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EXPLORING BUSINESS PROCESS DESIGN ALTERNATIVES THROUGH A BUSINESS MODEL LENS

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EXPLORING BUSINESS PROCESS DESIGN ALTERNATIVES THROUGH A BUSINESS MODEL LENS

Research in Progress

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Abstract

Organizations acknowledge that focusing on operational efficiency is insufficient to respond to disruptive forces and advances in digital technologies. Hence, business process management (BPM) needs to become more innovation-driven and capitalize on opportunities related to new products, services, and business models. Despite recent contributions, more research is required to strengthen the BPM capabilities of organizations in this direction. Following the design science research paradigm and situational method engineering, we develop a method to explore process design alternatives to support the implementation of a business model during its innovation. In this research-in-progress paper, we present the initial version of our method. With this research, we aim to contribute to explorative BPM by demonstrating how processes can support organizations in proactively creating value by enabling business model innovation. Our work also contributes to business model research and practice by providing actionable guidelines to implement a business model through the design of processes.

Keywords: Business process design, Business model, Explorative BPM, Design Science Research.

1 Introduction

Disruptive environmental changes and rapid advances in digital technologies force organizations to adapt and innovate their products, processes, or business models to remain competitive (Ciriello et al., 2018; Röglinger et al., 2022; Skog et al., 2018). Organizations have identified that concentrating solely on operational efficiency is insufficient to respond to disruptive forces, which can make entire processes obsolete (Grisold et al., 2022). Therefore, recent research has established the need for Business Process Management (BPM) to become more innovation-driven and capitalize on the opportunities associated with digital innovation (Grisold et al., 2019; Helbin and van Looy, 2021; Rosemann, 2014). Accordingly, *explorative* BPM should account for opportunities given the innovative use of digital technologies to transform business models, products, and services (Grisold et al., 2022; Wiesböck and Hess, 2020). Recent studies claim that a significant opportunity for further research in the field of explorative BPM is the integration of theoretical foundations and concepts from diverse research streams

(e.g., innovation management) (Grisold et al., 2021; Rosemann, 2014). A promising prospect is the business model research stream (Koelbel and Rosemann, 2022; Turetken and Grefen, 2017) which investigates how an organization creates, delivers, and captures value (Teece, 2010).

A business model details an organization's value proposition, the customer segment to which it is offered, the capabilities needed to put it forward, and the associated costs and benefits (Magretta, 2002). Business model innovation has emerged as a key form of holistic organizational innovation and a source of sustained value creation given rapid changes in business landscapes (Foss and Saebi, 2016; Wiesböck and Hess, 2020). During the innovation of a business model, the organization's operations must reflect the business model's changes to guarantee that the value proposition is provided to the customer (Globocnik et al., 2020). A newly designed business model must be implemented through the form that it takes in the real world, namely, the organizational structure, business processes, and IT infrastructure and systems (Osterwalder et al., 2005). Therefore, to implement a business model, corresponding processes must be (re-)designed (di Valentin et al., 2012).

Multiple studies have highlighted the need to establish a structural link between business models and business processes and develop methods for implementing business models by designing corresponding business processes (e.g., Al-Debei and Avison, 2010; Osterwalder et al., 2005; Solaimani et al., 2018). In research, there is a lack of methods that provide systematic guidance to design different business process alternatives during the implementation of a business model (Lara Machado et al., 2023). In parallel, in practice, there is a scarcity of guidelines that support and enable business model implementation (Geissdoerfer et al., 2018). Without proper guidance, organizations risk failing to adopt business model innovation initiatives (Frankenberger et al., 2013; Geissdoerfer et al., 2018; Teece, 2010). Therefore, BPM can play a crucial role in supporting the implementation of new business models.

Accordingly, the objective of our research is *to develop a method to explore and identify business process design alternatives to support the implementation of a business model during its innovation*. Our method guides organizations in business model implementation by supporting the design of corresponding business process alternatives and determining the prospective changes at the business process level. To achieve our objective, we follow the Design Science Research (DSR) paradigm (Hevner et al., 2004). In this *research-in-progress* paper, we report the results of the first design cycle. In this initial design cycle, we have identified the problem and motivation, defined the solution objectives for the method, designed the initial version of the method using Situational Method Engineering (SME) (Ralyté et al., 2003), and demonstrated and evaluated its applicability through a business case. We contribute to explorative BPM by demonstrating how business processes can enable business model innovation and support organizations in proactively creating value. Additionally, our work contributes to business model research and practice by providing prescriptive knowledge on how business models can be implemented through the design of corresponding business processes.

The remainder of the paper is structured as follows. Section 2 provides an overview of the background and related works on business process design methods, business models, and the relationship between business models and processes. Section 3 explains our research design process. Section 4 presents the initial version of the method design, and Section 5 illustrates the application of the method in a business case. Finally, Section 6 concludes the paper by providing initial contributions and the next steps.

2 Background and Related Work

Business process design is an essential activity in the BPM lifecycle (Dumas et al., 2018). Process redesign refers to the intentional change of elements within a process to influence its operation (Davenport and Short, 1990). Process design methods support identifying and conceptualizing current and future business processes (Rosemann and vom Brocke, 2015). These methods can be used to systematically change processes in a stepwise manner to generate design alternatives (vom Brocke et al., 2021; Dumas et al., 2018). In general, a distinction can be made between *explorative* and *exploitative* methods and techniques (Gross et al., 2021; Rosemann, 2014).

Traditional *exploitative* process design approaches (e.g., Lean Management (Bortolotti and Romano, 2012) and Six Sigma (Kwak and Anbari, 2006)) are generally problem-driven (Mendling et al., 2020; Rosemann, 2014). These methods aim to continuously detect and eliminate process-related issues to increase efficiency and effectiveness (Dumas et al., 2018). In contrast, *explorative* approaches (e.g., Five Diamond (Grisold et al., 2022), Business Process Design Space (Gross et al., 2021), Explorative Process Design Patterns (Rosemann, 2020)) are opportunity-driven and focus on rethinking processes in light of emerging opportunities such as those brought about by digital technologies or changing customer demands (Grisold et al., 2019; Rosemann, 2014). The BPM literature offers a vast number of process design methods and techniques (Dumas et al., 2018). However, less attention has been given to explorative BPM methods (vom Brocke et al., 2021). Therefore, scholars have called for the development of new explorative BPM methods that integrate innovation-oriented concepts (vom Brocke et al., 2021; Grisold et al., 2019; Helbin and van Looy, 2021; Mendling et al., 2020; Rosemann, 2014). Our research aims to integrate the business model concept to highlight the opportunities brought about by business model innovation to explorative BPM.

In essence, a business model describes an organization's means of value creation, delivery, and capture mechanisms (Teece, 2010). To support the innovation process of a business model, organizations may use a variety of business model frameworks, methods, and IT tools (Schwarz and Legner, 2020). One of the most recognized frameworks is the Business Model Canvas, which is used to (re-)design the business model using nine building blocks: value proposition, channels, customer relationship, customer segment, revenue stream, key resources, key activities, key partners, and cost structure (Osterwalder and Pigneur, 2010). Another approach to exploring alternative business model designs is the business model patterns (Gassmann et al., 2014). These patterns (e.g., subscription, freemium, razor and blade) are proven generic solutions to recurring business model design problems encountered throughout the innovation process (Abdelkafi et al., 2013). As such, organizations may use them to spur creativity, draw inspiration, and ideate alternative designs of the business model (Remane et al., 2016).

Several works have studied the relationship between business models and business processes (Betzwieser et al., 2020; Lara Machado et al., 2022). From an Information Systems (IS) perspective, the business model is an intermediate concept between the organization's strategy and its operation, which encompasses business processes and its supporting information technology (IT) systems (Al-Debei and Avison, 2010; Grefen and Turetken, 2018; Veit et al., 2014). In essence, a business model depicts *what* is offered to *whom*, while processes focus on *how* this offering is operationally fulfilled (DaSilva and Trkman, 2014; Gordijn et al., 2000; Turetken et al., 2019). As such, business processes are required to efficiently execute all activities associated with the fulfillment of a value offering predefined by the business model (Veit et al., 2014).

Methods that relate business models and processes are essential to the innovation of a business model as they provide practitioners with step-by-step guidance to implement business models through the design and execution of related processes (Osterwalder et al., 2005; Solaimani et al., 2018). In the literature, scholars mainly propose an array of models and frameworks to detail how business models and business processes are related (e.g., Bask et al., 2010; Cavalcante et al., 2011; Globocnik et al., 2020; Solaimani & Bouwman, 2012). A limited number of studies propose methods to identify business processes to support the implementation of a business model during business model innovation (Lara Machado et al., 2022; Solaimani et al., 2018). Current approaches primarily adopt a business model perspective, using supporting business model frameworks in their proposed methods (e.g., Andersson et al., 2006; di Valentin et al., 2012; Hotie & Gordijn, 2019; Suratno et al., 2018). However, fewer approaches provide a holistic design of processes that build on existing methods and techniques in the BPM literature (Betzwieser et al., 2020). As BPM is a mature, well-established discipline, there is an opportunity to use the methods put forth in the BPM literature to develop methods for implementing business models.

3 Research Design

To achieve our research objective (presented in Section 1), we follow the DSR paradigm (Hevner et al., 2004). DSR has been used in BPM and business model research to produce artifacts that can have value both in practice and research (e.g., Gilsing et al., 2021; Grisold et al., 2022). The goal of DSR is to systematically guide the research process of building and evaluating artifacts (e.g., constructs, models, and methods) to solve an identified business problem (Gregor and Hevner, 2013).

Our DSR project is structured in two iterative cycles and follows the design steps proposed by Peffers et al. (2007). In this research-in-progress paper, we report the results of the first design cycle (as seen in Figure 1). This initial design cycle consists of (1) *identifying the problem and motivation*, (2) *defining the objectives for the proposed method*, (3) *designing and developing the method*, (4) *demonstrating* and (5) *evaluating* the method to provide proof-of-concept, and (6) *communicating* partial results.

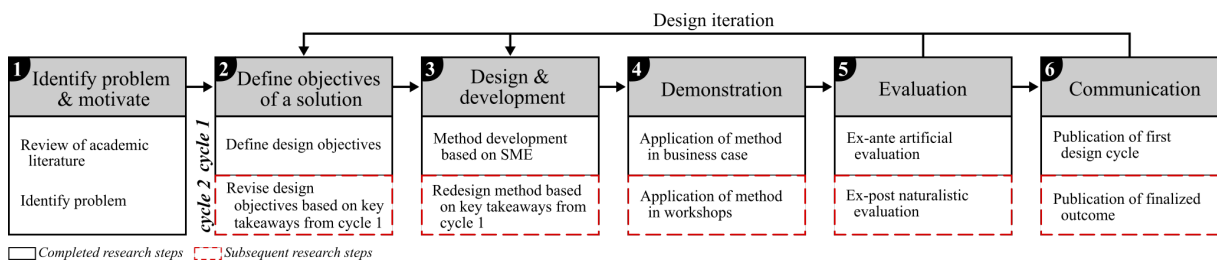


Figure 1. Research design process.

In the first design cycle, to *identify the problem and motivation*, we reviewed the existing literature on business models, their relationship to business processes, and process redesign methods, particularly explorative BPM. Based on this review, we described the identified problem and motivation for our study in Section 1, specifically (1) the need for BPM to become more opportunity-driven in view of emerging opportunities and (2) the lack of systematic guidance to support the implementation of a business model by designing alternative processes.

The problem identification and motivation guided the *definition of the solution objectives* derived from knowledge gained from our review of the business model and business process literature (presented in Section 4). To *design and develop our method*, we use the SME approach, as it allows the construction of a method by assembling existing and reusable method fragments available in the literature (Henderson-Sellers and Ralyté, 2010; Ralyté et al., 2003). There are two main approaches to SME, situational method configuration and situational method composition (Bucher et al., 2007). For the development of our method, we follow situational method composition, in which the fundamental idea is to select and orchestrate method fragments aligned with the solution objectives (Brinkkemper, 1996). Aiming to bring the business model and BPM field closer, we use existing approaches from both the business model and business process literature.

Lastly, we *demonstrate* the applicability and feasibility of the constructed method through an illustrative scenario based on a real-life business case (presented in Section 5). Demonstration through the use of a business case is a form of *ex-ante artificial evaluation*, as it results in descriptive justificatory knowledge in the form of empirical evidence (Sonnenberg and vom Brocke, 2012; Venable et al., 2016). Lastly, this research-in-progress paper *communicates* the results of the first design cycle.

4 Method Design

According to SME, defining the *context* and *project type* is crucial to determine in which situations a method can be used (Bucher et al., 2007). The *context type* refers to the organizational contextual factor that influences the use of the method, and the *project type* refers to the initial state and desired state after the method is applied (Gericke et al., 2009). We define our method's context using the BPM context framework dimensions (i.e., goal, lifecycle, process, organization, and environment dimension) (vom Brocke et al., 2016, 2021). The focus of our method is the exploration (*goal dimension*) during the

redesign phase (*lifecycle dimension*) of alternative core processes that support the new value propositions of a business model (*process dimension*). Our method can be used by small to large organizations, in product and service industries, with a medium to highly supportive BPM culture (*organization dimension*), as they must be knowledgeable of their processes. We expect the method to be used by organizations in competitive environments with medium to high uncertainty (e.g., organizations in the software industry) (*environment-dimension*) that in response, require changes to their business model and the corresponding operating processes. Regarding the *project type*, our method can be used when an organization wishes to innovate its business model by improving it radically or incrementally into a more competitive business model (Osterwalder et al., 2020). Hence, there would be a need to create new processes that support the novel value proposition brought on by the business model innovation.

We introduce three design objectives (DO) to guide the development of our solution artifact. We use the justificatory knowledge derived from BPM, business models, and the nexus between BPM and business models to derive appropriate objectives for our proposed method.

To foster the improvement and growth of an organization's existing business, our solution artifact should take the current business model design as a point of departure. Innovating the existing business model requires a shift toward a new, more competitive business model with a new or enhanced value proposition (Osterwalder et al., 2020). Accordingly, the following DO can be stated:

DO1: The method should support the definition of the current and future business model design of an organization.

The goal of explorative BPM is to support innovation by redesigning or creating new processes to deliver enhanced or new value propositions (Grisold et al., 2019). Therefore, the current business processes must be redesigned to adapt to the new value propositions put forth in the future business model design. This allows for identifying and integrating opportunities related to new value propositions into the design of future business processes. Accordingly, the following DO can be stated:

DO2: The method should support the definition of business processes that implement the current business model and provide systematic guidance to ideate process alternatives that implement the future business model.

The changes in a business model form the basis for the required changes at the business processes level (Cavalcante et al., 2011). Thus, each business process change has to be identified, and requirements that describe how each business process element changes in response to the innovation of the business model must be formulated (di Valentin et al., 2012). This change specification allows BPM stakeholders in the organization to assess the impact of each process design alternative and choose the best-fitting option. Accordingly, the following DO can be stated:

DO3: The method should support identifying required changes between the current and future alternative business process elements.

In response to the design objectives, we developed a method that guides organizations in designing business process alternatives that support the implementation of a business model design. The method encompasses five steps, each including a set of sub-steps, tools, roles, inputs, and yielded outputs. We describe the method in Table 1 according to the required method components for SME (adapted from Braun et al., 2005; Denner et al., 2018). The method can be executed by sequentially following the sub-steps in each step. However, the process can also be iterative, and method users can return to a preceding step when necessary.

Following the SME composition strategy, we assemble existing and reusable method fragments available in the reviewed literature to construct a method (Bucher et al., 2007). We built a method using artifacts from (1) the BPM literature, (2) the business model literature (3) literature that relates business models and BPM (*tools* in Table 1). From the *BPM literature*, we use the Business Process Redesign (BPR) framework to describe the business process elements (i.e., customer, product/service, business process function and behavior, organization, information, and technology) (Reijers and Liman Mansar, 2005) and the process design questions from the Business Process Design Space to facilitate the

systematic exploration of design alternatives along process elements (Gross et al., 2021). From the *business model literature*, we use the business model canvas (Osterwalder and Pigneur, 2010) to provide a template to describe the current and future business model and the business model patterns (Gassmann et al., 2014) as a tool to facilitate the future business model design and foster business model innovation opportunities. Lastly, we draw insights from the knowledge about *the relationship between business models and business processes*. We use the studies identified in recent literature reviews to construct a matrix that relates the business model building blocks to business process elements (Betzwieser et al., 2020; Lara Machado et al., 2023). Using these studies, we identified, classified, and described the interrelationship between business models and processes. The business model and business process (BMBP) matrix details how each element of the business model impacts elements of the business process. This matrix helps users to identify potential redesign alternatives given a change in the business model. Finally, we adapt the gap analysis approach in di Valentin et al. (2012) to compare process alternatives for a change in the business model.

Step	1 Describe current business model	2 Describe current business processes	3 Identify future business model	4 Ideate future alternative business processes	5 Conduct gap analysis
Sub-step	1.1 Describe the current business model design	2.1 Identify current business processes for the defined business model 2.2 Describe each process	3.1 Design the future business model (drawing inspiration from business model patterns)	4.1 Identify the impacted business model building blocks 4.2 Determine process element options 4.3 Engineer process alternatives that implement the redesigned business model	5.1 Identify differences between current and future alternative business processes
Tool	Business Model Canvas (Osterwalder et al., 2010)	Business Process Redesign framework (Reijers and Liman Mansar, 2005)	Business Model Canvas (Osterwalder et al., 2010) Business model patterns (Gassmann et al., 2013)	Business Process Redesign framework (Reijers and Liman Mansar, 2005) Process design questions (Gross et al., 2021) Business model and business processes matrix (Own development)	Business Process Redesign framework (Reijers and Liman Mansar, 2005) Gap analysis (di Valentin et al., 2012)
Role	Business model designer Business owner Digital business architect	Process designer Process engineer Business model designer Digital business architect	Business model designer Business owner Process designer Digital business architect	Process designer Process engineer Business model designer Business owner Digital business architect	Process designer Process engineer Business model designer Digital business architect
Input	Existing business model	Current business model design	Current business model Organization's vision and strategic objectives	Future business model	Current business processes that implement current business model Future process design alternatives that implement future business model
Output	Current business model design	Current business processes that implement current business model	Future business model	Future process design alternatives that implement future business model	Required process changes for each design alternative

Table 1. Overview of the method.

5 Demonstration and Evaluation

In this section, we evaluate our method by applying it in an illustrative scenario based on a real-life business case (Adali et al., 2020). The scenario depicts an organization, BikeShare, that provides an urban bike-sharing service business model. BikeShare has over 20,000 bikes distributed nationwide across 300 parking stations, providing around 5.4 million annual rides. Due to space limitations, we provide a detailed description of the method's outputs for each step at: <https://sites.google.com/view/bikesharedesign>.

BikeShare's current business model provides bike-sharing services based on a monthly subscription fee (*step 1* in Table 1). This fee allows the traveler (customer) to use available bikes located in designated parking stations. Currently, BikeShare executes two core business processes that implement its business model: bike lending (travelers can borrow bikes at parking stations) and traveler guidance (travelers get access to information about bike location and availability) (*step 2*). After evaluating the current business model, BikeShare intends to enhance its value proposition to increase customer satisfaction. The improved value proposition aims to provide greater flexibility and a comfortable traveling experience for the traveler. The future business model allows travelers to reserve a bike (guaranteed availability

business model pattern in Gassmann et al., 2014), pay exclusively for the time the bike is in use (pay-per-use business model pattern in Gassmann et al., 2014), and end the bike sharing service in any location in the city (step 3).

To ideate future process design alternatives (step 4), we begin by identifying the changes at the business model level, specifically which building blocks will change in the future business model design. In BikeShare’s case, the future business model comprises changes in the value proposition (flexible and comfortable bike sharing), key activities (bike reservation for guaranteed availability), key resources (GPS sensors to track bike location in the city), and revenue stream (pay-per-use fee) (step 4.1).

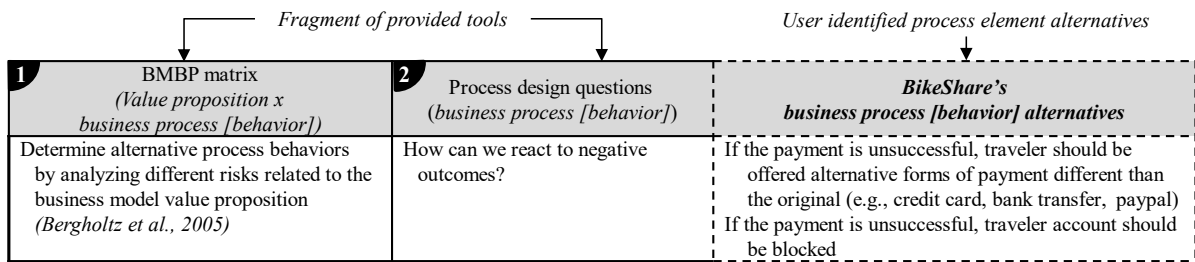


Figure 2. Example of BikeShare’s process element alternatives (step 4.2) developed based on fragments from (1) the BMBP matrix and (2) the process design questions.

Considering the changes at the business model level, we ideate potential design alternatives for each process element (step 4.2). Figure 2 shows examples of the design alternatives created for the behavioral elements of the business process. To ideate different design alternatives for each process element, the method user is provided with the BMBP matrix between the business model building blocks and business process elements (see 1 in Figure 2) and process design questions for each process element (see 2 in Figure 2). Each cell of the BMBP matrix describes aspects to consider when designing a process element in relation to a business model building block (e.g., the design of business process behavior elements in relation to the value proposition, as seen in Figure 2).

Business Process		(PA1) Precautious bike lending			
Product/Service	Flexible bike-sharing service	Customer	Traveler		
Business process [function]	Register traveler Sign in traveler Unlock bike Start session Track travel by distance Reserve bike Lock bike End session Handle payment Block traveler account	Business process [behavior]	Bike shall be available before unlocking	Organization	Bike Bike station
			Bike shall be in good state	Technology	Intelligent Bike Lock Mobile Application
			Bike use distance shall be tracked from when the session starts until the session ends	Information	Traveler profile Bike status (reserved/available) Bike location Traveler status (blocked/unblocked) Bike station information
Business Process		(PA2) Timed reservation bike lending			
Product/Service	Flexible bike-sharing service	Customer	Traveler		
Business process [function]	Register traveler Sign in traveler Unlock bike Start session Lock bike End session Handle payment Track travel by time Reserve bike	Business process [behavior]	Bike shall be available before unlocking	Organization	Bike Bike station
			Bike shall be in good state	Technology	Intelligent Bike Lock Mobile Application
			Bike shall be tracked from when the session starts until the session ends	Information	Traveler profile Bike status (reserved/available) Bike location Bike station information

Figure 3. Process alternatives and gap analysis (in comparison to current bike lending process green=existing elements, yellow=new elements, red = removed elements).

In our example, to ideate behavioral elements of the business process, BikeShare may analyze the risks and negative outcomes related to their new value proposition and how to respond to them. For instance, to enhance service flexibility, travelers are allowed to pay only for the time the service is in use. Bikeshare might consider how to react if the payment is unsuccessful (see ‘user identified process element alternatives’ in Figure 2). Similarly, it is possible to analyze and ideate alternatives for each one of the elements of the business process (i.e., customer, product/service, business process function and behavior, organization, information, and technology) by considering their relationship to the business model using the BMBP matrix and the process design questions.

After exploring the relevant alternatives for each process element, the next step is to group individual options into complete business process alternatives (*step 4.3*). These alternatives must implement the future business model and provide an enhanced value proposition in a unique manner. Figure 3 shows two process design alternatives that implement the future business model.

Finally, using the description of the potential process alternatives, we can identify the changes that must be done at the process level to implement the future business model (*step 5*). This can be achieved by comparing each process alternative (*output of step 4*) to the current business processes (*output of step 2*). The changes required at the business processes level to implement the future business model for the two newly ideated processes are presented in Figure 3.

6 Conclusion and Next Steps

Following the design science research paradigm and situational method engineering, in this research-in-progress paper, we present an initial version of a method to explore business process design alternatives to support the implementation of a business model during its innovation. We demonstrate the applicability and feasibility of our method by applying it to the business model innovation case of an organization that offers an urban bike-sharing service. This research responds to recent calls to extend the explorative BPM body of knowledge by integrating other research streams (Grisold et al., 2019; Helbin and van Looy, 2021; Kohlborn et al., 2014; Rosemann, 2014). Accordingly, this work takes the initial steps to pave the way for the integration of the business model concept within the BPM domain. We contribute to explorative BPM by demonstrating how organizations can leverage business process design to support business model innovation and proactively create value. Additionally, our work contributes to business model research by addressing the need to develop methods to implement a business model (Bouwman et al., 2020; Geissdoerfer et al., 2018; Turetken et al., 2019). Lastly, we contribute to practice by providing actionable guidance, using existing tools in the literature, to design business processes for business model implementation.

To enhance the initial version of our method, our next research steps will focus on the second design cycle of our DSR project. Future steps will focus on enhancing the method by further detailing the application of each step, for instance, providing additional guidelines to select process element alternatives and how to engineer a complete process alternative. To further evaluate our method, we intend to conduct interviews with business model development, BPM experts, and mobility domain experts to assess the utility of our method. Through these interviews, we will elicit improvement points to enhance our method design. Afterward, we plan to apply our method in a naturalistic setting in a real-life business environment to further evaluate its utility and strengthen its validity. To do so, we intend to conduct workshops with organizations in different domains that aim to identify business process design alternatives to support the implementation of their redesigned business model. In a subsequent phase, we will also adapt the method to different situations with a higher degree of complexity. For instance, the method can be tailored to allow organizations to explore new process alternatives for an entirely new business model based on emerging technologies, such as artificial intelligence or blockchain. In future publications, we plan to publish the complete method specification and evaluation and the business model and business process matrix design and evaluation.

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