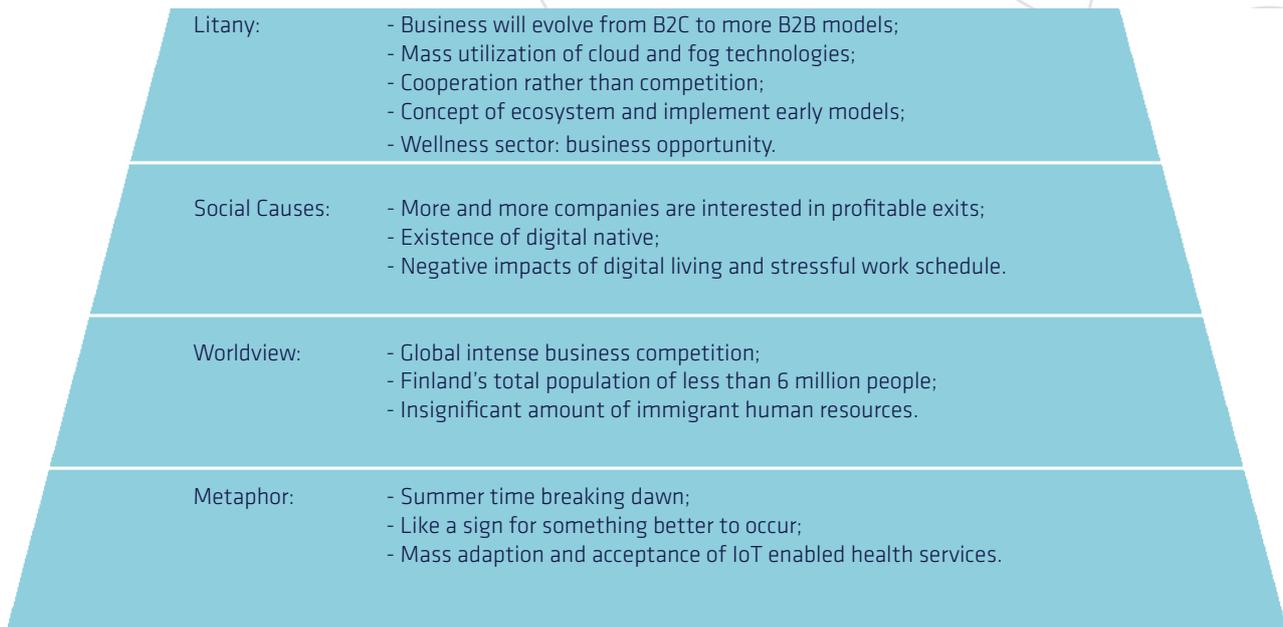


Figure 3: Summary of the Medium term future: "The breaking dawn" scenario

medium term future, market players and researchers will develop scientific knowledge to define an ecosystem and how to converge more companies in networks and networks into an effective ecosystem.

Since Finland's strongest link is its technology development, companies will focus more to that. Some major business activities will be outsourced to third party service providers. Companies in Finland realize the domestic market size is not enough for globally competitive business. Thus, they will start internationalizing more in numbers with their high quality certified IoT healthcare solutions. Service quality, accuracy, reliability and trust will be the major issues in gaining competitive advantage than fighting with price of other products in the western market. There will be some companies that will differentiate their products by pricing too. Companies differentiating with price are more likely to expand in some Asian and African markets. Companies that are differentiating with accuracy and reliability are likely to expand in the North American markets with higher price margin.

Marketing and sales alongside human resources will likely incur the major share of expenses due to outsourcing of activities. Business opportunities in this era will be endless for IoT enabled healthcare solutions due to the fact that the digital natives will be the drivers of the society. This group of people will be everywhere,

they will be the consumers, and they will be researchers, innovators and legislators. SH marked, "For the wellbeing business, it is private business and I believe that in future consumers will be more interested to buy different kinds of services". The digital natives' understanding of technology will boost the acceptance and mass adaption of such services. The wellness sector will see a massive boom in this medium term future due to the mass adaption.

Social causes: Numbers of companies look for profitable exits from the market; thus, the decision for outsourced solutions seems legitimate. Digital natives will obviously have impact on the mass adaption of more digital services. Additionally, digital living makes people lazy and leads to an unhealthy life. That will also encourage people adapting IoT enabled wellness solutions. Working people will be working more than regular shifts to keep up with the global competition which also increases the need for additional health attention.

Worldview: Global business competition will have direct impact on how the country's industries will operate. Golden days of the Western world are now past. A country with a population of less than 6 million and not a significant group of immigrants will have to work more than ever to keep up with highly volatile global competition in each sector. At the same time, the recent trend in Finland's winding down and minimalistic

lifestyle in one's retirement age will also offer some opportunities that introduce simplified multipurpose solutions.

Metaphor: We compare this medium term future with the summer time breaking dawn. When the dawn breaks roosters crow, birds chirp, birds flap together in groups and we as human beings wake up for another beautiful day. The time of breaking dawn is like a calling or a sign for something good to come. The sense of ecosystem building and stride towards that are such signs. Similarly, mass adaption and acceptance of digital services in this era will signify as the dawn for a better day.

By this medium-term future, participants in this sector will realize the benefits of working in clusters and early examples of ecosystems will also surface. The medium-term future is vital to show positive remarks on internationalization, working in networks and ecosystems for the organizations in this sector. Based on the results during this period, the long-term future will be shaped.

Long-term future: "The Ant Super-colony" scenario

Litany: On the long run with better understanding of ecosystems and how it operates, we will see multiple ecosystems working simultaneously in a complementing manner. However, by this time many ecosystems have been created and perished due to early trial issues. Preventive care and rehabilitation sector is likely to pose the bigger business opportunities alongside the need to create a single global platform for healthcare services. Different streams of technological advancements in different countries will offer opportunities.

Finnish IoT enabled healthcare industry as a whole will be a big export-based industry. The role of insurance companies will change significantly; they can even offer health care solutions to citizens and not only partner with healthcare providers. We will be spectating better cooperation between public and private sector. Public sector as client who pays for health services will regain its strength.

A lot of startups from the shorter term will die by then, but on the other hand the surviving ones will become good sized SMEs. As there will be better working eco-

systems in act, value propositions offered by companies will complement other companies to provide total solutions for citizens. There will be countless products and services for healthcare/wellness empowered by IoT, but how many of them will be of the desired quality? Consequently, the real value for money will bring competitive advantage for companies. Almost all of the

The earlier blind spot for technology & network cost in healthcare will be better absorbed by then. The cost for R&D will be relatively lower because most device innovation will reach maturity. However, the cost of human resources is going to drive the biggest share of costs. Finnish companies will find their place in global value chains. This industry will have a good impact on the overall economy of Finland. Thus the leaders from the industry will be better heard by the politicians and policy changes will be possible in a comparatively easier way than now.

Social causes: At this moment there is no global giant originated from Finland in the global business picture. There are a lot of tech based health service startups in the present market. Some of them will survive for a longer period and many more will be created. To make Finland's economy sustainable, there will be a need for jobs and a good portion can be created in this sector. The country needs a constant balance between taxation, regulation and business in this sector for continuous prosperity. For that, the industry first needs to reflect smart gross production by contributing to the national economy and then can be heard by the politicians for policy changes. All in all, Finland needs a healthy workforce that can work its way out with the limited population of the country.

Worldview: A large group of aged population added to a consistently very low population growth rate puts the faster economic growth in question. At the same time, all the countries in the world are greedy for power, assets and talents. Finland needs to be competent in these fights to retain local talents and assets. Global competition is multifold; companies need to compete with quality, price or accessibility and trust on a global level. Global competition will surely come from both developed and developing countries. Constant balance is thus required to maintain market position.



Figure 4: Summary of the Long term future: “The Ant Super-Colony” scenario

Metaphor: We call it the ant super-colony. According to BBC (Walker 2009) earth news in 2009 scientists discovered an ant super-colony in Southern Europe stretching over 6,000 kilometers and populating several billion ants together happily. Altogether this super-colony nested 33 different populations living in a connected system. We are aware of the team work ability of ants. When that is added to the ecosystem idea, it seems like a justified comparison to be encouraged for global dominance. The overall healthcare sector in Finland will have multiple ecosystems simultaneously. We see a substantial role of IoT in those ecosystems' building and growth.

Discussion & conclusions

Futures business models of IoT enabled health-care sector

At a glance, the business model changes for the future IoT health arena might seem pretty predictable if we consider each scenario in isolation. However, if the scenarios are considered as a broader picture, we can find a story underlying. Authors observe the role of the public sector as customer, being changed over time and again is becoming stronger on the long run, which is an exciting stream. Also, the role of R&D as a key operation is going to change in different time frames. Additionally, the prospect of IoT being an enabler in the health sector across wellness, care and health tech seems evident and is growing over time. Table 2 summarizes the prob-

able business model elements for each scenario and each time frame.

Healthcare companies in Finland currently lack somewhat of marketing and sales styles that reflect in the future as well. It is time that organizations start learning the art of creative marketing and selling. Similarly, on the short run future for better business results for IoT health solutions, Finnish companies need to work on better user experience and the usability of services. These early improvements should provide the sector with traction for a longer lasting globally sustainable competition. Having a small population, Finland will need the industry to be export-oriented and operate globally. This research foresees, more and more successful internationalization of firms from this sector during the medium-term future and beyond.

We approached the study with a linear sight towards the future and tended to understand the logics that will emerge and evolve. Some congruent trends that came up from professionals' viewpoint highlight, that, Finland should work for ecosystem environments in the healthcare as a whole, where IoT is a definite part, for the future. One of the interviewees marked that currently messages from industry players are too fragmented. This fragmentation needs to be reduced and that can be done when companies become part of a bigger cluster, larger networks and finally an ecosys-

Table 2: Probable business models of an IoT enabled healthcare sector in Finland

| | BM element | Short term | Medium term | Long term |
|-------------|----------------------------|--|---|---|
| | Business opportunity | Assisted living, Elderly care through connected services | Mass market for the digital natives, Pull from consumer side, Wellness sector | Preventive care, Rehabilitation sector, Global business expansion |
| What | Customer groups | Public sector as major payer, Private consumers for wellness business | More B2B customers, Private consumers for wellness business | Export based industry, B2B customers, Public sector as major payer again |
| | Value proposition | Gamifying health with statistics, Digital services for digital natives, Different points of care | Digital services at all levels | Total solution, Complement other companies' value promises |
| | Product offerings | Service based solutions | Software and application enabled services | Endless types and numbers of offers and digital services |
| | Competition and partnering | Traditional competition, Cooperation with others when needed | Networks will emerge in numbers in the sector | Efficiently working ecosystems |
| How | Competitive advantage | Companies need to evolve and keep up with changes | Service quality, accuracy, reliability and price | Better partnering, networking, agility |
| | Marketing and sales | More like as it is now, Niche marketing for niche products | Outsourced, Brand marketing | Private product/services sold through public channels |
| | Key resources | Technological readiness, Network and connectivity, Sales channels | Medical acceptance of many services, Strong technology infrastructure | Global value chains, Science based knowledge, Efficient working ecosystems. |
| | Key operations | R&D, create science based knowledge, improve usability and user experience | R&D about ecosystems, Internationalization | Internationalization, Attract international investment |
| Why | Basis of pricing | Service oriented pricing will emerge | Market competitive prices, Prices will come down due to R&D maturity | Service oriented pricing throughout the market, Better value adjusted |
| | Cost drivers and elements | R&D, Network and connectivity | Marketing & sales, Human resources | Human resources |

tem. Another respondent thinks there will be working ecosystems in the industry by the medium term future; however she expressed her doubts of seeing a single ecosystem lasting for longer period without wisdom, leadership, navigation, change management and adaptation.

One more major observation of this study is that Finnish companies in this sector are already realizing the needs and benefits of working in cooperation rather than competing while the major competitors are waiting outside the national border. This understanding about cooperated international competition will help approach many challenges which would be more difficult if the task was left for an individual company. The startup scene in Finland has played a vital role in this course. Some products and services that are being developed now are breathtaking according to another interviewee. These services need a global market for longer sustainability. However, global digital literacy and connectivity issues stand as obstacles now. Given enough time and simplifying these innovations, it is possible to deliver them to any part of the globe, whether to more advanced North American markets or comparatively less advanced Sub-Saharan Africa. The challenge for companies is to anticipate proper timing for expansion in the proper direction depending on their own readiness and the market's readiness in regard to economic condition, digital literacy, network and connectivity standards.

As stated earlier, this research considers business opportunities to lie at the heart of the business model. So, for each time frame some potential key business opportunities are identified. Finland has a huge group of ageing population who needs proper care. For the short term future elderly care and assisted living seems to be the most prospective business opportunities. In a few years, we will have a society full of digital natives who never saw a society without computers, mobile phones and the Internet. Thus a huge market full of digital natives will offer wider opportunities for many companies to experiment and offer. During the medium-term future, we will see extensive adaptation of wellness products and applications aided by IoT. For the long-term future, this research identifies preventive care and rehabilitation sector to be the potential flourishes for IoT interventions. Besides, by the long-

term future companies in Finland will gain better understanding about global markets. Internationalization will be another aspect of business opportunity during the medium to the long term future.

The table provides a conceptual space by depicting different business model elements, as what it could be at that time frame but not exact prediction. This accumulation of business model elements can serve industry players to better model their own business model as a part of the industry.

Business model and CLA

Recently, the attention has been focused on the evolution and transformation of the business models as a method of researching the futures (Ahokangas & Myllykoski, 2014). This change is due to the characteristics of today's world market where a growing number of small companies with new and alternative business models and fast innovation progress that challenges the incumbents (Rohrbeck, Döhler & Arnold, 2009) are emerging. As a result, a successful reinvention of business models to respond to environmental shifts is substantially influencing the possible future success of an enterprise (Wirtz, Schilke & Ullrich, 2010). It is arguable that from an industry point of view, similar successes are achievable if industry business models can be mapped by creating a wholesome picture.

Using the future as a setting where transformation will happen is about the habits and world views (Inayatullah, 2007); however, the notion of business model reflects the realized strategy of the firm (Masanell & Ricart, 2009) which includes the logic of the value creation and capture as well as the architecture of the business. Thus, the combination of these two concepts provides a firm tool for researching and creating sustainable prospective business models.

CLA is a future-oriented method that can be utilized in many circumstances. It leads to creating transformative spaces for generating alternative futures by questioning the past, present and future. It is grounded on the premise that the way a problem or an issue is formulated and framed influences how it is perceived and changes the actors who are responsible for solving them. CLA applies deconstructed linguistics to elicit knowledge and experience on the whole context

by moving up and down in these four layers/ways of knowing. The litany view point is simplistic and rule-oriented. The social causes view is able to analyze the world complications subtly. The discourse/worldview layer is concerned with rather profound analysis of complications. (Inayatullah & Milojević, 2015).

At the abstract level, business models are complex entities that are embedded in the organizations (Casadesus-Masanell and Ricart, 2010). However, they are socially constructed and representable using words or meta-models. Understanding the construction of the business models is influenced by our perception of a model which might range from "ideographic understandings to general and perceptive (nomothetic)". Therefore, business models can be static or dynamic entities which contain elements of learning based on the understanding the linkages and the causal relationships among the building blocks of the model (Jensen, 2013).

The horizontal analysis of CLA investigates alternative ways of knowing within a certain layer through scenarios. It originally occurs in social causes and discourse/worldview layers. Social causes questioning discloses multiple understanding of an issue which can be corresponded to the horizontal dimension of the business model concept. Discourse/world view asks about values, perspectives, viewpoints and their effects. Finally, the metaphor layer can help build and choose a future instead of only foreseeing. In that sense, business models can be transformed based on available resources, relations and logic. These are also associated with actors, processes and outcomes. Therefore, they are connected to the future market.

This paper attempted to display a way of using the business model-CLA combo to understand and analyze the future of Finnish IoT enabled healthcare sector. Unlike other foresight methodologies, CLA professes less of predicting the actual future rather opening up transformational conceptual space for practitioners. We argue that the combination of Business Model Wheel (BMW) as a tool and CLA offers additional structure to look at the industry future. This BM-CLA structured lens provides us the tool to create a wholesome picture. Then we can break it down into smaller parts and find out probable future business model elements for

the industry.

For this study, first, we designed the interview framework combining business models and CLA by creating a two-axis matrix. This matrix helped us to develop a focused but wide enough question set, so that we could collect the required data that eventually enabled us to create a wide and holistic picture of the sector. To succeed in looking at the future of an industry by using business models, it is necessary to understand the overall market opportunities, market context, market participants, competitors, partners, customer groups, different value streams, basis of pricing, different product offerings and financial aspects as a whole.

While looking at the future of an industry instead of a certain company we utilize some steps from the Bouwman et al (2012) tools like identifying desired changes, analyzing the impact of desired changes, translating BM changes and identifying uncertainties. Also, as Bouwman et al suggests in their discussion that all these should be translated to specific activities. However, because we focus on industry level, the findings of this study thus can be a guide for individual organizations for developing their business models and identify specific activities for alternation. This also complements the claim from CLA perspective by not predicting exact future of an entity, rather offering transformative conceptual space for development. Business model wheel in this case offers additional space for conceptualizing by emphasizing market opportunities unlike other prominent tools.

Based on the interview outcomes three linear progressive future business scenarios were constructed for the context of the study. Scenario planning is virtually applicable to any situation where the intension is to imagine how the future might unfold (Schoemaker, 1995; Jetter & Kok, 2014). Schoemaker (1995) also stated "scenario planning simplifies the avalanche of data into a limited number of possible states (pp. 27)" to open a space for better strategic planning. Empirical evidence supported the feasibility of the created scenarios which tell a whole story about the market for three different time horizons. For this study, the short-term future is considered as 5 years in the future, the medium-term future as 10 years ahead and the long-term future is considered as 15 years from now. The use

of CLA layers in scenario writing expands the range and richness of each scenario and helps to analyze feasibility (Inayatullah, 2004). Finally, we further analyze the CLA translated qualitative scenarios to concretize the list of probable futures business model.

Conclusion

Ahokangas et al (2015) argued for future centricism in the next generation of business modeling research. Bouwman et al (2012) offered different tools for organization specific approach to handle business model development for the future. Building on futures thinking and Amit & Zott's (2001) note, we consider it is just to use the business model as the basis of analyzing the industry future and open up space for thinking for the practitioners. Thus, in this paper we display a way of applying the business model concept to analyze an industry and industry opportunities.

With theoretical understanding coupled with qualitative empirical data, we developed and translated three linear continuous future scenarios using the business model-CLA combo. We presented a holistic conceptual space of the future for the context of the study. We have analyzed the empirical data to create futures scenarios and derived different business models. We explicated some probable future trends in business models and how they might evolve. We have identified major business models elements including opportunity, revenue, cost perspective, value proposition, customer, competencies and competition perspective. The interview framework that we developed was a balance between business model wheel framework and CLA. Finally, using the concept of busing models alongside CLA, we have created the futures business picture of an industry. The series of congruent scenarios was created based on different time frames to understand the future more profoundly. Besides, the created approach could have helped identifying business model elements and lifecycles (i.e. 5, 10 and 15 years ahead) as a guide for the future market over time.

The concept of ecosystem is elusive, complex and very little understood till now. There is need for more research in that perspective, in order to understand what can be called an ecosystem and how to organize such a setup. The healthcare industry in Finland is growing fast and IoT is surely going to play an outstanding role

in its development. The interest lies in finding out how much IoT will foster the speed of growth in this sector. Change is complex, and necessary, when we think about the future. Instead of disregarding the future, we illustrated three future scenarios out of many other possible ones with an attempt to create a more harmonized long-term real future where Finnish companies take lead globally and operate in an ecosystem that complements local entities in order to provide a total solution for public health.

Besides the CLA-BM combo, we perceive additional theoretical contributions of the paper for the business model literature. This study shows how business models are going to be transformed over a longer period of time in the future for the industry. Further studies can also hence explore strategic transformations that are needed for policy developments (Ivri, 2015). Our findings suggest the need for new service concepts and pricing models which resembles the notion on how these can help companies gain competitive advantage (Petri, 2014). Furthermore, we point out the existing interest on ecosystem ideation and building for the industry. To do so, we observe a potential to apply concepts like network-based business models (Lund & Nielsen, 2014).

There are few limitations in this current study to mention. First, because we adapted a futures research methodology and applied it to look at far future, we needed to draw conclusions based on logical assumptions and not exact predictions about the future. Second, this research presents empirical analysis of the IoT enabled healthcare sector from a futures perspective, which is one of many industries which might benefit from the use of business model- CLA combo to look at the future. Since this study proposes a novel way to combine business model and CLA, it is arguable that the exploratory approach is applicable to other industries as well. Additionally, because this is the first attempt to combine business models and a futures research methodology to look at industry's future, there were no existing literature to reflect and compare the findings' application.

Despite the limitations, this research opens the way for further research in the futures avenue for business problems. One possibility can be employ the explorato-

ry approach of business model-CLA combo in researching other industries. In addition, further research with similar approach can result in a standardized futures business research technique. From a contextual point

of view, it is evident that the IoT/healthcare industry calls for further research on the concept of business ecosystems from the network-based business models perspective.

Reference list

- Afuah, A., & Tucci, C. L. (2001), *Internet Business Models and Strategies: Text and Cases*, 1st edn, McGraw-Hill Higher Education.
- Afuah, A. (2004), *Business models: A strategic management approach*, McGraw-Hill/Irwin., New York.
- Ahokangas, P., Atkova, I., Moqaddamerad, S. & Juntunen, M. (2015), "Bringing futures thinking to business model innovation", Paper presented at 23rd Nordic Academy of Management Conference 2015, Copenhagen, 12-14 August.
- Ahokangas, P., Juntunen, M. & Myllykoski, J. (2014), "Cloud Computing and Transformation of International E-Business Models", *A Focused Issue on Building New Competences in Dynamic Environments (Research in Competence-Based Management, Volume 7)* Emerald Group Publishing Limited, 7, 3-28.
- Ahokangas, P. (2014). The practice of creating and transforming a business model. *Journal of Business Models*, 2(1).
- Amendola, S., Lodato, R., Manzari, S., Occhiuzzi, C. & Marrocco, G. (2014), "RFID Technology for IoT-Based Personal Healthcare in Smart Spaces", *Internet of Things Journal*, IEEE, vol. 1, no. 2, pp. 144-152.
- Amit, R. & Zott, C. (2001), "Value creation in e-business", *Strategic Management Journal*, vol. 22, no. 6, pp. 493-520.
- Applegate, L., M. (2001), "E-business Models: Making sense of the Internet business landscape", *Information technology and the future enterprise: New models for managers*, Prentice Hall, Upper Saddle River, pp. 49-94.
- Atzori, L., Iera, A. & Morabito, G. (2010), "The Internet of Things: A survey", *Computer Networks*, vol. 54, no. 15, pp. 2787-2805.
- Baden-Fuller, C. & Morgan, M.S. (2010), "Business models as models", *Long range planning*, vol. 43, no. 2, pp. 156-171.
- Balandin, S., Balandina, E., Koucheryavy, Y., Kramar, V. & Medvedev, O. (2013), "Main Trends in mHealth Use Scenarios", *Journal On Selected Topics In Nano Electronics And Computing*, vol. 1, no. 1, pp. 64-70.
- Bouwman, W. A. G. A., De Reuver, G. A., Solaimani Kartalaei, H., Daas, D., Haaker, T., Janssen, W., ... & Walenkamp, B. (2012), "Business models: Tooling and a research agenda. In 25th bled econference eDependability: Reliable and Trustworthy eStructures, eProcesses, eOperations and eServices for the future", 17-20 June 2012, Bled, Slovenia. Bled eCommerce Conference.
- Briggs, J., Adams, C., Fallahkhair, S., Iluyemi, A. & Prytherch, D. (2013), "M-health review: joining up healthcare in a wireless world." Working Paper. University of Portsmouth, Portsmouth.
- Casadesus-Masanell, R. & Ricart, J. E. 2010. From Strategy to Business Models and onto Tactics. *Long Range Planning*, 43, 195-215.

- Coetzee, L. & Eksteen, J. (2011), "The Internet of Things - promise for the future? An introduction", IST-Africa Conference Proceedings 2011, IEEE, pp. 1-9.
- Domingo, M.C. (2012), "An overview of the Internet of Things for people with disabilities", Journal of Network and Computer Applications, vol. 35, no. 2, pp. 584-596.
- Dubosson-Torbay, M., Osterwalder, A. & Pigneur, Y. (2002), "E-business model design, classification, and measurements", Thunderbird International Business Review, vol. 44, no. 1, pp. 5-23.
- Fernandez, F. & Pallis, G.C. (2014), "Opportunities and challenges of the Internet of Things for healthcare: Systems engineering perspective", Wireless Mobile Communication and Healthcare (Mobihealth), 2014 EAI 4th International Conference on, pp. 263.
- Hayward, P. (2004), "Facilitating foresight: where the foresight function is placed in organisations.", Foresight, vol. 6, no. 1, pp. 19-30.
- Hedman, J., & Kalling, T. (2003). The business model concept: theoretical underpinnings and empirical illustrations. European journal of information systems, 12(1), 49-59.
- Inayatullah, S. & Milojević, I. (2015). Transformative research in theory and practice. Tamkang University publication. Taipei, Taiwan.
- Inayatullah, S. (2008), "Six pillars: futures thinking for transforming", Foresight, vol. 10, no. 1, pp. 4-21.
- Inayatullah, S. (2007). Questioning the future: methods and tools for organizational and societal transformation. Ed. Third, Tamkang University Press. Taipei, Taiwan.
- Inayatullah, S. (2005), Questioning the Future: Methods and Tools for Organizational and Societal Transformation. Taipei: Tamakang University Press.
- Inayatullah, S. (2004), The causal layered analysis (CLA) reader: Theory and case studies of an integrative and transformative methodology. Taipei: Tamkang University Press.
- Inayatullah, S. (2000), "Tips and pitfalls of the futures studies trade", Foresight, vol. 2, no. 4, pp. 369-374.
- Inayatullah, S. (1998), "Causal layered analysis: Poststructuralism as method", Futures, vol. 30, no. 8, pp. 815-829.
- Iivari, M. M. (2015). Dynamics of Openness in SMEs: A Business Model and Innovation Strategy Perspective. Journal of Business Models, 3(2).
- Jensen, A. B. (2014). "Do we need one business model definition?". Journal of Business Models, 1(1), pp. 61-84.
- Jetter, A. J., Kok, K. (2014). "Fuzzy Cognitive Maps For Futures Studies- A methodological assessment of concepts and methods". Foresight, 1, 27.
- Johnson, M.W., Christensen, C.M. & Kagermann, H. (2008), "Reinventing your business model", Harvard business review, 86(12), pp. 57-68.

- Liu, L. & Jia, W. (2010), "Business model for drug supply chain based on the internet of things", 2nd IEEE International Conference on Network Infrastructure and Digital Content, pp. 982-986.
- Lund, M., & Nielsen, C. (2014). The evolution of network-based business models illustrated through the case study of an entrepreneurship project. *Journal of Business Models*, 2(1).
- Masanell, R.C & Ricart, J.E (2009). From strategy to business models and to tactics. Working paper. IESE Business School- University of Navarra.
- Masini, E. (2006), "Rethinking futures studies", *Futures*, vol. 38, no. 10, pp. 1158-1168.
- Morris, M., Schindehutte, M. & Allen, J. (2005), "The entrepreneur's business model: toward a unified perspective", *Journal of business research*, vol. 58, no. 6, pp. 726-735.
- Nielsen, C., Ahokangas, P., Cöster, M., Westelius, A., Iveroth, E. & Petri, C. (2014), "Editorial: The Business Model Eruption and How Game Changing Mind Sets Challenge Existing Nodes of Business", *Journal of Business Models*, vol. 2, no. 1, pp. 1-5.
- Onetti, A., Zucchella, A., Jones, M.V. & McDougall-Covin, P.P. (2012), "Internationalization, innovation and entrepreneurship: business models for new technology-based firms", *Journal of Management & Governance*, vol. 16, no. 3, pp. 337-368.
- Osterwalder, A. & Pigneur, Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers*, Wiley, Hoboken, NJ [etc.].
- Osterwalder, A. (2004), "The business model ontology: A proposition in a design science approach", *Universite de Lausanne, Lusanne*.
- Pigneur, Y. & Tucci, C.L. (2005), "Clarifying business models: Origins, present, and future of the concept", *Communications of the association for Information Systems*, vol. 16, no. 1, pp. 1.
- Pang, Z., Zheng, L., Tian, J., Kao-Walter, S., Dubrova, E., & Chen, Q. (2015). Design of a terminal solution for integration of in-home health care devices and services towards the Internet-of-Things. *Enterprise Information Systems*, 9(1), 86-116.
- Petri, C. J. (2014). Using an innovative price model to leverage the business model-The case of price model innovation in the largest Swedish taxi company. *Journal of Business Models*, 2(1).
- Porter, M. E. (1991). Towards a dynamic theory of strategy. *Strategic management journal*, 12(S2), 95-117.
- Research and Market. (2013), *Mobile Health Trends and Figures 2013-2017 Report Highlights 10 Key Trends that will Shape the mHealth Market Until 2017*, URL: <http://www.reuters.com/article/2013/07/23/research-and-markets-idUSnBw236434a+100+BSW20130723>, (accessed 07 March 2015).
- Research2Guidance. (2013), *Mobile Health Trends and Figures 2013-2017*, URL: <http://research2guidance.com/product/mobile-health-trends-and-figures-2013-2017/>, (accessed 31 March 2016).
- Richardson, J. (2008). The business model: an integrative framework for strategy execution. *Strategic change*, 17(5-

6), 133-144.

Rohrbeck, R., Döhl, M. & Arnold, H. (2009) Creating growth with externalization of R&D results: The spin-along approach. *Global Business and Organizational Excellence*.

Schoemaker, P. J. (1995). "Scenario planning: a tool for strategic thinking". *Sloan management review*, 36(2), 25-50.
Seelos, C. & Mair, J. (2007), "Profitable business models and market creation in the context of deep poverty: A strategic view", *The academy of management perspectives*, vol. 21, no. 4, pp. 49-63.

Shafer, S.M., Smith, H.J. & Linder, J.C. (2005), "The power of business models", *Business horizons*, vol. 48, no. 3, pp. 199-207.

Timmers, P. (1998), "Business Models for Electronic Markets", *Electronic Markets*, vol. 8, no. 2, pp. 3-8.

Walker, M. (2009), Ant mega-colony takes over world, URL: http://news.bbc.co.uk/earth/hi/earth_news/news-id_8127000/8127519.stm, (accessed 31 March 2016)

Weill, P. & Vitale, M. (2013), *Place to space: Migrating to eBusiness Models*, Harvard Business Press.

Westerlund, M., Leminen, S., & Rajahonka, M. (2014). Designing business models for the internet of things. *Technology Innovation Management Review*, 4(7), 5.

Whitmore, A., Agarwal, A. & Xu Da, L. (2015), "The Internet of Things—A survey of topics and trends", *Information Systems Frontiers*, vol. 17, no. 2, pp. 261-274.

Wirtz, B.W., Pistoia, A., Ullrich, S. & Göttel, V. (2015), "Business Models: Origin, Development and Future Research Perspectives", *Long range planning*.

Wirtz, B.W, Schilke, O., Ullrich (2010). Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet. *Long Range Planning* 43, 272-290.

Xu, Li. Da., He, Wu., & Li, Shancang. (2014), "Internet of Things in Industries: A Survey", *Industrial Informatics, IEEE Transactions on*, vol. 10, no. 4, pp. 2233-2243.

Appendix 1: Interview framework

This framework was used a guide for the interviews. In most cases questions were rephrased and adjusted to the progression of discussion.

| | What: Customers, offering, Value proposition, value networks, competition | How: Selling & Marketing, service delivery, competitive advantage, key operation | Why: Pricing, charging, cost elements, cost drivers | Where: Organizational environment (Internal), External organizational environment | Opportunity |
|-----------------------|--|---|---|---|--|
| Litany: | 1. How do you think customers groups can be identified and segmented in the future | 7. How do you think the selling and marketing activities will change in the future from now | 13. How might the pricing model and basis of pricing be changed in the future | 19. How do you think the impact of organizational environment on business performances will change over time in the future | 23. What could be the business opportunity for in the future in your opinion? |
| | 2. What might be the different value propositions designed in in the future your opinion | 8. What mode of service delivery can take lead in your opinion | 14. What sort of current cost elements could be there in the future | 20. How do you think the impact of external business environment on business performance will change over time in the future | |
| | 3. Do you think business networks and competition will be different in the future compared to current markets? If yes, how? | 9. How can companies gain competitive advantages in this industry | 15. What sort of new cost elements might come up in the future | 16. What will be the major cost drivers for the health IoT business | |
| | 4. What sort of product/service offerings can be there in the future in the health IoT business | 10. What will be the key operations and resources in the future in your opinion | 17. What could cause such pricing and cost structure changes in the way you mentioned | 21. What might encourage such changes in impact of organizational and external environments on business performance will change over time | |
| Social Causes: | 5. Why do you think companies would be interested to act like this in the future | 11. Why would companies design such campaigns in future in your opinion | 18. Why do you think such cause will take place | 22. Why do you think such encouragements arise | 24. Why do you think the business opportunity might come from that specific source or in that form |
| World-views: | 6. What deeper reason could be causing the social changes that is likely to interest companies in such a way | 12. Why do you think such social changes will take place | 25. What global issues might have an impact on such opportunity being generated or identified | | |
| Meta-phor: | 26. If you are asked to compare the overall structure of the futures business model of an IoT enabled business model, how would compare it to a metaphorical setting | | | | |

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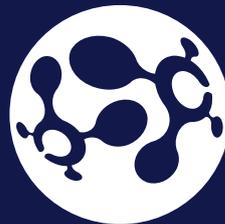


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