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Methods that bridge business models and business processes: a synthesis of the literature

Paola Lara Machado, Montijn van de Ven, Banu Aysolmaz, Alexia Athanasopoulou, Baris Ozkan and Oktay Turetken
Eindhoven University of Technology, Eindhoven, The Netherlands

Abstract

Purpose – Business models are increasingly recognized as a concept to support innovation in organizations. The implementation and operation of a new or altered business model involves the (re-)design of an organization's business processes and their successful execution. This study reviews and synthesizes the existing body of literature to guide organizations in systematically moving from a business model design to the implementation and operation of the business model through their underlying business processes.

Design/methodology/approach – A systematic literature review of the methods that bridge business models and business processes is performed. The selected 34 studies are classified according to the method's characteristics and the support in the design, implementation and operation of business models.

Findings – The results of the systematic review provide an overview of existing methods that organizations can adopt when moving from business model design into the implementation and operation of their business model using processes.

Originality/value – This work provides a comprehensive overview and detailed insight into the existing methods that align business models and business processes. It increases the understanding on how these two concepts can be synthesized to support more effective digital innovation in organizations. Based on the review results, knowledge gaps are identified and an agenda for future research bridging the fields of business models and business processes is proposed.

Keywords Business model, Business model management, Business process, Systematic literature review

Paper type Literature review

1. Introduction

The current business landscape is characterized by disruptive changes and increased adoption of digital technologies (Röglinger *et al.*, 2022; Skog *et al.*, 2018). To remain competitive, organizations are constantly challenged by the need to adapt and innovate their business models and the underlying operations (Foss and Saebi, 2016; Wirtz and Daiser, 2018). According to Teece (2010, p. 172), a business model is "*a design or architecture of how an organization creates, delivers, and captures value*". It depicts an organization's value proposition, the customer segment to which it is offered, the capabilities needed to put it forward, and the costs and benefits associated with this (Magretta, 2002). Thus, the business model is often seen as a distinct concept that represents the logic of how the business functions and operates, and that links the strategic aspect of the business to the operational aspect (Al-Debei and Avison, 2010; Globocnik *et al.*, 2020).

Organizations that wish to succeed in changing competitive environments must rethink and innovate their business model to enable digital innovation (Legner *et al.*, 2017).

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Thus, organizations must understand how business models can be implemented (Osterwalder *et al.*, 2005; Saebi and Foss, 2015). The process of innovating and adapting a business model can be viewed as a continuous cycle (Andreini *et al.*, 2022), which is referred to as the Business Model Management (BMM) lifecycle (Wirtz, 2020). The BMM lifecycle encompasses the phases of the design, implementation, operation, adaption and modification and monitoring and controlling of the business model (Wirtz, 2020). When an organization innovates its business model, the organization's operations must reflect the business model's changes to ensure that the value proposition is delivered to the customer (Balocco *et al.*, 2019; Globocnik *et al.*, 2020). The implementation of a newly designed business model includes the translation of the business model design into the form that it takes in the real world, such as the organizational structures, business processes and IT infrastructure and systems (Osterwalder *et al.*, 2005). Therefore, to implement and operate a business model, business processes must be (re-)designed and executed (Osterwalder *et al.*, 2005) which is typically performed by following the business process management (BPM) lifecycle (Dumas *et al.*, 2018).

Recent studies have also highlighted the need for BPM to become more innovation-driven (Grisold *et al.*, 2019; Helbin and van Looy, 2021). Researchers have coined the term *explorative BPM* to suggest that organizations should develop process related capabilities to detect innovation opportunities in view of emerging technologies and business models (Grisold *et al.*, 2019). As such, BPM can support digital innovation through the operationalization of new business models. To do so, there must be clarity on the existing knowledge regarding the alignment between business models and business processes.

Existing research has focused on developing models and frameworks to provide insight into how the concepts of business model and business process are related (e.g. Al-Debei and Avison, 2010; Osterwalder *et al.*, 2005; Solaimani and Bouwman, 2012). However, practitioners need guiding methods that provide support during the implementation and operation of a business model (Geissdoerfer *et al.*, 2018; Schneider and Spieth, 2013). A survey conducted by Gartner (Kopcho *et al.*, 2022) indicates that 62% of strategy leaders were overburdened by the legacy operations supporting their current and future business models, making it more challenging to develop capabilities at the required speed. Without proper guidance, organizations might be highly inefficient in implementing and operating their business model and could fail to adopt business model innovation initiatives (Geissdoerfer *et al.*, 2018; Ghezzi and Cavallo, 2020; Teece, 2010).

Multiple studies have identified this need and developed structured methods for implementing and operating business models by designing and executing related business processes (Al-Debei and Avison, 2010; Osterwalder *et al.*, 2005; Solaimani *et al.*, 2018). Despite the research contributions over the last couple of decades, we currently lack a clear overview of how existing research can be used to systematically guide organizations in moving from a business model design to its implementation and operation through their underlying business processes. There is a need to synthesize the current knowledge on these concepts to bring them closer to each other.

Accordingly, our research objective in this study is *to provide a comprehensive overview of the current state of knowledge regarding the methods that bridge business models and business processes*. To achieve our objective, we performed a systematic literature review to identify the relevant methods (Okoli, 2015). We used a concept matrix development technique to extract the relevant concepts that characterize the identified methods (Webster and Watson, 2002). We aim to identify the structural characteristics of the methods and how they can be used to guide the implementation and operation of business models. In particular, we intend to identify what methods relate business models to business processes and the extent to which these methods support the activities in the BMM lifecycle and the BPM lifecycle.

Our work contributes to business model research, related to the field of Information Systems (IS), by providing an overview of the implementation of business models through the design and execution of business processes. We also contribute to the field of innovation-driven or explorative BPM by clarifying the role of business processes throughout the innovation of a business model. Our research responds to recent calls in the literature to investigate how to integrate theoretical foundations and concepts from alternative research streams in the field of explorative BPM, and that highlight the need for BPM to become more innovation-driven (Grisold *et al.*, 2019; Helbin and van Looy, 2021). Based on our results, we identify knowledge gaps for future research and inform the development of improved methods that structurally relate business models and business processes. Lastly, we contribute to practice by providing an overview of existing methods that organizations can use when managing their business model through business processes.

The remainder of the paper is structured as follows. Section 2 provides an overview of the background and related works on business models, the relationship between business models and business processes and the link between the BMM and BPM lifecycles. Section 3 explains the research design for the systematic literature review, while section 4 presents the results. Subsequently, section 5 discusses our research findings and proposes future research avenues. Finally, in section 6 we conclude by summarizing our findings and the limitations of our research.

2. Background and related work

2.1 Business model and business model innovation

The business model has become an increasingly established concept both in research and practice (Baden-Fuller and Morgan, 2010; Massa *et al.*, 2017). It is viewed as a means to analyze, design, innovate and manage the business logic of an organization (Osterwalder *et al.*, 2005). In this study, we interpret a business model as a "formal conceptual representation of how a business functions" (Massa *et al.*, 2017, p. 73). Therefore, we view the business model as a conceptual tool to manage the way a company does business (Osterwalder *et al.*, 2005) and to study its intersection with the firm's operational business processes (Al-Debei and Avison, 2010; Spieth *et al.*, 2014; Veit *et al.*, 2014). From an IS perspective, the business model functions as an intermediary concept between an organization's strategy and business processes, including its information technology (IT) systems (Al-Debei and Avison, 2010; Veit *et al.*, 2014).

While in the past, the term "business model" was often used interchangeably with concepts such as "business process" and "strategy" (DaSilva and Trkman, 2014), in recent years, there has been a growing consensus about how a business model is perceived (Massa *et al.*, 2017; Wirtz *et al.*, 2016). Initially, models and frameworks were created to link business strategy directly to business processes. For instance, in the Business Engineering Framework (Winter, 2001), IT systems are designed according to three layers: strategy, process and systems. Similarly, the Strategic Alignment Model (SAM) proposed by Henderson and Venkatraman (1993) defines four perspectives: strategy execution, technology transformation, competitive potential and service level. However, in the contemporary business environment, the shift from traditional business to new digital business has caused a gap between business strategy and processes (Al-Debei and Avison, 2010). New digital business requires quicker changes and is characterized by a high level of complexity, which calls for new ways of thinking about how organizations do business (Al-Debei and Avison, 2010; Grefen and Turetken, 2018). Consequently, the business model has emerged as a distinct unit of analysis and concept used for innovation (Foss and Saebi, 2018; Frankenberger *et al.*, 2013).

In recent years, business model innovation has gained increasing attention as an important and holistic form of organizational innovation and a source of sustained value creation (Foss and Saebi, 2016, 2018). There have been multiple processes or lifecycles proposed for business model innovation, each contrasting in terms of the number of phases, scope of the process and content orientation (e.g. Bucherer *et al.*, 2012; Frankenberger *et al.*, 2013; Geissdoerfer *et al.*, 2017; Osterwalder and Pigneur, 2010; Teece, 2010; Wirtz and Daiser, 2018). Different from reviews that focus on the lifecycle of business model innovation (e.g. Andreini *et al.*, 2022; Wirtz, 2020), we aim to provide an overview of the methods that can be used in each phase of the business model innovation lifecycle to bridge business models and their underlying business processes. To do so, we refer to Wirtz (2020), who identifies the process of innovating and adapting a business model as a *continuous management lifecycle* and synthesizes this process in the five phases of design, implementation, operation, adaption and modification and monitoring and controlling. We use this lifecycle in our study as it integrates over 20 different business model innovation processes found in the literature (Wirtz and Daiser, 2018).

2.2 The relationship between business models and business processes

Strategy, business models and business processes depict different concepts, which are interlinked and represent different organizational levels (Al-Debei and Avison, 2010). In practice, the strategy focuses on the corporate planning level, business models on an organization's business unit and architecture level and business processes on the functional, implementation and operational level (Bask *et al.*, 2010). The business strategy describes how organizations compete against other players in the market and how the organization positions itself in an industry (Magretta, 2002; Porter, 1980). The business model can be derived from the business strategy as it describes in more detail how the business architecture is composed (Al-Debei and Avison, 2010; Globocnik *et al.*, 2020). In turn, business processes represent the operational level and depict the translation of a business model into concrete elements, including the operational infrastructure to execute the business model (Gilsing *et al.*, 2021; Globocnik *et al.*, 2020; Osterwalder *et al.*, 2005).

Extant research has aimed at understanding how the concepts of business models and business processes are related by proposing different frameworks and models. Gordijn *et al.* (2000) were one of the first to analyze and distinguish the difference between the business model and business process model concept by stating that a business model depicts *what* is offered by *who* and processes focus on *how* the offering is operationally fulfilled. Osterwalder *et al.* (2005) clarify the relationship between both concepts by emphasizing that business models are implemented by defining the business structure, business processes and infrastructure and IT. The relationship between both concepts is further elaborated by Al-Debei and Avison (2010), who argue for the need to align business models to business processes and vice versa. Casadesus-Masanell and Ricart (2010) claim that business models are made up of concrete choices, and these choices will represent consequences on the specific logic of the organization's operation. Bask *et al.* (2010) propose a framework for combining three modules: strategic service positioning, business models and modular business processes. Cavalcante *et al.* (2011) use a process-based perspective of the business model to imply that core standard repeated processes are key to the business and its performance. Solaimani and Bouwman (2012) introduce a framework for aligning business models and business processes, which contains three layers: value, information and processes (VIP). More recently, Globocnik *et al.* (2020) developed an integrated management framework in which the specific design of the business model and the resource configuration for the operation of the business model represent tactical choices that determine the operation of the business model (i.e. business processes and operational infrastructure). However, despite the research

on the intersection between business models and business processes, the relationship between both concepts needs clarity and consolidation of existing knowledge (Betzwieser *et al.*, 2020; Osterwalder *et al.*, 2005).

To provide an overview of the relationship between business models and business processes, Betzwieser *et al.* (2020) conducted a systematic review of related works in the literature. In this review, they differentiate studies based on the direction of the relationship (i.e. bottom-up vs. top-down). In this work, the authors highlight an absence of approaches that focus on the representation of the process perspective and a lack of understanding regarding how processes change in view of business model innovation. Nonetheless, this study has made no clear distinction between the types of approaches or contributions (e.g. models, methods, or tools as specified by Hevner *et al.*, 2004) that the studies propose and their support throughout the different phases of the BMM lifecycle. Solaimani *et al.* (2018) call for urgent guidelines on business model implementation and provide a list of studies that intend to translate or map a business model into a business process model. However, this list does not provide a comprehensive overview of the methods and how they support business model implementation and operation. Moreover, practitioners not only lack awareness of the methods, but it is also unknown whether the extant methods are indeed useful as there is no clarity over their empirical validation. In summary, to improve our understanding of the relationship between business models and business processes, current methods can be further assessed based on certain characteristics, such as employed directionality, process perspective and evaluation technique, as well as the support they provide during the BMM lifecycle.

3. Research design

This study aims to identify and analyze existing methods that relate business models and business processes according to two main aspects: (1) characteristics of the methods and (2) support in the BMM lifecycle. For this purpose, we conducted a systematic literature review following the guidelines proposed by Okoli (2015) and Webster and Watson (2002). In the following subsections, we present the procedure we followed and discuss the developed concept matrix.

3.1 Systematic literature review process

We conducted the systematic literature review in four phases: *planning, selection, extraction* and *execution* (Okoli, 2015). During the *planning phase*, we identified the purpose and scope of the study and defined our research objective (as presented in the introduction section of this paper). To determine the scope of the study, we conducted pilot searches using different keyword combinations in the Scopus database. We defined our search string as: "business model*" AND "business process*". We do not include the term *method* or synonyms as a keyword as this limited our search results and excluded relevant studies.

In the *selection phase*, we applied a practical screen and searched in the Web of Science, Scopus and AISeL digital libraries as they publish extensive research related to both business models and business processes. For the practical screen, we defined a set of inclusion and exclusion criteria as presented in Table 1. We included studies available in English and published from 2000 onward, as this is when the business model concept rose to prominence in the literature (Osterwalder *et al.*, 2005). Considering our research objective, the selected studies needed to focus both on business models and business processes and relate them to each other. Therefore, the selected studies had to be aligned with the descriptions of the concepts presented in the introduction and background sections. We included studies that are either journal articles, conference papers, or scientific book chapters and excluded workshop proceedings and book editorials.

Protocol element	Definition in this study
Research question	What is the current state of knowledge regarding the methods that bridge business models and business processes?
Sources	Scopus, Web of Science, AISeL
Search terms	"business model*" and "business process*"
Search strategy	Search in databases that publish related work to both business models and business processes and perform "snowballing" from identified articles
Inclusion criteria	Include only papers written in English Include only papers indexed in the databases from 01-01–2000 until 22-Apr-2022 Include only papers that are available for download Include only papers published in journals, conferences, and scientific book chapters Include only papers that propose methods
Exclusion criteria	Exclude papers that use the business model and business process concepts interchangeably Exclude papers that do not explicitly address business models, business processes, and their relationship
Quality criteria	Only peer-reviewed papers

Table 1.
Systematic literature review protocol based on Boell and Cecez-Kecmanovic (2015)

Figure 1 shows an overview of the research design followed during the *extraction phase*. In the selected libraries, we found an initial set of 2,771 studies (as of 22-Apr-2022) distributed as 1,728 in Scopus, 833 in Web of Science and 69 in AISeL. We merged the data set and removed duplicated studies, leaving 1,918 studies. Subsequently, the two leading authors evaluated the remaining studies based on their title, abstract and keywords. Both authors evaluated the studies using the predefined inclusion and exclusion criteria in Table 1. In case of disagreement, the authors discussed all mismatches and decided whether to include or exclude a study. We evaluated Cohen's kappa coefficient to assess the degree of inter-rater reliability among these authors. The result was 0.675, which reflects a substantial level of inter-rater agreement between both authors (Landis and Koch, 1977).

Then, we performed a full-text review of the remaining 409 studies. In the course of the full-text review, we included only papers that propose *methods*. In our study, we refer to a method as an approach that proposes a systematic structure to perform steps or activities to achieve a certain goal (Braun *et al.*, 2005). In our review of the literature, we selected methods that provided a set of steps or activities to support managing business models and business processes in an interrelated way. During this review, we identified that some authors published multiple studies concerning a single method over the course of time. In these cases, we selected the most comprehensive publication (e.g. Edirisuriya and Johannesson, 2008; de Castro *et al.*, 2011; Boubaker *et al.*, 2017). We found 19 studies that match our research objective.

Afterward, we performed a forward and backward search (snowballing), as suggested by Wohlin (2014) to detect additional related studies. We began with the backward search by taking our resulting set of 19 studies and reviewing the cited references. To include or exclude new studies, we evaluated the title, abstract and keywords and applied the same criteria specified in Table 1. Afterward, we performed a forward search on the resulting set of studies

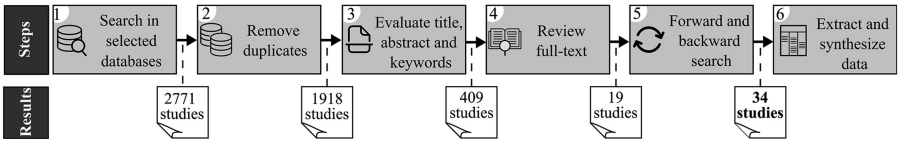

Figure 1.
Overview of the research process for the systematic literature review

by reviewing the studies' citations using Google Scholar. We scanned the titles, abstracts and keywords of the citing studies to decide their relevance using our inclusion/exclusion criteria. If the study was potentially relevant, we proceeded to do a full-text review and evaluate if the study proposed a method. If a new study was included in our set, we analyzed its references and citing publications to discover additional relevant works. As suggested by Wohlin (2014), we continuously performed forward and backward searches until no new relevant studies were found. This procedure led us to an additional set of 15 relevant studies, resulting in a final set of 34 studies.

During the *execution phase* of the literature review process, we analyzed and synthesized the selected studies. We developed a concept matrix as suggested by Webster and Watson (2002), which we used to categorize the 34 selected studies. The concept matrix provides an overview of the existing literature and allows the identification of knowledge gaps.

3.2 Development of the concept matrix

The concept matrix was developed iteratively during the extraction phase of the review process. The concept matrix is composed of *two* main categories to classify the methods in the literature: *method characteristics* and *support in the BMM lifecycle*. In Table 2, we describe the concepts within each of the main categories of our concept matrix.

The *method characteristics* category refers to general aspects of the methods that relate business models to business processes: *purpose, directionality, organizational level, organizational context, process perspective* and *evaluation*. For the method characteristics category, we identified the subcategories and, for each subcategory, specific features that can be used to classify the methods. The features of each subcategory are not mutually exclusive. For instance, related to the *evaluation* subcategory, a method can be evaluated through multiple techniques, such as an illustrative scenario, a case study and a technical experiment.

The *purpose* subcategory originates from the literature review conducted by Betzwieser *et al.* (2020) in which they specify if a study provides a mapping approach between business models and processes (transformation feature) or investigates the direct impact between them (impact analysis feature). The *directionality* subcategory identifies if the direction of the method's steps is described in a top-down fashion (i.e. using the business model as a starting point) or a bottom-up direction (i.e. using the business processes as a starting point) (Betzwieser *et al.*, 2020; Globocnik *et al.*, 2020; di Valentin *et al.*, 2015).

The *organizational level* subcategory defines the level at which the method aims to fulfill its purpose. Organizations have different management and planning levels to determine different aspects of the organization (Morris *et al.*, 2005). The strategy is at a high level of the organization and aims to define how the company positions itself in a certain industry and how it will compete (Magretta, 2002; Porter, 1980), while, at the tactics level, the strategic direction of the organization is considered to define the business model (Casadesus-Masanell and Ricart, 2010; Globocnik *et al.*, 2020). The operation of the business model is at the third operational level, where it is operated and implemented through the execution of business processes and the supporting IT infrastructure (Al-Debei and Avison, 2010; Globocnik *et al.*, 2020).

The *organizational context* subcategory refers to either the intra-organizational or inter-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). Meanwhile, the inter-organizational context is related to cross-organizational boundaries, how value is exchanged between organizations and the operational processes that are needed to share information and coordinate the physical flow of goods and integrate workflows (vom Brocke *et al.*, 2016; Grefen and Turetken, 2017; Solaimani *et al.*, 2018).

Catg.	Subcategory Feature	Definition
Method characteristics	**Purpose**	The reason(s) for which the method relates business models and business processes (Betzwieser *et al.*, 2020)
	Transformation	Describes how to map, move, or translate a business model to business processes or vice versa
	Impact analysis	Highlights how different factors affect a business model and related business processes
	Directionality	Direction(s) of interaction between business model and business processes (Betzwieser *et al.*, 2020; di Valentin *et al.*, 2015)
	Top-down	The method's steps are described in a top-down direction (i.e. using the business model as a starting point or use of the business model as a source of analysis for assessing the effect on underlying processes and resources of an organization)
	Bottom-up	The method's steps are described in a bottom-up direction (i.e. using the business processes as a source of analysis for assessing the effect on the related business model)
	Organizational level	Organizational level(s) in which the method aims to fulfill its purpose
	Strategy	The definition of how a company positions itself in a certain industry and how it will compete (Magretta, 2002; Porter, 1980)
	Tactics	The plan of actions for the specific configuration of business model elements and its corresponding resources given the residual choices predefined at the strategy level (Casadesus-Masanell and Ricart, 2010; Globocnik *et al.*, 2020)
	Operations	The operational level involves business processes that are required to efficiently execute all activities associated with the business model given the residual choices predefined at the tactical level. This includes the definition of IT elements, that in combination with processes, support the functioning of the business (Al-Debei and Avison, 2010; Globocnik *et al.*, 2020)
	Organizational context	Describes whether the method aims to analyze the context of an organization inwardly and/or externally
	Inter-organizational	Focus on how actors in a business ecosystem participate and exchange value in a network (vom Brocke *et al.*, 2016; Grefen and Turetken, 2017; Solaimani *et al.*, 2018)
	Intra-organizational	Focus on a single focal organization and how the organization operates to create value (Grefen and Turetken, 2017)
	Process perspective	Dimension(s) used to characterize a business process (Curtis *et al.*, 1992)
	Functional	Activities performed
	Behavioral	Sequencing and conditions between the activities
	Organizational	Participants, roles, and systems that perform the activities
	Informational	Data and artifacts produced or manipulated
	Evaluation	The type(s) of evaluation(s) performed to provide proof of the validity and usefulness of an artifact in question (Peffers *et al.*, 2012)
	Illustrative scenario	A demonstration of an artifact using a synthetic or real-world situation to illustrate its suitability
	Case study	The application of an artifact in a real-world situation to evaluate its effect
	Action research	Use of the artifact in a real-world situation as part of research intervention while simultaneously evaluating its effect
	Prototype	An implementation of the artifact to demonstrate its utility or suitability
	Subject-based experiment	A test involving subjects to evaluate whether an assertion is true
	Expert evaluation	An assessment through one or more experts, i.e. interviews
	Logical argument	An argument with face validity
	Technical experiment	A performance evaluation of the implemented artifact in relation to the real world

(*continued*)

Table 2. Description of the categories in the concept matrix

Catg.	Phase *Activity*	Definition
Support in the BMM lifecycle	**Business model design**	Activities related to the idea generation, prototyping, feasibility, and decision making (Wirtz, 2020)
	Business model prototyping	Representation of possible business model alternatives through ontologies (Wirtz, 2020)
	Process/capability identification	Identification of the current or potential process architecture and organizational capabilities (Adali *et al.*, 2021; Dumas *et al.*, 2018)
	Impact assessment/ decision-making	Evaluation of the feasibility, viability, and risks of the business model in consideration of the process architecture and organizational capabilities (Gilsing *et al.*, 2022; Wirtz, 2020)
	Business model implementation	Activities related to the definition and configuration of business processes and required resources before the actual operation of the business model (Wirtz, 2020)
	Process discovery/modeling	Process modeling or documentation (Dumas *et al.*, 2018)
	Process analysis	Process assessment of potential impact and estimated effort using performance metrics (Dumas *et al.*, 2018)
	Process redesign	Redesign of existing business processes or identification of new processes required to implement a new business model (Dumas *et al.*, 2018; Globocnik *et al.*, 2020)
	Process implementation	Activities related to organizational change management and automation of business processes (Dumas *et al.*, 2018)
	Business model operation	Operation of the business model through the execution of business processes (Globocnik *et al.*, 2020; Wirtz, 2020)
	Process execution	The actual execution or enactment of the business processes (Globocnik *et al.*, 2020)
	Process monitoring and controlling	Evaluation of the performance and compliance of the business processes to potentially trigger changes in the business processes or in the business model (Dumas *et al.*, 2018; Globocnik *et al.*, 2020)

Table 2.

In the work by Betzwieser *et al.* (2020), the authors highlight an absence of approaches that focus on the description of the processes. To analyze which perspectives were considered by the methods in our review, we use the *process perspective* subcategory that details how the studies describe the business process dimensions (functional, behavioral, organizational and informational) (Curtis *et al.*, 1992). Finally, as evaluation is a key activity to prove the validity and usefulness of the methods proposed by the authors, we used the framework developed by Peffers *et al.* (2012) to categorize the form of *evaluation* used in the studies.

The *support in the BMM lifecycle* category is used to classify whether a method provides steps to systematically carry out an activity in the *business model design, implementation,* and *operation*. In this category, the first level of subcategories represents the initial phases of the BMM lifecycle (Globocnik *et al.*, 2020; Wirtz, 2020), while the features include mainly the activities related to the BPM lifecycle (Dumas *et al.*, 2018). A single method may provide steps to carry out multiple activities in the BPM or BMM lifecycle. For instance, a method may provide steps to both design and implement a business model.

Throughout the BMM lifecycle, there are multiple convergence points with the BPM lifecycle. The BPM lifecycle encompasses *process identification, discovery, analysis, redesign, implementation* and*monitoring* (Dumas *et al.*, 2018). During the design phase of the business model, opportunities are uncovered, and new business model ideas are generated. In this phase, business model prototypes and alternatives are created, evaluated and selected (Wirtz, 2020). To create business model prototypes, different ontologies have been proposed in the literature (Szopinski *et al.*, 2022). Some of the most frequently used business model frameworks include the Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010),

e3-value (Gordijn and Akkermans, 2001) and the Resource-Event-Actor (REA) ontology (McCarthy, 1982). The BMC is a template style framework that has become the quasi-standard for representing business models (Massa *et al.*, 2017). The business model design serves as a starting point for identifying processes and organizational capabilities (Adali *et al.*, 2020; Turetken and Grefen, 2017). Based on the organization's capabilities and processes, different business model prototype alternatives can be evaluated to identify their potential impact and select the most promising alternative (Gilsing *et al.*, 2022; Wirtz, 2020).

Next, the newly designed business model is implemented, which involves analyzing and designing new processes or redesigning existing ones (Osterwalder *et al.*, 2005). This phase also concerns process implementation, which requires considering both organizational change management and process automation (Dumas *et al.*, 2018). Subsequently, the business model is put into operation, which is enabled by executing processes and involves continuous monitoring and control for financial and operational performance and potential risks for timely adaptations (Globocnik *et al.*, 2020; Wirtz *et al.*, 2016). After the implementation, the operation of the business model must be monitored and controlled to ensure the creation and preservation of competitive advantage (van de Ven *et al.*, 2022). As such, the business model can be modified to achieve continuous improvement through adjustments in the design (Wirtz, 2020).

4. Results

In the following subsections, we synthesize and discuss the extant research based on the categories presented in the concept matrix. Table 3 provides an overview of the classification of the discovered studies in the literature. Figure 2 shows the distribution of the articles by year (from 2000 to 2022), the publication type (journal, book chapter and conference proceeding) and the business model specificity (general or specific type) addressed in the publication.

The distribution over the years shows a peak during 2005 and 2010. In terms of publication type, the studies published in conference proceedings represent the majority (76%), followed by journal articles (21%) and book chapters (3%). While conference proceedings were published during earlier years, journal articles have been more recently developed, showing an increase in the topic's maturity. Lastly, regarding the business model specificity, the methods that address a specific type of business models (73.5%) refer to a particular domain or field of application (e.g. network business models, service business models, product-service system business models). In contrast, only 26.5% discuss methods for general business models (i.e. no specific context or domain of application). Accordingly, the implementation and operation of business models through the execution of business processes and the relationship between both fields have been considered in many domains and contexts.

4.1 Characteristics

In the following subsection, we discuss the results related to the methods proposed in the studies with respect to their *characteristics* (as displayed in Table 3). The identified studies are positioned in the left column of the matrix, and the relevant categories and subcategories are positioned in the headers of the remaining columns in Table 3.

4.1.1 Purpose. In our review of the literature, we found that 28 methods have a transformation purpose, while 14 methods have an impact analysis purpose. The *transformation* methods are used to transform or map a business model into business processes or vice versa. These methods can be used to identify the corresponding processes that operationalize a business model or the business model of a set of processes. These

Table 3.
Concept matrix of methods that relate business models and business processes

		Method characteristics																					Support in the BMM lifecycle								
		Type		Direction.		Org. level			Org. context		Process perspectives				Evaluation								BM design			BM implementation				BM operation	
		Transformation	Impact analysis	Top-down	Bottom-up	Strategy	Tactics	Operations	Inter-organizational	Intra-organizational	Functional	Behavioral	Organizational	Informational	Illustrative scenario	Case study	Action research	Prototype	Expert evaluation	Subject-based experiment	Logical argument	Technical experiment	BM prototyping	BP/capability identification	Impact assessment/decision-making	BP discovery/modeling	BP analysis	BP redesign	BP implementation	BP execution	BP monitoring and controlling
M1	(Andersson *et al.*, 2006)	●		●			●	●	●		●	●	●	●	●								*			●		●			
M2	(Azam *et al.*, 2007)	●		●			●	[●]		●	●	●	●	●	●								●			●		●	●		
M3	(Bergholtz *et al.*, 2005)	●	●	●			●	●	●						●								●		●	●		●			
M4	(Bergholtz *et al.*, 2002)	●		●			●	●	●		●	●	●	●	●											●		●			
M5	(Bodenstaff et al., 2007)		●				●	●	●		●	●	●	●	●								*			*					●
M6	(Boubaker *et al.*, 2017)	●			●		●	●		●	●	●	●	●	●			●		●			●			*					●
M7	(Braccini, 2010)		●		●		●	[●]		●	●		●			●							*								●
M8	(de Castro *et al.*, 2011)	●		●			●	[●]	●	●	●	●	●	●		●		●					*			*			●		
M9	(di Valentin *et al.*, 2015)	●	●	●	●		●	[●]		●			●	●					●						●	●		●			●
M10	(di Valentin *et al.*, 2012)	●	●	●			●	●		●			●	●	●								●	●	●	●		●			
M11	(Edirisuriya and Johannesson, 2008)	●		●			●	●	●		●	●	●		●								*			●		●			
M12	(Fatemi *et al.*, 2010)	●	●	●			●	●	●		●	●	●			●							*			●		●			●
M13	(Fayoumi and Loucopoulos, 2016)	●	●	●		●	●	[●]		●	●	●	●	●		●							●	●	●	●	●	●	●		●
M14	(Gregoire and Schmitt, 2006)	●	●	●			●	●	●		●		●	●	●								*		●	●		●			
M15	(Hänel and Felden, 2015)	●		●			●	[●]	●	●	●		●	●			●						●	●				●	●		
M16	(Hofreiter *et al.*, 2012)	●		●			●	[●]	●		●		●	●						●			●			●		●			
M17	(Hotie and Gordijn, 2019)	●		●			●	●	●		●	●	●	●			●						*		●	●		●			
M18	(Huemer *et al.*, 2009)	●		●			●	●	●		●	●	●	●	●								*			●		●	●		
M19	(Jayaweera *et al.*, 2001)	●		●			●	●	●		●	●	●	●	●								●			●		●			
M20	(Mohamed *et al.*, 2010)	●		●			●	[●]	●		●		●	●		●							●	●		●		●	●		
M21	(O'Donnell, 2005)		●	●			●	●		●	●		●			●								●	●						
M22	(Pijpers and Gordijn, 2007)	●		●			●	●	●		●	●	●			●							●		●	●		●			
M23	(Roelens *et al.*, 2019)		●			●	●	●		●	●						●	●	●				●	●							●
M24	(Rudtsch *et al.*, 2014)	●		●			●	●		●											●		●		●				●		
M25	(Salgado *et al.*, 2014)	●			●	●	●	●		●	●		●		●								●			*					●
M26	(Schief *et al.*, 2012)		●	●		●	●	●		●	●				●				●				●	●	●						
M27	(Schuster *et al.*, 2010)	●		●			●	●	●		●	●	●	●	●			●					*			●		●			
M28	(da Silva Torres *et al.*, 2021)	●			●		●	●	●		●	●	●	●			●						●			*					●
M29	(Suratno *et al.*, 2018)	●		●			●	●	●	●	●	●	●		●								*			●		●			
M30	(Weigand *et al.*, 2007)	●		●			●	●	●		●	●	●		●										●	●		●			
M31	(Wieringa *et al.*, 2008)	●	●	●			●	●	●		●	●	●	●	●								●			●		●			
M32	(Wieringa and Gordijn, 2005)	●		●			●	●	●		●	●	●	●	●								*		●	●		●			
M33	(Zancul *et al.*, 2016)	●	●	●			●	[●]		●	●		●	●		●							●		●			●	●		
M34	(Zlatev and Wombacher, 2005)		●				●	●	●		●	●	●	●	●								*			*					●
	Total = 34 studies	*28*	*14*	*27*	*5*	*4*	*34*	*34*	*22*	*15*	*30*	*20*	*30*	*22*	*19*	*8*	*4*	*4*	*3*	*2*	*1*	*0*	*17*	*7*	*13*	*21*	*1*	*23*	*8*	*0*	*10*

Note(s): ●: Category classification, [●]: IT analysis,*: BM prototype or BP model as method input, BM: Business Model, BP: Business Process

methods suggest different steps and guidelines to transform a business model into business processes or vice versa.

Semantic mapping is a common approach used by the identified methods when realizing model-to-model transformations. In semantic mapping, the elements in the notation used to represent a business model or a process are mapped to elements in the target model's notation (Brambilla *et al.*, 2017). For this purpose, equivalency links must be created between two modeling notations (one for business models and the other for process models), for instance, for identifying which elements or group of elements in REA (modeling notation for business models) and Business Process Modeling Notation (BPMN) (modeling notation for process models) have an equivalent meaning (e.g. Boubaker *et al.*, 2017). However, a method based exclusively on semantic mapping is not optimal because the semantic gap between models is too large (Hotie and Gordijn, 2019). Therefore, entirely automated translations or a model-to-model transformation approach are likely not feasible. Accordingly, a subset of methods proposes a human design process in which both the semantics of the notation and the stakeholders' perspective are considered for the transformation of business models or business processes (e.g. Suratno *et al.*, 2018; Hotie and Gordijn, 2019).

The series of transformation steps proposed by each method depends on aspects such as the specific type of business model (e.g. service-dominant business models, networked business models, product-service system business models), how the business model is represented (e.g. e3-value, BMC) and the method's objective (e.g. identifying inter-organizational processes in a network setting, deriving use cases for a system, defining executable processes for a business model). For instance, the chaining methodology by Andersson *et al.* (2006) proposes a method that starts with the design of an e-commerce business model in e3-value. In this method, the main actors and relationships must be identified to construct a process model by analyzing the value exchange between actors. Other examples include methods that use the business model to identify requirements for the development of an IT system. These methods start by identifying the business model of the system and propose steps to analyze which business processes the system requires to operate (e.g. Azam *et al.*, 2007; Mohamed *et al.*, 2010; Zancul *et al.*, 2016; Fayoumi and Loucopoulos, 2016). In essence, the transformation methods found in the literature to transform business models into processes, or vice versa, depend on the type of business model, how the business model and business processes are represented and the method's objective.

Regarding the representation of the business model and business processes, most transformation methods suggest creating a business model or business process model in a specific modeling notation. The most common notation to represent business models are e3-value (16 studies), BMC (4 studies) and REA (4 studies). For business process representation, the most commonly used notations are BPMN (11 studies) and Unified Modeling Language (UML) activity diagrams (6 studies).

Regarding the impact analysis subcategory, the 14 identified methods provide support to (1) perform impact analysis by identifying the potential consequences of a change in a

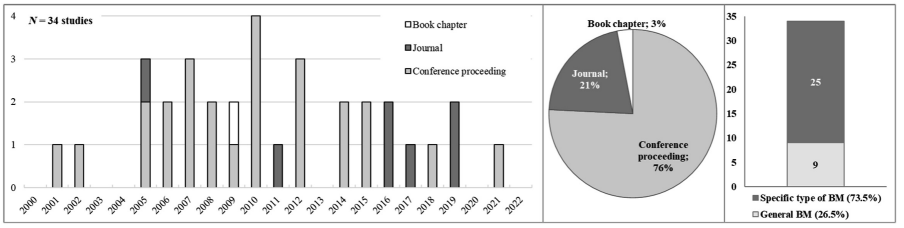

Figure 2.
(a) Distribution of articles by year, (b) type and (c) business model (BM) specificity

business model or process element and measure the impact in terms of costs, benefits, or other factors, (2) ensure the alignment between the business models and business processes and (3) determine how certain factors (e.g. risks, trust assumptions) affect the design of a business model and their operationalization through business processes. Regarding the change impact analysis, Schief *et al.* (2012) suggest identifying a strategic influence that changes the business model configuration, identifying the potentially influenced business processes and their likelihood of change and estimating the costs and benefits. As for the analysis of alignment between business models and business processes, Roelens *et al.* (2019) propose a technique for the realization of strategic fit within the business architecture including the operational processes to suggest opportunities for strategic-fit improvement based on performance measurement. Finally, as an example of the third group of impact analysis methods, Wieringa and Gordijn (2005) propose analyzing trust between different actors in a network business model to then design coordination processes between the actors (i.e. inter-organizational processes) that fulfill the value-exchange of the business model.

We found that 8 out of the 14 methods suggest steps for both *transformation*- and *impact analysis*-related tasks. These methods provide both steps to translate business models or processes and consider different factors that might impact the transformation, such as the potential risk and trust between actors before, throughout, or after the transformation process. For instance, Gregoire and Schmitt (2006) recommend analyzing different types of risks when designing the business model operations (e.g. risk of nonpayment, collection risk, insolvency, poor liquidity, currency fluctuation) and suggest selecting and implementing pre-defined process patterns that mitigate the identified risks during the transformation of the business model to process models.

4.1.2 Directionality. In the directionality subcategory, 27 methods employ a *top-down* directionality, while only five methods employ a *bottom-up* directionality. This reflects a heavier use of business model as a source of analysis to identify, define, or analyze related business processes. Various methods in the top-down feature use a designed business model to transform it into specific business processes or identify specific process elements (e.g. activities, resources, participants). For instance, Suratno *et al.* (2018) propose a three-step method to operationalize service-dominant business models (Gilsing *et al.*, 2018; Turetken *et al.*, 2019) into conceptual business process models. Another group of methods evaluates the potential effect on business processes when changing business model elements (e.g. Zancul *et al.*, 2016). In the bottom-up feature, we identified methods that use business processes to derive a business model (e.g. Boubaker *et al.*, 2017). Deriving a business model from business processes can convey why business processes are executed in a certain way (di Valentin *et al.*, 2015). It reflects the business intent and expresses why particular activities are performed in a particular manner (Boubaker *et al.*, 2017). Other methods evaluate the effect that process elements have on a business model (e.g. Braccini, 2010).

In our analysis, we identified one study that uses both top-down and bottom-up directionalities. di Valentin *et al.* (2015) propose matching Key Performance Indicators (KPIs) to business model elements to measure the effects of transforming a business model into business processes (top-down direction). Moreover, the authors suggest identifying process-relevant KPIs and mapping them to corresponding business model elements to monitor business model performance (bottom-up direction). Lastly, we also discovered three methods with no perceived directionality, which are used to identify the alignment and consistency between business and process models. For instance, Bodenstaff *et al.* (2008) propose a method to identify dynamic and static consistency between e3-value models and process coordination models expressed BPMN.

4.1.3 Organizational level. As a result of the business model concept being situated at the tactical level and the corresponding business processes at the operational level of an organization, all methods we found suggest steps both at the *tactics* and *operations* levels.

Among all methods, we found that four methods also draw from the *strategy* to determine business model choices or the operation of the business model. In particular, these methods start from a high-level definition of business goals to determine the business model configuration. For instance, Fayoumi and Loucopoulos (2016) propose a method that starts by defining the business goals and aligning them to best practices which are used to determine how the goals determine the business architecture of an IT system. Salgado *et al.* (2014) propose using the balanced scorecard to infer an organization's strategic goals and the tactics to define an organization's business model.

The determination of IT elements is key to supporting the business model operations and the design and execution of IT-based business processes (Veit *et al.*, 2014). Identifying IT elements, such as the IT infrastructure and systems, are particularly relevant as business model innovation goes hand in hand with digital innovation (Legner *et al.*, 2017). We detected nine methods that propose how to identify IT elements related to business models and processes or how the current IT elements affect the business model and processes (e.g. Azam *et al.*, 2007; Mohamed *et al.*, 2010). To exemplify, Zancul *et al.* (2016) propose a method to adopt a product-service system business model. The results of the method include deriving an Internet-of-Things (IoT) architecture and corresponding business process design.

We focused on the 28 transformation methods to identify the transformation routes they proposed for moving from business models to business processes or vice versa. For the determination of the transformation routes, we examined each step of the methods to identify the organizational level at which the step is performed. Figure 3 shows the result of the analysis of the transformation routes related to the organizational levels. The thickness of the arrow corresponds to the number of methods identified for that route, while the dot represents the starting organizational level of the transformation route. For instance, the route from tactics to operations consists of 17 methods. It is therefore displayed as a relatively thick arrow, compared to the arrow representing the route from operations to tactics, which is only covered by two methods.

Most of the identified methods in the literature propose a route from tactics to operations through business processes (i.e. translation of a business model into processes or process elements) (e.g. Huemer *et al.*, 2009; da Silva Torres *et al.*, 2021). Considering the importance of IT related aspects and IT-based business processes during the implementation of a business model, we identified a group of five methods that relate tactics to operations and additionally propose steps to aid in identifying IT-related aspects (e.g. de Castro *et al.*, 2011; Hänel and Felden, 2015). In third place are the methods that propose bottom-up transformations to go from the operational level to the tactical level (i.e. translate business processes to a business model) (e.g. Boubaker *et al.*, 2017; da Silva Torres *et al.*, 2021). Furthermore, as can be seen in Figure 3, alternative transformation routes exist that are less common. For instance, Zancul *et al.* (2016) propose designing the business model (tactical level) and using it to identify the IT architecture and derive the operational business processes (operational level).

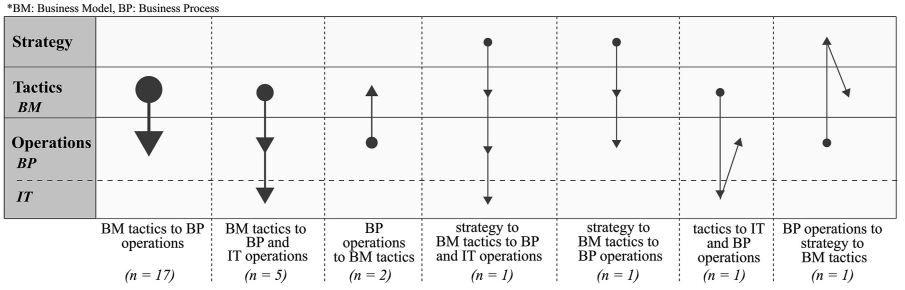

Figure 3.
Transformation routes based on the organizational levels

4.1.4 Organizational context. Out of the 34 studies identified in our literature review, 22 methods focus on the inter-organizational context, which makes it the most popular context. These methods focus on the ecosystem view, the relationship between external actors, and the value that is being exchanged across organizations. Noticeably, the e3-value and REA are commonly used to represent the business model as they have an external outlook on the value being exchanged. As such, at the operational level, collaboration or coordination processes are designed for the corresponding business model. This context is particularly prevalent in methods that can be applied in service-dominant business models (e.g. Bergholtz *et al.*, 2005; Wieringa and Gordijn, 2005; Fatemi *et al.*, 2010).

The intra-organizational context is based on the point of view of a single focal organization. It concentrates on how value is created within the organization rather than on how the value is exchanged with other actors in a network. We found 14 methods that focus on the intra-organizational context. These methods require the analysis of internal capabilities and resources to realize the business model. In this analysis, we found no clear evidence of a predominant notation to represent the business model. However, ontologies that describe the internal functioning of the business model are commonly present in the intra-organizational context (e.g. the BMC and the business model components in the software industry by Schief and Buxmann (2012)). The types of business processes developed by the methods are mainly within an organization (intra-organizational processes).

Three methods use both an inter- and intra-organizational context (i.e. de Castro *et al.*, 2011; Hänel and Felden, 2015; Suratno *et al.*, 2018). These methods identify operational elements required both to realize the business model internally and the needed business process related to the value exchange with the actors in the ecosystem. For instance, Hänel and Felden (2015) identify network-centric design elements of an IT system using the e3-value notation and internal business processes using the work system framework (Alter, 2013).

4.1.5 Process perspective. Our objective regarding the process perspective subcategory is to identify which elements of a business process the method intends to describe. The methods focus on two process perspectives equally: *functional* and *organizational*. This is expected because, in general, the information regarding key activities and participants is relevant for both a business model and a business process. For example, Salgado *et al.* (2014) employ UML use case diagrams to depict high-level system functionalities of a platform's services in relation to actor roles.

Noticeably, methods that focus on describing the *behavioral* (20 studies) and *informational* perspective (22 studies) of business processes were less common. Moreover, less than half of the methods (15 studies) consider all four process perspectives in their proposed method steps. For instance, da Silva Torres *et al.* (2021) use BPMN to describe the activities and their sequencing, participants and message flow of the information elements of a business process of the Dutch National Bank and use this to derive an e3-value model.

4.1.6 Evaluation. In general, we found that most studies lack a proper evaluation of their methods. The most common form of assessment applied, roughly half of the studies, is *illustrative scenarios,* which can be considered a weak form of evaluation (Peffers *et al.*, 2012). For instance, Edirisuriya and Johannesson (2008) introduce a method to systematically derive a process model expressed in BPMN from a business model expressed in e3-value using so-called Activity Dependency Models (ADM) and process patterns. The authors then demonstrate their method using a massive multiplayer online game (MMOG) case relevant to the business model innovation case in the video game industry (Landoni *et al.*, 2020; Lantano *et al.*, 2022).

Compared to illustrative scenarios, *case studies* represent more substantial evidence of the method's efficacy, validity, or performance (Peffers *et al.*, 2012). We found eight representative methods that use this type of evaluation. Case studies were performed to

evaluate the feasibility of applying the method (e.g. de Castro *et al.*, 2011), identify the method limitations and propose potential re-engineering routes to tailor the method for the stated problem (e.g. Braccini, 2010).

Action research and *prototypes* represent the third common evaluation technique, with four methods in each feature. Distinctively, two of the four methods utilize technical action research (Hotie and Gordijn, 2019; da Silva Torres *et al.*, 2021), which is intended to evaluate an experimental artifact and observe its effects in practice (Wieringa and Morali, 2012). Studies that use prototypes either propose mapping methods to traverse a business model to business processes (or vice versa) using the Eclipse Modeling Framework (EMF) (Boubaker *et al.*, 2017; de Castro *et al.*, 2011; Schuster *et al.*, 2010) or a technique for process-goal alignment using the ADOxx platform (Roelens *et al.*, 2019). These methods are not fully automated; however, they can be considered tool-supported methods.

We identified two methods that use *expert* and *subject-based* evaluation techniques. Subject-based evaluations were all conducted using students in an academic setting (e.g. graduate students in Boubaker *et al.* (2017)), while expert evaluations were conducted using industry experts (e.g. software industry experts in di Valentin *et al.*, 2015). Lastly, we identified one study that only employed informed arguments to persuade readers about the usability of the method (Rudtsch *et al.*, 2014), which can be considered the weakest form of an evaluation (Peffers *et al.*, 2012). We did not identify any methods that implement a technical experiment as an evaluation form.

4.2 Support in the business model management lifecycle

In the following subsection, we summarize and discuss the results on how the identified studies *support the BPM lifecycle* regarding the design, implementation and operation of a business model.

4.2.1 Business model design. In our selected studies, we found that 23 studies in total provide support for business model design. Related to the *business model prototyping* activity, 17 studies suggest using a specific notation, with the most common being e3-value, followed by the BMC and REA. In most studies, the method begins with designing a business model prototype that is then used to identify business processes to implement such a prototype (e.g. Fayoumi and Loucopoulos, 2016; Schief *et al.*, 2012; Zancul *et al.*, 2016). However, 13 methods do not explicitly mention the design of the business model prototype as a step. Yet, these methods use a prototype as an input to develop their proposed approach. For instance, de Castro *et al.* (2011) use as input an e3-value model to identify business actors, activities and limitations of the underlying IT.

We found six methods related to the activity of process/capability identification. For instance, di Valentin *et al.* (2012) propose using the supply chain of a certain industry (e.g. software industry) to identify processes in the organization and assess business processes and capability alternatives to implement a new business model.

We uncovered 13 methods that provide support for the activities related to *impact assessment/decision-making*. In these methods, we identified studies that propose analyzing possible business model implementation alternatives through different business processes (e.g. di Valentin *et al.*, 2012), identifying which processes would be affected by the implementation of a new business model and the impact on the processes (e.g. Schief *et al.*, 2012) and using KPIs (e.g. cost, time and efficiency) to identify the potential impact or risk of the new business model on existing business processes (e.g. Zancul *et al.*, 2016). To exemplify, Fayoumi and Loucopoulos (2016) suggest identifying alternative patterns from best practices and standards to support the design and decision-making of the appropriate solution.

4.2.2 Business model implementation. We identified a total of 25 studies that focus on *business model implementation*. Most of the methods in this subcategory focus on *process*

discovery or modeling (21 studies) and *process redesign* (23 studies). These methods mainly intend to convert, map, integrate, or derive specific business process models from a business model (i.e. *process modeling activity*), with the intention to implement the business model through the assembled process (i.e. *process redesign activity*). BPMN and UML activity diagrams are the most commonly used notations to model processes. For example, Hotie and Gordijn (2019) propose a method to operationalize a business model by using an e3-value model as a starting point, then assembling two intermediate models for possession- and trust-flows and finally arriving at a BPMN model. We identified six methods that use process models as an input to develop other activities in the BMM lifecycle (mainly *process monitoring and controlling*) but do not explicitly provide guidelines to identify the process. For instance, Bodenstaff *et al.* (2008) use an e3-value model and a BPMN coordination process model as inputs to determine the consistency among the models.

We identified one method with activities related to *process analysis*. Fayoumi and Loucopoulos (2016) evaluate processes in terms of implementation cost, implementation time, execution time, process efficiency, process maturity and sustainability.

Related to the activity of *process implementation*, we found eight methods that provide guidelines related to enabling process automation and identifying the underlying IT architecture. de Castro *et al.* (2011) propose guidelines to obtain executable lower-level platform-independent behavioral models (web service models) from an e3-value model and a conceptual process in BPMN.

4.2.3 Business model operation. Compared to the other phases of the BMM lifecycle, methods focus less on the *business model operation*. We did not find any method that specifically targets activities related to *process execution*. Methods in the business model operation subcategory consist of ten studies related to *business process monitoring and controlling*. In this subcategory, we identified a group of studies concerned with the consistency, compliance and alignment of business processes to a business model. Zlatev and Wombacher (2005) provide a guide for determining the consistency of an e3-value model and a UML activity diagram. They do so by individually transforming both the value model and the activity diagram into a pair of so-called reduced models in an ad-hoc modeling notation. Then, the authors provide steps for checking the semantic equivalence of the resulting models. Another set of methods in this same category analyzes the effect of business process execution on the business model. One method aids the identification of the impact of IT resources that enable a certain business process on value-generating activities in an organization (e.g. impact on costs and revenues of the business model) (Braccini, 2010).

5. Future research avenues

Through a systematic review of the literature, we identified, classified and analyzed 34 studies that provide methods that aim to bridge business models and business processes. In this section, we discuss future research avenues regarding the development of new methods that bridge business models and business processes.

Our analysis has uncovered various knowledge gaps, which we present in Table 4. For each knowledge gap, we present potential research avenues and specific recommendations for further research. Using the research avenues that we suggest, future works can further explore the relationship between business models and business processes to strengthen the knowledge of how BPM supports digital innovation through the operationalization of new business models. Future studies can build upon existing methods in the BPM field to develop methods that bridge business models and business processes. Explorative BPM methods can be used to design methods that support the BMM lifecycle. For instance, according to Rosemann (2020), explorative business process patterns provide a dedicated business

Knowledge gap	Research avenue	Recommendation
Methods that focus both on *transformation* and *impact analysis*	Developing methods that address the effect of business model changes at the business process level and vice versa	Associating business models and business processes through impact analysis methods to identify how the transformation of a business model is affected throughout different phases of the BMM lifecycle
Methods that use business processes as a source of analysis (i.e. *bottom-up* directionality)	Associating existing methods in the BPM field to the phases of the BMM lifecycle	Incorporating *explorative BPM* methods to identify possible process design alternatives for business model innovation. Using *exploitative BPM* methods for the development of methods related to the operation of the business model
Methods that relate to elements in the *strategic level* or IT in the *operational level*	Building methods that include both business model tactics and business process operations, as well as a relation to the organization's strategy and IT elements that enable the operations	Building methods that analyze the effect of strategy on the business model and processes design and how this affects the required IT to support the business model. Identifying IT opportunities to design digital business models and processes
Methods that identify the *intra-organizational* context required to implement a business model	Developing methods that also address the identification of *intra-organizational* requirements to design, implement and operate a business model	Developing methods that identify the process architecture and capabilities both within the organization and the organization's network (i.e. inter- and intra-organizational)
Methods that focus on the *informational* and *behavioral* process perspectives	Developing methods that address all business process perspectives	Identifying data elements and artifacts that are produced and manipulated by IT-enabled business processes while making process design decisions based on a business model
Methods that are *evaluated* empirically using real-world business cases	Evaluating methods to prove their effectiveness through rigorous evaluation techniques	Performing rigorous evaluation techniques to assess and ensure the effectiveness and validity of the methods (e.g. case study, action research)
Methods that provide guidelines for *identifying processes and capabilities* to design a business model	Developing methods that address the identification of the process architecture and capabilities required for business model operationalization	Developing methods that use the business model as a basis to identify the current or potential process architecture and capabilities and using these to understand the impact, feasibility, viability, or risk of implementation

(*continued*)

Table 4.
Research avenues for methods that bridge business models and business processes

Knowledge gap	Research avenue	Recommendation
Methods that support all activities required for *business model implementation*	Engineering integrated methods to support business model implementation using business processes	Designing integrated methods that support all phases of business model implementation, building on existing methods to construct enhanced methods that focus on *process analysis* and *process implementation*
Methods that support *business model operation*	Building methods to support business model operation using processes	Building methods that support the monitoring of executed processes and impact on the business model (e.g. using KPIs)

Table 4.

process lens, which is currently missing in business model implementation methods. On the other hand, business model research has proposed an array of 194 business model patterns (e.g. razor/blades, subscription, freemium), which describe proven solutions to recurring problems during business model design and are used for systematic business model innovation (Weking *et al.*, 2020). We argue that business model patterns can guide the decision of *what* changes to implement (Lara Machado, 2021), while explorative process patterns can identify *how* to implement those changes. Coupling explorative process patterns with business model patterns can help ideate possible design alternatives on *how* to implement a business model.

We also see an opportunity to use traditional (exploitative) BPM methods to support the activities within the BMM lifecycle. Traditional BPM techniques and tools focus on the efficiency and effectiveness of business processes (Grisold *et al.*, 2019). Future studies can develop methods to determine operational inefficiencies to initiate adaptations both at the business model and process level. These methods can be drawn from previous studies in the business process field (van de Ven, 2021). For instance, the reporting and monitoring of KPIs have been an extensive research topic in BPM (e.g. del-Río-Ortega *et al.*, 2013). Existing knowledge from the field of BPM can be used to develop KPIs to monitor the impact of process performance on a business model. This monitoring can support the identification of timely triggers to change and (re-)design business model elements, understanding the impact of business process execution on the business model and checking the alignment of business processes with respect to previously defined business model implementation goals (di Valentin *et al.*, 2015; van de Ven *et al.*, 2022).

6. Conclusions

With this study, we provide a synthesis of the academic literature regarding methods that bridge business models and business processes. Our systematic literature review resulted in the discovery of 34 studies that present methods relating business models and business processes. We classified the identified methods in two main categories using a concept matrix: *characteristics* and *support in the BMM lifecycle*. Our analysis of the methods' characteristics showed that the studies focus mostly on defining transformational methods, specifically using a top-down direction to relate the tactical organizational level to an organization's operations. The methods focus on the functional and organizational perspectives of the business processes (i.e. activities and participants) and an inter-organizational context. The leading evaluation method used in the studies is illustrative

scenarios. Regarding the methods' support in the BMM lifecycle, we revealed that most studies provide guidelines to model and redesign processes. However, there is a lack of methods to identify the processes/capabilities when designing a business model, analyze and implement business processes in the context of business model implementation and to monitor and control the process performance in the operation of a business model.

Based on our synthesis of the literature, we identified knowledge gaps and future research avenues that can be used to improve the development of methods that bridge business models and business processes. Future works can aim to develop methods that cover the presented knowledge gaps and using preexisting methods in BPM research to further develop the guidelines for BMM. Likewise, future research can focus on empirical case studies in organizations that are implementing new business models by investigating the effectiveness of current methods.

The concept matrix developed in this study can help practitioners in selecting appropriate methods for managing their business models using processes. It can provide support for managers when adopting relevant methods for operationalizing their business model through business processes. Nevertheless, the specific context and needs of the organization still need to be considered when choosing the appropriate method identified in this study.

6.1 Limitations

Despite following a rigorous research method (Okoli, 2015; Webster and Watson, 2002), our study is subject to limitations. In our literature search, we interpreted the business model concept as a formal, conceptual representation of how an organization creates, delivers and captures value. This interpretation limits the selected set of methods as we purposely did not include methods that conceptualize the business model as an attribute of the firm or as a cognitive/linguistic schema (Massa *et al.*, 2017). We acknowledge that the activities related to business model design, implementation and operation are more extensive than the scope covered in our analysis (e.g. planning, communicating and project management activities). However, we chose to narrow our scope and exclusively focus on the development of these activities through processes.

6.2 Implications for research and practice

Our work contributes to the domains of business models and business processes. It increases the understanding of how these two concepts and their relationship can help support the different phases of business model innovation in organizations. Based on the review results, we contribute to the business model literature by increasing the understanding of how business models can be implemented through the analysis and design of business processes. We also contribute to the field of explorative BPM (Grisold *et al.*, 2019) by clarifying the role of business processes during the innovation of a business model. Our work demonstrates how methods that relate business model to business processes can play a crucial role in the different phases of the business model management lifecycle.

In this study, we contribute to practice by providing an overview of existing research that can be used to guide organizations throughout the design, implementation and operation of a business model using business processes. In our analysis of the literature, we classified the identified methods according to a set of characteristics (i.e. *type*, *directionality*, *organizational level*, *organizational context*, *process perspectives* and *evaluation*) and the support they provide throughout the business model management lifecycle (i.e. *business model design*, *implementation* and *operation phase*). Based on this classification, practitioners can select and apply appropriate methods to manage their business model through business processes. To provide insight into how an organization can select a method based on its classification, we illustrate two scenarios with distinct objectives: (1) adoption of a new business model and (2) improvement of an existing business model (Osterwalder *et al.*, 2020).

For the first scenario, when organizations wish to adopt a new business model, they seek new ideas and value propositions to incorporate into the design of the business model (Wirtz, 2020). In this case, organizations might select methods that provide a framework for designing the business model prototype (e.g. Hotie and Gordijn, 2019), instead of those methods that require an existing or previously formulated business model design as an input. In this scenario, transformational methods (*type characteristic*) are relevant for finding and discovering new business processes to operationalize the new business model design (e.g. da Silva Torres *et al.*, 2021). Additionally, impact analysis (*type characteristic*) methods can be used to determine the potential effect of the designed business processes on the organization's operation before actually implementing the new business model (e.g. Fayoumi and Loucopoulos, 2016). The selected method must be top-down (*directionality characteristic*), as the new business model will determine the design of the business processes.

For the second scenario, to improve an existing business model, the organization's objective might be to redesign the business model and corresponding business processes. Monitoring and controlling the operation of the existing business model might trigger the redesign of the current business model and processes (*business model operation phase*). As such, the organization can analyze the alignment between the business processes and the business model or the performance of the operating business model (e.g. Roelens *et al.*, 2019). When redesigning the business model and corresponding business processes, transformational top-down methods (*type and directionality characteristic*) can be used to identify how to redesign the processes and impact analysis methods (*type characteristic*) can be used to determine the effect of the business model changes on the business processes (e.g. Schief *et al.*, 2012).

As illustrated in these two scenarios, the methods can be selected and applied in different scenarios and considering diverse contextual factors. Accordingly, a relevant contextual aspect to examine when selecting a method is the type of business model under consideration. For instance, if an organization wishes to improve or implement a networked business model which focuses on interactions between multiple actors (Turetken *et al.*, 2019), it is crucial to (re-)design inter-organizational processes (*organizational context characteristic*). In the context of digital business models, IT-enabled business processes are essential; thus, organizations might require methods that support the identification of relevant IT elements (*organizational level characteristic*). Consequently, practitioners must analyze the needs and requirements of the organization to select and apply appropriate methods to manage their business model through business processes.

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Corresponding author
Paola Lara Machado can be contacted at: p.lara.machado@tue.nl