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Research paper

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Abstract

The emergence of service-dominant logic has influenced business in many domains. It emphasizes the interaction of the producer, consumer, and other value-network partners as they co-create value through collaborative processes. These processes can be seen as service-for-service exchanges of these actors, which contrasts with the output orientation of the goods-dominant-logic that emphasizes how actors exchange output units. This paradigm transition has significant implications on doing business: the business requirements to services will change faster, and the complexity of value-networks required to meet these requirements will increase further. This requires new approaches to business engineering that are grounded in the premises of service-dominant logic. This paper introduces the service-dominant business model radar (SDBM/R) as an integral component of the business engineering framework that we have developed for engineering network-based, service-dominant business. Existing approaches to business model design follow an organization-centric view rooted in goods-dominant-logic, which does not allow adequately modeling the character of service-dominant business. The SDBM/R was developed with close collaboration with industry experts and empirically validated through a series of hands-on workshops with industry professionals from several domains. Thereby, this paper contributes a novel business design approach that has proper academic background and relevant practical embedding.

Keywords: Service-dominant, business model, value-in-use, value co-creation.

1 Introduction

In many contemporary business domains, customers desire integrated solutions for their needs, instead of products that they have to deploy themselves to fulfil these needs (Luftenegger, 2014; Vargo and Lusch, 2004). In an example business-to-consumer domain, we see that customers move from buying traditional music playing devices (goods) to getting subscriptions to full-fledged music services (solutions). In a business-to-business setting, we see, for example, that companies move away from buying transportation vehicles, and instead employ integrated logistics solutions. Consequently, many organizations are transitioning towards a service-dominant (SD) business setting, where the provisioning of solution-oriented services to the customers is the focal point (Lusch and Vargo, 2006). This moves away from the traditional goods-dominant setting where the emphasis is on the delivery of products (Ostrom et al., 2010). The services may require the deployment of products, but these products become part of the delivery channel of services, not the central point. Ownership of the products becomes a less relevant issue. This transition has shifted the emphasis from the value of the individual products or services to the value of the use of the products and services in an integrated, customer-focused *context* - so-called *value-in-use* (Lusch and Vargo, 2008) or *value-in-context* (Vargo, 2009).

In a highly dynamic business environment, the customer expectations from solution-oriented services evolve faster than the capabilities of the underlying products. Customers expect coherent solutions consisting of multiple complementary elements, as opposed to stand-alone solution fragments. The delivery of these complex solutions requires an agile integration of the capabilities of multiple service providers and introduces the necessity of tightly managed business *networks* (Camarinha-Matos and

Afsarmanesh, 2005). Organizations no longer operate in isolation, but they collaborate in a network to deliver complex solutions (Gawer and Cusumano, 2008; Power et al., 2001).

For a solution-oriented service provider, however, it is not only about what services to offer, but also about how to get them delivered. Managing service complexity and business agility requires a tight integration between the business strategy and business models on the one hand, and the structure of business operation and information technology on the other hand (Al-Debei et al., 2008). Truly agile service provisioning business is not achievable if these elements are treated in isolation.

Adopting the foundational principles of service-dominant logic (Lusch and Vargo, 2008), we have proposed a *business engineering framework* that puts service management at the forefront (Luftenegger, 2014). The framework adapts a holistic view and covers the entire spectrum from high-level business strategy definition to business information system architecture design. It includes the main elements: *business strategy*, *business models*, *service compositions (business process models)* and *business services*. The strategy and business model elements of the framework represent the business goals (the 'what' of business), while service compositions and business services characterise the business operations (the 'how' of business). The framework distinguishes also between the slowly evolving essence of an organization (i.e., business strategy and business services) and its agile market offerings (i.e., business models and service compositions) that revolve faster.

Our prior works address the need to translate the principles of service-dominant business logic into actionable insights for practitioners at the *strategic* level (Luftenegger et al., 2012, 2015). It focuses on the conceptualization, formulation, and communication of a service-dominant *business strategy*. This paper delineates the next element: *business models*.

There is an increasing attention on the concept of *business models* in the academic literature (Schneider and Spieth, 2013). Several works investigate and propose approaches for defining and representing business models (Gordijn and Akkermans, 2001; Osterwalder and Pigneur, 2010; Roelens and Poels, 2015; Veit et al., 2014). Although, many of these approaches consider cross-organizational relations and the importance of partnerships, they are typically characterised by being organization-centric and hence reason from the perspective of a *single* focal company.

However given the solution-oriented nature of service-dominant business discussed above, a business model design approach for service-dominant business must adopt a *network-centric* mind-set at its core and allow for the composition of service design in multi-party business networks (Luftenegger, 2014). Such an approach defines how actors in the business ecosystem participate in value co-creation and what the cost–benefits distribution in the network is. It operationalizes the business strategy and provides a starting point for a mapping to the operational processes and organizational capabilities. It also facilitates the level of business agility found in service-dominant markets.

Therefore, we posed the following *research question*: *How to design a new approach for collaborative business modelling that satisfies the aforementioned requirements of service-dominant business*? Accordingly, we have developed the *service-dominant business model radar (SDBM/R)* as an integral part of our business engineering framework. Following the service-dominant line of thinking (Vargo and Lusch, 2008), SDBM/R puts the added value of a service-based solution for a specific customer group at the centre-point, called the value-in-use. From this value-in-use, a collaborative network of organizations is designed that can realize this value-in-use and that has a realistic combination of costs and benefits for the involved organizations. The contributions of organizations to the value-in-use are mapped to their capabilities, which in turn are based on existing or future assets (infrastructures). Our early works provided background on the theoretical underpinnings of the SDBM/R, and offered illustrations with sample cases (Grefen et al., 2015; Luftenegger et al., 2013). This paper provides an overall view on the development, application and evaluation of the SDBM/R and its method of use.

Following the design science research approach (Hevner et al., 2004), we developed the initial version of the SDBM/R by taking related works in the literature as a basis, but developing a new concept specifically targeted at the collaborative, agile nature of service-dominant business. The initial versions of the artefact were refined through a joint effort of industry experts using focus-groups and workshops.

Further, we evaluated the SDBM/R for its *validity* and *utility*. For validity, we organized 6 workshops, where (in total) 59 industry professionals working in a number of business domains used the SDBM/R to collectively design new service-dominant business models. To evaluate the *utility* of the SDBM/R and its method of use, we performed a survey with the participants of the workshops. Our evaluation through the workshops and survey shows that SDBM/R can be considered useful for the collaborative design of service-dominant business models.

The remainder of this paper is structured as follows. In Section 2, we provide a background on the key concepts of service-dominant business, and discuss related work on the business model design. Section 3 presents the research design that we followed in constructing, applying and evaluating the SDBM/R. Section 4 introduces the SDBM/R and how it can be used in practice. In Section 5, we present the application of the SDBM/R in the workshops that we organized with industry professionals and the results of the survey conducted with the participants of the workshops. Finally, Section 6 presents our conclusions and future research directions.

2 Background and Related Work

In this section, we first discuss the paradigm shift from goods-dominant to service-dominant business, and provide a background on the business engineering framework that we have introduced, which incorporates the services-dominant business models as an integral part. Secondly, we discuss related literature on the conceptualization and design of business models.

2.1 Service-Dominant Business

In early 1990s, manufacturing companies recognised that their traditional value-chain role of producing and selling goods became less profitable, and that they have to move beyond the factory gate to get closer to the customer and towards providing services required to operate and maintain products (Wise and Baumgartner, 1999). The product's role started to be seen as a mechanism for service delivery.

This shift to services is a move from the means and the producer perspective to the utilization and the customer perspective. Customers buy offerings which render services that create value (Gummesson, 1995). Innovating a value is considered as a collaborative process occurring in an actor-to-actor network. It is not developed within the confines of a single organization; instead, it evolves from the joint action of a network of actors including suppliers, partners and customers – so called the 'value network' (Chesbrough, 2003; Lusch and Nambisan, 2015). Co-creation of value is grounded on the fundamental idea of Service-Dominant (SD) logic, which argues that humans apply their competences to benefit others and reciprocally benefit from others' applied competences through service-for-service exchange (Vargo and Lusch, 2004).

Although SD logic is introduced mainly by marketing scholars, it has a major role in driving service business design and operation, which remains largely unexplored in academic literature (Grönroos and Gummerus, 2014; Ostrom et al., 2010). Transitioning to service-oriented business requires agility not only at the level of business models, but also in the business operations and supporting IT systems. At the same time, it calls for a tight integration between the two sides of business: what services to offer and how to get them delivered (Magretta, 2002). Performing this transition and managing its consequences is a formidable task for any non-trivial business organization.

2.2 Business Models and SD Logic

Early works provided diverse interpretations and definitions of the business model, focussing primarily on its conceptualization (Amit & Zott, 2001; Chesbrough, 2003; Gordijn & Akkermans, 2001; Osterwalder & Pigneur, 2002; Shafer et al., 2005; Timmers, 1998) and its relationships with IS (Hedman & Kalling, 2003). Later works aimed at consolidating interpretations to offer a better understanding of the concept and facilitating the process of business model design (Al-Debei & Avison, 2010; Osterwalder & Pigneur, 2010; Roelens & Poels, 2015; Veit et al., 2014; Zott et al., 2011). Al-Debei et al. (2010) defines a business model as the way in which an organization -along with its providers and partners, creates value for all its stakeholders. Taking a broader perspective, Magretta

(2002) views a business model as a story that explains how an enterprise works. Well-designed business models that ensure harmonization among business strategy, processes, and information systems are crucial for any organization to survive and succeed (Magretta, 2002; Di Valentin et al., 2012).

Business model representations have been in the form of a mixture of informal texts and graphical representations (Zott et al., 2011). Gordijn and Akkermans (2001) propose an ontology (e3-value ontology) that borrows concepts from the business literature. It uses a network-centric approach to model constellations of enterprises and end-consumers who create, distribute, and consume things of economic value. An e3-value model describes the value exchanges among actors of a business network. However, it emphasizes on the analysis of business models' *economic feasibility* through the value exchanges among actors of a business network (rather than the conceptual definition of business models and the value-in-use). The relationships between the actors in the network are mapped bilaterally, as opposed to the multilateral nature of the value-network in SD business.

Following the precedent set by Gordijn and Akkermans (2001), Osterwalder and Pigneur (2002) proposed the Business Model Ontology (BMO) that formed the basis for the development of the Business Model Canvas (BMC). The BMC is a visual chart with elements describing a company's or product's value proposition, customers, infrastructure -including its partnerships, and financial aspects. It has been widely adopted in practice for designing business models (Osterwalder and Pigneur, 2010). However, it follows an organization-centric approach that renders the model from the perspective of a single company, as opposed to a network-centric view. It focuses on the processes controlled by the focal company, and pays less attention on the customers' active role in value co-creation.

Adopting an organization-centric approach in business model design is a manifestation of the Goods-Dominant (GD) logic and its underlying assumption regarding the creation of *value* (Luftenegger, 2014). The organization-centric approaches adapt the *value chain* perspective where the firm creates goods, and pushes them out to its customers, who are then responsible for using them to fulfil only part of their needs. Value is produced at the left-side of the chain and consumed at the right-hand side. The *value-network* perspective of the SD logic, instead, supports value co-creation by a *network* of parties, which also includes the customer: the network as a whole creates the integrated solution that the customer needs. A product in the GD logic is assumed to be valuable of itself, whereas in the SD logic, it has no value unless the customer uses it (Parker et al., 2016).

Although the existing approaches to business model ontologies and design provide the basis for the key elements that constitute a business model, they fall short in addressing the premises of the SD logic, in particular the focus on the value-in-use, the basis in a value network, and the role of the customer as a co-creator in this network.

2.3 Business Engineering Framework

We have proposed a business engineering framework that is tuned to the basics of service-dominant business (Lusch and Vargo, 2008; Vargo and Lusch, 2008) and built on the existing works on business design and engineering (Al-Debei et al., 2008; Al-Debei and Avison, 2010; De Castro et al., 2009; Osterwalder and Pigneur, 2002; Sanz et al., 2007). The framework distinguishes between the business goals (the 'what' of business) and business operations (the 'how' of business) on the one hand, and between the relatively stable essence of an organization (business strategy and business services) and its agile market offerings (business models and service compositions) on the other hand. This leads to a model with four layers, as shown in Figure 1.

The first layer, *business strategy*, describes the identity of an organization in a service-dominant market (Karpen et al., 2012; Luftenegger et al., 2015). The strategy is relatively stable over time: it evolves. The second layer contains service-dominant business models, describing market offering in the form of integrated solution-oriented complex services. They follow fluid market dynamics and are agile: they revolve – they are conceived, modified, and discarded as required. Business models are specialized from the strategy as they implement part of the strategy in a more specific way. They are operationalizations of the strategy as they are more concrete.
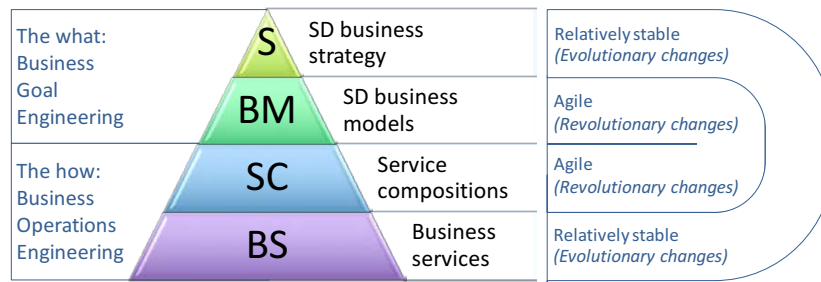
Figure 1.   Business Pyramid

The bottom half of the pyramid covers business operations engineering, which contains business services and service compositions. Each business service encloses a core service capability of the organization. As these capabilities are related to the resources, they are relatively stable over time: they evolve. In the service compositions layer, business services are composed to realize the service functionality required by a business model: they implement a concrete value-in-use. A composition, in the form of a business process model, includes business services from the organization's own set, but also business services of partner organizations in the value-network. As service combinations follow business models, they are agile: they revolve with their associated business models. This study focuses on the second layer: *the service-dominant business models*.

3   Research Design

In this study, we have followed a design science research methodology (Gregor and Hevner, 2013a; Hevner et al., 2004), as our primary goal is to develop a new IS artefact, which we refer to as service-dominant business model radar (SDBM/R). Accordingly, our approach involved defining the problem and the goal of the artefact, development of a satisfactory model, and the evaluation of the artefact in a real-life business setting to examine its validity and utility (Baskerville et al., 2009).
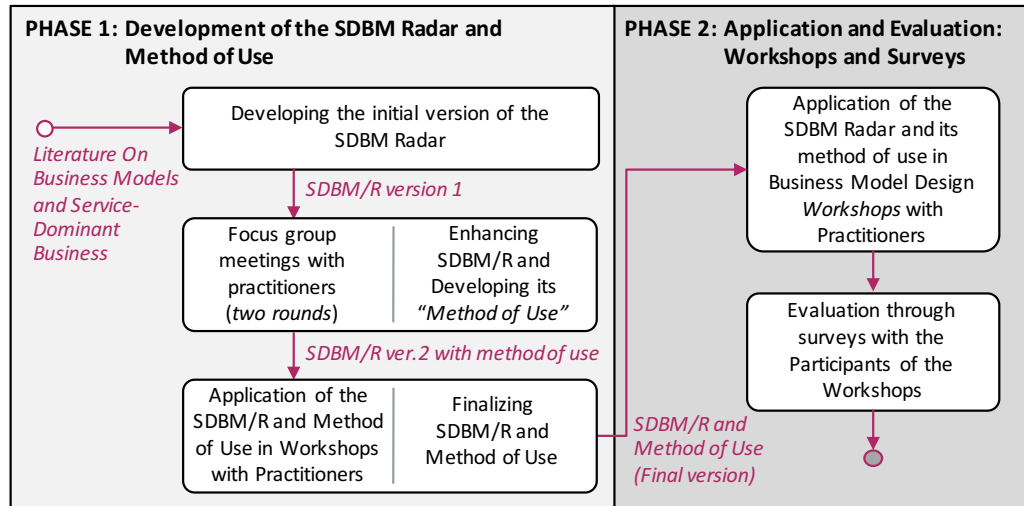

Figure 2.   Research procedure

We followed the procedure depicted in Figure 2 in constructing, applying and evaluating the SDBM/R. In the first phase, we developed the initial version of the radar by taking the existing literature as a basis. Next, we performed two rounds of focus group meetings with 11 industry professionals to gather their feedback about the initial version, after which we refined the SDBM/R to increase its relevancy and practicality. Following the refinement, we use the SDBM/R and followed its method of use in 3 workshops, where practitioners applied the refined version of the radar to design business models in the traffic management domain. The application of the SDBM/R and the feedback gathered were helpful in refining and finalizing the artefacts and ensuring their content validity.

The second phase aimed at the evaluation of the artefact. This involved a series of workshops where the final versions of the artefacts were used by industry experts in different business domains to design innovative business models with a service-dominant business logic in mind. We organized 6 workshops - in total with 59 professionals, to evaluate the *validity* of the artefact (i.e. the extent to which it is applicable and can be used for its intended purpose of use (Gregor and Hevner, 2013b)). Next, we conducted a survey with the participants of the workshops (among which 38 participants responded) to evaluate the *utility* of the SDBM/R, i.e., how useful and easy-to-use they consider the artefact is.

The following subsections describe the details about the steps that were carried out and the research methods applied in the first phase of our research, i.e. in developing the SDBM/R and the method. We discuss the details regarding the application and evaluation of SDBM/R and its method of use in Section 5 (after introducing the practical details of the artefact in Section 4).

3.1 Developing the initial version of the SDBM/R

We developed an initial version of the SDBM/R by taking as a ground the existing works on business model design and ontologies, and the key principles of service-dominant business. In particular, we confronted the Business Model Canvas - BMC (Osterwalder and Pigneur, 2010) against the service-dominant mind-set (Luftenegger, 2014). We chose BMC as a base due its strong academic foundation and high relevance to business practitioners. However, the BMC is a firm-centric model and embeds a value chain -rather than a value network perspective, over business model design. It identifies suppliers and clients at different ends of the value chain, and their role in generating costs and revenues for the focal organization. The service-dominant logic – on the other hand, suggests focusing on collaborations at the network level of actors. Accordingly, we conceptualize the service dominant business model as a collection of *actors* (i.e. heterogeneous entities such as businesses, firms, and customers), which interact with each other to achieve shared goals, i.e. *value co-creation*. These entities can be viewed as socio-economic actors, connected through *value propositions*. They perform actions aimed at reaching desired outcomes, such as mutual value creation through co-produced solutions and experiences (Wieland et al., 2012). Each actor has an active role in the business model through *co-production activities*, which eventually incur costs and benefits for each one. We elaborate these concepts in Section 4.

3.2 Focus Groups

To increase the relevancy of the SDBM/R to practice, we organized two rounds of focus group meetings with industry experts. The selection of focus group as a research method was mainly due to the efficiency it offers in interviewing several participants at the same time and allowing in-depth discussions in the meetings (Kontio et al., 2004). The focus group comprised 11 executives and business-unit managers of a large enterprise that offers financial services to companies operating in diverse domains. The participants had over 7 years of experience on the average (the most experienced with 15 years of experience and the least with 5) in management, strategy definition, and business model design in the financial sector. The primary goal in these one-hour meetings was to capture the shortcomings of the initial version of the SDBM/R by focusing on its understandability and applicability in practice. In each meeting, the facilitator (one of the authors of this paper) presented the initial version of the SDBM/R by going through an illustrative scenario. The participants provided in-depth review and feedback on the elements of the SDBM/R focusing on its understandability and pragmatic use, which led to changes and simplifications in the key elements of the radar. The initial and intermediate versions of the SDBM/R are available in (Luftenegger, 2014).

3.3 Workshops (pre-evaluation)

The next step in the artefact development phase was to provide a setting for industry practitioners to *use* the improved version of the SDBM/R in designing new business models. We selected traffic management as a suitable business domain to apply the SDBM/R for designing innovative business mod-

els. This domain has a large number of stakeholders who have to collaborate tightly to provide next-generation customer solutions. The domain is, however, currently heavily infrastructure-dominant, emphasizing individual physical transport assets. This creates the need for a new way of business modelling. We organized 3 workshops for the design of 3 SDBM/R blueprints and were able to bring together industry experts representing in total 20 stakeholder firms operating in this domain. In the first part of the workshops, we presented the concepts related to service-dominant business and the use of SDBM/R. In the second part, the authors of this paper moderated sessions where the participants collaboratively designed service-dominant business models using SDBM/R around a specific business theme (e.g. traffic management in a certain district of a city during large events).

We gathered feedback from participants about the elements and use of the SDBM/R, as well as its potential benefits. During the workshops, we focused mainly on the *method of use* – i.e., the SDBM design method, but also received improvement suggestions for the elements of the radar. An example of such a suggestion involves the representation of cost-benefit flow between actors in the SDBM/R, which was incorporated in the final edition of the radar as an optional layer in the representation. The feedback gathered through the focus groups and workshops were helpful in finalizing the SDBM/R and its method of use, and ensuring the content validity and practical relevance.

The next chapter presents the SDBM/R and the method that can be applied for its effective use.

4 SDBM Radar and its Method of Use

In this section, we present the final version of the SDBM/R resulting from the focus group meetings and workshops, and describe how it can be effectively used for collaborative design of service-dominant business models.

4.1 Elements of the SDBM Radar

Figure 3 presents the elements of the SDBM/R. The co-created *value-in-use* constitutes the central point in SDBM/R. Following service-dominant thinking, it represents the value of a solution to a customer. It is not a service delivering the value, nor a product used to produce or transfer the value.
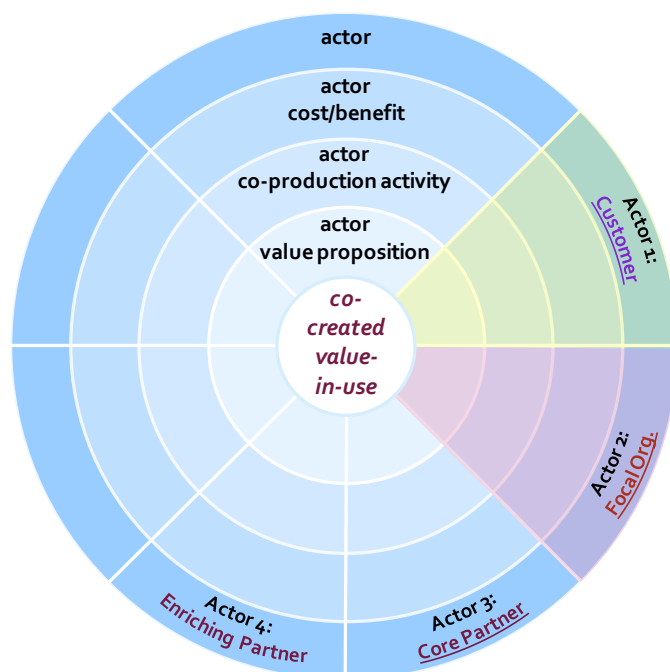
Figure 3. *Service Dominant Business Model Radar (SDBM/R) template*

The first concentric layer framing the value-in-use contains the *actor value propositions,* which represent the part of the central value-in-use contributed by a single actor. The *co-production activity* defines the activities that each actor performs in the business for achieving the co-creation of value, i.e. its actor value proposition. The effects of this activity are observable by the customer.

The third frame –*actor cost/benefits* defines the financial and non-financial expenses/gains of the co-creation actors. Finally, each 'pie slice' of the radar represents a co-creation actor, including the *focal organization*, *core* and *enriching partners*, and the *customer*. We put the labels of the actors in the fourth frame. The focal organization is often the party that initiate the setup of the business model, and participates actively in the solution. The customer is always one of the parties contributing to the production

of the value-in-use. A core partner contributes actively to the essentials of the solution, while an enriching partner enhances solution's added value-in-use. SDBM/R accommodates an arbitrary number of actors, suiting the network-centric character of service-dominant business.

All parties – including the customer, collaborate such that each of them has a clear interest in the business model. Collaboration is on the basis of mutual ethical benefit in terms of service-dominant logic. More concretely, a business model is set up to bring benefits to all parties, but also incurs costs to all parties. These benefits and costs can be of financial or non-financial character. This calls for bidirectional collaboration between actors rather than an outsourcing relation, which implies a client/server relation with typically opposite interests.

4.2   Using the SDBM Radar

A business model defines a concrete value-in-use for a concrete customer segment – and in its realization, i.e., the way the customer experiences the creation and delivery of this value-in-use. Therefore, a business model may take an informal scenario as a basis for inspiration, which is refined during the design process into a description of a *customer journey*. The customer journey offers a brief description for the high-level operation and future realization of the business model.

The business model design using the SDBM/R involves the following design steps:

1. Identifying and agreeing on the co-created *value-in-use* and the targeted *customer (*or *customer*-segment). The value-in-use is the added value of a solution for the customer, who also contributes to its creation.

2. Determining the components of the value-in-use (*actor value propositions*) and associated actors (roles). One actor is the focal organization, often taking the role of orchestrator. The number of actors is arbitrary, but it is a good practice to focus on the core actors at the initial stages of the design to reflect only the essence of the model. More information on the background of the concept of actors and their roles in the business model can be found in (Luftenegger, 2014).

3. Determining the *costs and benefits* for each actor. These can be of a financial or a non-financial character. A cost item of an actor typically relates to a benefit, often with another actor(s). An optional practice at this step is to define the cost/benefit flow among actors. (In the SDBM/R this is shown either using color codes or arrows between costs and benefits, positioned in a separate circular frame in-between the cost-benefit frame.) This flow also provides an input for the *customer journey* discussed above. The sum of costs and benefits for each actor - *in a qualitative sense,* is expected to be positive. Similarly, the business model as a whole should have a positive sum of costs and benefits from a global perspective (in qualitative terms).

4. Determining for each actor, the high-level activities that realize the actor-value proposition. These activities become a part of the customer journey, and can be mapped -at a later stage- to (sequences of) tasks in business processes executed by the actors in the network.

Despite the sequential design steps described above, the business model design using SDBM/R should be applied as an iterative process. The application of the radar during our workshops showed that, the activities performed in step 3, i.e., determining costs and benefits, and their flow among actors, have high potential to influence the decisions given in prior steps. A typical course of sequence during and after this step is to revisit the actors and their roles, as well as their value propositions as depicted in the radar to ensure alignment between the radar and the customer journey that the actors agreed on. The outcome of this practice is a business model depicted in a radar together with the customer journey, which can be expressed textually as a story, or graphically as a story board.

A practical setup for the business model design involves a number of stakeholders brought together around a theme in a business model design session, which is moderated by a person experienced in the use of SDBM/R. The moderator should foster out-of-the-box thinking while engaging the stakeholders in active communication and collaboration for innovative ideas.

5   Application and Evaluation of SDBM/R

Although SDBM Radar has been developed as a joint effort of experts through focus groups and workshops, it should be evaluated in real-life business settings (Hevner et al., 2004). As mentioned in Section 3, for the evaluation of SDBM/R's, we focused on its validity and utility. For validity, we prepared a setting where industry professionals experienced the use of the radar to design new business models, and observed the extent to which the SDBM/R is applicable and can be used for its intended purpose of use. For SDBM/R's utility, we conducted a survey among the participants who used the SDBM/R to elicit their views on its *usefulness* and its *ease of use* as a tool to design service-dominant business models.

5.1   Application of SDBM/R in Workshops

We organized 6 workshops where we asked industry professionals working in different business domains to use SDBM/R to design innovative business models in their domain of expertise. Each workshop was organized around a theme in a specific business domain. We invited professionals working in companies that operate in (or provide service for) logistics, mobility, and traffic management domains, which are characterized by their technology-dominant view and diversity of stakeholders.

Table 1 presents the domain that each workshop focused on, the number of participants, and the business models that were designed using SDBM/R. In total, we were able to bring together 59 industry experts collaboratively designing blueprints for 13 new business models.

Workshop	Domain of Focus	# Participants (59 in total)	Business Models (their 'value-in-use')
Ws1	Traffic Management Logistics and Transportation	8	- Ultimate Festival Edition in the City - Most Efficient Container on the Road
Ws2	Mobility	9	- Free Event for the Government - Just-in-time Presence of Elderly
Ws3	Logistics and Transportation	7	- Flexible On-Time Delivery
Ws4	Logistics and Transportation	5	- Fast-Lane End-to-End Shipping
Ws5	Mobility Logistics & Transportation	16	- Convenient City Visit for Shopping - Cheap delivery intercity
Ws6	Logistics and Transportation Document management Lighting	14	- Close-Loop Disintermediated Intelligent Delivery - Safe water to China - Individualized newspaper on paper - Ambiance in the City

Table 1.   The design of the workshops and the value-in-use of the designed business models.

Table 2 shows further demographic details about the participants regarding their domain experience, and the size of the companies that they work for. Majority of the participants were experienced professionals working in industry for more than 10 years (Table 2a), while they varied in terms of the time they had been working in their current position (Table 2b). The companies that the participants represented were of diverse size (Table 2c). Accordingly, there was a balance in terms of the size of the companies and in the number of SMEs and large enterprises. This helped us to elicit viewpoints of different business stakeholders in corresponding business domains.

Authors of this paper participated in all workshops, one of whom acted as the *moderator* in each session (alternatingly). Each meeting was organized as a 2-hour workshop with two phases. The first phase involved a tutorial on the concept of service-dominant business, business engineering framework, and the use of SDBM/R. The second phase comprised the core of the collaborative design of a business model using the SDBM/R. Following a practical approach, large SDBM/R template posters and 'post-its' were used to represent the SDBM/R blueprints and its specific elements (see Figure 4a).

1) How long have you been working in the industry?		2) How long have you been working in your current position?		3) What is the size of your company (num. of employees)?	
a) Less than 2 years	3%	a) Less than 2 years	26%	a) Below 10 employees	5%
b) 2-4 years	0%	b) 2-4 years	11%	b) 11-50	22%
c) 4-7 years	16%	c) 4-7 years	21%	c) 51-100	5%
d) 7-10 years	8%	d) 7-10 years	16%	d) 101-250	14%
e) Over 10 years	68%	e) Over 10 years	26%	e) 251-500	3%
f) No answer	5%			f) 501-1000	8%
				g) 1001-3000	16%
				h) 3001-5000	3%
				i) Over 5000	24%

Table 2.   Demographic profile of the participants of the workshops.

Figure 4b depicts an example business model blueprint designed using the SDBM/R. The workshop in which this model was developed had as participants the stakeholders operating in the deep-sea cargo transportation domain. The workshop was initiated with a stakeholder' idea to introduce *priority* in deep-sea cargo transportation. Handling high volumes of deep-sea cargo in ports takes substantial time and effort. It is typical for deep-sea container vessels to be loaded without taking any priority schemes into account. This usually leads to long unloading times levelled randomly among containers. This may seriously hinder small volumes of priority cargo that 'gets lost' in a large stream of other cargo. The business model 'Fast-Lane End-to-End Shipping' emerged to address the need for a *faster* delivery for a set of high-priority containers that are shipped by a customer to the hinterland of the port of arrival. Following the SDBM/R method of use depicted in Section 4, the collaborative business model design session led to the design of the model depicted in Figure 4b.
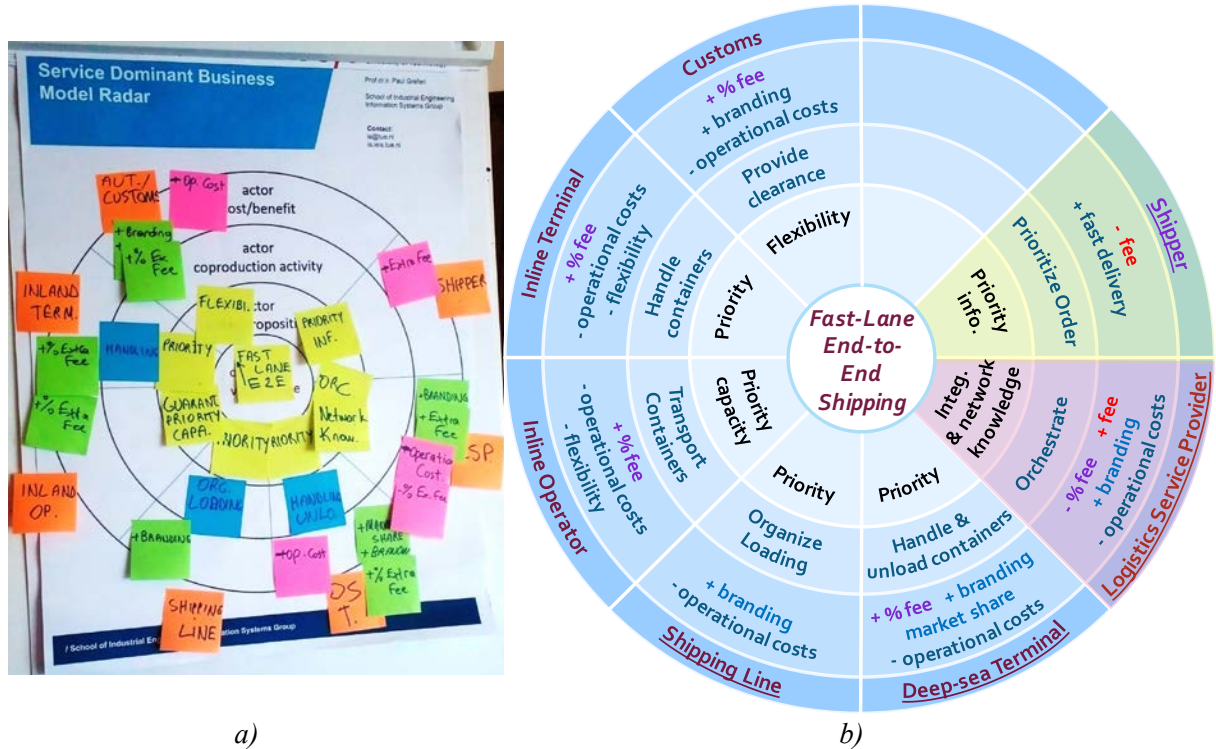

a)   *b)*

Figure 4.   Use of SDBM/R poster and 'post-it's during a workshop (a), and a business model blueprint in SDBM/R: Fast-Lane End-to-End Shipping (b).

The example business model depicted above requires well-planned, collabo   rative operations by several partner companies. The *Logistics Service Provider (LSP)* acts as the focal organization bringing all network parties together to provide the value-in-use to the customer – i.e. *Shipper*. The LSP is the

customer interfacing company with the network knowledge and integrates the operations of all parties. The Shipper also contributes to the value-in-use by specifying the priorities for containers. The network requires also other parties that are core to the value-in-use. First, the *Shipping Line* participates by organizing the loading of high-priority containers in such a way that the unloading can be performed more quickly and efficiently at the *Deep-sea Terminal* at the port of arrival. After the high-priority containers are ready for pick-up, the *Inland Operator* or *Inland Terminal* ensures on-time arrival and transports these containers to the requested destination. Furthermore, in order to ensure that these containers are ready for pick-up directly after unloading, *Customs* offers flexibility and precedence in processing these containers. Delivering this exclusive value-in-use to the customer can greatly enhance the reputation of many network parties - particularly the LSP, Deep-sea Terminal and the Shipping Line- and can help increase their business volume and market share. However, 'end-to-end fast lane' incurs increased operational costs to these parties, which is covered through additional fees paid by the Shipper. These fees are shared among network parties, including the Customs, with certain pre-defined amounts.

5.2   Evaluating utility through Surveys

After each workshop sessions, participants were asked to fill out a survey questionnaire to gather their view on the utility of the SDBM/R. Out of 59 workshop attendants, 38 participated in the post-workshop surveys (leading to a participation rate of 64.4%).

The survey questionnaire was built using a set of statements from the Technology Acceptance Model - TAM (Davis, 1989; Venkatesh and Davis, 2000). TAM and its derivatives e.g. (Venkatesh et al., 2003) are the most commonly referred theories that predict and explain the acceptance of design artefacts, mainly through their perceived usefulness/utility and ease-of-use. It has been used as a theoretical basis for many empirical studies in the information systems field, including the acceptance of IS methods and models (Moody, 2003). The original TAM has three primary constructs: perceived ease of use, perceived usefulness, and intention to use (Davis, 1989). *Perceived usefulness* refers to users' perception on the *utility* of the design artefact in providing gains to its user (Venkatesh et al., 2003). *Perceived ease of use* refers to "the degree to which a person believes that using a particular design artefact will be free from physical or mental effort". Finally, *intention to use* can be defined as the extent to which a person intends to use a particular design artefact. Intension to use is the most proximal antecedent to the artefact use and believed to be determined by perceived usefulness and ease of use.

All constructs of TAM are operationalised using multiple indicators, which have been rigorously evaluated for reliability and validity (Davis, 1989). Following the work in (Venkatesh and Davis, 2000), we used 4 items for perceived usefulness and ease of use, and 2 for intension to use. In line with the approach followed in (Moody, 2003), the wording of the items was modified to accommodate this research. The participant could express their level of agreement with each statement on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

In order to gather more information about participants' experience and view on the use of the method, our survey included 3 open questions that inquired participants to indicate their opinion on the strong and weak points of the approach, the difficulties that they have experienced in the use of it, and the aspects that can be improved.

5.3   Results and Discussion

Using the SDBM/R, the practitioners that participated in the workshops were able to design several service-dominant business model blueprints (similar to the one depicted in Figure 4) in their domain of expertise. These business models and the feedback that we gathered from the participants during the workshops and through the open questions in the survey are valuable to assess the validity of our approach. Participants agreed that following an explicit method that structures the interactive design of service-dominant business models fostered the creation of innovative ideas. Participants indicated SDBM/R as an effective means for a diverse set of stakeholders to collaboratively design new busi-

ness models. They further agreed that the approach creates awareness on the value of agile, service-dominant business thinking and provided inspiration for collaboration with different stakeholders. Below are two (literally translated) quotes from the participants of the workshops:

> *"The approach appealed to me and I think it offers leads to further shape our projects and improve your stakeholder analysis."*

> *"An inspiring session. After our investigation of traffic flows, one should sit together with business and government organizations to conceive a business model for a service."*

The participants also mentioned a number of difficulties, some of which relate also to the specific business model that they designed. Examples include the difficulty in deciding on the customer, in identifying core and enriching partners, as well as in identifying the core value-in-use for the business model without sufficiently embracing the service-dominant mind-set and being experienced with its principles and terminology.

Figure 5 presents the responses for each item in the TAM-based questions of the survey. The results suggest a positive view on all measured constructs, i.e., the perceived usefulness, perceived ease of use and intention to use. All workshop participants considered the SDBM/R to be useful (Q4). Majority of them believed that it would be easy for them to *learn* and *become skilful* at using the radar and its design method (Q5, and Q7). Only a single participant indicated an overall negative view on the ease of use of the radar and the method (Q8) and intention to use it (Q9) (while 6 were neutral). Overall, the responses of the participants for the model indicate a general positive attitude towards using the radar.
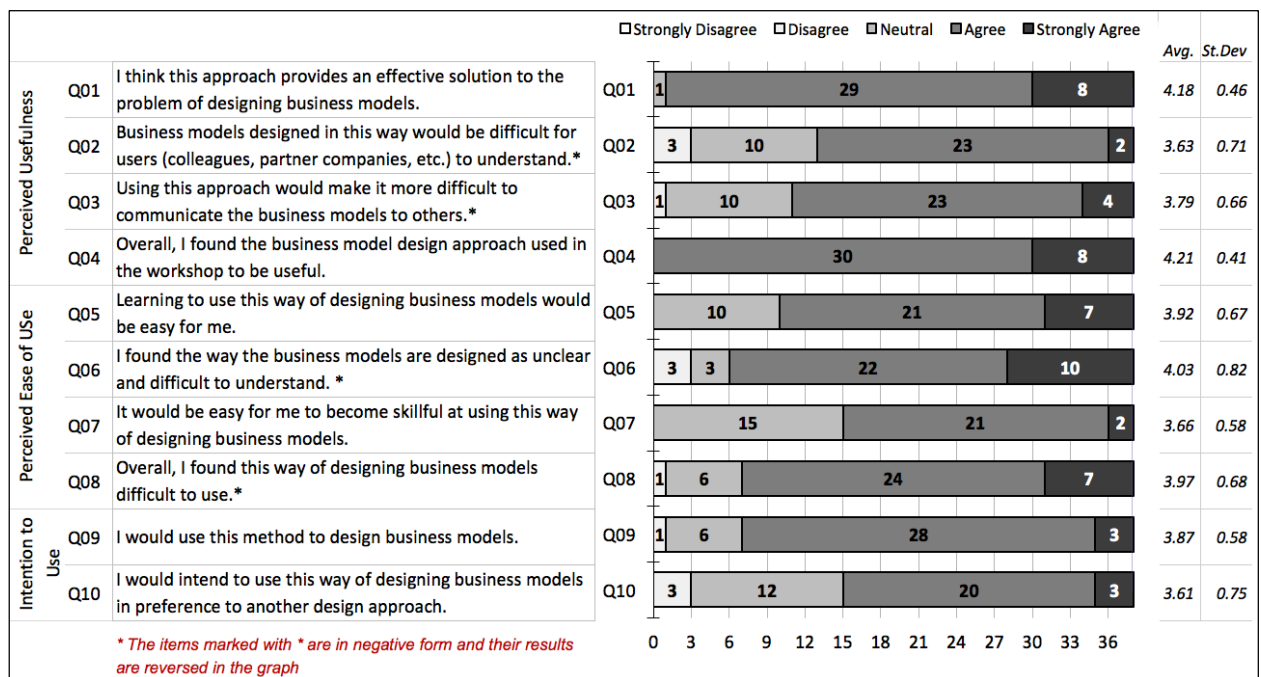

Figure 5.   *Results of the survey on the perceived usefulness and ease of use of SDBM/R.*

6   Conclusions

The ongoing shift from goods-dominant logic to service-dominant logic has transformed the landscape of business innovation (Lusch and Nambisan, 2015). We have experienced breakthrough innovations of intangible nature, which have focused on the development of new processes co-created with all actors (Prahalad and Ramaswamy, 2004). These shifts have also expanded the role of information technology as a key facilitator in making innovations technically feasible and economically viable (Peters et al., 2016; Veit et al., 2014). However, in many business domains, the firms' agility in providing

support for such innovations is heavily constrained by the business structures and IT platforms they use to deliver their services. This suggests the need for the development of new frameworks to structure service-dominant business modelling that can aid in integrating business strategy and business models on one hand, and business services, processes, and IT platforms on the other hand.

We have developed a business engineering framework to assist companies in establishing a basis for structural agility and in instituting a service-dominant business environment. In this paper, we introduce an integral part of this framework –i.e. the service-dominant *business model radar* (SDBM/R) and its method of use, for collaboratively designing business models. Our prior works focused on the conceptualization and development of the radar, while this paper offers a complete view on the design-cycle including an intensive application and evaluation of the radar with industry professionals.

We brought together a diverse set of stakeholders and helped them in collaboratively designing innovative business models focussed on customer-centric business solutions. Collaborative workshops have shown to be effective means to quickly arrive at agile, customer-centric business models. The feedback gathered from the workshop participants and the result of the survey confirm the utility of the model and its potential to be adopted in practice.

This work contributes to the research on business models by integrating the concepts related to the core elements and design of business models with the principles of SD business. It provides a concrete basis for researchers and practitioners who aim to apply business modelling concepts to engineer SD business. Combined with our prior work on the SD strategy (Luftenegger et al., 2015), this work offers the foundation for structuring the business goals, and initial steps to aligning them to the business operations and implementation of SD business through the application of advanced information technology. Using business models as a conceptual tool of alignment is significant, since in most of the existing alignment research this issue is addressed only at the strategic level (Al-Debei and Avison, 2010). The SDBM/R is a practical tool that can help executives in start-ups or SMEs in designing and communicating their new solutions to the market. The executives in established companies will also find it useful in rethinking their business models and transitioning from a GD to SD business.

Several practitioners have applied SDBM/R and evaluated its usefulness in designing new business models in workshop settings. However, as a limitation of this work, not all the models that were designed have been implemented in practice (at the time of writing this paper). Yet, there are ongoing initiatives by the companies participated in our workshops in realizing a set of these models. For instance, currently one of these companies -an information logistics company in a large international port, has adopted the proposed business engineering approach (that also includes SDBM/R) to designing a service-dominant future for its business. In addition, the SDBM/R has been adopted by two European Consortia working in the area of smart manufacturing, and logistics-transportation for designing and implementing new business models. The SDBM/R has also been introduced on a national scale in The Netherlands by the authorities as the approach to inspire the stakeholders in the mobility and traffic management domain in exploring new collaborative business thinking.

Our future work will focus on operationalizing service-dominant business models through business process models, which compose a number of services offered by the parties in the business network, and can be executed in process-oriented information systems. Our future work will also consider the development of structured approaches for evaluating the financial as well as non-financial feasibility of service-dominant business models from a multi-criteria perspective.

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