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Conceptualizing business models in industrial networks

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ABSTRACT

This paper is concerned with business model conceptualizations and outlines a framework for their analysis in industrial networks. A literature review suggests that there is a broad range of current conceptualizations of business models. Analyzing them as they pertain to interaction, business relationships, and industrial networks reveals two main explanations for their differences: first, they clearly rely on different basic theoretical assumptions, and second, they seem to address two types of business models. We refer to these as firm-centric and network-embedded business models. Based on this distinction, a scheme of analysis at the levels of the firm, relationship and network is suggested for the two types of business models. Business models are challenging from an analytical as well as managerial perspective. Further research on emerging network-embedded business models is suggested.

1. Introduction

The starting point for addressing business models, and eventually to write this paper, was that we were invited by an automotive OEM to research developing new business models on emerging markets. The many business models identified in the literature spurred our interest in how they can be conceptualized to capture industrial network phenomena, and thus how they can be based on theoretical assumptions of interdependence among interacting firms.

Modelling business activity has always been a key concern for IMP scholars. The interaction model (Håkansson, 1982), the Activities-Resources-Actors framework (Håkansson, 1987), and the analytical scheme of business relationship development effects (Håkansson & Snehota, 1995) are all models of business in industrial networks. However, "business models", as a concept, has only recently received interest from researchers that rely on the industrial network approach (see, e.g., Freytag & Clarke, 2012).

According to most scholars, the concept is poorly defined (see, e.g., Chesbrough & Rosenbloom, 2002; Mahadevan, 2000; Morris, Schindehutte, & Allen, 2005; Zott, Amit, & Massa, 2011). Moreover, a common claim is that current business model conceptualizations are not theoretically grounded (Hedman & Kalling, 2003), and that when business model dynamics are concerned there is a need to learn more about "the forces that facilitate and impede constructive adaptation in the elements of an extant business model" (Chesbrough & Rosenbloom, 2002: 552).

According to Mason and Palo (2012) a key limitation of the main body of business model literature is that it creates a description of the firm at a single point in time and that it fails to consider the influence of the business network. Moreover, Mason and Spring (2011) argue that this literature fails to show the power of business models to bring about change in business networks. While most business model conceptualizations focus on the firm vis-à-vis generalized "markets", Mason and Spring (2011: 1032) note their use in Internet-based businesses in which "firms were being understood from the outset in terms of their position and role in business networks".

Coombes and Nicholson (2013) note that business models have received very little attention from marketing scholars. In particular, they suggest that the IMP Group's focus on interaction and networks could make distinctive contributions to the literature: "The focus within that perspective on the embeddedness of action and relationships across time also offers the potential to develop dynamic open-business models that evolve over time and which are not fixed and static entities…" (Coombes & Nicholson, 2013: 663). In this paper, we inquire further into the notion of "open" business models and how it relates to interaction, business relationships and industrial networks.

Two types of business models are identified: firm-centric and network-embedded. This distinction, together with differences in basic theoretical assumptions, may explain some of the variety among the approaches to the business model concept. Moreover, we inquire into the meaning of "open ends" and suggest that these are relying on interaction between various parties. We conclude that analysis of interaction is vital for the understanding and development of both kinds of business models.

A framework for business models relying on exchange as the smallest unit of analysis is offered. Three levels of analysis, that is, the

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firm, the relationship and the network, are suggested as ways to address the two types of business models. Interaction is identified as the force underlying the emergence of business models since open-ended, interactive interfaces with specific partners permit companies to influence, and to be influenced by, their direction and scope.

The paper is structured as follows: In the next section, we present an overview of some of the most recognized business model conceptualizations. In the third section, we discuss them in view of their theoretical assumptions of "business life" and in relation to the type of model they capture. In the fourth section, we suggest a framework for analysis of business models. In the concluding discussion, we discuss recent developments of business models and make suggestions for further research. In the last section, we point out some managerial implications.

2. Business model conceptualisations

There is a broad range of business model conceptualizations in the literature. In this section, we review the most cited contributions with an emphasis on: (1) definitions and components, (2) theoretical underpinnings, and (3) how network aspects are captured.

2.1. Definitions and components of business models

Based on a literature review, Zott et al. (2011) identify four common themes: (1) business models emerging as a new unit of analysis; (2) business models emphasizing the system level, that is, holistic approaches to explaining how firms "do business", (3) firm activities influencing conceptualizations of proposed business models, and (4) business models seeking to explain how value is created.

Most researchers conceive of a business model as answers to the following questions: How to create value? How to make customers pay for that value? How to convert payment through firm-internal operations into profit? (Chesbrough & Rosenbloom, 2002; Morris et al., 2005; Teece, 2010). Business models have also been described as stories that explain how enterprises work and answer such questions as: Who is the customer? How do we make money? What underlying economic logic explains how we can deliver value to customers at an appropriate cost? (Magretta, 2002: 86).

Doganova and Eyquem-Renault (2009) show that business models can be analyzed as a "market device", which (with reference to Callon, Millo, & Muniesa, 2007) is, "a market-enabling instrument that operates empirically for the enhancement of socially situated practices of calculation and decision-making" (ibid.: 1561). Doganova and Eyquem-Renault also suggest that business models can be seen as "boundary objects". Chesbrough and Rosenbloom (2002), in turn, argue that business models can be seen as "focusing devices" that mediate between technological development and economic value creation: "The business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs" (ibid.: 532). According to Chesbrough and Rosenbloom (2002: 549), the ultimate role of the business model for an innovation is to ensure that its technological core delivers value.

Studies of business models have mainly taken a firm-level perspective, typically with a focus on technology-based and/or entrepreneurial firms (see, e.g., Ghosh, 1998; Gordijn & Akkermans, 2001; Morris et al., 2005). How the firm is assumed to relate to its environment underpins the conceptualizations. Most often the firm is considered in relation to customers (in general) or to "classical marketing thinking" (Håkansson, Harrison, & Waluszewski, 2004). In contrast to such "firm and market" concepts, Mason and Spring (2011) suggest a framework consisting of three main elements: the market offering, the technology, and the network architecture. In their model, the technology element contains four dimensions: product, process, core, and infrastructure. Firms in the network have different degrees of control over these dimensions, but since they are all influencing business models, they should not be treated as "environmental variables", but, "as part of the network of internal and external actors that practice the business model" (ibid.: 1034). Moreover, Mason and Spring suggest four dimensions of network architecture: capabilities, transactions, markets and standards, and relationships. Capabilities include those that a firm can access and utilize indirectly within the wider business network. The ease with which firms can access their counterparts' capabilities is influenced by the existence and development of markets and standards. The structure, content, and governance of transactions (suggested as a definition of business models by Amit and Zott (2001)) link this dimension of network architecture to relationships. In a similar way, Hedman and Kalling (2003) suggest including customers and competitors, the offering, activities and organization, resources and factor market interactions, emphasizing the causal interrelations and longitudinal processes by which business models evolve.

Other alternatives to "firm and market" approaches have been presented. For instance, Mahadevan (2000) suggests that a business model is a unique blend of three "streams" (value, revenue and logistical) that identify the value propositions to the buyers, sellers and other actors. Furthermore, Mahadevan describes "the process of arriving at an appropriate business model" involving choices of "the right mix of alternatives" (ibid.: 66) and points out three factors that affect this choice: the role in the market structure, the physical attributes of the goods traded, and the personal involvement required in the buying/selling process. Mahadevan (2000) expands this concept in the market/network dimension while the technological considerations are limited to the physical attributes. Since Mahadevan addresses *e*-commerce, these attributes are focused on whether or not electronic transfer is possible. Ghosh (1998), also focusing on e-commerce, takes a relational view by suggesting that, "…by allowing for direct, ubiquitous links to anyone anywhere, the Internet lets companies build interactive relationships with customers and suppliers, and deliver new products and services at very low cost." (ibid.: 126).

Another approach to how business models extend the firm boundary has been suggested by Zott and Amit (2010), who conceptualize a system of interdependent activities that transcends the focal firm boundaries. Taking a somewhat broader scope, Zott et al. (2011: 1020) suggest that "the business model is a new unit of analysis that is distinct from the product, the firm, industry, or network; it is centered on a focal firm, but its boundaries are wider than those of the firm…." Moreover, Mason and Palo (2012) describe business models as "frames" that configure multiple components or elements encased by narratives that explain how a business works. Table 1 summarises examples of business model concepts and the contexts for which they have been developed. We have focused on references that include explicit definitions and components.

2.2. Theoretical underpinnings of common conceptualisations

Several authors stress the need to develop theoretically sound business models (see, e.g., Amit & Zott, 2001; Hedman & Kalling, 2003; Mahadevan, 2000; Morris et al., 2005; Porter, 2001; Zott et al., 2011). Amit and Zott (2001) present a model of the "value creation potential" of *e*-businesses, noting that: "no single entrepreneur or strategic management theory can fully explain the value creation potential of e-business. Rather, an integration of the received theoretical perspectives on value creation is needed" (ibid.: 493). In particular, Amit and Zott argue that the value creation in e-business goes beyond the value chain (as conceptualized by Porter, 1985), the strategic networks among firms (Dyer & Singh, 1998), and the exploitation of firm-specific core competences (Barney, 1991). Therefore, their business model is suggested as "a unifying unit of analysis that captures the value creation arising from multiple sources" (Amit & Zott, 2001: 494), and is defined as follows: "A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities" (ibid.: 511).

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Table 1
Examples of business model conceptualizations.

Source	Description/definition	Conceptual components	Context
Mahadevan (2000)	A unique blend of the three streams (see conceptual components).	(1) Value stream (2) Revenue stream (3) Logistical stream	*E*-commerce/Internet
Hedman and Kalling (2003)	Based on the casual inter-relations among those components which emerge over time	(1) Customers (2) Competitors (3) Offering (4) Activities and organization (5) Resources (6) Supply of factor and production inputs (7) Longitudinal process	Information systems
Morris et al. (2005)	Captures key aspects of a business plan, but excludes operational issues; includes strategy elements, but is not strategy. A business model is not an activity set, even though activity sets support the components of a business model.	(1) Factors related to offering (2) Market factors (3) Internal capability factors (4) Competitive strategy factors (5) Economic factors (6) Growth/exit factors	Entrepreneurial
Chesbrough and Rosenbloom (2002)	Articulates the value proposition; identifies a market segment; defines the value chain structure; estimates cost structures and profit potential; describes the position of the firm within the value network; formulates the competitive strategy	(1) Technological inputs: e.g., feasibility, performance (2) Economic outputs: e.g., value, price, profit	General/innovation
Mason and Spring (2011)	Frames for action	(1) Technology (2) Network architecture (3) Market offering	General
Gordijn and Akkermans (2001)	The articulation of the economic value proposition	(1) Business value viewpoint (2) Business process viewpoint (3) System architecture viewpoint	*E*-business information systems
Teece (2010)	Defines how a firm delivers value to the customer, entices the customers to pay for that value and converts those payments to profit.	(1) Supplier specification value proposition? (2) Related appropriation mechanism? (3) How can imitators be avoided?	Business strategy and innovation

Expanding on this, Zott et al. (2011) argue that business model research has developed in isolation and that this hampers "a more unified study of business models" (ibid.: 1020). Hedman and Kalling (2003) argue along similar lines and suggest that there is a need to integrate theories that deal with industry structure, strategy, value chains and resources. The combinations of theories are considered necessary in order to fully grasp the potential of information systems, since each only offers a limited scope of possibilities.

While these are examples of suggested "mixed" theoretical approaches to the business model concept, Chesbrough and Rosenbloom (2002) take a clear starting point in the strategy literature and argue that their suggested concept may "inform these earlier perspectives" (ibid.: 532). The business model is offered as a construct that mediates the value creation process as it "translates between the technical and the economic domains, selecting and filtering technologies, and packaging them into particular configurations to be offered to a chosen target market" (ibid.: 550). Although Chesbrough and Rosenbloom's construct clearly relies on a "firm and market" approach, the cases presented exemplify how the companies' business models emerge from interactive processes involving, for example, entrepreneurs, customers, and sources of funding.

According to Spieth, Schneckenberg, and Ricart (2014), business models are traditionally concerned with "firm-level value creation" while innovation poses additional questions about "novelty in customer value propositions and about logical reframing and structural reconfigurations of firms" (ibid.: 237). Spieth et al. refer to Markides' (2006: 20) definition of business model innovation: "the discovery of a fundamentally different business model in an existing business", and state that the phenomenon represents a "slippery" construct to study owing to "inconsistencies in the conceptual framework of business models itself" (Spieth et al., 2014: 238). Moreover, while some scholars (e.g., Teece, 2010) see business model innovation as conceptually separate from technological innovation, others, like Mason and Spring (2011), consider it as part of the business model concept (Mason & Palo, 2012).

2.3. Business models and networks

Freytag and Clarke (2012) point out two major limitations in traditional business model approaches. One is that organizational re-design is seen as a minor challenge in that, for example, path dependence is only to a limited degree taken into account. Second, the approaches lack consideration of network-embeddedness: "Firms are seldom independent, but are often embedded in a network in which changes have to take place not only in one firm, but in a number of firms" (ibid.: 5). Freytag and Clarke thus point out the importance of considering the embedded nature of business models and consequently that individual firms cannot change business models without considering the consequences for their business partners. There are several recent suggestions of such open, or embedded, approaches to business models.

Mason and Spring (2011) emphasize networks by suggesting that interaction between technology (development), market offering (development) and network architecture (development) shapes what a business model becomes. The authors characterize the market offering as: "…consisting of the value-creation opportunity arising from alternative combinations of artefacts, access to suppliers' capabilities and capacities, and activities performed by the supplier(s) on the customer and/or its property." (ibid.: 1035). Other network-based models, such as that presented by Mason and Leek (2008), include dynamic aspects as they consider business models as emergent, network-embedded phenomena. Mason and Leek conceptualized dynamic business models as "the emergent outcomes of preconceived network structures built through the development of routines that guide problem solving" (ibid.: 774).

Coombes and Nicholson (2013) argue that networked and open business models are an emerging theme: "An open-business model examines the creation of value between stakeholders, rather than simply considering the value created within the boundaries of a single firm" (ibid., 658). In line with these assumptions, Palo and Tähtinen (2013) present a "networked business model" to be used when it is impossible for a single company to govern all the relevant resources and activities

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needed in developing, producing and marketing technology-based services. They note that the main challenge for managers is "business model dynamics": "The networked business model is not a static model of the net, but it needs to be constantly adjusted and developed according to the changes in the environment as well as the net" (ibid.: 385).

3. Discussion of previous literature

In this section we discuss two vital aspects of the business model conceptualizations. First, we inquire into the theoretical assumptions applied and then we identify and discuss two types of business models.

3.1. Theoretical assumptions

Regarding theoretical underpinnings for business model conceptualizations, there is a range of approaches, some of which are explicitly grounded in established theories, while others are more implicit. In contrast to Zott et al. (2011), who suggest that there is a need for a "unified approach" involving a mix of theoretical foundations to business models, we argue that any definition of, or approach to, business models needs to be grounded in specific and coherent theoretical assumptions of business life.

Some conceptualizations clearly rely on "the independent firm acting on the market" assumption. For instance, definitions of business models by Chesbrough and Rosenbloom (2002); Magretta (2002), and Teece (2010) are firmly rooted in this assumption. These definitions all describe how the firm (independently) defines or articulates its value delivery or value propositions to a market segment or a customer. This approach has been subject to criticism both generally (e.g., the IMP approach, see Håkansson, 1982, and Håkansson et al., 2004) and more specifically with regard to the business model conceptualizations relying on it (Coombes & Nicholson, 2013; Freytag & Clarke, 2012; Mason & Palo, 2012).

In contrast, business model concepts relying on network-embeddedness consider firms and their business models as interdependent. Consequently, open-ended buyer-supplier interaction is assumed to be vital. There are several consequences following this choice of theoretical grounding. First, the business perspective in traditional conceptualizations is often one-sided, which is reflected, for instance, in Magretta's, 2002 focus on the firm as *making* and *selling*. To capture "all" the firm's business exchanges, the focus needs to include the firm's *buying* and *using* as reflected, for example, in Mahadevan's focus on three types of streams (going both up and down stream). This business logic also follows from a relational perspective wherein the features of a product subject to business exchange result from interactions between the buyer and the supplier. The "imprints" of such interactions "reflect the fact that the product is part of both a 'selling' and a 'using' system" (Håkansson & Waluszewski, 2002: 35). Håkansson and Waluszewski (2002) contrast this view with the traditional view of economic exchange wherein products are treated as "given". Hence, only by including both sides of firms (buying and selling) and of relationships (buyers and suppliers), can business models, and how they evolve, be understood.

Second, most business model conceptualizations take *the firm* as a starting point. Freytag and Clarke (2012) refer to these as "managerial design approaches". The focus on *the firm* as the key unit of analysis is problematic for several reasons. Benson-Rea, Brodie, and Sima (2013); Hedman and Kalling (2003) point out that a firm may be engaged in several business models and that the relation between different business models is vital. In addition, Spring and Araujo (2009) suggest that the "offering" is more suitable for configuring business models in a network context. This relates to the consideration of business models as "boundary objects" wherein products are seen as both the object and subject of producer-user interaction, rather than being limited to the features of the particular product/service (Araujo & Spring, 2006), or to a specific sequence in the development (first) of technology and (then of) "markets" (see, e.g., Chesbrough & Rosenbloom, 2002; Teece, 2010). Spring and Araujo (2009: 458) contrast the operations management approach with their suggestion of a business model (BM) approach: "Rather than putting the firm and its operations center-stage, adding suppliers and the supply chain as subsidiary issues, then trying to insert new products and services into this network, the BM approach starts with the essence of some potentially valuable offering and then configures a network to deliver it."

Third, the notion of business models as "focusing devices" that mediate between technology and economic value creation (Chesbrough & Rosenbloom, 2002), points out an inside (technology) – out (market) logic. Coombes and Nicholson (2013) refer to such conceptions as being "closed" and directed to passive receivers, as opposed to "open business models" that instead rely on active business partners. Hence, considering the embeddedness of both value creation processes and business exchange in wider business networks calls for analysis of the interaction between different parties and thus of their relationships.

3.2. Firm-centric versus network-embedded business models

In view of the broad range of theoretical assumptions and approaches to business models, could there be other explanations to the variety of descriptions and definitions apart from those depending on what theoretical lens is chosen? The recent interest in business models based on e-commerce, and on Internet-based business in general, suggests that emerging empirical phenomena may call for new conceptualizations (see, e.g., Ghosh, 1998; Gordijn & Akkermans, 2001; Mahadevan, 2000). Then, how can such "new" business models be defined and distinguished from "traditional" ones?

Descriptions of the "traditional" type of business model seem to center on the firm and its offerings, focusing on how it "creates value" for its customers, or how they make their customers pay, etc. (see, e.g., Chesbrough & Rosenbloom, 2002; Magretta, 2002; Morris et al., 2005; Teece, 2010). We will refer to these as firm-centric business models. This type of business model makes sense when firms provide their customers with products or services that are subject to value creation contained in dyadic business relationships.

In contrast, several of the suggested business model concepts seem to describe what we will refer to as a network-embedded type. We draw on the concept of embeddedness introduced by Granovetter (1985) to explain economic action in structures of social relations. The notion has been frequently used in studies of business relationships and industrial networks as an underlying theoretical assumption (see, e.g., Holmen, 2001). While this notion has mostly been concerned with firms, relationships, resources and activities, part of the literature seems to suggest that business models may be subject to embeddedness. For instance, Zott and Amit (2010) and Zott et al. (2011) consider a business model as a system of interdependent activities that transcends the focal firm. Mason and Spring (2011), in turn, refer to internal and external actors that "practice the business model". Coombes and Nicholson (2013) stress the creation of value "between stakeholders" in "networked and open business models". Moreover, Palo and Tähtinen (2013) suggest that a "networked business model" is useful in situations wherein it is impossible for individual firms to govern all relevant resources and activities. Hence, the network-embedded type of business model encompasses a set or network of firms involved in business exchanges that can only be understood and described at the network level.

Some hybrid approaches maintain a focus on the firm although acknowledging the models' network-embedded character (e.g., Zott and Amit, 210 and Zott et al., 2011). Others imply that all business models are network-embedded and thus broader than what the individual firm can control (e.g. Freytag & Clarke, 2012). As a starting point, we consider Coombes & Nicholson's, 2013 suggestion of "networked and open business models" to be instrumental in our further conceptualization of business models in industrial networks. A key issue then is what this open-ended character of business models might be; that is, how can

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"open ends" be defined and analyzed? In the next section we suggest an analytical framework for business models in industrial networks that considers both firm-centric and network-embedded business models.

4. Analysis of business models in industrial networks

An industrial network approach to business models needs to address business exchanges as well as relationships in the shaping and performance of business models. Furthermore, the embeddedness of firms and business relationships needs to be addressed in the analysis of business models based on the assumption that they rely on, and evolve through, *interaction* between network partners. Hence, as suggested by Freytag and Clarke (2012), we assume that interdependencies in industrial networks have implications for business model dynamics and thus that individual firms cannot change business models independently and/or in view of "faceless markets". Interdependencies that span firm boundaries imply that changes need to be dealt with in interaction since other firms will also have to make adjustments. Furthermore, the scope of such change, the "change boundary", may stretch far beyond the focal firm and its direct business partners, as illustrated by Holmen (2001).

In order to develop an industrial network-based approach to business models that can communicate with other scholars as well as managers, we use *business exchange* as the smallest unit of analysis. Business exchange can take place in long-term, high-involvement business relationships or be subject to limited transactional exchanges (Gadde & Snehota, 2000). The *content* of business exchange concerns the products and/or services that are the object(s) of exchange and that may be subject to interaction in business relationships (Araujo, Dubois, & Gadde, 1999; Håkansson & Snehota, 1995). This content in a particular dyad develops over time as a result of interaction between the buyer and supplier. The interaction thus functions as "open ends" of business models, either as a means to develop the firm's firm-centric business model, or as a means to develop the firm's role in a network-embedded business model. Hence, interaction can be considered as the "engine" that drives the development of business models. For firms involved in "open ended" interaction this may change their firm centric business models or their roles in network embedded business models and, as part of this, the boundaries of the firms involved may change (Araujo, Dubois, & Gadde, 2003; Baraldi, Proenca, Proenca, & de Castro, 2014).

Placing *relationships* at the center of business model analysis draws attention to their embeddedness in wider technological and organizational contexts. Based on their resources, activities, and business exchange partners, firms see opportunities differently; thus, relationships enable firms to extend their scope of business opportunity. Involving multiple and varied actors may, therefore, reveal "unimagined possibilities" to develop current business models (Mason & Palo, 2012).

When interaction and, hence, "open ends" are concerned, business relationships can be analyzed with regard to their content and how this develops over time and in relation to particular parties. That is, the supplier may relate the business exchange with a focal customer with business exchanges with other specific customers and with specific suppliers. The buying firm, in turn, may need to integrate the business exchanges on the buying side in order to deal with specific customers. Series of connected "open ends", that is, interactive interfaces (Araujo et al., 1999), with specific links among business exchanges thus extend the scope of interaction to third parties.

4.1. Firm-centric business models

Since business exchange takes place in business relationships, the business model of *a firm* concerns the content and functions of the business relationships that the firm is involved in and how these relationships relate to one another (Håkansson & Snehota, 1995). Modelling the business of a firm thus includes its relationships with both customers and suppliers. Obviously, this encompasses a complex, and time-dependent, set of business exchanges for most firms. This can be seen as much as an analytical issue as a managerial one. However, not all business exchanges take place in "open ended" interactive interfaces with partners (Araujo et al., 1999). Those based on standardized, specified or "translation" interfaces are subject to little or limited interaction, while interactive interfaces are 'open ended' and thus extends to other firms and relationships beyond the ones maintained by the firm itself (ibid.: 504). When business exchanges are subject to series of transactions over time the interactive and dynamic features of relationships entail that the content of the business exchanges between the parties involved in such open-ended interfaces develops.

The extent to which a firm is involved in interaction with specific business partners can thus be seen as a feature of its business model. Instead of suggesting either a closed or an open business model concept, we suggest that the "openness" is a matter of degree and direction and that it can be subject to scrutiny through firm-level analysis of the firm's interactive interfaces. A firm-level approach to firm-centric business models can, hence, be defined as follows:

> The firm-centric business model depicts the firm's business relationships (including both value creation and business exchange), how these are related and how they extend the firm's boundaries through open-ended interactive interfaces with its business partners.

While this definition concerns a particular point in time, it allows identification and analysis of the "open ends" and thus of the interaction that sets the conditions for the development of the firm's business model.

As an example, we may consider the case of a firm making and selling trucks that wants to develop its firm-centric model in a new business context. Business modelling in this case may concern with whom and how to develop new and existing business relationships, how to connect its business relationships, and with whom to interact. The business modelling may thus include considerations of whether the company should try to develop relationships with multi-brand distributors and workshops or develop direct business relationships with large fleet-owners, etc. Every attempt to develop business relationships with new partners will depend on how these firms perceive their business models. How the firm becomes embedded in the network is thus a matter of how the related (firm-centric) business models can be linked.

4.2. Network-embedded business models

Analysis of network-embedded business models relates to Spring and Araujo's (2009) suggestion of a business model approach to a network configuration delivering a potentially valuable offering. The scope of this network-embedded business model thus becomes a key issue.

The case of Opera Software described by Håkansson and Olsen (2015) can be used as an example of a firm involved in a network-embedded business model. In this case, the business model relies on a set of key resources: web-browsers, software, and mobile handsets. The interfaces between these resources are subject to international standards and the business set-up in terms of who is involved in business exchange with whom is far from self-evident; "New solutions and offerings must find ways to establish deals with others in order to be fitted into the existing structures of activity and to function in relation to the dynamics of existing value creation processes as well as to be part of the deal structures that format and facilitate the associated financial flows" (ibid.,: 212). Opera Software has managed to develop relationships with mobile operators on the Nigerian market who were benefitting from the extensive use of its web-browser. Opera's basic software is included in certain mobile phones, as a result of previously developed relationships with some mobile phone OEMs, and therefore used for free by the mobile operators' customers, but improvements incentivize mobile operators since they generate more traffic. Hence, to get involved in the on-going business exchanges Opera focuses on developing relationships, first, with the mobile phone OEMs, and then with mobile operators.

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The Opera Software case illustrates how, "the heterogeneity of interactions makes them difficult to simply translate into financial flows that fully reflect the actual value creation process" (Håkansson & Olsen, 2015: 211). Based on this observation, Håkansson and Olsen note that the deal structure is not clearly aligned. Instead, the "value creation process" is subject to a different network scope than what is reflected in the set of individual business exchanges.

In contrast to firm-centric business models, network-embedded models relate to value creation processes and to the business exchange structures in different ways. Analysis of network-embedded business models therefore needs to capture how the firms and their relationships are components of the wider network in terms of both the "value creation", i.e. content-related, processes and in terms of the business exchange patterns since these are not clearly aligned.

A network-level approach to *network-embedded business models* can be defined as follows:

> A network-embedded business model relies on network level value creation processes and business exchange patterns that are not clearly aligned.

Returning to the automotive example, future models relying on automated transport systems might challenge the business logic for vehicle OEMs as well as transport service providers and other actors. A description of the principles of such a future system suggests a network-embedded, rather than firm-centric, business model: "The Global Automated Transport System is a driver-less, integrated transport system which has the ability to simultaneously coordinate the macro and micro needs of road transport networks. Theoretically, millions of vehicles can be optimally, simultaneously and automatically 'driven' over a virtually unlimited geographic region, while at the same time, the requirements of each individual vehicle and its passengers attended to." (http://www.global-transportation.com). While this description points out the potential value for users, the business exchange structure seems less obvious. Hence, how will the making, selling, buying and using of transport services relate to the making, selling, buying and using of trucks, buses, road infrastructures and of other resources in this system? And, what roles will the firms—and what firms—develop in the new business model?

4.3. Three levels of analysis

The suggested framework includes three related levels of analysis inspired by Håkansson and Snehota (1995). Firm-, relationship- and network-level business exchange analysis entails different analytical challenges for firm-centric and network-embedded business models. While analysis of firm-centric business models takes a starting point in the firm and its business exchanges, analysis of network-embedded business models starts from an understanding of the business logic at the network-level. Fig. 1 illustrates these challenges and some of the key analytical issues at the other levels of analysis.

As illustrated in Fig. 1, the two types of business models call for different analytical starting points. Hence, from a firm perspective, analysis of the firm-centric business model is carried out inside-out, while for the network-embedded business model the analysis requires an outside-in approach.

For firm-centric business models, *firm-level analysis* is useful, in particular, for how a firm relates to and depends on major business partners. *Business-relationship-level analysis* permits special scrutiny of the most important business relationships to capture how these evolve in interaction and how this interaction extends to specific third parties, e.g. customers to the supplier and the customer's customers. Such third-party influence presents the relationship with opportunities as well as challenges relating to their current and future business models.

When specificities in the business exchange extend the dyadic level, and thus link to business exchanges with specific third parties, business model analysis concerns the *network-level of analysis*. The dynamics inherent in industrial networks rely on interaction between firms, and therefore the content of business exchange is considered both as the input to and the outcome of interaction between business parties. Moreover, the time and scope dimensions of interaction set the conditions for the content and function(s) of emerging business models. Business relationships are thus instrumental as a focal unit of analysis that sets the scope for analysis of the "open ends" at the network level.

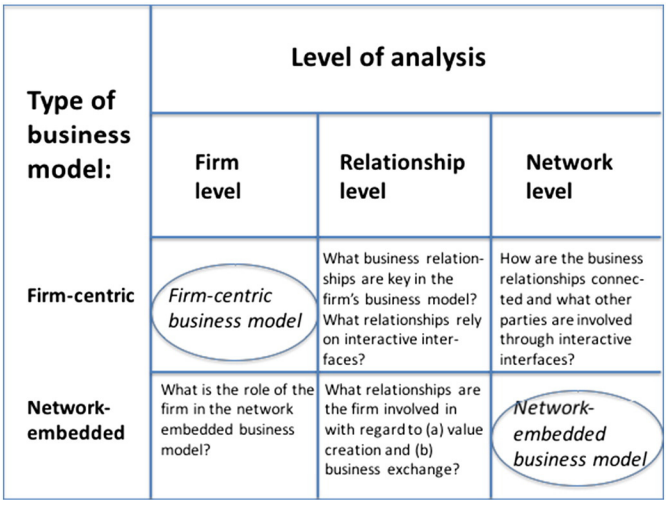

Fig. 1. Scheme of analysis for firm-centric and network-embedded business models.

When network-embedded business models are concerned, *network-level analysis* is instrumental for complex sets of business exchanges that span the boundaries of individual firms and relationships. In particular, this concerns situations wherein the activities involved in making, selling, buying and using the products and/or services are distributed among various network actors. Hence, *firm- and relationship-level analysis* follows from analysis of the business model at the network level. A key business modelling issue for the firm in these situations is: What is (or could be) the role of the firm in the business model? For instance, if we consider the firms operating driverless trucks in future autonomous transport systems, these will probably need to take on other roles than current haulers who own trucks and employ drivers to operate them. These roles depend, in turn, on what relationships are needed to position the firm in the network: with what other actors should the firm interact in order to influence the value creation processes and to get involved in the business exchange? In the autonomous transport system example, value creation may be directed to various other actors who develop and operate complementary resources in the system while the business exchange structure may instead be based on customer-adapted service configurations.

5. Concluding discussion

Our main conclusion is that there is a need for an industrial network approach to business model analysis. Business model dynamics are inherent in this approach since interaction between companies is considered the force that drives emerging business models. Assuming that interaction shapes relationships over time, every emerging business model sets new conditions for interaction between the parties involved. Spring and Araujo (2009: 446) note that when business models change: "Cost structures change, incentives are aligned differently, risks are redistributed". How a firm deals with the new conditions is, again, a matter of how it interacts with its business partners. This interaction, in turn, provides opportunities for developments of the firm's (firm-centric) business model, or of the firm's role in a (network-embedded) business model. The key issue for firms when business model dynamics are concerned is with whom and how they interact, since open-ended,

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interactive, interfaces with specific business partners permit companies to influence the direction and scope of their involvement in emerging business models.

Recent examples of "business model innovation" describe changes in how buyers and suppliers do business with one another. In particular, a shift to "service innovations" has been noticed (see, e.g., Spring & Araujo, 2013). The well-known example of how Rolls Royce sells "power by the hour" instead of airplane engines (Smith, 2013) illustrates how the business exchange between Rolls Royce, as a supplier, and its customers (from being buyers of engines to becoming buyers of the services of engines) was developed. Also, developments of so-called "solution offerings" are described as a trend (see, e.g., Cova & Salle, 2008; Frankenberger, Weiblen, & Gassman, 2013; Gebauer, Paiola, & Saccani, 2013; Storbacka, Windahl, Nenonen, & Salonen, 2013; Windahl & Lakemond, 2006). Such offerings rely on several firms integrating their business exchanges, with consequences at the firm, relationship and network levels. We argue that an understanding of such business model development and its consequences requires analysis that embrace all three levels of analysis suggested. However, these examples of developments in or of business models follow the logic of firm-centered business models and thus maintain a focus on value creation and business exchange (as aligned) at the firm level.

In contrast, developments of network-embedded business models are more challenging to analyze since there is additional complexity. The network of interlinked business exchanges and of the interaction aiming at creating and developing value needs to be addressed and understood as a whole. Further scrutiny is needed of network-embedded business models in which the business logic resides at the network level. We suggest that these aspects of growing network complexity require further research. Continued problematizing of business model dynamics in industrial networks is suggested as a way forward. Especially, case studies illuminating interaction among parties involved in emerging network-embedded business models are needed. The industrial network approach seems well equipped with appropriate conceptual and methodological tools to contribute to this research by describing and explaining business models as emerging network phenomena.

6. Managerial implications

Increasing specialization and interdependence together with developments of information and communication technologies imply that modern firms, rather than maintaining their firm-centric business models of the past, to an increasing extent need to become aware of, and to get engaged in, network-embedded business models. To handle this transition, the challenges involved in business modelling need to be addressed. Arguing that advancing technologies and their adoption are upending "traditional business models", Bughin, Chui, and Manyika (2010) stress distributed co-creation, wherein, "co-creators often value reputation more than money", and the need for, "making the network the organisation". Bughin et al. also argue that future business models will become "multi-sided", implying that interactions among multiple parties will replace traditional one-on-one transactions or information exchanges. Hence, increasing numbers of firms (and individuals) may become involved in such emerging business models. However, the long-term business potentials for the individual parties involved, as well as for the network-embedded business models as a whole, are far from obvious. Hence, how to position the firm in these emerging network-embedded business models becomes a key concern.

When traditional firm-centric business models are replaced by network-embedded ones, firms may face challenges in having less control in, and of, the business models in which they are, or want to become, involved (Håkansson & Ford, 2002). In particular, how the company can become involved in value creation with partners with whom the company is *not* doing business is of particular interest. Hence, new, and less apparent, patterns of interaction may be required. For instance, internet-based business models in which actors such as Google "make business" on data as a key resource are vital to consider.

In order for firms to cope with emerging business models, broader scrutiny of their potential roles in new network configurations is needed. Starting with considerations of possible scenarios in terms of how the business logic may develop at a wider network level may inspire firms to interact with new partners, and with present business partners in new ways, in order to influence and co-create new value processes and business exchange patterns.

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