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RESEARCH PAPER

Navigating Business Model Redesign: The Compass Method for Identifying Changes to the Operating Model

Paola Lara Machado · Montijn van de Ven · Banu Aysolmaz · Oktay Turetken · Jan vom Brocke

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Abstract In today's dynamic business environment, organizations constantly change their business models to respond to emerging digital technologies and shifting customer expectations. It is a fundamental challenge to translate these changes into the organization's operating model. When organizations redesign their business models, significant adjustments to the operating model and its underlying business processes are necessary to ensure the effective delivery of the value proposition to customers. Existing research falls short in detailing how changes to the business model at the tactical level impact the operating model at the operational level. To address this gap, this paper introduces the Compass Method. This method provides guidance for decision-makers at the tactical and operational levels in identifying necessary changes to their operating model using a set of operating model design cards. The method has been developed following the design science research methodology and is grounded in extant knowledge from both business model research and process management research. Three rounds of design and evaluation of the method were completed in multiple settings. The study contributes to the understanding of the relationship between business models, operating models, and business processes, paving the way for the development of complementary methods and tools to further investigate this relationship.

Keywords Business model · Operating model · Business process management · Organizational design · Process change · Design science research

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P. Lara Machado (✉) · M. van de Ven · B. Aysolmaz · O. Turetken
Information Systems Group, Department of Industrial Engineering & Innovation Sciences, Eindhoven University of Technology, De Zaale, 5600 MB Eindhoven, The Netherlands
e-mail: p.lara.machado@tue.nl

M. van de Ven
e-mail: m.r.v.d.ven@tue.nl

B. Aysolmaz
e-mail: b.e.aysolmaz@tue.nl

O. Turetken
e-mail: o.turetken@tue.nl

O. Turetken · J. vom Brocke
European Research Center for Information Systems, Münster, Germany
e-mail: jan.vom.brocke@uni-muenster.de

J. vom Brocke
University of Münster, Leonardo-Campus 3, 48149 Münster, Germany

J. vom Brocke
University of Liechtenstein, Fürst Franz Josef Strasse, 9490 Vaduz, Liechtenstein

1 Introduction

To deal with continuous change in today's business landscape, organizations are forced to adapt their business models to remain competitive (Foss and Saebi 2018; Verhoef et al. 2021; Vial 2021). These changes are numerous, encompassing disruptive environmental shifts, rapid technological advancements, and evolving customer demands (Denner et al. 2018; Röglinger et al. 2022). A key problem we address in this article is how to incorporate these changes into the organization's operating model. Let's consider the example of Rolls-Royce. When Rolls-Royce introduced the TotalCare program, transitioning from a

product-based business model (selling jet engines) to a service-oriented business model (offering services throughout the product lifecycle) (Osterwalder et al. 2020), numerous operational changes were required. How could they ensure that their processes delivering the new maintenance services across 50 countries and involving 40,000 people globally would effectively reflect the business model changes? The challenge becomes even more demanding when considering that business model changes happen multiple times and simultaneously in various facets. How can organizations be systematically enabled to propagate changes in their redesigned business model to changes in their operating model?

Extant research has shown that change affects multiple organizational levels (i.e., strategic, tactical, and operational) (Al-Debei and Avison 2010; Bask et al. 2010; Globocnik et al. 2020). Specifically, the importance of aligning the relatively stable strategic level with the more dynamic operational level has been emphasized (vom Brocke et al. 2024; Pentland et al. 2021; Grisold et al. 2022b). As scholars and practitioners alike grapple with the complexity of managing dynamic business processes at the operational level (Baiyere et al. 2020; Mendling et al. 2020; Kerpedzhiev et al. 2021), a need for deeper insights and innovative approaches arises to understand, represent, and manage the dynamics inherent in modern organizational environments (Klun and Trkman 2018; Grisold et al. 2020). Organizational change extends beyond the organization's strategy, catalyzing changes in the organization's business model and requiring process redesign (Casadesus-Masanell and Ricart 2010; Demil and Lecocq 2010; Simmert et al. 2019). Thus, it becomes necessary to determine how to effectively manage change in an organization's business model, especially considering the effect on the underlying operating model (Di Valentin et al. 2012b).

From an information systems (IS) perspective, the business model is considered an intermediary concept between an organization's strategy and its *operating model* (Veit et al. 2014). While business models define *what* value a company aims to create and deliver, the operating model describes *how* this will be operationally achieved (Al-Debei and Avison 2010; DaSilva and Trkman 2014). In the context of innovation and transformation, the notion of the operating model is frequently used in research (Ross et al. 2006; van der Heijden et al. 2022) and in practice (Gartner 2022) to describe the desired state of *business processes* required for delivering goods and services to a customer. As illustrated in Fig. 1, business models and operating models share a reciprocal relationship (Bask et al. 2010; Globocnik et al. 2020). From a top-down perspective, a business model redesign requires changes to the operating model and its underlying business processes (Osterwalder et al. 2005; Al-Debei and Avison 2010; Turetken et al. 2019). From a bottom-up perspective, monitoring and evaluating the operation of business processes may provide insights that could trigger the need to rethink and redesign the business model (Di Valentin et al. 2012b; Globocnik et al. 2020; Badakhshan et al. 2022).

The need to establish a conceptual link between business models and operating models has been emphasized by multiple studies (Al-Debei and Avison 2010; Solaimani and Bouwman 2012; Veit et al. 2014; Szopinski et al. 2020; Verhagen et al. 2023). In practice, without clear guidance, organizations risk inefficiency, ineffectiveness, or even failure in business model redesign initiatives due to a lack of shared understanding among executive leaders about the broader implications of proposed changes across the organization (Teece 2010; Gartner 2023). According to a recent McKinsey (2023) report, only 23% of organizational redesigns are implemented successfully; however, organizations can increase their chances of successfully transforming their operating model by taking a structured approach.

To contribute to a better understanding of the relationship between business models and operating models, in this study, we investigate how to propagate changes in the business model into the operating model. We thus adopt a top-down perspective to arrive at initial concrete and useful

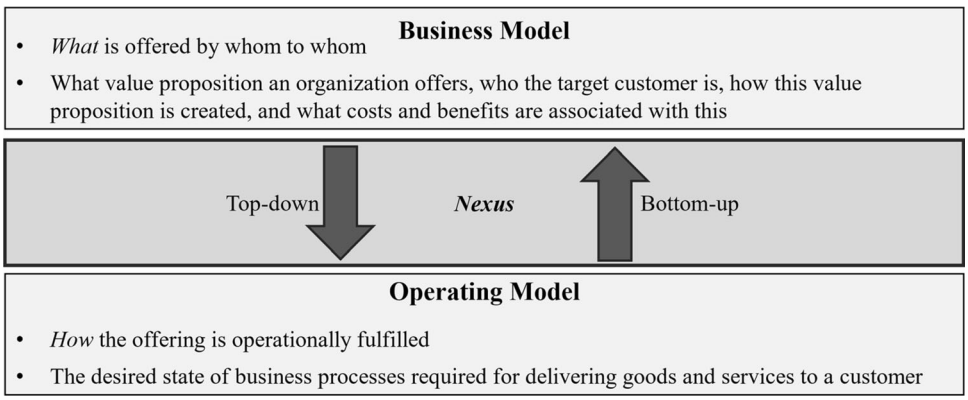

Fig. 1 Relationship between business models and operating models

results. The top-down perspective also reflects the requirements in practice: Currently, organizations face difficulties in transitioning from the development of a business model in the design phase towards its implementation and operation (Spieth et al. 2014; Geissdoerfer et al. 2017). Furthermore, there is a lack of methods that provide systematic guidance for redesigning the operating model to implement the changes introduced in a business model (Solaimani et al. 2018; Lara Machado et al. 2023a).

The objective of our research is *to develop a method to support organizations in identifying changes in their operating model resulting from a business model redesign.* To this end, we applied a design-oriented research process (Hevner et al. 2004; Tuunanen et al. 2024) to design this method. Grounded in extant knowledge from business model research and process management research, we completed three rounds of designing and evaluating the method both formatively and summatively, as well as in artificial and naturalistic environments (Venable et al. 2016). We refer to the method as *the Compass Method*, as it provides guidance for decision-makers at the tactical and operational levels in identifying necessary changes to their operating model through the use of a set of *operating model design cards*. Our work contributes to the understanding of the relationship between business models, operating models, and business processes. This study paves the way for developing complementary methods and tools to further explore this relationship. We present a set of design objectives to facilitate the creation and evaluation of our method, as well as future artifacts.

The remainder of the paper is structured as follows. Section 2 provides an overview of our research's background and related work. Section 3 details our research design. Section 4 presents the design of the proposed method and demonstrates how the method can be applied using the fictitious scenario of BikeShare, an urban bike-sharing provider. Section 5 presents the method's evaluation, and Sect. 6 discusses the evaluation results, contributions to research and practice, limitations, and avenues for future research. Finally, we conclude the paper in Sect. 7.

2 Background and Related Work

In this section, we first provide an overview of the business model concept and its fundamental underpinnings, focusing on its redesign. Secondly, we review the operating model, detailing its connection to business processes and business process change. Lastly, we describe the relationship between business models and their underlying operating models and review existing approaches that link both concepts.

2.1 Business Models

The evolution of digital business requires a paradigm shift in traditional approaches to how organizations do business (Legner et al. 2017; Ciriello et al. 2018). In response, the business model has surfaced as a distinct unit of analysis and as a concept used for driving innovation and organizational alignment (Al-Debei and Avison 2010; Frankenberger et al. 2013; DaSilva and Trkman 2014; Foss and Saebi 2018). The business model has become an established research concept in many fields, including IS, strategic management, and entrepreneurship (Schneider and Spieth 2013; Veit et al. 2014; Wirtz et al. 2016). Over the years, various definitions for the business model have been proposed in the literature (Al-Debei and Avison 2010; Wirtz et al. 2016; Massa et al. 2017). At an abstract level, a business model describes how an organization creates, delivers, and captures value (Teece 2010). In essence, a business model characterizes what value proposition an organization offers, who the target customer is, how this value proposition is created, and what costs and benefits are associated with this (Magretta 2002).

While strategy, business model, and operating models are interconnected, they portray different organizational levels (Morris et al. 2005; Globocnik et al. 2020). An organization's strategy tends to remain relatively stable over time, whereas its business model has a greater degree of agility, and its operating model exhibits an even more dynamic behavior (Turetken and Grefen 2017). In practice, strategy is concerned with corporate planning, business models with the business units and architectural aspects, and operating models with the implementation and functions of the operation (Bask et al. 2010). At the strategic level, the strategy determines the competitive positioning and industry stance of the organization (Porter 1980; Magretta 2002). At the tactical level, the business model is derived from the strategy, providing a detailed blueprint of the business architecture (Al-Debei and Avison 2010; Globocnik et al. 2020). At the operational level, the operating model represents the operationalization of the business model by outlining concrete elements, including the business processes required to execute the business model (Osterwalder et al. 2005; Solaimani and Bouwman 2012).

Business model redesign is a crucial activity when innovating a business model (Frankenberger et al. 2013; Bachmann and Jodlbauer 2023), which involves providing new or enhanced value propositions and, consequently, changing other constituent elements of the business model (Schaltegger et al. 2012; Foss and Saebi 2016). To assist organizations in redesigning their business models, various models, methods, and software tools have been proposed in the literature (Schwarz and Legner 2020; Szopinski et al.

2022). One of the best known frameworks for (re-)designing business models is the Business Model Canvas (BMC) by Osterwalder and Pigneur (2010). The BMC poses as the quasi-standard for depicting business models (Veit et al. 2014; Massa et al. 2017). The framework consists of nine dimensions to describe a business model: value proposition, customer segment, channels, customer relationship, key resources, key activities, key partners, revenue stream, and cost structure (Osterwalder and Pigneur 2010), whose instantiation or elements, serve to depict a concrete business model of an organization (Szopinski et al. 2022). Moreover, business model patterns are frequently used artifacts for ideating and designing business models (Remane et al. 2016). These patterns, such as the subscription and freemium models, are proven generic solutions to recurring business model design problems (Weking et al. 2020). As such, organizations can use them to foster creativity, spark new ideas, and facilitate the process of business model redesign (e.g., Abdelkafi et al. 2013; Lüttgens and Diener 2016).

In the past decade, business model research has shifted from the conceptualization of business models towards the application of the concept to innovate the business models of organizations (e.g., Ebel et al. 2016; Simmert et al. 2019; Athanasopoulou and De Reuver 2020) which is nowadays often driven by digitalization (e.g., Bouwman et al. 2018; Rachinger et al. 2019). Moreover, considerable attention has been devoted to business model ideation and design, yet comparatively less focus has been placed on the implementation and operationalization of new or redesigned business models (Geissdoerfer et al. 2018; Verhagen et al. 2023). Therefore, we generalize this research gap as: *the lack of research in the business model domain that focuses on the implementation of business models*. Our research aims to respond to this gap by providing systematic guidance to operationalize redesigned business models.

2.2 Operating Models and Business Processes

A newly (re-)designed business model must be implemented through the form it takes in reality (Osterwalder et al. 2005; Iacob et al. 2014). The operating model determines the implementation of the business model to realize the envisioned value (Berman 2012). An operating model is a blueprint of the products and services, business processes, organizational roles, information, and technologies that must be (re-)configured to deliver the value proposition to the customer (van der Heijden et al. 2022). From a business process perspective, the dimensions that form an operating model coincide with the design specification of process redesign initiatives (Reijers and Liman Mansar 2005; Gross et al. 2021). By referencing the operating model, the scope of the redesign extends beyond a single business process, encompassing a set of one or more processes that collectively implement the business model (Ross et al. 2006). As such, we consider the changes to the operating model to encapsulate the *process requirements* needed to enable the implementation of a redesigned business model.

The need for organizations to continually assess the effectiveness of their business models often requires redesigning or developing a new business model, thus triggering a revision of the operating model and its underlying processes (Bask et al. 2010; Bruls et al. 2021). These shifts in process structures over time are of significant interest and are captured using various notions, such as process redesign and improvement or process dynamics (Pentland et al. 2021; Grisold et al. 2022b). These changes involve analyzing, redesigning, and implementing new processes to improve efficiency or adapt to shifting business landscapes (Rosemann and vom Brocke 2015; Feldman et al. 2016). Process changes can manifest in a variety of ways, including alterations in organizational structures, the reconfiguration of information systems, or the introduction of new technologies (Dumas et al. 2018). Key drivers of process change often include advancements in digital technologies and evolving customer demands (Leonardi and Treem 2020). In response, processes must be conceived, modified, and discarded as required. This adaptability in processes is essential for managing uncertainty in the current digital era (Beverungen et al. 2021). Consequently, to address fluid market dynamics, organizations need to change their business processes in a more agile and faster-paced nature (Baiyere et al. 2020).

In the literature, BPM research puts forth methods, techniques, and tools to support the changes in business processes throughout their lifecycle (Dumas et al. 2018). Strategic decisions influenced by dynamic environments often lead to changes in an organization's business model (Saebi and Foss 2015), necessitating BPM initiatives that align and implement the strategic objectives (Rosemann and vom Brocke 2015). In response to this demand, scholars have developed models and frameworks to link strategy directly to operational execution and processes, such as the Business Engineering Framework (Winter 2001), the Strategic Alignment Model (SAM) (Henderson and Venkatraman 1993), strategy maps (Kaplan and Norton 2004), the TOGAF standard (The Open Group 2022).

In the face of digital transformation, recent claims suggest the need to re-examine traditional BPM assumptions (Mendling et al. 2020; Kerpedzhiev et al. 2021). One of the key challenges is to make processes adaptive and easily configurable so that they can evolve rapidly, promoting flexibility over rigid structures (Baiyere et al. 2020). Digitalization often needs adaptive approaches to

implementing change, which can be contrasted to the traditional, predictive methods of implementing change (Gartner 2016). Additionally, there's a need to explore how BPM can play an enabling role in digital innovation (Grisold et al. 2021) and a more active role in value creation (i.e., explorative BPM) (Beerepoot et al. 2023). These considerations are typically not part of traditional BPM methodologies, most of which are exclusively concerned with individual processes and their improvement (Klun and Trkman 2018; vom Brocke et al. 2021b).

Consequently, BPM approaches such as the Five Diamond Method for identifying opportunities from business and technology trends (Grisold et al. 2022a), the Business Process Design Space for exploring unconstrained process design alternatives (Gross et al. 2021), and the BPM Billboard to improve the alignment of BPM initiatives with the organization's strategic objectives (vom Brocke et al. 2021b) have been proposed. Nonetheless, scholars advocate for novel approaches to manage the dynamics of process changes and support the integration of emerging opportunities, such as those arising from shifts in customer demands, the advent of new digital technologies, or data-driven value creation (Grisold et al. 2019; Mendling et al. 2020; vom Brocke et al. 2021a; Beerepoot et al. 2023). Therefore, we generalize this research gap as: *the need for new approaches to manage dynamic process changes and integrate emerging opportunities*. Our research aims to respond to this call by identifying process changes in the operating model induced by the redesign of a business model.

2.3 Business Models and Operating Models

Changes in any dimension of the business model can entail multiple implications for the operating model, often requiring creating, removing, or redesigning instances or elements within the operating model dimensions (Cavalcante et al. 2011; Di Valentin et al. 2012b). However, determining the most appropriate changes to the operating model is challenging because designing the operating model is a non-deterministic process with various viable options (Weigand et al. 2007). These options vary in terms of costs and benefits but are all aimed at achieving the desired business model implementation objective (Di Valentin et al. 2012a; Fayoumi and Loucopoulos 2016). Therefore, when designing the operating model of a given business model, several design decisions have to be made concerning the operating model's constituting elements (Weigand et al. 2006; Al-Debei and Avison 2010). Moreover, the operating model can also provide a more detailed understanding of the operational feasibility of the business model (Solaimani et al. 2018).

Several studies have contributed to the understanding of the relationship between business models and operating models (e.g., Gordijn et al. 2000; Morris et al. 2005; Weigand et al. 2006; Bask et al. 2010; Cavalcante et al. 2011; Solaimani and Bouwman 2012). We provide an overview of representative methods in the literature in Table 1, including relevant method characteristics, such as the method's purpose, organizational context, operating model perspective, and the evaluation approaches used to validate the method's utility (Lara Machado et al. 2022).

The existing methods can have varying objectives; however, they can be mainly categorized into two overarching types: *transformation purpose* and *impact analysis purpose*. On one hand, transformational methods describe how to translate a business model to its corresponding operating model in a top-down fashion (i.e., using the business model as a starting point) (e.g., Andersson et al. 2006; Suratno et al. 2018; Hotie and Gordijn 2019) or bottom-up direction (i.e., using the operating model as a starting point) (e.g., da Silva Torres et al. 2023). On the other hand, impact analysis methods provide guidelines to assess how different factors affect a business model and its underlying operating model, comparing alternative operating model options based on specific criteria (e.g., Fayoumi and Loucopoulos 2016; Roelens et al. 2019). To effectively operationalize a redesigned business model, a method should offer guidelines for transforming the business model into its corresponding operating model, considering the changes in the business model design and identifying different operating model alternatives (*transformation purpose*). Furthermore, it should support the assessment of alternative operating model options based on their potential impact and feasibility (*impact analysis purpose*). However, current methods mainly focus on greenfield scenarios to operationalize the design of a new business model and lack systematic guidance to identify what elements of the operating model change, how they change, and what the most appropriate changes.

Methods that bridge business models and operating models are also characterized by their *organizational context*. The *intra-organizational context* is related to the internal capabilities of a focal organization and how the organization operates to create value (Grefen and Turetken 2017) (e.g., De Castro et al. 2011; Zancul et al. 2016). In comparison, the *network context* is related to cross-organizational boundaries, how value is exchanged between organizations, and the operational processes that are needed to share information, coordinate the physical flow of goods, and integrate workflows (Solaimani et al. 2018) (e.g., Weigand et al. 2007; Wieringa et al. 2008). Regarding the organizational context, the vast majority of methods in the literature focus on the network or ecosystem context without further detailing how an organization

Table 1 Methods that bridge business models and operating models

Approach	(Andersson et al. 2006)	(Da Silva et al. 2023)	(De Castro et al. 2011)	(Di Valentin et al. 2012a)	(Fatemi et al. 2010)	(Fayoumi & Loucopoulos 2016)	(Hotie & Gordijn 2019)	(Roelens et al. 2019)	(Suratno et al. 2018)	(Weigand et al. 2007)	(Wieringa et al. 2008)	(Zancul et al. 2016)
Description	Method to transform business models to process models that describe how value is exchanged among actors by using patterns	Guidelines to derive a business model from a process model	Model-driven approach with semi-automated transformations from business models to lower-level behavioral models	Methodological framework for mapping business models onto business processes within an organization	Guidelines for the design of aligned and consistent business value models and coordination processes	Multi-perspective conceptual modeling approach to align the business architecture with information systems	Step-wise method to design a process model for networked value constellations given a value model	Process-Goal Alignment technique to realize strategic fit within the organization's business architecture	Method for the operationalization of service-dominant business models into conceptual business process models	Method to derive a process model from a value model focusing on resource management, communication, and risk assessment	Coordination process design method that focuses on the physical delivery models and coordination process	Method for adopting IoT enable product-service systems in consideration of a business model design
Transformation purpose	(Top-down, Design) Transforms e3-value model using pattern library to process models	(Bottom-up) Transforms BPMN process model to e3-value model	(Top-down, Design) Transforms business model and process model to lower-level process models	(Top-down, Redesign) Transforms business models to business process alternatives components in eEPC	(Top-down, Design) Transforms e3-value model to a coordination process model in BPMN	–	(Top-down, Design) Transforms e3-value model to BPMN model considering trust and physical possession	–	(Top-down, Design) Transforms service-dominant business model to BPMN process model	(Top-down, Design) Transforms e3-value model to BPMN process model	(Top-down, Design) Transforms e3-value to coordination processes (UML activity diagram)	(Top-down, Redesign) High-level indications of process changes
Impact analysis purpose	–	–	–	–	–	Operational model alternatives (processes) are contrasted using predefined criteria	–	Performance and impact of activities on value proposition	–	–	–	–
Intra-organizational context	–	Business process model may describe internal functions	Service composition and operations of an info. system	Business model and processes of an organization	–	Business architecture of an organization	–	Focus on goals and value proposition of an organization	–	High-level indications to identify internal activities	–	Process changes within an organization
Network context	Value exchange among network actors	Value exchange among network actors	Partial description of interaction with network actors	–	Actor coordination and value transfers	–	Value exchange among network actors	–	Network-centric design	Coordination among network actors in value models	Cross-organizational coordination processes	–
Operating model perspective	Focus on product/services, actors, process functions and behaviors, and info. exchanged	Focus on product/services, actors, process functions and behaviors, and info. exchanged	Comprehensive overview	Focus on product/services, actors, information, and technology	Focus on product/services, actors, process functions and behaviors	Comprehensive overview	Focus on product/services, actors, process functions and behaviors, and info. exchanged	Focus on functions	Focus on product/services, actors, process functions and behaviors	Focus on product/services, actors, process functions and behaviors	Focus on product/services, actors, process functions and behaviors, and info. exchanged	Focus on types of processes and technology
Evaluation approach	Illustrative scenario	Case study, single case-experiment	Illustrative scenario, prototype	Illustrative scenario	Illustrative scenario	Case study	Case study	Case study, prototype, expert evaluations	Illustrative scenario	Illustrative scenario	Illustrative scenario	Case study

operates to create the value that is being exchanged (Lara Machado et al. 2023a). When an organization redesigns its business model, there is a need to adapt the supporting operations that will deliver value to the customers and put forth the organization's value proposition.

In light of the need to adapt the redesigned business model's underlying operations, a central element is the design of the corresponding *operating model* (i.e., products and services, business processes, people, information, and technologies) (Osterwalder et al. 2005; Globocnik et al. 2020). Therefore, to provide a comprehensive overview of the operating model and its changes, it is crucial to address all operating model dimensions. Available approaches in the literature strongly focus on depicting the operating model in terms of organizational roles, process functions and behaviors, and products and services provided by processes (e.g., Fatemi et al. 2010). However, approaches provide limited support related to the design of the information dimension and, to a greater extent, enabling technologies.

Moreover, despite identifying multiple methods aimed at bridging business models and operating models, there is a notable lack of evidence demonstrating the validity of these methods and their perceived utility in practice (Nunamaker Jr. et al. 2015). In particular, approaches are mainly *evaluated* and demonstrated via illustrative scenarios that provide insights into the method's inner workings (e.g., Andersson et al. 2006; Weigand et al. 2007; Wieringa et al. 2008; Suratno et al. 2018). Hence, empirical evaluations are required to enhance the usefulness of methods in this domain. Ultimately, although various approaches exist to facilitate the transformation of a business model into its operating model, there remains a pressing need for a valid and useful method to assist organizations in identifying and assessing potential changes to their operating model in response to a business model redesign.

We generalize the research gaps related to the existing methods that bridge business models and operating models as: *the lack of valid and useful approaches that support organizations in identifying which elements of the operating model should change and which changes are the most appropriate given a business model redesign.* Our research aims to respond to this gap by developing a method to identify operating model changes induced by the redesign of a business model.

3 Research Design

We applied a design-oriented research process (Hevner et al. 2004; Tuunanen et al. 2024) to develop a method that supports organizations in identifying changes in their operating model resulting from a business model redesign. We deem design science research (DSR) the most appropriate strategy of inquiry since we aim to find a solution to a yet unsolved problem, which is to identify changes in the operating model resulting from a business model redesign. We expect the method to be perceived as useful by decision-makers in organizations who are concerned with implementing and managing operating models, such as process owners and process managers. By designing and evaluating the method, we generate design knowledge to further understand the many aspects of the relationship between business models and operating models. As illustrated in Fig. 2, we conducted specific research activities for problem identification, definition of solution objectives, design and development, demonstration and evaluation,

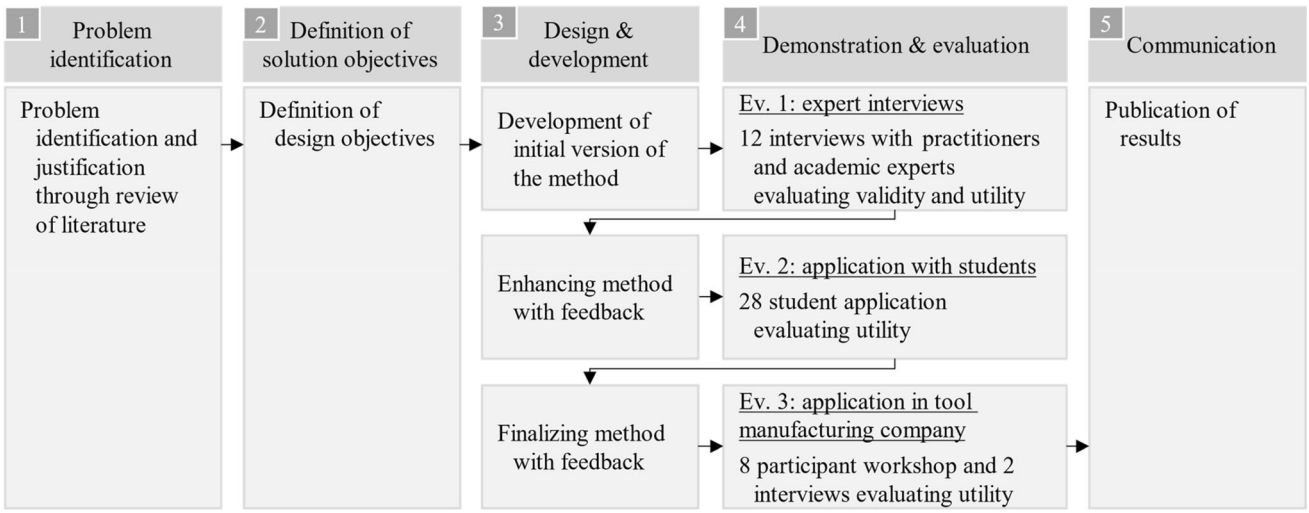

Fig. 2 Research design process

and for communicating our results. We structured our research according to the phases by Peffers et al. (2007). We applied three rounds of concurrent design and evaluation as proposed by Sonnenberg & vom Brocke (2012) and Tuunanen et al. (2024) to refine, validate, and improve the design artifact.

We ground our work in a rich problem understanding, which we gain through a review of the literature, specifically in the fields of business model research and process management research. We derive and define two specific design objectives, which operationalize and guide the further design and evaluation process. We design The Compass Method which defines three steps, with two sub-steps each, propagating changes in the business model to the operating model. In each step, tools are specified, including a set of operating model design cards that we constructed to identify operating model changes based on business model changes.

We design and evaluate the Compass Method in three iterations: an initial, an enhanced, and a final method, which was then used for summative evaluation (Venable et al. 2016). First, we evaluate the validity and utility of the design of the initial method by presenting a fictitious scenario of BikeShare, an urban bike-sharing provider, to 12 practitioners and academic experts to validate our prototype's initial validity and utility. Second, we evaluate the utility of the enhanced method by applying it with 28 master students in the case of a travel administration department that aimed to redesign its business model to promote more sustainable and environmentally conscious travel. Third, we evaluate the utility of the Compass Method by applying the final version with eight practitioners from a tool manufacturing company in the construction industry to redesign their business model using IoT data.

3.1 Problem Identification

Sections 1 and 2 of this paper introduce and elaborate on the problem central to our research. Organizations are forced to redesign their business models to deal with continuous changes (Foss and Saebi 2018; Verhoef et al. 2021; Vial 2021). Due to a lack of understanding of the relationship between business and operating models, it is challenging to identify the changes to the operating model resulting from changes to the business model. Hence, continuous change leads to difficulty managing change across the organization's strategic, tactical, and operational levels (Turetken et al. 2019; Globocnik et al. 2020). The business model has emerged as a concept for innovation and organizational alignment; however, existing research falls short in detailing how changes to the business model at the tactical level impact the operating model at the operational level (Solaimani et al. 2018; Betzwieser et al. 2020; Lara Machado et al. 2023a). Moreover, traditional process management approaches are ill-equipped to handle process changes prompted by the evolving digital landscape, such as the need for agility, flexibility, and integration of emerging opportunities (Denner et al. 2018; Baiyere et al. 2020; Grisold et al. 2022b).

We formulate the problem statement as follows: *The decision-makers at the tactical and operational levels of organizations lack systematic guidance to identify the necessary changes in the operating model when a business model is redesigned.*

3.2 Design Objectives

We use the justificatory knowledge derived from the literature discussed in Sect. 2 to formulate appropriate objectives for our proposed method. To guide the development of our solution artifact, we introduce two design objectives (DO) as described below.

Organizations that redesign their business model trigger the need to redesign their operating model correspondingly and change their constituting business processes. The operating model must reflect the internal capabilities required for the organization to create, capture, and deliver value to its customers. Hence, the changes to a business model should serve as the basis for identifying potential changes across all operating model dimensions (Di Valentin et al. 2012a). However, translating the changes in the business model into changes in the operating model is challenging due to the non-deterministic nature of designing an operating model (Weigand et al. 2007). Therefore, the method should enable organizations to conceive a range of potential ideas regarding potential changes in the operating model, ensuring that each operating model dimension is adequately represented (Al-Debei and Avison 2010). Accordingly, we state the following DO:

DO1: The method should provide systematic guidance to design potential changes to the operating model resulting from a redesigned business model.

To successfully operationalize a business model redesign, a method should offer guidelines for evaluating different operating model options based on their potential impact and feasibility. Therefore, after identifying potential changes to the operating model, stakeholders must assess and select the most appropriate changes in consideration of relevant criteria (Schief et al. 2012; Fayoumi and Loucopoulos 2016). For instance, it is important to assess the degree to which these changes align with the redesigned business model (Roelens et al. 2019). Accordingly, we state the following DO:

DO2: The method should support the assessment of potential operating model changes resulting from a redesigned business model.

Furthermore, we expect the method to be valid and useful for *decision-makers at the tactical and operational levels of organizations* across various domains. The method should provide structured step-by-step guidance to professionals in tactical and operational roles in bridging the business model and the operating model by focusing on key elements.

3.3 Design and Development

In response to the design objectives, we developed a method that guides practitioners in designing the potential changes required at the operational level and assessing the most suitable options to enable the implementation of a business model redesign. We designed the initial version of the method drawing upon relevant literature in BPM, business models and the nexus between business models and the operating models (Lara Machado et al. 2023c). To structure and present the Compass Method, we leveraged guidelines suggested by situational method engineering (SME) (Brinkkemper 1996; Henderson-Sellers and Ralyté 2010). Following the initial development of the method, we conducted two additional rounds of design and development, incorporating the feedback gathered during the demonstration and evaluation process. The results of the method's design and development are detailed in Sect. 4.

3.4 Demonstration and Evaluation

To demonstrate and evaluate the method, we defined an evaluation strategy that covers both formatively and summative and in artificial and naturalistic settings (Venable et al. 2016). We conducted three rounds of demonstration and evaluation to assess the method's *validity* (i.e., the extent to which it is applicable and can be used for its intended purpose of use) and *utility* (i.e., the extent to which it is considered useful and easy to use by its target users in achieving its intended purpose of use) (Gregor and Hevner 2013). To evaluate utility, we use the core constructs of the Technology Acceptance Model (TAM), frequently used in IS research and DSR (Venkatesh et al. 2003), to account for the perceived usefulness and perceived ease of use of novel technologies and design artifacts (Davis 1989). The results of the evaluations are presented in Sect. 5.

During the *first evaluation*, we conducted 12 semi-structured interviews with practitioners and academic experts (Myers and Newman 2007). The purpose of this evaluation was to evaluate the method's design specification and initial prototype, focusing on both its *validity* and *utility*. The interviewees were presented with the fictitious illustrative scenario of an urban bike-sharing provider (Adali et al. 2020; Gilsing et al. 2020), referred to as BikeShare, that aimed to redesign its business model to offer greater flexibility and a more comfortable traveling experience for customers. The scenario is based on a real-life business case of an urban bike-sharing organization. However, we intentionally created this scenario to demonstrate the Compass Method in a controlled (artificial) environment (Venable et al. 2016). We use this scenario to demonstrate the method's application in Sect. 4. Additional details regarding the interview design are presented in Online Appendix B.

In the *second evaluation*, 28 students in the final semester of their master's degree applied the method in a real-life case (Prat et al. 2015) involving the redesign of a business model for a travel administration department. The department aimed to promote more sustainable and environmentally conscious travel. The students served as proxies for real users in an experimental setting to demonstrate the *utility* of the artifact (Mettler et al. 2014). In particular, the students had a solid theoretical understanding of the underpinnings of the method, which allowed us to elicit valuable feedback on the perceived challenges of using an early version of the artifact (Compeau et al. 2012). Additional details regarding the design of the method application with students are presented in Online Appendix C.

In the *third evaluation*, we applied the method in a tool manufacturing company in the construction industry to evaluate the utility of the Compass Method in a naturalistic environment. The goal was to redesign the company's business model using IoT data to provide recommendations to their customers about their tools and assets. The application consisted of a workshop with eight participants and two interviews with key stakeholders to evaluate the method's *utility*. Additional details regarding the design of the method application in the tool manufacturing company are presented in Online Appendix D.

4 Method Design and Description

In this section, we provide an overview of the resulting method from our iterative design and evaluation process (Sect. 4.1), followed by a design specification of the tools that are used throughout our approach (Sect. 4.2). In the remaining subsections (Sects. 4.3–4.5), we provide a stepwise description of the method's application using the BikeShare scenario and depict how each one of the steps can be applied.

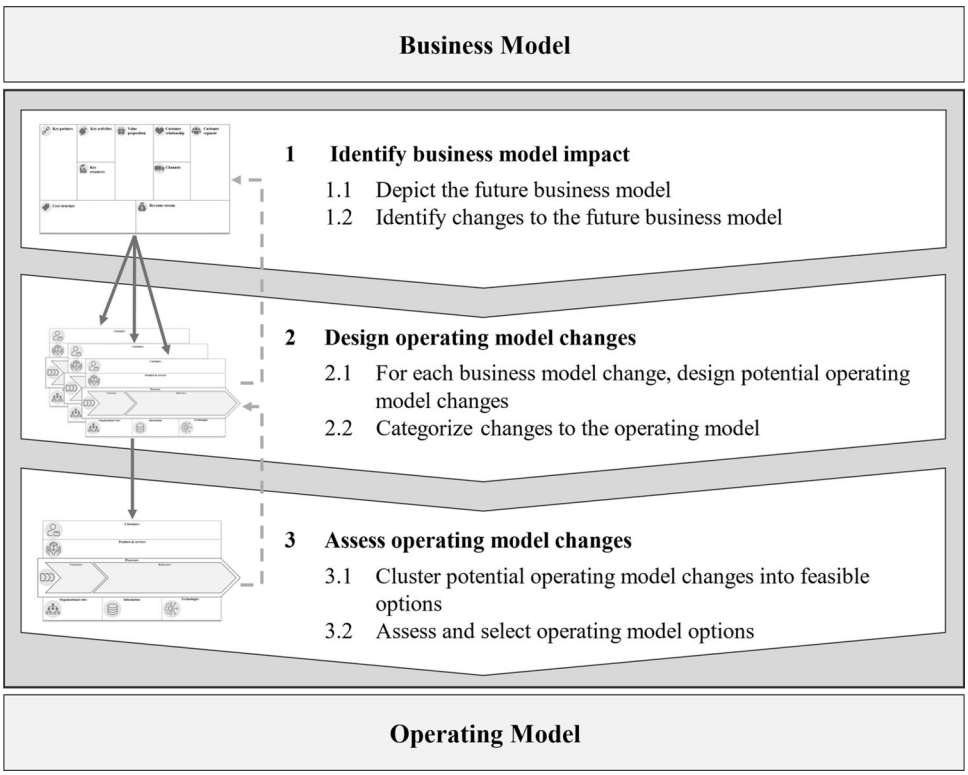

Fig. 3 Overview of the method

Table 2 Overview of the method

Step	Sub-step	Tool	Role	Input	Output
Step 1: Identify business model impact	1.1 Depict the future business model 1.2 Identify changes to the future business model	Business Model Canvas Business model patterns	Business model designer (R) Business owner Digital business architect Process designer	Current business model	Changes to the future business model
Step 2: Design operating model changes	2.1 For each business model change, design potential operating model changes 2.2 Categorize changes to the operating model	Operating model template Operating model design cards	Process designer (R) Digital business architect Business model designer Business owner	Changes to the future business model	Potential operating model changes
Step 3: Assess operating model changes	3.1 Cluster potential operating model changes into feasible options 3.2 Assess and select operating model options	Operating model template Assessment criteria	Process designer (R) Digital business architect Business model designer	Potential operating model changes	Selected operating model option

4.1 Method Overview

To depict the overall procedure, we provide a representation of the method's steps in Fig. 3. Additionally, we describe the method by defining the required steps, tools, roles, inputs, and outputs in Table 2 (adapted from Bucher et al. 2007). In accordance with the design objectives, steps 1 and 2 are consistent with DO1 (design of changes), and step 3 is related to DO2 (assessment of changes). The method can be applied by sequentially following each step. However, the process is *iterative*, allowing the users to revisit a previous step when necessary. Primarily, in step 2, potential changes at the operating model level may require changing the business model design produced in step 1 (Veit et al. 2014). For instance, the identification of required resources to implement a process may trigger a reconsideration of the future business model's key resources to enable operational fulfillment.

The method should be applied in a workshop setting with participants who act as decision-makers at the tactical and operational level, spanning roles such as digital business architect (ensures alignment from business strategy to process execution), business owner (responsible for defining business strategy), business model designer (specifies business model design), and process designer (designs business processes) (adapted from Suratno et al. 2018). Table 2 shows the responsible role (R) for each step. To assist the method application, we suggest including a facilitator who is familiar with the method and moderates the interaction between the participants.

To build the Compass Method, we leveraged SME, an approach that provides guidelines for designing situation-specific methods (Henderson-Sellers et al. 2014). In line with SME, we describe of the situations in which our method can be used. To define the situations in which a method can be used, the *project type* and *context* must be established (Henderson-Sellers and Ralyté 2010).

The *project type* refers to specific project characteristics that determine the method's choices and tailoring, such as the goal of the method (Bucher et al. 2007). As recommended for projects involving the redesign of business models (Simmert et al. 2019), the Compass Method is appropriate when an organization seeks to change its business model, through either radical or incremental innovation, into a more competitive business model. Consequently, the organization needs to redesign its operating model to support the implementation of the newly redesigned business model.

The *context* refers to organizational contextual factors that influence how the method is used (Bucher et al. 2007). We use the BPM context framework dimensions to define the method's context (i.e., goal, lifecycle, process, organization, and environment dimension) (vom Brocke et al. 2021a). The Compass Method aims to help explore (*goal dimension*) changes in core processes in the operating model that support the implementation of a redesigned business model (*process dimension*) during the BPM redesign phase (*lifecycle dimension*). The Compass Method suits organizations that offer products or services regardless of their size. However, they must be knowledgeable of their processes and have a supportive BPM culture (*organization dimension*). The Compass Method is relevant for organizations operating in competitive environments characterized by medium to high uncertainty, such as the software industry (Veit et al. 2014), which require changes to their business model and operating model, along with their corresponding processes (*environment dimension*).

4.2 Design Specification for Tools Supporting the Method

This section describes tools we have selected, adapted, or assembled from relevant literature. We utilized the SME composition strategy (Bucher et al. 2007) to reuse method fragments identified in the review of relevant literature (Henderson-Sellers and Ralyté 2010). The fundamental idea behind this strategy is to select and orchestrate method fragments from the literature that are aligned with the design objectives (Brinkkemper 1996). In particular, we leveraged this SME strategy to reuse well-known approaches in BPM and business model research. Section 4.2.1 outlines the selected tools from the business model literature, including the BMC as a business model design template and business model patterns, both used for identifying the business model impact (step 1). Section 4.2.2 describes the adapted tools from the BPM literature, including the Business Process Redesign (BPR) framework employed as an operating model design template (steps 2 and 3) and process assessment criteria such as the devil's quadrangle employed for assessing operating model changes (step 3). Finally, Sect. 4.2.3 describes a set of operating model design cards that we assembled from the literature relating business models and operating models. These cards are intended to help translate changes in the business model into corresponding changes in the operating model (step 2).

4.2.1 Business Model Canvas and Patterns

To construct the Compass Method, we use the BMC template shown in Fig. 4 (Osterwalder and Pigneur 2010) to depict the future business model redesign. Accordingly, the *value proposition* defines a set of products and services that create value and satisfy the needs of a specific customer segment. The *customer segment* defines the different groups of people or organizations that the business aims to serve. The *channels* describe how the organization

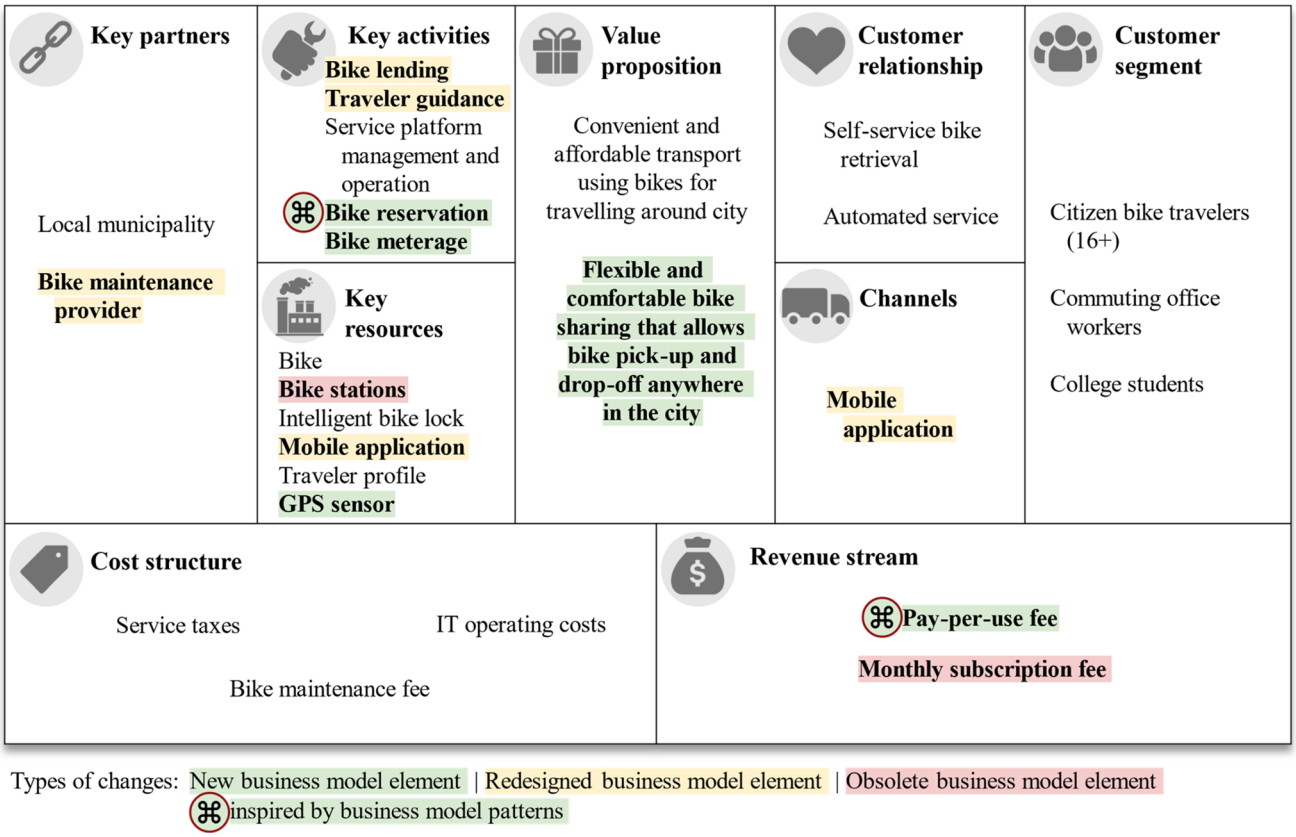

Fig. 4 Step 1 output: Changes to BikeShare's future business model

communicates and delivers the value proposition to the customer segment. The *customer relationship* outlines how the organization builds and maintains the relationship with specific customer segments. The *key resources* define the key physical, intellectual, human, and financial assets required to deliver the value proposition. The *key activities* encompass the most important activities the organization must realize to create and deliver value. The *key partners* represent the network of external organizations a business collaborates with to provide the value proposition. The *revenue stream* details how the organization generates income or benefits from the customer segment. The *cost structure* describes all costs the organization incurs from operating the business model. When an organization depicts a concrete business model using the BMC, the nine constituent dimensions are instantiated as business model elements. For example, in the business model of a streaming platform like Netflix, the *revenue stream* dimension is instantiated by business model elements, such as the subscription service for streaming content.

Additionally, we suggest the use of business model patterns as a tool to foster business model redesign opportunities and new sources of value (Gassmann et al. 2014; Remane et al. 2016; Weking et al. 2020). The business model patterns can describe distinct dimensions of the business model. Accordingly, a business model can be designed as a combination of different patterns, facilitating the redesign process (Osterwalder and Pigneur 2010; Lara Machado 2021). Weking et al. (2020) provide a catalog of patterns categorized by different dimensions of the business model. For instance, value proposition patterns include: 'data as a service'—offering information to the customer as the value proposition (Hartmann et al. 2016), 'digitally-charged products'—wrapping classical physical products with sensor-based digital services (Fleisch et al. 2014), and 'remote usage and condition monitoring'—equipping products with technologies that allow to detect errors and monitor usage (Fleisch et al. 2014).

4.2.2 *Operating Model Template and Assessment Criteria*

To describe the operating model, we adopt the dimensions of the Business Process Redesign (BPR) framework by Reijers and Liman Mansar (2005). The BPR framework describes business processes in terms of the customer, product and services, business process functions and behaviors, organizational roles, information, and technologies. The *customer* dimension describes the internal or external customer of a process. The *products and services* dimension defines the products or services that are

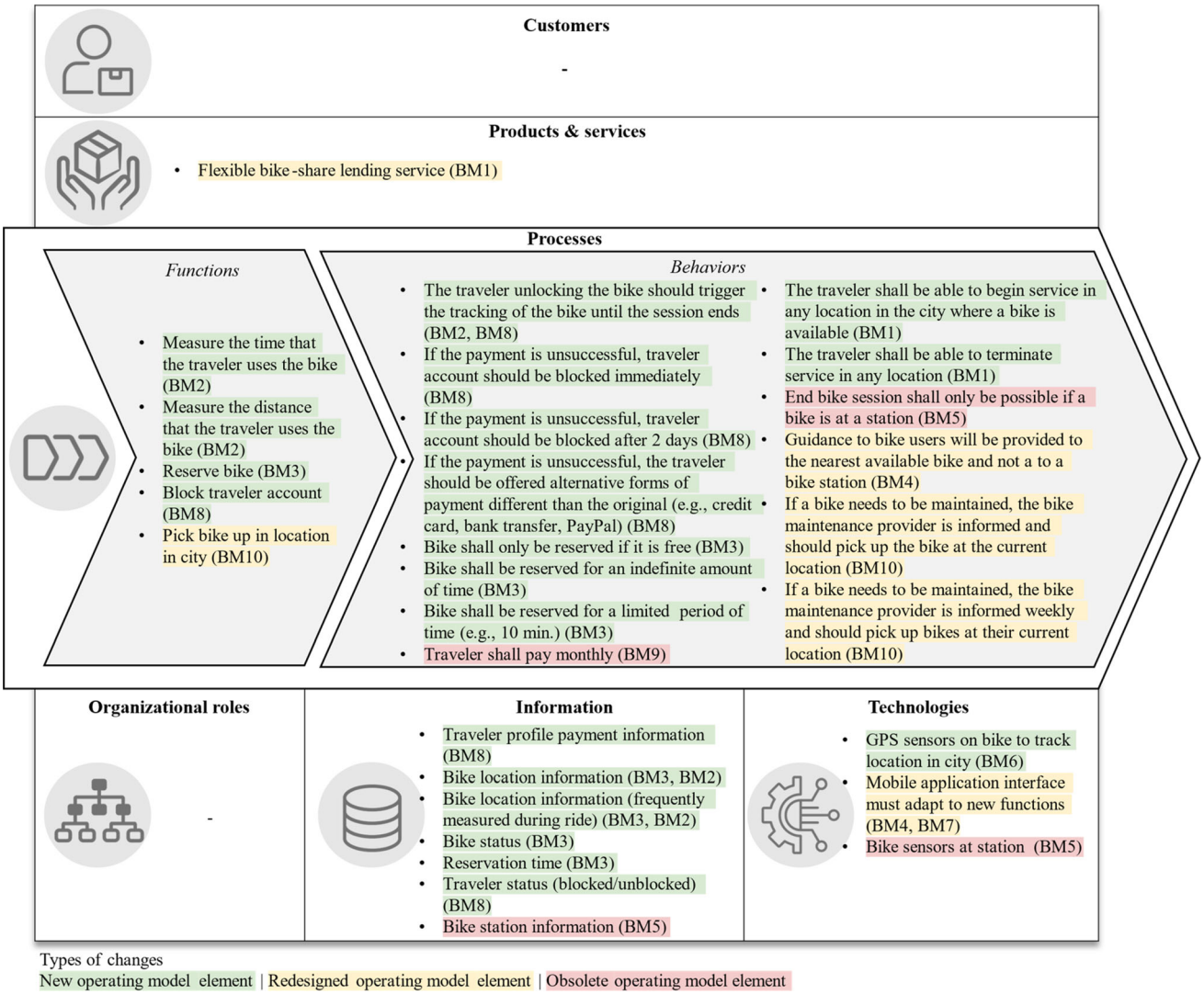

Fig. 5 Step 2 output: Potential changes to BikeShare's operating model

generated by a process. The business process *function* dimension describes what tasks need to be executed. The business process *behavior* dimension describes when the tasks are executed. The *organizational roles* dimension details the participants executing tasks of a process. The *information* dimension defines what data a process creates or uses. The *technologies* dimension describes which technology elements are used to support the execution of a process. When an organization depicts a concrete operating model, the constituent dimensions are instantiated as operating model elements. For example, in the operating model of a streaming platform like Netflix, the *technologies* dimension is instantiated by operating model elements such as web and mobile applications, load balancers, and cloud servers, among others, that support the organization's business model.

In line with our adopted definition of the operating model (van der Heijden et al. 2022), the dimensions of the BPR framework coincide with those of the operating model. Furthermore, the framework is well established in the process redesign domain (Gross et al. 2021). For these reasons, we adopt the BPR framework to create an *operating model template,* depicted in Fig. 5, to describe the changes of the redesigned operating model. The operating model template is a visual representation of the dimensions of the operating model. Moreover, we suggest the optional use of a process model to enhance the process description with a simple process flow.

To assess the operating model, we suggest employing widely used assessment criteria, such as the devil's quadrangle evaluation framework (Brand and van der Kolk 1995). This framework is a commonly used tool in BPM redesign initiatives (Dumas et al. 2018) and consists of four

key dimensions: *time*, *cost*, *quality*, and *flexibility*. Within the context of the method, the cost dimension refers to the cost of implementing and executing the changes in the operating model. The time dimension reflects the time to implement the changes and deliver the services once the business model is operating. The quality dimension is related to the quality of the value provided and the feasibility of the operating model. The flexibility dimension refers to the adaptability and ease of configuration of the operating model, enabling quick changes to accommodate new value propositions or emerging technologies. Considering the method's design objectives, we include a fifth criterion: *alignment*. This additional criterium reflects the importance of ensuring that the operating model is aligned with the future business model (Roelens et al. 2019). Additionally, method users may find incorporating additional criteria tailored to their unique strategic priorities beneficial. For example, integrating criteria related to digital innovation (e.g., Barthel et al. 2021) or sustainability goals (e.g., Seidel et al. 2012; Wollmann and Tortato 2019; Rosati et al. 2023) could be pertinent for specific business model redesign endeavors.

4.2.3 Operating Model Design Cards

In line with the method's objective, the method should support the identification of changes in all elements of the operating model dimensions. However, as discussed in Sect. 2, we found that existing approaches lack a comprehensive focus to derive changes in all operating model dimensions (Lara Machado et al. 2023a). To enable the translation of a business model into an operating model design, we constructed a set of operating model design cards. The cards were built using a qualitative content analysis (Krippendorff 2018) in which we used the extant literature on the nexus between business models and operating models to synthesize the information regarding the relationship between the constituting dimensions (e.g., how the business model's *value proposition* relates to the *functions* executed in the operating model) (Lara Machado et al. 2023b).

The purpose of the operating model design cards is to guide the transformation of a business model design to a potential operating model design. Each operating model design card depicts a business model dimension[1] (e.g., value proposition, key activities, key resources, etc.) and provides guiding questions meant to help structure and explore possibilities (MacLean et al. 1991) of how that specific business model dimension influences the design of the operating model dimensions. Furthermore, the operating model design cards provide illustrative examples that answer the guiding questions in real-world settings. The cards facilitate analyzing the impact of a change in the business model on the operating model (e.g., how changing the business model's value proposition impacts the operating model's processes). Table 3 shows an overview of the operating model design cards for the "value proposition" dimension of the business model. The development process and details of the operating model design cards are provided in Online Appendix A.

4.3 Step 1: Identify Business Model Impact

4.3.1 Step 1.1: Depict the Future Business Model

The method requires the organization's current business model as input to depict the future business model. During the first step, method users depict the future business model using the BMC template (detailed in Sect. 4.2.1). It is crucial for the envisioned business model to align with the organization's strategy and vision (Globocnik et al. 2020). We suggest using a business model pattern catalog to ease the process of the business model redesign (e.g., Gassmann et al. 2014; Remane et al. 2016; Weking et al. 2020).

We illustrate the Compass Method using the BikeShare scenario, an urban bike-sharing provider with over 20,000 bikes distributed nationwide across 300 parking stations, providing around 5.4 million annual rides. In its current business model, BikeShare provides bike-sharing services based on a monthly subscription fee. The traveler (customer) may use available bikes situated in designated parking stations across the city.

As part of the strategy to improve customer convenience and accessibility, the method entails the redesign of BikeShare's current business model. The purpose of the redesign is to enhance the business model's value proposition and increase customer satisfaction. The envisioned future business model aims to provide greater flexibility and a more comfortable traveling experience for the traveler. Under this model, travelers should have the ability to reserve a bike (guaranteed availability business model pattern (Gassmann et al. 2014)), pay exclusively for the metered bike use (pay-per-use business model pattern), and end the service use in any location in the city.

4.3.2 Step 1.2: Identify Changes to the Future Business Model

Once the future business model is depicted, the current and future business models are compared to identify and categorize the changes. When the business model is

[1] Due to a lack of available information in the literature regarding the relationship between the business model's revenue stream and cost structure dimensions and the operating model, we merged these two dimensions to create a single operating model design card for the business model's profit formula.

Table 3 Overview of operating model design cards for '*value proposition*' business model dimension

Operating model dimensions	Value proposition	
	Guiding questions	Design examples
Products & services	What products and services are needed to deliver the value proposition? What products and services are of value to the customer?	In a ride-sharing business model, the value proposition is to provide convenient on-demand transportation services. Products/services may include enabling users to request rides via a mobile app, secure payment processing.
		In the case of a fitness-subscription business model, the value proposition is to provide accessible and overall fitness solutions. Products/services may include access to a variety of workout videos, personalized fitness plans, nutritional guidance.
Process functions	What functions enable the creation and delivery of the products and services offered in the value proposition?	A personalized fitness app business model provides personalized fitness training and tracking. Products/services in the value proposition may include customizing a workout plan, tracking progress and analytics, and setting goals and reminders. Functions for customizing a workout plan include tailoring workout plans based on user goals, fitness levels, and preferences. Functions for tracking progress and analytics include tracking workout progress and measuring performance metrics. Functions for setting goals and reminders include setting a fitness goal and sending a reminder to the customer.
		An on-demand car-sharing business model provides a value proposition focused on safety and reliability. A service provided is the safety and quality control. Related functions are implementing safety measures, driver screening, and ride monitoring.
Process behaviors	Who triggers the delivery of the value proposition? Does the customer request the value proposition? Is the delivery scheduled?	In the business model of a beauty salon, the customer triggers the delivery of the value proposition by scheduling an appointment through a phone call, online booking system, or in-person visit.
		In the business model of an industrial equipment maintenance service provider, the customer does not trigger the delivery. However, it is scheduled based on predetermined maintenance intervals or specific triggers such as machine performance data, usage metrics, or time-based maintenance schedules.
	When is the delivery of the value proposition finalized?	In a subscription service business model, the delivery of the value proposition finalizes once the customer cancels a subscription or once the customer does not pay the subscription fee.
	What is the order of functions and exchange of information to enable the delivery and creation of the value proposition?	In a ride-sharing service, the value proposition is convenient and affordable transportation services for customers. The customer shall make a request, then the application must match the customer's request with an available driver. The driver shall accept the request to provide the corresponding navigation details; the ride must begin once the driver has arrived at the pick-up location and finalizes once the customer arrives at the drop-off location. At the end of the ride, the application automatically charges the customer's selected payment, and once the ride has finished, the customer may rate and provide feedback.
	How can the process be sequenced to reduce threats that endanger the value proposition?	In a ride-sharing service, the application ensures that the driver meets the safety standards before a driver can accept a request. Likewise, the passenger's identity must be verified before the passenger can request a ride. Risk mitigation instruments may also include exchanging messages between actors, such as reminders and notifications.

Table 3 continued

Operating model dimensions	Value proposition	
	Guiding questions	Design examples
Organizational roles	What organizational roles are required to support the value creation and delivery of a value proposition? Which roles are internal to the organization and which roles are external?	In a Software-as-a-Service (SaaS) provider, the value proposition is providing cloud-based software application services to customers. Organizational roles such as product manager, customer success manager, sales representative, technical support specialist, and marketing specialist are required.
Information	What information is required to create the value proposition?	In the business model of a real estate agency, the value proposition is expert real estate guidance and access to exclusive property listings. Informational resources that support the value proposition may include property listing data, market trends and comparative sales data, client preferences and requirements data, legal and regulatory data, local area data.
Technologies	What technology resources support the creation and delivery of the products and services in the value proposition?	Technology resources that support the creation and delivery of the products/services a value proposition include information systems and software such as customer relationship management (CRM), customer fulfillment, and front desk services, for decision-makers to have real-time access to the business model's information and key performance indicators; manufacturing equipment and machinery; communication and collaboration tools; and data analytics and business intelligence tool, among others. The value proposition in a health insurance business model is affordable and comprehensive health coverage. To support the value proposition, the company uses technology resources such as an online enrollment platform, a claims processing system, data analytics and decision support tools, and a mobile application for customers.

redesigned, this creates the need to change specific elements of the current business model. These changes can involve introducing new elements, altering existing elements, or removing obsolete elements that are no longer required. Furthermore, a change in one of the elements of the business model may trigger a change in another element of the business model (Romero et al. 2021). For instance, introducing a subscription fee in the revenue stream of the business model might mean phasing out the one-time purchase option for customers. Hence, the task is to identify and categorize these changes into three distinct types: *'new'* elements that are introduced, *'redesigned'* elements that undergo alterations, and *'obsolete'* elements that are no longer compatible or necessary. This step results in a comprehensive list of business model changes categorized to facilitate a clear understanding of the impact of the redesigned business model.

With regard to the BikeShare scenario, with the introduction of the new elements to the redesigned business model, the next step is to identify if there is a need to introduce further, redesign, or remove obsolete business model elements. For instance, in the case of BikeShare's business model, to accommodate a pay-per-use fee in the revenue stream, the monthly subscription fee revenue is removed. The output of step 1 is shown in Fig. 4, including BikeShare's redesigned business model and a list of categorized changes to BikeShare's business model (Table 4).

4.4 Step 2: Design Operating Model Changes

4.4.1 Step 2.1: For each Business Model Change, Design Potential Operating Model Changes

In step 2.1, users iteratively analyze each business model change and identify the impact on the operating model. For each change, users brainstorm about potential changes in the operating model. The type of change at the business model level guides the identification of the type of changes in the operating model. For instance, new business model elements might mean that elements are introduced or redesigned at the operating model level. To facilitate this step, the *operating model design cards* are used to guide the identification of potential changes in the operating model with a series of questions and examples (described in Sect. 4.2.3). For example, users can analyze how a change in the key partners could affect the customer,

Table 4 List of business model changes

ID	Business model element	Business model dimension	Type of change
BM1	Flexible and comfortable bike sharing that allows bike pick-up and drop-off anywhere in the city	Value proposition	New
BM2	Bike meterage	Key activities	New
BM3	Bike reservation	Key activities	New
BM4	Provide guidance to bike users	Key activities	Redesign
BM5	Bike station	Key resources	Obsolete
BM6	GPS sensors	Key resources	New
BM7	Mobile application	Key resources, Channels	Redesign
BM8	Pay-per-use fee	Revenue stream	New
BM9	Monthly subscription fee	Revenue stream	Obsolete
BM10	Bike maintenance provider	Key partners	Redesign

products and services, process functions and behaviors, organizational roles, information, and technologies of the operating model. As users brainstorm and generate ideas, they document the potential changes in the operating model template.

Considering the changes introduced in BikeShare's business model, this step involves determining the changes in the operating model using the operating model design cards. Table 5 exemplifies the use of the operating model design cards. For each changing business model element, insights can be drawn from the operating model design card associated with the dimension altered in the business model. For instance, with the introduction of the new key activity, 'bike meterage' (BM2 in Table 4), relevant operating model design cards for the 'key activities' dimension can be utilized. As shown in row 1 in Table 5, one of the questions that help to identify a potential change in the operating model is "*How can key activities be decomposed further into specific process functions?*". In response to this question, there are two potential changes for realizing this key activity as a function: measure the time the traveler uses the bike or measure the distance

Table 5 Examples of using the operating model design cards

ID	Business model element	Operating model design card	Operating model dimension	Guiding questions from operating model design cards	Operating model element
1	(BM2) Bike meterage	Key activities (Online Table A2.5)	Processes – functions	How can *key activities* be decomposed further into specific *process functions*?	Measure the time that the traveler uses the bike Measure the distance that the traveler uses the bike
2	(BM5) Bike stations	Key resources (Online Table A2.6)	Information	What *information* must be acquired from external or internal systems?	Bike station information
3	(BM6) GPS sensors	Key resources (Online Table A2.6)	Technologies	What *key resources* represent *technology elements* needed to operate the business model?	GPS sensors on bikes to track location in city
4	(BM9) Monthly subscription fee	Profit formula (Online Table A2.8)	Processes – behaviors	When and in which order must the *key activities* be carried out?	Traveler shall pay monthly
5	(BM10) Bike maintenance provider	Key partners (Online Table A2.7)	Processes – behaviors	When does the organization communicate with *key partners*? How are *process functions coordinated* with key partners?	If a bike needs to be maintained, the bike maintenance provider is informed and should pick up the bike at the current location

traveled with the bike. As exemplified in Table 5, design cards are used in a similar way for redesigned (row 5) and obsolete (rows 2 and 4) business model changes.

4.4.2 *Step 2.2: Categorize Changes to the Operating Model*

The next step is to categorize the changes described in the operating model template into three types: 'new', 're-designed', and 'obsolete' elements. This categorization ensures a clear understanding of the impact on the operating model. In this step, all the identified changes to the operating model are categorized as 'new', 'redesigned', or 'obsolete'. Figure 5 displays the outcome of the analysis of BikeShare's business model changes, showcasing potential changes in the operating model. For example, the removal of bike stations as a key resource in the business model triggers both a redesign and a removal of elements in the operating model. On the one hand, when a traveler requests 'traveler guidance', they will be guided to the nearest available bike, not a bike station (change in processes). On the other hand, the information related to the bike station is obsolete and no longer required (change in information).

4.5 Step 3: Assess Operating Model Changes

4.5.1 *Step 3.1: Cluster Potential Operating Model Changes into Feasible Options*

The objective of step 3.1 is to form feasible clusters of changes that collectively implement the future business model. These clusters of changes are *operating model options* that must satisfy two requirements. The first requirement is that an operating model option should contain operating model changes corresponding to all changes in the business model identified in step 1.2. This is needed to ensure alignment with the future business model. The second requirement is that the operating model option should not contain those operating model changes that are incompatible or unfeasible to implement in tandem.

We propose using a non-exclusive agglomerative clustering approach to create the operating model options (Kaufman and Rousseeuw 1990). This approach is used to cluster a set of elements that can be assigned to one or multiple clusters or remain unassigned. Method users commence by taking the potential operating model changes and an empty operating model template. To initiate the formation of the first operating model option, users select an operating model change and place it within the empty template. Subsequently, users iterate through the remaining changes and assess their compatibility with the existing options. For each operating model change, users assess its fit with each existing option. If the operating model change is compatible with the assessed option, it is added to the cluster of the current option. Conversely, suppose an operating model change is incompatible with existing operating model options. In that case, a new operating model option can be created, or the operating model change can be discarded. This iterative process continues until all potential changes are evaluated and assigned to an operating model option or are deemed unfeasible for implementation.

In the example of BikeShare, two different operating model options are exemplified in Fig. 6. In line with the proposed agglomerative clustering approach, each operating model element is assessed and assigned to an operating model option. Some elements can be placed in both operating model options as they are compatible with both. For instance, the ability of the traveler to reserve the bike is present in both operating model options. Conversely, there are elements in BikeShare's operating model that are incompatible under one option and, therefore, placed into two different operating models. Mainly, the options vary in the *process functions*, *process behaviors*, and *information* dimensions of the operating model. For instance, measuring the distance that the traveler uses the bike is in option 1, while measuring the time that the traveler uses the bike is in option 2 (process functions dimension). Moreover, option 1 requires BikeShare to record the location of the bike frequently from the moment the traveler unlocks the bike to measure the distance accurately (information dimension). While knowing the bike location is relevant for option 2, it does not require high accuracy, such as in option 1.

4.5.2 *Step 3.2: Assess and Select Operating Model Options*

Following the construction of the operating model options, method users compare and assess the different redesign possibilities. Using the cost, time, quality, flexibility, and alignment dimensions, users score, prioritize, and select the most suitable option. The operating model options are qualitatively ranked for each dimension from very low to very high (e.g., using a 5-point Likert scale). Users may also adopt a weighted sum model approach, assigning a weight that represents its relative importance to the organization (Triantaphyllou 2000). Each option is awarded a total score, which is used to prioritize the options from most to least desirable.

After constructing BikeShare's operating model options, the next step is to assess and select the most suitable option. Table 6 shows two operating model options (shown in Fig. 6) that are scored qualitatively for their alignment, cost, time, quality, and flexibility. Both operating model options are equally *aligned* with the business model redesign as they implement all the changes identified in Fig. 4.

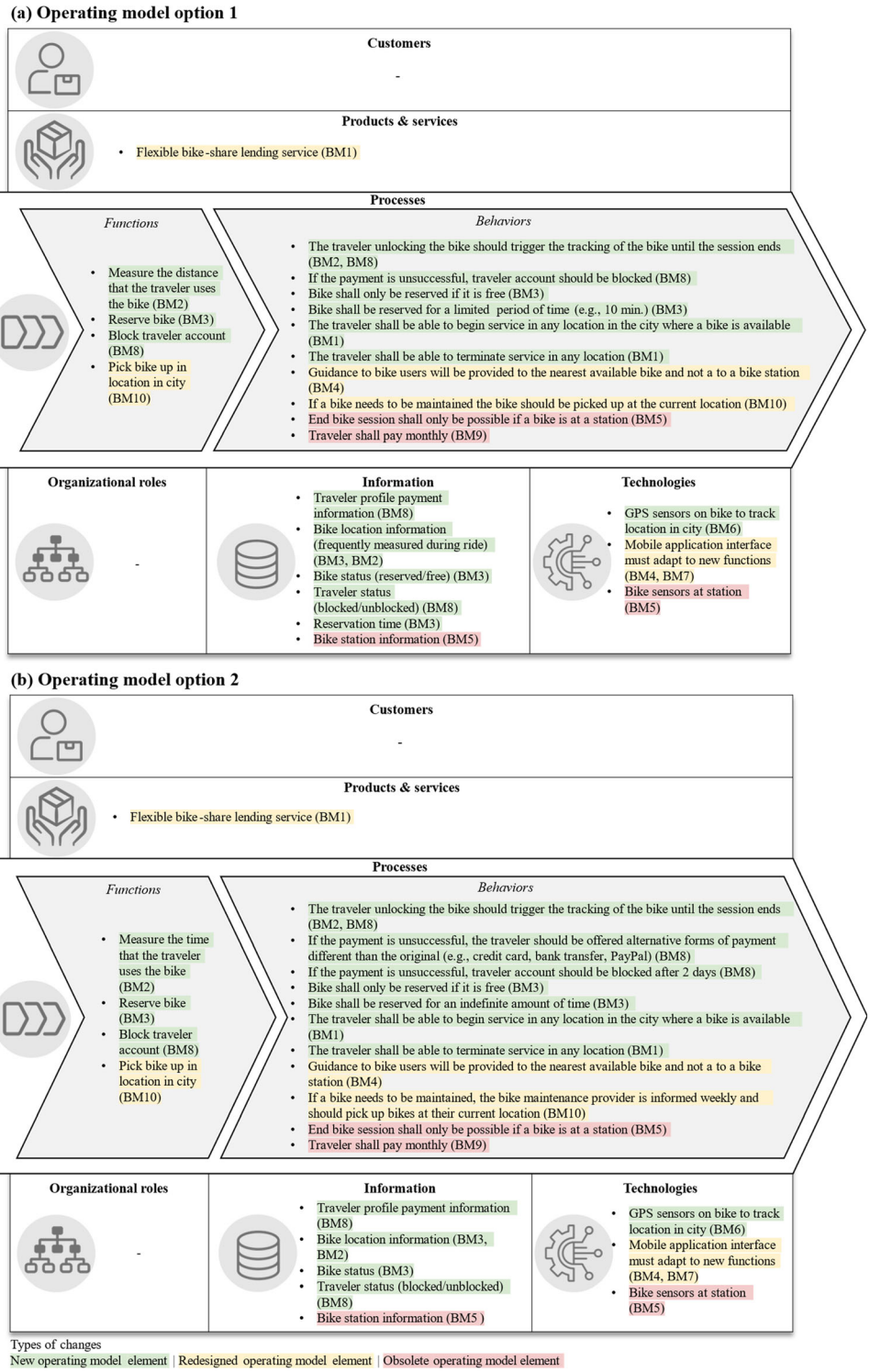

Fig. 6 Step 3 output: BikeShare operating model options

The *cost* of implementing option 1 is higher because it requires implementing a more accurate and extensive GPS coverage for frequent updates. Accordingly, the *time* to implement these changes would also be greater for option 1. Regarding the *quality,* option 2 may increase the perceived value for the traveler, for example, by providing alternate forms of payment and waiting two days until blocking their account when the payment is unsuccessful.

Table 6 Assessment of operating model options

Operating model option	Criteria					Total score	Priority
	Alignment	Cost	Time	Quality	Flexibility		
Operating model 1	5	2	2	3	4	18	2
Operating model 2	5	5	4	4	3	21	1

Lastly, option 1 provides more *flexibility* because it may allow BikeShare to implement additional GPS-enabled services or features (e.g., data analytics features). In this option, BikeShare must record and store more data points related to the distance the traveler has used the service. Using the resulting score, the favorable operating model for BikeShare is option 2.

5 Evaluation

In this section, we present the results obtained from the three evaluation rounds we performed as a part of our research design. Accordingly, we describe how each evaluation was conducted, discuss the key results, and delineate the method's evolution resulting from the evaluations.

5.1 Evaluation 1: Expert Interviews

The first round of the artifact's evaluation involved 12 semi-structured expert interviews (Myers and Newman 2007) with the purpose of gathering experts' perceptions on the *validity* and *utility* of the proposed method. In particular, with regard to validity, we gathered experts' views on the extent to which the Compass Method addresses the objectives we defined (relevance to our research objectives). For utility, we focused on the practitioners' perception of the method's usefulness and ease of use. In the following subsection, we elaborate on the design and execution of the interviews, present the results for the evaluated criteria by providing illustrative quotes, and provide a synthesis of the changes to the method resulting from this round of evaluation.

We followed an expert sampling approach, inviting industry practitioners and academic experts from our personal networks (Bhattacherjee 2012). We invited 13 experts, of which 12 agreed to participate. The interviews lasted for approximately one hour and were conducted in an online setting. Each session was recorded and transcribed to analyze the results. During the interviews, one author presented the method along with the BikeShare scenario. Afterward, the authors asked questions related to one of the evaluation criteria. Following the 12 interviews, we determined that the experts' feedback was consistent and that we had achieved the point of saturation (Saunders et al. 2018). Consequently, we did not conduct any further interviews.

Table 7 shows the relevant information about the participating experts. The pool of participants included experts from practice (33.3%), academics (50%), and those involved in both (16.7%). All experts had at least five years of experience related to business model development or BPM. The experts differed in terms of their current position (e.g., enterprise architect, business model consultant, full professors) and industry (e.g., IT services and consulting, semiconductor, applied research). This enabled us to elicit viewpoints from different stakeholders in different

Table 7 Overview of the experts interviewed

Expert	Current role	Work experience (years)	Industry
Expert 1	Full professor and business architect	> 30	Education, IT consulting
Expert 2	Business model consultant	> 6	Applied research
Expert 3	Assistant professor	> 19	Education
Expert 4	Associate professor	> 18	Education
Expert 5	Full professor and lead architect	> 25	Education, IT services and consulting
Expert 6	Software engineer	> 10	Semiconductor industry
Expert 7	Enterprise and IT architect	> 6	IT consulting
Expert 8	Assistant professor	> 13	Education
Expert 9	Lecturer and researcher	> 15	Education
Expert 10	Doctoral researcher	> 12	Education
Expert 11	Assistant professor	> 5	Education
Expert 12	Lead scientist for strategic business analysis	> 14	Applied research

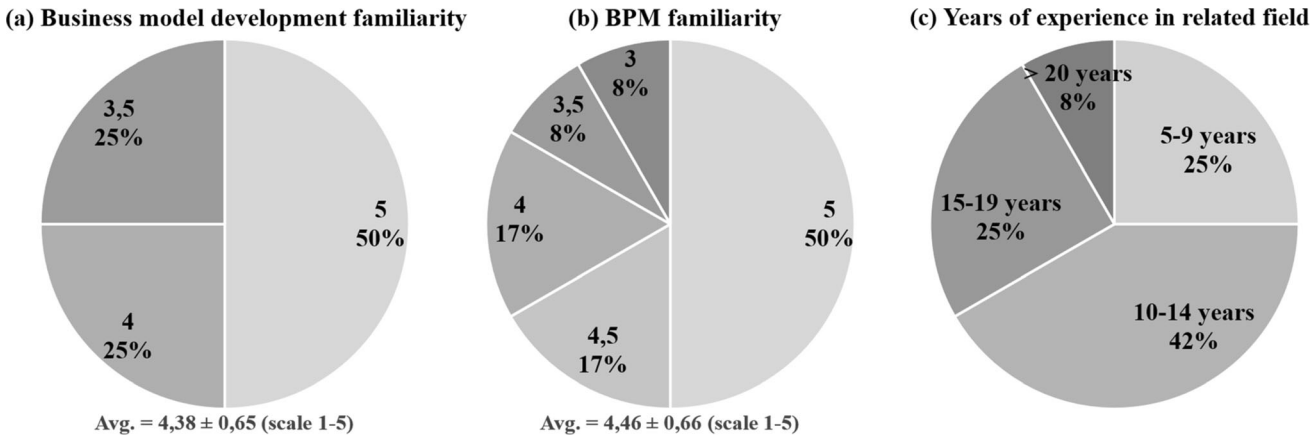

Fig. 7 Demographics of the interview participants

domains. Figure 7 shows a summary of the participants' demographics regarding their familiarity with business model development (Fig. 7a) and BPM (Fig. 7b) and their years of experience in relation to these domains (Fig. 7c).

To analyze the interview results, we used a deductive thematic analysis approach (Braun and Clarke 2012). Accordingly, the authors coded the transcripts using NVivo using two categories of codes: evaluation criteria and potential improvement points. One category of codes refers to the evaluation criteria themselves (i.e., validity and utility codes) to identify the relevance of our research objectives, the usefulness, and ease of use of the method. Another set of codes was used to identify potential improvement points highlighted by the participants. For this purpose, we introduced codes related to the method's specification and components, such as those presented in Table 2 (e.g., the method's application, steps, roles, and tools). Additional details regarding the interview protocol are presented in Online Appendix B. Below, we present the results related to the evaluation criteria.

Regarding validity, all experts confirmed the relevance and significance of our research. Based on their experience, many organizations have the need to make changes to their business model and must think about how to implement those changes at the operational level:

> *"In my view, business model design, evaluation, and decision-making are almost independent of the exploration in the implementation. So, you will hit a mindset shift. Hey, you cannot just decide on a business model if you have not systematically explored the impact on your business processes." [Expert 12]*

Concerning the method's validity and relevance in the BPM domain, experts highlighted that leveraging a business model enables linking opportunities from the market, such as new digital technologies, to the operating model while effectively limiting the options in process redesign endeavors. Digital innovation has fundamentally altered how businesses operate, opening avenues for value creation by leveraging advanced technologies like artificial intelligence. In essence, the method facilitates the alignment of changes in the business model, such as new value propositions, with corresponding changes in the operating model and constituent business processes:

> *"I think the external validity is very high. The redesign of value propositions, regardless of how the process looks like, is often taken independently from the actual process design. I think this is what sets your method apart from other (…) business process methods. It is a constrained explorative BPM activity, in the sense that there is a certain requirement in which the business process design should take shape, and that is a strength." [Expert 11]*

Experts emphasized the method's utility in systematically linking business models with operating models and supporting structuring users' thought processes. Some experts found the method's steps intuitive, noting that it incorporates well-known tools from the business model and BPM domains, such as the BMC, which enhances its ease of use. They indicated that the method helps bridge higher-level management and operational activities, facilitating communication among stakeholders and identifying reusable resources and needs at the operational level:

> *"The usefulness of the method lies in its ability to help organizations identify operational gaps and determine the necessary steps to implement process changes. It provides valuable guidance on how to proceed, offering a structured approach." [Expert 6]"*

Moreover, practitioners acknowledged the method as a potential way to evaluate a business model design and

make business model decisions considering the operational feasibility. Furthermore, practitioners also highlighted the use of the method's outputs, namely, the operating model alternatives. For instance, one practitioner mentioned the potential use of the method in enterprise architecture projects:

> *"The method can help organizations identify transition architectures between their current operating model and their desired target state. For instance, in the context of digital innovation, it can facilitate the transition from traditional payment methods to fully integrating cryptocurrency payments." [Expert 7]*

Despite the optimistic view regarding the method's intuitiveness and utility, some experts indicated that the usefulness of the method depends on the cases or scenarios where the method would be applied, such as the type of project, the maturity of the organization in managing business processes, or the type of business model. Experts highlighted that the usability of the method is tied to the knowledge of the participants applying the method and the ability of business practitioners to interact with more technical roles. Additionally, some were concerned with the difficulty in grouping different operating model options. Concerning these limitations, one practitioner noted:

> *"In principle, the method is useful. There are some boundaries, you look at a single organization if you would consider a network business model, it would make it (using the method) a bit more difficult." [Expert 2]*

In summary, the expert interviews underscored the significance of our research, affirming the claims for organizations to bridge the gap between business models and operational implementation. Practice and academic experts recognized the method's relevance in the domain of process management, particularly its capacity to align new value-creating opportunities with operational restructuring by adopting process changes. Furthermore, practitioners highlighted the method's systematic approach in guiding users through the decision-making process of operating model changes. While some experts expressed confidence in the method's intuitiveness, concerns were raised regarding the complexity of the method's use, suggesting potential challenges in practical applications across different organizational contexts and project scenarios (e.g., collaborative networks).

Accordingly, we used the interview results to improve the design of the Compass Method by identifying areas for enhancement. Participants identified the need for a facilitator role to guide the implementation process and to have detailed participant roles. Regarding the method steps, we incorporated more precise guidelines to assess operating model options and limit the number of potential changes by using a clustering mechanism to improve the method's use and reduce the complexity of the method's application. Additionally, we suggest the optional use of supportive tools (e.g., process models) to visualize the description of the processes and their changes. Detailed changes to the method based on the results are available in Online Appendix B.

5.2 Evaluation 2: Application with Students

In the second round of evaluation, 28 students, divided into six groups, were tasked with applying the method to a business case. This application was carried out with master students enrolled in a BPM-related course. Each student group had the challenge of identifying the changes to the operating model of a travel administration department seeking to redesign its business model to provide more sustainable and environmentally conscious traveling. Before the students could apply the case, we introduced the theoretical foundations in a two-hour lecture. The groups were given a three-week period to implement the method and present their outcomes. On average, the groups reported identifying 46.8 ± 19.3 potential changes to the operating model and constructed 2.3 ± 0.52 operating model options.

Following the application, students provided qualitative feedback through an open-ended questionnaire related to the utility and use of the method. More specifically, we asked them to give feedback on their challenges while using the method, whether they considered the operating model design cards useful, and on the method's weaknesses, strengths, and improvement points. Accordingly, we synthesize the relevant insights gathered from this method application.

The students emphasized the valuable role of the operating model design cards in facilitating their exploration of potential changes to the operating model. They also underlined how the cards provided a structured approach for analyzing which elements within the operating model could potentially undergo changes:

> *"The guiding questions provided a structured approach to analyze and evaluate our business model and identify the corresponding operating model elements. They helped us consider important factors for value proposition, customer relationship, key resources, and so on. The examples served as a source of inspiration. Being shown examples of companies made it easier and more effective to identify operating model elements that could be used in our own processes."*

Table 8 Overview of the workshop participants

Workshop participant	Current position	Work experience (years)
Participant 1*	Product manager	> 6
Participant 2	Chief architect	> 28
Participant 3	Scrum master	> 5
Participant 4	Segment manager	> 15
Participant 5	Segment manager	> 17
Participant 6*	Lead architect	> 30
Participant 7	Head of software development	> 12
Participant 8	Product manager	> 7

*In-depth interviews were conducted with workshop participants 1 and 6

Moreover, students highlighted that the approach enhances traceability by connecting the changes made at the business model level with the direct impact they have on the operating model level:

> *"We think the strength of this approach lies in the fact that it becomes very hard to forget the influence of the changes on the operating model."*

In summary, the student application confirmed the utility of the operating model design cards for structuring the analysis of potential changes. The students' successful application of the method, achieving the intended results, is an indication of the method's validity. Furthermore, the evaluation validated the method's role in enhancing traceability between modifications to the business model and their operational implications. Nonetheless, challenges arose in the students' application of the method, particularly related to the rigidity of the templates implemented and the assessment criteria. To address these issues, we centralized the operating model changes in a single template (i.e., the operating model template). Likewise, we proposed adopting criteria relevant to the organization's strategic goal, which can be assigned specific weight in the assessment process (e.g., sustainability criteria). Further details of the evaluation protocol and modifications to the method are provided in Online Appendix C.

5.3 Evaluation 3: Application in Tool Manufacturing Company

In the third and final evaluation round, we conducted a naturalistic evaluation with a large tool manufacturing and asset management company in the construction industry. The objective of this evaluation was to observe the method's application in an empirical context with target users to gather insights into the *utility* of the method. The evaluation was structured in a staged approach, consisting of a workshop where the method was applied and two interviews to gather feedback.

Initially, we conducted a three-hour workshop involving eight members of the organization as the target users of the method and one of the authors acting as the facilitator for the method's application. After the workshop, two semi-structured one-hour interviews were conducted with the lead architect and a product manager. Each session was recorded and transcribed to analyze the results regarding the method's utility. Table 8 presents an overview of the workshop participants. The participants included product and segment managers, who are in charge of identifying customer needs and developing new business model ideas; digital architects, who oversee the implementation of the new ideas; and software engineers, who translate these ideas into functional software solutions. Additional details regarding the structure of the evaluation are presented in Online Appendix D.

One of the organization's strategic objectives is to improve customer productivity by optimizing the customers' tool and material usage on the construction site. These customers are primarily construction professionals and companies who rely on efficient and effective use of tools and materials to complete their projects. During the workshop, participants brainstormed to redesign their current business model by providing IoT data recommendations to improve their customers' asset management. This resulted in designing a future business model and identifying 11 changes to the current business model, including five new elements and six redesigned elements. Participants identified an opportunity to enhance the value proposition with a data-driven consultation service by adding new key activities (such as those related to data transformation and management), key resources (such as an integrated sales platform), and a new revenue stream through consultation. Moreover, participants identified the impact of introducing a new service to the business model in different processes in the organization, such as the current training that sales representatives provide to the customers.

Each business model change was then analyzed to identify the changes at the operating model level. Using the operating model design cards, this analysis produced over 20 distinct changes to different dimensions of the operating model. Table 9 depicts the results obtained from the

Table 9 Use of operating model design cards

Operating model dimension	Guiding questions from operating model design card	Operating model elements	Type of operating model change
Process—functions	How can key activities be decomposed further into specific process functions?	Offer customized recommendations to customers based on specific requirements, for example, the type and quantity of a tool	New element
		Sales team training (focus on data-driven recommendations)	Redesigned element
Organizational roles	What organizational roles are required to carry out the key activity?	Sales team	Redesigned element
Information	What information supports the key activity?	Customer tools	New element
		Details regarding customer projects	New element
Technologies	What technology resources (e.g., application services, infrastructure services and components, physical and virtual hardware) are crucial to enable the key activities?	Sales platform	New element
		Integration with external data sources	Redesigned element
		IoT gateways and sensors at customer sites	Redesigned element

analysis of the new business model activity related to the assessment of customer inventory. To obtain these results, guiding questions from the 'Key Activities' operating model design card (Table A.5) were used. Once the changes were categorized, three operating model options were identified. The main difference between these options was the delivery mechanism of the consultations (i.e., via an application or a sales representative) and the operationalization of the revenue stream (i.e., whether the service would be charged separately or as part of an existing customer subscription). The three operating model options were evaluated using the suggested criteria of alignment, cost, time, quality, and flexibility. After evaluating the options, the selected option was to provide data-driven recommendations via sales representatives, as this was better aligned with the organization's direct sales strategy.

The workshop demonstrated the method's *utility* by effectively aligning the organization's desired business model with the design of the changes to the operating model. The method was useful in identifying and capitalizing on new business opportunities by aligning the organization's strategic objective of improving customer productivity by identifying concrete operating model avenues. The method's systematic categorization and evaluation of multiple implementation options facilitated the decision-making process among workshop participants. Participants commended the method's structured approach for facilitating its use among people with both business and technical backgrounds. This enabled business development practitioners to contribute to the business model redesign process and fostered meaningful discussions with technically proficient participants, who provided detailed insight into implementation requirements. This highlights the importance of involving diverse organizational roles in the operating model design, as different stakeholders possess varying expertise in processes, technology, and data management.

The participants found that the method's structured approach to identifying changes facilitated its ease of use and assessment of potential implementation risks. They highlighted that this systematic approach facilitated better initial planning, enabling the identification and consideration of potential impacts on organizational roles, information technologies, processes, products, services, and customer interactions. The use of cards to brainstorm and analyze changes in the operating model was seen as a helpful tool for organizing thoughts and facilitating discussions. Participants acknowledged the need for a clear and detailed assessment of both the current and desired future stated. In particular, one participant noted:

> "*(The method) helped to systematically assess and plan the impact of business model changes*"*[Participant 1]*

The method was also considered highly useful in standardizing the process of business model redesign, enhancing repeatability, promoting awareness of the implications, and reducing subjectivity in the decision-making process. Participants appreciated the method's approach to breaking down abstract concepts into concrete, actionable operational elements, pointing out that this approach allowed them to identify where business models elements were impacting business processes. The method was valued for encouraging a thorough consideration of operational assumptions, which would require validation once the implementation process commenced (e.g.,

resource availability). Moreover, participants emphasized the importance of having different roles to identify potential changes and assess accurately the criteria based on their knowledge and expertise. One of the participants highlighted the usefulness of the method at an early stage of the business model redesign initiative and the need to have a flexible approach to adapt quickly to changes introduced by market dynamics:

> *"I think it helps in the beginning and to do it in a systematic way, but the main challenge is there are so many things you probably don't foresee, so you need to always be agile and react." [Participant 1]*

Participants with business development or technical backgrounds found the method straightforward and similar to the company's current practices for managing business processes and IT system changes, such as analyzing current and future states. However, they noted that their existing process for implementing new business models was more ad-hoc, which often led to overlooking important dimensions of the operating model and business process design. In contrast, the applied method offered a more structured and systematic approach to their current, less formalized, and more reactive practices. Additionally, participants highlighted the method's ability to enhance awareness of cross-organizational operational implications as a key factor driving their intention to use the method. The interviewed participants expressed their intention to use the method, in particular, the operating model template:

> *"An approach which helps to standardize a bit how we do things and give it a good structure, and a good template is always good because we reinvent wheels too often and have a lot of inconsistency with how we approach problems." [Participant 6]*

Overall, the application reflected the method's utility in identifying the changes at the operating model level and assessing different options. Nevertheless, participants highlighted that while the selected operating model option seemed most viable, concerns remained regarding its feasibility due to internal constraints and limitations, such as project budget and data regulations. This implies the need to further evaluate the feasibility of the business model redesign initiative. Therefore, complementary approaches, such as cost and legal or regulatory analyses, are required to implementation. Participants also pointed out the need to remain agile and flexible in adjusting the selected operating model as new information during the implementation process becomes available and unforeseen events occur.

6 Discussion

In this section, we discuss the results of the evaluations, detail the method's contributions to research and practice, and discuss the limitations and future research avenues.

6.1 Discussion of the Evaluation Results

Overall, the evaluation participants found that the method facilitated the identification of operating model changes resulting from a business model redesign and emphasized various strengths of the artifact. The interviewed experts found the method highly relevant and considered it useful for contemplating a redesigned business model's operational feasibility. Students recognized that the method helped them trace changes between the business model design and the operating model. Notably, they found the operating model design cards useful for exploring operating model changes and designing changes to the business processes. The workshop participants highlighted that the systematic, step-by-step guidance provided by the method facilitated the achievement of the intended objective. Furthermore, the operating model template was seen as a valuable tool to standardize the analysis of operating model dimensions and to promote flexibility in exploring different operationalization options (Baiyere et al. 2020).

The participants also mentioned several difficulties in the use of the method and areas for improvement. Notably, experts highlighted the difficulty of limiting the number of potential changes introduced in the operating model and of constructing different operating model options. Furthermore, they recognized that the method's usability was closely tied to a specific context. Therefore, applying the method in different scenarios (e.g., collaborative business models) would require supplementary guidelines to tailor the method and enable its application. Workshop participants emphasized that one of the major challenges of applying the method is the required domain or expert knowledge about the business model and the operating model of the organization. In large and complex organizations, it is inherently difficult to have a comprehensive understanding of the business. Hence, the inputs and required knowledge and information to apply the method might not be readily available, which poses a significant challenge to utilizing the method.

6.2 Contributions to Research and Practice

In this work, we set out to learn more about the relationship between business models and operating models. To do so, we developed a systematic approach to bridge the gap between both concepts using DSR. In line with the DSR paradigm, our work contributes to both descriptive and

prescriptive knowledge (vom Brocke et al. 2020). Regarding descriptive knowledge, we provide a refined understanding of why and how the business model is linked to the operating model and business processes. Regarding prescriptive knowledge, we provide solution design knowledge as design objectives and solution design entities in the Compass Method and the operating model design cards.

As to descriptive knowledge, our work contributes by associating the business model concept, which is prevalent in strategic management, with business processes (Schneider and Spieth 2013; Veit et al. 2014; Wirtz et al. 2016). Our work addresses the discussion of how the business model can be operationalized through the design, implementation, and execution of the corresponding business processes highlighted in the research gap in Sect. 2.1. Business models enable the adoption of innovation opportunities and new value propositions triggered by emerging digital technologies, such as robotic process automation (RPA), cloud computing, blockchain, and the Internet of Things (IoT) (Bock and Wiener 2017; Remané et al. 2022). Approaches that integrate these emerging trends into business processes are highly relevant in the field of explorative BPM (Grisold et al. 2019). Likewise, the business model facilitates the alignment between strategic shifts and the operational capabilities of an organization (Al-Debei and Avison 2010). Therefore, our work demonstrates how the business model concept can be used as a linchpin to enable value creation, integrate emerging digital technologies, and guide changes to the operating model and its constituent dynamic business processes, thus addressing the research gap in Sect. 2.2.

Concerning prescriptive knowledge, we contribute with solution design knowledge by providing two design objectives. Design objectives guide the creation and evaluation of artifacts, and they ensure that these meet specific goals. These objectives provide reusable knowledge for creating similar solution artifacts and addressing similar problems in similar contexts (Drechsler and Hevner 2018). The design objectives are independent of the proposed method, which allows them to be implemented in different ways in both research and practice. This enables the creation of future tools for implementing business models, as mentioned in the research gap in Sect. 2.1.

We contribute prescriptive knowledge by presenting the Compass Method, which provides systematic guidance for practitioners to design and assess the most suitable changes to the operating model when redesigning a business model. Our work addresses the design-implementation gap in business model research described in Sect. 2.1 by developing a method that supports business model implementation and the evaluation of a business model's operational feasibility (Solaimani et al. 2018; Turetken et al. 2019; Bouwman et al. 2020). The definition of changes to the operating model helps organizations implement business model initiatives more effectively (Ross et al. 2006). As organizations apply the method, additional empirical knowledge of the relationship between business models and operating models can be generated, enhancing our understanding of the nexus between these two concepts. With the Compass Method, we address several gaps found in other methods in the literature that relate business models to operating models highlighted in Sect. 2.3:

- *Transformation purpose* the Compass Method provides guidelines to support the translation of business model changes to operating model changes. Our approach is particularly suited for business model redesign, as it supports modifying the existing business and operating models. While most existing approaches cover the transformation aspect, they are tailored towards the design of greenfield scenarios, which do not explicitly account for the existing business or operating models and their changes. Notable exceptions include studies by Di Valentin et al. (2012a) and Zancul et al. (2016). However, these studies provide limited guidance for identifying the types of changes in the operating model. To address this challenge, our method helps transform the business model changes into operating model changes using the operating model design cards, which we discuss at the end of this subsection.
- *Impact analysis purpose* the Compass Method supports the assessment of the potential changes to the operating model, an aspect often overlooked in existing methods. It aids decision making by evaluating which set of collective changes to the operating model are best suited to enable the business model redesign. The method allows for an early assessment (i.e., before the operation of the business model) of the feasibility of the future business model. Hence, we address a significant void in the literature where such combined approaches (i.e., transformation and impact) are not found.
- *Organizational context (intra-organizational and network context)* the method focuses on the internal configuration of an organization's capabilities and resources to deliver value (intra-organizational context). This approach diverges from the conventional emphasis on configuring processes for value exchange within a network (e.g., Suratno et al. 2018; Hotie and Gordijn 2019; da Silva Torres et al. 2023). The Compass Method provides tools to analyze the impact of key partners in a business model; however, the method does not explicitly focus on value exchange and coordination among network actors.
- *Operating model perspective* this work takes a comprehensive approach, encompassing the design of

changes in all dimensions of the operating model. The identified approaches seldom leverage all dimensions of business process design except for De Castro et al. (2011) and Fayoumi and Loucopoulus (2016). However, these methods are not suitable for business model redesign endeavors as they do not explicitly focus on changes to the existing business and operating models.

- *Evaluation approach* we offer practical insights obtained from three rounds of evaluations, including two applications. In contrast, prevailing methods in this domain primarily rely on illustrative scenarios as a means to evaluate their approach (e.g., Andersson et al. 2006; Weigand et al. 2007; Fatemi et al. 2010). This empirical validation strengthens the applicability and robustness of our proposed method, offering concrete benefits for practitioners beyond theoretical frameworks.

Ultimately, we produce prescriptive knowledge through the operating model design cards. Since business models cannot be directly and automatically transformed into operating models (Weigand et al. 2007; Hotie and Gordijn 2019), the design cards help practitioners navigate the translation by exploring the necessary operating model changes. As such, practitioners can use the cards to create a bridge between business model changes in the business model and different operating model design alternatives. In contrast, current approaches in this domain provide limited ontological support for identifying which elements of the operating model change and how to develop these different design alternatives.

6.3 Limitations and Future Research

We acknowledge that our work is subject to limitations. The application of the Compass Method is limited by the context and type of project in which it is to be used. A clear direction for future research is to investigate the method's applicability and design specification tailored to different situations, for instance, its application in different business model innovation scenarios, such as the implementation of a completely new business model. Moreover, we recognize that adopting a specific business model framework (i.e., the BMC) constrains the method's use in distinct situations. There have been multiple business model frameworks developed for different types of business models, for example, the e3-value ontology (Gordijn and Akkermans 2001), the STOF model (Bouwman et al. 2008), and the SDBM/R (Turetken et al. 2019; Gilsing et al. 2021). We suggest future research focus on how to adapt the method to different types of business model frameworks.

We acknowledge that the lack of completeness of the operating model design cards is a limitation. The operating model design cards are derived from the studies available in the literature; however, no empirical work has been conducted to further enhance the completeness of the cards. The design cards pave the way for new studies that aim to enhance the relationship between business models and the operating model. Future research could provide valuable input by studying the relationship between each element in practice. For instance, studies could focus on the interplay between a business model dimension and technology requirements for the operation of IT-enabled or digital business models (e.g., implementation and operation of digital platforms) (Veit et al. 2014). Additionally, the method and the operating model design cards could be tailored to specific types of business models to guide their implementation, for example, circular business models (Geissdoerfer et al. 2020).

Future research can also investigate how to enhance the selection of operating model changes beyond considering their feasibility. For instance, organizations may want to cluster the operating model changes based on their strategic objectives. Relevant options could focus on minimizing costs, enhancing sustainability, or increasing benefits. Based on pre-defined objectives, the organization can discard irrelevant operating model options early on. Such insights would help practitioners in the decision-making process of selecting the most appropriate changes. Moreover, it is also possible to further evaluate the operational feasibility of the business model through multiple techniques, such as process simulation (Iacob et al. 2014). Process simulations can offer valuable insights into the viability and impact assessment of the business model by evaluating key performance indicators (van de Ven et al. 2023). Exploring different evaluation techniques enables more informed decisions at the operating model level (Gilsing et al. 2022).

The method's primary output consists of overarching changes to the operating model. These changes can be translated into requirements that serve as a foundation for the subsequent implementation phases of the business model. A promising avenue for future research is to define mechanisms for using these requirements to help organizations create a detailed implementation roadmap, as operational changes driven by business model redesign often trigger changes in different functions and roles of an enterprise (De Reuver et al. 2013). For instance, the technology dimension's elements can be further elaborated by engaging specialized domain experts, such as infrastructure architects. Additionally, to enhance the method's ease of use, future research could involve developing a software tool (e.g., Schoormann et al. 2020) to support the method application and further specify detailed mechanisms to identify how changes in the business model might be affected by the changes at the operating model level and

vice versa. Moreover, future studies can develop bottom-up methods in order to identify operational inefficiencies to initiate adaptations at both the business model and process levels. These methods can be drawn from previous studies in the business process field.

Regarding the repeatability of the method, it should be noted that there are two distinct perspectives to consider. First, the guidelines and steps outlined in the method are designed to be repeatable and provide a structured framework for users to follow. However, it is important to acknowledge that the method does not guarantee consistent output quality. This is primarily due to its reliance on user expertise, which was highlighted during the application in the case company. The effectiveness of the method and the quality of its output are heavily dependent on the proficiency of the user and their level of knowledge, particularly in accurately applying the approach.

We recognize that scalability is an area that requires further investigation, as more cases are required to validate the extent to which our approach can scale to support a wide range of services, channels, and organizational models. The approach's applicability across diverse settings remains untested. Future research should explore the method's performance across different operational complexities (e.g., organization size and service portfolio) to ascertain its scalability and generalizability. Furthermore, incorporating additional case studies and empirical evaluations across varied organizational settings would provide valuable insights into the method's adaptability and effectiveness. These cases can also compare the effectiveness of the Compass Method with ad-hoc approaches to dealing with business model and operating model changes.

7 Conclusion

In today's fast-changing and highly dynamic business landscape, organizations are forced to adapt and innovate to stay competitive. This calls for an effective management approach to the complexities inherent to managing organizational change (Globocnik et al. 2020). In response to the evolving business landscape, business model redesign initiatives often emerge, leading to changes in the organization's operating model and business processes (Veit et al. 2014; Skog et al. 2018).

Accordingly, we have presented the Compass Method in this paper. This method helps organizations identify changes to their operating model and business processes in response to a redesigned business model. To facilitate identifying changes to the operating model, we developed a set of operating model design cards that can be used to create a bridge between the changes in the business model and their influence on the operating model. Additionally, the method assists in assessing these changes and determining the most suitable operating model option. The method was developed following the DSR methodology (Hevner et al. 2004). We used SME (Brinkkemper 1996) to construct the method by leveraging existing tools in the literature and to address the design objectives. We demonstrated and evaluated the method in three rounds following an evaluation strategy in artificial and naturalistic settings. To evaluate the method, we conducted semi-structured interviews, an application with students, and an application in a tool manufacturing company. Ultimately, this staged approach culminated in the refinement and completion of the method presented in this study.

Our work contributes by providing detailed insights into the relationship between the business model, operating model, and business processes. Furthermore, we present design objectives that can guide the development of future artifacts which bridge business models and operating models. Ultimately, our work proposes the Compass method and the operating model design cards to support organizations in operationalizing a redesigned business model by identifying required changes to their operating model, including adjustments to business processes.

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