Business Model Innovation Roadmap (BMI-R): Insights from an Action Research in a German SME

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ABSTRACT

Digitalization is advancing fast, and companies need to innovate their business model at a more rapid pace to adapt to the accelerated changes in market conditions. This paper outlines an action research study where the business model innovation roadmap (BMI-R), with its three layers (1) digital technologies, (2) business model and (3) resources, is tested in a German SME. The company for the pilot case operates in the postal delivery sector. The firm had no structured approach for business model innovation, and even less within the context of digital transformation. The results from the action research study indicate that one of the most challenging part is to identify potential digital technologies for the business model. Moreover, resource allocation is recognized as a difficult task. The proposed BMI-R approach supported the company to start the BMI process. The BMI-R gives a high-level view of the BMI process, and helps to define an action plan during the digital transformation of the business model.

Keywords: *Business model innovation, BMI-R, roadmap, roadmapping, digital transformation, action research, SME*

1. INTRODUCTION

The domain of business model innovation (BMI) gained widespread attention during the last decade [1] – [3]. This is partly due to the increasing inefficiency of only innovating products or services in order to stay ahead of competition. Studies about business model have already acknowledged the importance of the process of BMI [2], [4] – [8]. Companies have to rethink their business model to outperform their competitors, especially in the digital age. New digital technologies might affect a business model, either as a threat or an opportunity. However, the task of BMI reveals to be resource intense and difficult to manage [9]. In academic research, the rise of interest in BMI can be observed [10], whereas in practice organizations show limited abilities to initiate BMI. Often companies do not know where to start and how the process unfolds [1], [2]. Despite the process representation by scholars, innovating the business model does not emerge as a common process in practice. So far, only little is known about the best way to begin this innovation process and how a successful transition from an extant to a new business model is managed [11]. According to Chesbrough [12] a possible reason for this is that firms do not have the right approaches as they do for product or process innovation [13]. Wirtz [14] acknowledge that "there have been only few studies that associate concrete activities and recommendations for action with the various process phases and thus are suitable as management tool". This applies specifically in the context of BMI driven by external factors such as digital technologies [15].

Roadmapping is a structured approach to analyze an organization's business environment for potentially disruptive changes [16] – [18]. Traditionally termed technology roadmapping, the approach is used as a management tool for planning, forecasting and administration. More recently firms apply the technique with a more general mindset to formulate business strategies for innovation that can address such disruptive

changes [19] – [21]. The intentions for combining the BMI process and the roadmapping concept are manifold. Given the holistic, flexible and systems nature of the generic roadmap architecture, there is no inherent reason why any other significant tool cannot be included with or in roadmaps such as a business model. No other concept has been acknowledged that shares the integrative potentials that a roadmap offers [17]. A justification identified in the literature to integrate the BMI process into the roadmapping concept is that strategic "planning and innovation processes need to accelerate and be more agile to respond to this world, and research is needed to develop suitable approaches" [21]. First attempts by innovation scholars have demonstrated that the roadmap concept can help with the process of BMI [11], [20], [22]. Kaplan [23] already noted that "progress on the big-system issues of our time will require a road map and manageable platforms for business model and system-level experimentation and change". According to Cosner et al. [24] and Phaal, Farrukh, and Probert [25] the roadmapping concept is useful for innovation and business strategy in general.

1.1 CONTEXT OF THE RESEARCH

Numerous authors [26] – [28] state that the successful adaptation of an existing business model to a new environment closes the gap between the firm's basis of competitive advantage in the industry and its extant resources and capabilities. A lot of studies [8], [28] – [31] pinpoint that being unable to adapt an established business model to new environmental conditions has proven to be fatal for many organizations. Given that, companies require a structured way of how to innovate and adjust their extant business model to the digital context. Cautela, Pisano, & Pironti [32] state that uncertainty in an organization's environment can be related to the fast speed of technological innovations. According to Matzler, von den Eichen, Anschober, and Kohler [33] "companies that find ways to deploy digital technologies for their business models to the advantage of their customers will be that succeed in the area of digital disruption".

This article will focus through an action research on small- to medium-sized enterprises (SMEs) to shed light on the BMI process when considering digital technologies by applying the BMI-R approach. Digitalization decisions are particularly important for SMEs, as limited resources availability mean that there is less scope for strategic mistakes associated with the transformation of the business model. This issue justifies the elaboration of an integrated overall approach for the BMI process in an increasing digital world.

1.2 RESEARCH OBJECTIVE AND RESEARCH QUESTION

This research will coin the terms business model, innovation and roadmap. The overall research objective is to find an empirically tested approach for the business model innovation roadmap (BMI-R), which will support companies to integrate digital technologies into their business model, and thus helps to manage technologies. Organizations necessitate sustained development in the environment of persistent disruptions, and hence sustained growth requires agile reinvention of the business model. All transformation projects involve reconsidering how an organization creates value today, but also in the future. In light of the potential digital disruptive risks, aligning all of the elements to get the innovated business model competitive, entails more than an A-to-B action plan. It demands an integrated approach such as can be offered by a roadmap, which is able to link the business model to digital technologies and resources in order to unlock breakthrough value. Having a clear and structured approach for the innovation process helps top-management to match the required activities with the organizational goals. Furthermore, the BMI-R supports executives to more visibly communicate desired transformation outcomes, be it from a financial perspective or from an operational viewpoint. With the BMI-R, an organization will have in place a common visual approach for structuring activities and responsibilities, a roadmap for communicating the appropriate sequence, and a background set of guiding principles that govern BMI in the digital sphere. Therefore, a generic roadmap for BMI is justified and may help managers to plan the trajectory in the short-, mid- and long-term or to identify missed opportunities. The subsequent main research question is formulated to investigate the phenomenon of the BMI process:

How can the process of BMI in the context of digitalization be integrated into the (technology) roadmapping concept and how does it unfold in a company?

2. CLARIFICATION OF KEY TERMS

The next sections will give an overview about the main terminologies BMI, roadmap, and digitalization.

2.1 BUSINESS MODEL INNOVATION

As the term BMI spontaneously put forward, it has something to do with business and with the innovation of a model. A look-up in the online version of the Cambridge Learner's Dictionary [34] proposes no results for the complete joined terminology. Instead, when

contemplating the three separate terms, the following definitions can be retained:

- Business: "the activity of buying and selling goods and services, or, a particular company that buys and sells goods and services, or work that you do to earn money".
- Model: "a representation of something, either as a physical object that is usually smaller than the real object, or as a simple description that can be used in calculation".
- Innovation: "the use of a new idea or method".

In the academic literature there exist a wide range of possible definition for BMI. Given that the topic of BMI is a relative new research stream [35], the definitions vary depending on the authors. Table 1 gives an overview of selected BMI definitions found in the literature.

***Table 1**: Selected Business Model Innovation Definitions*

Author(s)	Definition BMI
Bock et al. [36]	"Business model innovation is new-to-the-firm changes in the design of organizational structures" (p. 10).
Bucherer et al. [8]	"We define business model innovation as a process that deliberately changes the core elements of a firm and its business logic" (p. 184).
Johnsom [37]	"Seizing the white space requires new skills, new strengths, new ways to make money. It calls for the ability to innovate something more core than the core, to innovate the very theory of business itself. I call that process business model innovation" (p. 13).
Osterwalder and Pigneur [9]	"Ultimately, business model innovation is about creating value, for companies, for customers, and society" (p. 5).

An analysis of the different definitions shows that in general the definitions involve changes around the architecture of a business activity. By evaluating the literature, it becomes clear that there are discrepancies upon when a change is qualified as BMI. The definitions for BMI range from the simple change of an element of the business model to the redesign of the whole industry business model [38]. Some authors talk about BMI when the value proposition for the customers changes [4] or the value creation process is altered [39] – [41]. Several definitions state that the alteration of just any one or two components of the business model is enough [40], [42], whereas other definitions note that only a fundamentally new business qualifies as BMI [28], [43] – [45].

In this article the definition by Frankenberger et al. [46] is followed, since the definition given by the authors synthesizes best existing definitions of BMI found in the literature. With this definition, it is clear that BMI is achieved when at least one component changes significantly.

Definition of BMI for this article [46]:

At root, a business model innovation can be defined as a novel way of how to create and capture value, which is achieved through a change of one or multiple components on the business model

2.2 ROADMAP

Roadmapping in general is used as an approach to support the development, communication and implementation of technology and business strategy [16]. Technology roadmapping is defined as a technique, which is supportive in the capacity of technology management and planning, but also helpful for exploring and communicating the dynamic linkage between technological resources, organizational objectives and the changing environment [17]. Kappel [47] argue that roadmapping deals with constantly changing factors over time such as products, technologies and markets. The approach is considered as being very flexible and thus can be used for different aims [16], [48]. The roadmapping concept uses time-based structures, which are represented in a graphical way. Roadmapping can be seen as the process, whereas a roadmap as the outcome (graphical representation) of this process. According to De Reuver et al. [11] there is no commonly accepted methodological approach to conceive a roadmap since the methods used for roadmapping are very distinct and derive from many diverse fields. The different approaches are seldom supported by strong pragmatic evidence and are more than often based on experience in action research. Fig. 1 shows a generic roadmap.

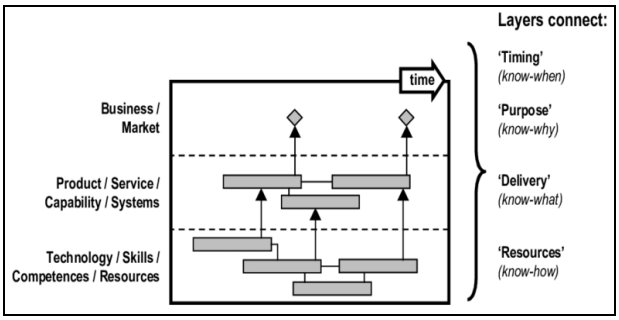

Fig. 1 *Generic Roadmap (Source: [16])*

Besides the traditional application of roadmaps, new areas to roadmapping such as new product development process [49], knowledge management [50], virtual innovation [51], disruptive technologies [52], [53] and business models [11] have been discovered, which shows the highly flexible and customizable potential of the roadmapping concept.

Definition of roadmap for this article [18]:

Roadmap is nothing less than a graphical representation of technologies, often relating objects like products or competencies and the connections that have evolved between them in the course of time. The activities required in generating and updating this kind of representation are referred as technology roadmapping.

2.3 DIGITALIZATION

It is not always clear what digitalization exactly means and how it can affect a business model. The term digitalization can be traced back to Gottfried Wilhelm Leibnitz, who transformed Arabic numerals into binary strings [54]. While contemplating digitalization from a purely technical perspective, it can be seen as a coding (0/1) procedure, in which an analogue representation is transferred to a digital one. However, according to Baker [55], digitalization represents much more than just this coding procedure.

Digitalization cannot be equated with a specific form of binary coding when discussing it in the context of BMI, since companies "in a wide range of industries redesign processes and even entire business models to transform innovative information technology (IT) options and digitization opportunities into strategic advantages" [56]. A connection between digitization and business model was proposed by Becker, Ulrich, Botzkowski, and Eurich [57], stating that digitalization is the change of a business model through the optimization of the business processes with the help of information and communication technologies (ICT). In the same vein, Botzkowski [58] recognizes under digitalization the partial or total transformation of a business model through the application of ICTs with the goal of value creation. Therefore, "exploiting digitization goes hand-in-hand with business model innovation, which requires novel offerings and processes that define how value is created, delivered and captured between providers, customers, and other value chain actors" [59].

Digital technologies allow to compress and store a huge amount of information on small storage devices that can be effortlessly preserved and carried. It includes all types of electronic equipment and applications that use information in the form of numeric codes. Khin and Ho [60] state that digital technologies such as IoT, big data analytics, artificial intelligence, augmented and virtual reality, and cloud computing are a recent emerging phenomena, which might help to digitize a business model. In the same vein, Ibarra, Ganzarain, and Igartua [61] acknowledge that novel empowering digital technologies are introduced to optimize the value creation architecture of a company. According to Fitzgerald. Kruschwitz, Welch, and Bonnet [62] organizations can only improve themselves if they are eager to accept digital technologies. Those improvements range from enhancing customer experience and engagement, streamlining operations and creating new business models.

When speaking about digital transformation, a distinction at three different levels has to be made: digital products and services, digital processes and decisions, and entirely new digital business models [63].

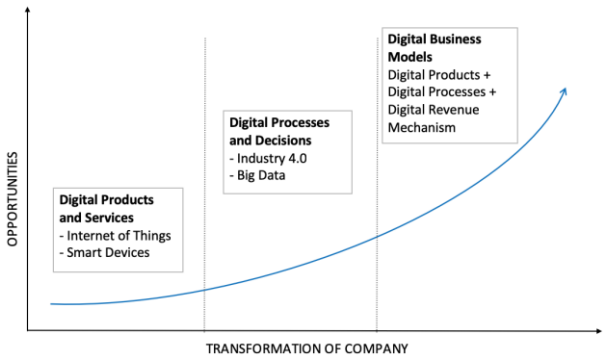

Fig. 2 *Three levels of Digitalization (Source: [63])*

Based on Bieger and Reinhold [64] Schallmo [65], [66], Zollenkop [67] as well as on Kathuria, Rojas, Saladanha, Khuntia [68], there are several different alternatives when it comes to the digitalization of the business model:

1. Total transformation – complete digitalization of the whole business model
2. Partial transformation

   a. Complete digitalization of selected business model components
   b. Partial digitalization of all business model components
   c. Partial digitalization of selected business model components
3. A second business model is designed besides the extend one
4. More than two business models are designed besides the extend one
5. Remain in "status quo".

In his dissertation, Botzkowski [58] made some findings about digitalization in the context of SMEs. Overall, the scientific understanding of digitalization is in accordance with the understanding of managers in SMEs. However, in practice, there is a greater focus on the automation of existing processes. The main driver for the digitalization process is triggered by the change in technologies, the market-and customer needs, and the impulse from top management. In the same vein, Rittmann, Krickl, and Kühnis [69] state that executive managers need a comprehensive, holistic digital strategy and have to invest in their digital future. The top management level often decides to digitalize under calculated risks, following proper objectives, such as market, or process goals. Furthermore, the partial digitalization of selected business model elements dominates [58]. Becker, Ulrich, Botzkowski, and Eurich [70] state that a total digitalization of all business model components is unusual for SMEs, and only one or two components of the business model change at a time. This is in accordance with the BMI definition used for this paper, where BMI is defined when at least one component changes [46]. The innovation of all business model component at the same time would take up too many resources at once. According to Sia, Soh, Weill [71] most companies just "respond to new digital threats or opportunities in an ad hoc manner within some organizational functions", thus not having a digital strategy to follow. According to Gassmann et al. [13], a reason for this is that SMEs have a smaller budget for BMI than multinational cooperation, even partly neglecting this activity. Therefore, an approach to better allocate the resources, and identify and link the digital technologies to the business model components, is needed.

Definition digitalization for this paper [58]:

Digitalization is the partial or total transformation of business models using information and communication technologies with the aim of creating value.

3 METHODOLOGY

The often-cited Academy of Management Journal article by Bartunek, Bobko, and Venkatraman [72] calls for the application of innovative methodological ideas while doing research. An interesting proposed research set-up for business models and BMI was introduced by Halecker [73]. The author suggested the abductive methodology in combination with an action case study [73]. The action case research strategy situates itself between action research and case study [74]. According to Sorensen, Mattsson, Sundbo [75], there is a growing expectation regarding the application of innovative research design in BMI projects in order to close the theory-practice gap.

For this research a qualitative approach is chosen. The reasons to apply this research methodology to the BMI process are manifold. In qualitative research the value lies in the particular description of the case(s) rather than in the generalization of the findings [76]. According to Locke, Spirduso, and Silverman [77], the aim of qualitative research is to understand a specific social situation, event, group, interaction or role, in this case the process of innovating the business model for an organization in the context of digitalization. Qualitative research fits business model research because the field is understudied [1], [3], [78], and hence the question about how the process occurs needs to be investigated first before being able to quantify the findings [1].

In order to test the BMI-R, an abductive approach in combination with an action research strategy was chosen. In contrast to deduction and induction, abduction is seen as a well-structured creative process to develop new knowledge i.e. for the BMI process [79]. It breaks out of the limitations of both other approaches and does not follow a logical process, but instead it is acknowledged as an intuitive leap [79], [80], which is characterized by a back and forth between theory and practice. Due to the complexity of the BMI process, research about this topic can benefit from action research since it requires temporary participation with the object of study [81]. The specificity of action research is that only one case (i.e. pilot case) is considered during the study. According to Langley [82] knowledge of practice can only be transferred or learnt in the practical context, and thus requires an action research approach [48]. Action research study, which was pioneered by Kurt Lewin [83], enables the researcher to develop and test approaches and frameworks in the scenario under study. This research strategy is helpful to understand complex, social processes while introducing changes to the studied object and observing their effects such as for integrating and combining the BMI and roadmapping process into the BMI-R approach.

The research set-up is arranged in a way, that best fits the overall research question of how to arrange the BMI process by integrating it into the roadmapping

concept. It is worthwhile noting that this research does not aim at generalizability or prediction. Nonetheless, the research questions reveal the objective of a scientific contribution by establishing a theoretically sound research set-up, and thus giving a possible approach for the BMI process in the context of digitalization.

3.1 ACTION RESEARCH DATA COLLECTION AND ANALYSIS

For action research, data collection is similar to those in other case study researches [73]. Therefore, the action research strategy allows to collect data from multiple sources. Establishing the research on different sources of information usually denotes triangulation [84], [85]. This form to collect and double check findings is highly suggested in the literature on action research strategies [76], [80], [85]. Yin [84] propose six major sources for data collection, (a) documents, (b) archival records, (c) interviews, (d) direct observation, (e) participant-observation, and (f) physical artefacts. Moderated workshops also offer excellent opportunities for data collection [86], [87]. For this research, all 6 different sources introduced by Yin [84] were considered, partly covered through the workshop, which was based on the S-plan development process for a generic roadmap [25].

Company specific documents as well as archival records were collected and analysed appropriately. Documents included company presentations, process workflows, journal articles, financial statements, balance sheets, and profit and loss accounts.

Interviews were held with two distinctive employees in different functions to avoid single-informant bias [88], but both were at the top management level. This lead to the reduction of subject biases [89], and ultimately enriched the data set [90]. The interview questions were based on an open-ended format, which is in accordance with the principles of qualitative research by providing the interviewees the opportunity to formulate their understanding of a phenomenon in their own words [91]. Furthermore, the interviews followed a semi-structured interview guideline, which is often referred to qualitative interviews and lasted around one hour each [84]. Follow-up interviews were conducted as appropriate and needed in order to remove possible ambiguity or to gain a more detailed view of a certain point. When conducting interviews, issues as poor articulation might emerge, thus the researcher should collect additional information from other sources in order to support the interview data (data triangulation).

The workshop was divided into two parts, which were held over two days with three participants form the top to middle management level. The workshop lasted approximately for four hours for each session. After the workshop, the results were presented, followed by a quantitative questionnaire to be filled out by the participants. A semi-structured group discussion was held at the end. Phaal et al. [25] define six steps for the S-Plan roadmapping development process, which was adapted to the BMI-R workshop:

1. Planning - the person in charge define the focus, the aim, the architecture, the workshop agenda, the participants, the logistics and the necessary preparation. The workshop was prepared by the researcher.
2. Workshop stage (a) - participants develop a so called *'strategic landscape'*. The researcher gave guidance during the workshop sessions.
3. Workshop stage (b) - the central aspect is the identification and prioritization of *strategic opportunities*. This was done under the guidance of the researcher with the participants.
4. Workshop stage (c) - *priority opportunities* are examined in more detail by small groups in parallel. This was done under the guidance of the researcher with the participants.
5. Workshop stage (d) - is there to assess the opportunities and learning points as well as to define *future direction/ next steps*. The researcher presented the final BMI-R approach and the participants deduced an action plan.
6. Review - progress after the workshops is assessed to evaluate if the learning points are recorded and the way forward agreed on.

In accordance with the explorative and abductive nature of this research, data analysis followed a grounded theory approach [92]. Instead of testing hypothesis or propositions, it exemplifies "an organic process of theory emergence based on how well data fit conceptual categories identified by an observer, by how well the categories explain or predict ongoing interpretations, and by how relevant the categories are to the core issues observed" [93]. As Charmaz [94] puts it: "We grounded theorists code our emerging data as we collect it. Unlike quantitative research that requires data to fit into preconceived standardized codes, the researcher's interpretations of data shape his or her emergent codes in grounded theory".

The analysis was established on a standard coding procedure, which is the application of a code to a specific part of the text [95]. Strauss [96] define coding in the following way: "Many indicators (behavioural actions/events) are examined comparatively by the analyst who then 'codes' them, naming them as indicators of a class of events/behavioural actions". Following Strauss and Corbin [97] suggestion, the coding procedure was based on three types of coding, open, axial, and selective coding. Open coding refers to

the reorganisation of data into categories. In axial coding, possible relationships between the categories are tried to be recognized and then rearranged into a hierarchical form. In selective coding a main category is identified around which the other categories are then related. The source of codes followed a data-driven approach, where the source of the codes is derived from the data by the researcher. The coding was done with the help of a Computer Assisted Qualitative Data Analysis Software (CAQDAS), in this case with MAXQDA (MAX Qualitative Data Analysis), which is a software that assists to structure non-quantifiable data [98]. The benefits of using a CAQDAS is that it makes the coding and retrieval process faster, it enhances the transparency of the process of data analysis, and it offers new opportunities in terms of the development of explanations [95].

3.2 THE ACTION RESEARCH CASE

The selection strategy for the case example of the action research is based on the work of Pettigrew [86] and the BMI-tool developed by Trapp [78]. Pettigrew [86] underlines that it is key, while concentrating on a limited number of case(s), to focus on those who provide the highest transparency in accordance to the research issue. Therefore, following the recommendation of Pettigrew [86], a pilot case example is selected, which represents best the research project. Furthermore, while selecting a pilot case, it is important to opt for an 'interesting' organization, which also represents the research gap appropriately. Moreover, Saunders et al. [76] note that the purposively selection of a case example might be because of its typical character or because the object under study represents a phenomenon, which was not studied earlier. The BMI process was considered by some researchers previously [1] – [3], [38], [66], [73], [78], but the introduction of the roadmap approach offers to study and analyze the phenomenon from a different perspective, which few considered before and hence making it legitimate for an action research strategy. Therefore, while using this research strategy, a detailed description of the case example is key.

To test the BMI-R approach, a pilot case study in an SME is conducted. SMEs account for 99.5% of the companies in Germany and most of the overall economic performance is produced by SMEs [58]. However, capital market-oriented companies still determine the public debate and are the ground for the economic theories [99]. Nonetheless, SMEs are recognized as the basis of a stable and efficient competitive economy. Therefore, since the 70th, there have been an increased effort from economic policy makers in countries like USA, Germany, and Japan, to support those type of companies [100]. The German SMEs class is a central element of the social market economy and a determinant success factor of the German economic wonder [58]. SMEs are considered to be the driving force of most economies, since they are the main actor for employment, innovation and growth according to the Organization of Economic Cooperation and Development (OECD), and the European Union [101]. Given the huge overall economic function the SMEs incorporate, it is often the subject of various economic political activities [102]. Despite this fact, their exist no common definition of the term SMEs in literature [103]. In order to define SMEs, the theory and practice base their criteria on qualitative and quantitative attributes. According to Berens, Hoegemann, and Segbers [102] qualitative criteria are used to define the nature of the SME (e.g. managed by the founding family), whereas quantitative criteria are set as a demarcation of practical manageability and are based on rigid numerical values [102] (Table 2).

***Table 2** : SME Definition by IfM (Institut für Mittelstand) [58]*

Company Size	Employees	Revenue/Year
Smallest	Up to 9	Up to 2 million
Small	Up to 49	Up to 10 million
Medium	Up to 499	Up to 50 million
(SME) sum	**Below 500**	**Below 50 million**

The chosen SME for the pilot case is a postal service provider in the business-to-business market including mail service, inhouse post room consulting, and lettershop service. The company was founded in 1988 and is still managed by the founding family. The company offers its services in the German state North Rhine-Westphalia, with locations in Düsseldorf, Cologne, and the Rhine-Ruhr region. The case example fulfils the characteristics of an SME defined by the IfM (Institut für Mittelstand), and the qualitative criteria by Becker, Staffel, and Ulrich [104]). Furthermore, the company was selected purposely for the action research based on the relevance for the research question(s) [87], the possibility to easily access all necessary information, the willingness of the top-management level to commit to the study, and the possibility to collect an abundance of evidence and information in order to best analyze the phenomenon under study [105].

4 RESULTS

DeReuver et al. [11] investigated the adaptation of

the roadmpping concept to the business model concept and coined the term business model roadmapping. The idea behind it, is to outline the change from a current to a desired business model. De Reuver et al. [11] propose a road map "that describe the intermediate steps to realize a new business model". Schallmo et al. [15] and Botzkowski [58] propose respectively a roadmap for the digital transformation of business models. However, their approaches are not established on the roadmap literature, rather the term roadmap is used in a common sense. Therefore, the results from this research can be seen as one of the first in its kind, where the business model is integrated in a roadmap to represent the innovation process with a focus on digital technologies. The BMI-R was previously develop from the literature (see paper by the author [106]), and validated through a Delphi survey (see paper by the author [107]). The validated BMI-R approach by experts of the respective research fields in the Delphi survey was the basis for the action research study (Fig. 3).

The BMI-R is composed of an initial situation analysis, and a roadmap with three different layers: digital technologies, business model, and resources. A toolkit with various methods is proposed to assess and analyze the external environment, digital technologies, company resources, internal firm activities, and the economic feasibility [107]

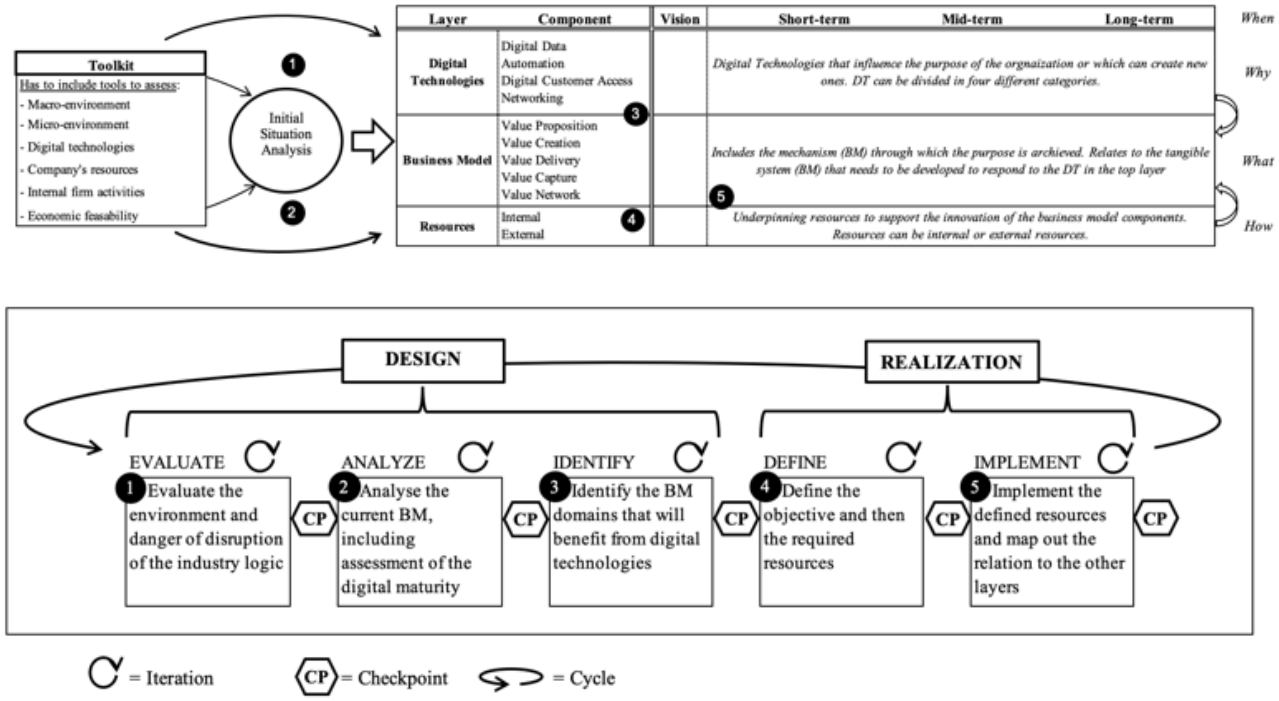

Fig. 3 *Revised and Final BMI-R Approach and steps after the Delphi Survey*

In the following, a detailed representation of the BMI-R toolkit is represented (Table 3). The toolkit can be used for BMI-R creation, development, and improvement, and depending on the company and industry, different tools or methods can be applied.

By applying the BMI-R toolkit, companies have essential management tools at their disposal to assess and analyze the different layers of their own BMI-R. In this, companies can start the innovation process in a structured and guided way.

Often companies do not know which exact tools are at their disposal. Having an overview of all the tools, categorized in different aspect, will help to get the innovation process started.

4.1 INTERVIEWS

The results of the action research study are mainly composed of the interviews and the workshop supplemented with company documents, observations, and artefacts.

Table 3 *BMI-R Toolkit*

BMI-R Toolkit		
External	**Environment Analysis**	
	Macro-Environment	• PESTEL • SWOT • Five-Forces
	Micro-Environment	• Five-Forces • ABC Analysis • SWOT • Experience Curve • Concept Visioning • Scenario Building
Trends	**Digital Technology Analysis**	
	Digital Technologies	• Gartner's Hype Cycle • S-Curve • Digital Radar • Technology Radar • Bibliometrics • Patent Analysis • Morphology Analysis • Technological Development Envelope • Analytical Hierarchy Process
Internal	**Company Analysis**	
	Firm Activities	• Value Chain Analysis • Portfolio Analysis (e.g. BCG-Matrix) • SWOT • MOST Analysis • Heptanalysis • Strategy Map • Linking Grids
	Company Resources	• VRIO • Innovation Matrix • Scenario Planning
	Economic Feasibility	• KPIs (e.g. Return on Investment, Net Present Value, Internal Rate of Return)

Interviews were held with the business director and the deputy CEO. Both interview partners had only limited experience in innovation activities, and even less in BMI. During the interviews, very little was known or understood by the interviewees concerning future potential business models for the company. However, both interview partners have stated to be favourable to explore opportunities in the digital sphere. In a postal sector study by Bogers et al. [108], the three interview partners were also decided to venture in the digital space, however, "there was no roadmap" that could have helped to support this process.

Both interviewees acknowledge their concern about the decrease of the postal mail and also highlight that the company only loses customers when mail volume diminishes, but not because the customer is partnering with another postal service provider. This trend is highlighted in Figure 4, where the exponential increase in e-mail exchange and at the same time the diminishing physical mail delivery is clearly visible in Germany from 1998 to 2018 [109], [110]. Since 2012, the number of letters subject to licensing by postal service providers in Germany has been steadily declining and in 2018 was only at 14.9 billion. One reason for the decreasing volume of letters being send is that private individuals and companies are increasingly communicating via digital channels [108]

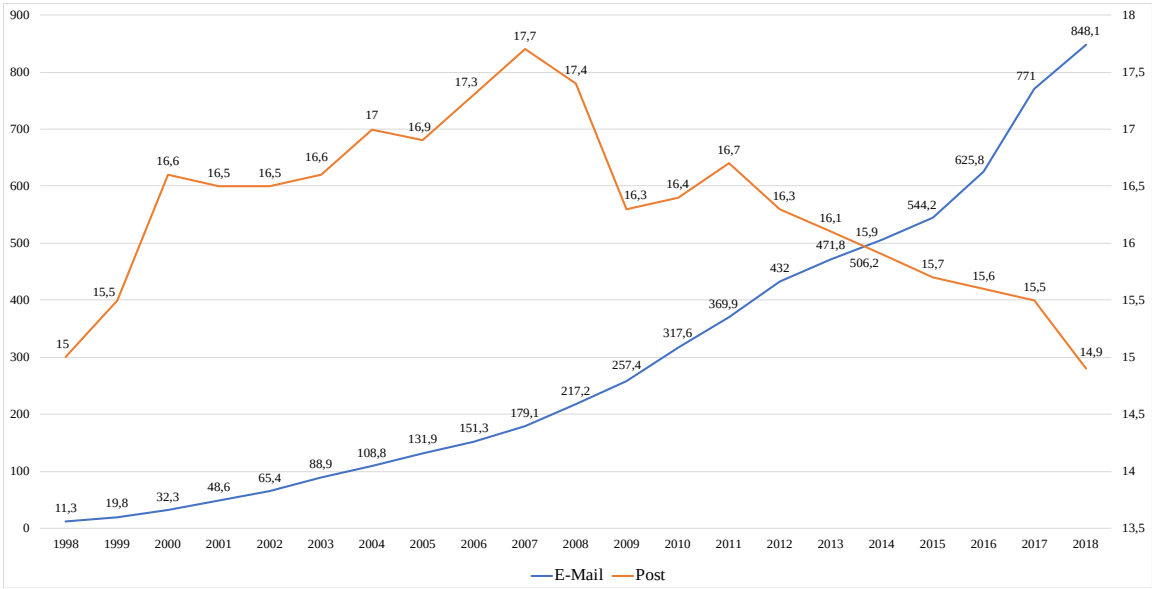

Fig. 4 *Decrease of Postal Mail Compared to Increase of E-mail in Germany from 1998 to 2018 (in billion, source: Statista, 2020b, 2020a)*

Overall, a shift in the industry logic can be noticed due to the integration of digital technologies [108]. This is also due to the influence of digital technologies to other processes not directly linked to the company and the postal service market, but which have on influence on their business. Such digital technologies are e.g. SAP VIM (Vendor Invoice Management), where documents (e.g. invoices, order confirmations) are scanned and directly allocated in the operating system to the right vendor or debtor and also addresses the right accounts of the balance sheet and/or the profit and loss statement. Due to this digital technology fewer mails will be send out since the documents will be digitally available. Therefore, the company has to innovate its business model and think about new value proposition options for the customer. One such possible new value proposition is the scanning of the mails to make them digitally available to the customers. A decrease in postal mail can undoubtedly be noticed, however, on the other hand, due to the internet and the online shops, an increase in the traffic of parcels can be registered. This was also noticed in the study by Bogers et al. [108], and thus represents an opportunity for the company to be exploited. Bogers et al. [108] also remarked that postal operators have completely diversified their business areas and are now also proposing services in finance, logistics, or telecommunications, thus a completely new service should be thought about by the top management of the company.

During the interview, both interviewees stressed out the limited resources and capabilities of the company to do BMI. This was also acknowledged by Bogers et al. [108] during their study of the European postal industry, highlighting "a number of dynamic tensions between the core business and the new innovative business models with cognition, the struggle for resources, and capabilities to be among the most relevant challenges for these firms". For the BMI of the company, both interviewees highlight the need of specific resources such as financial resources, new IT-systems, and skilled employees. However, both interviewees are not sure how to start the process and find it difficult to keep an overview of all different factors. Bogers et al. [108] also registered during their case studies an increased uncertainty during the initial stages of BMI. Therefore, a visualization aid would be beneficial to track the interplaying factors. The complexity and the system spanning dimension of BMI is too broad and too difficult to manage for such a small company without any structured approach and without any experience in this process. The right resource allocation and the right starting point are unclear. Nonetheless, the interview partners recognized the need to innovate the business model in order to stay competitive in the market. The participants recognized the potential of digital technologies for the company's business model. Especially the digitalization of certain processes is seen as a future avenue for the development of the operations.

4.2 WORKSHOP

The workshop was held over two days, and followed the general rules and principles of the S-plan approach by Phaal et al. [111]. The initial situation analysis revealed one major competitor for the company in the regional market. Conversely, the services proposed are in the details slightly different, and thus a complete match to the business model of the company cannot be made. However, on a national level, further competitors could be identified, which is important to notice, because a) those competitors might one day want to enter the regional market (North Rhine-Westphalia) of the company, and thus the company has to be prepared for it, and b) in terms a further expansion and development of the business activities the assessments of the national competitors might indicate some market opportunities. Furthermore, the substitution of their current services (physical mail collection, sorting, and delivery) was considered as high as the industry is moving from physical to digital mail processing (digital substitution). Bogers et al. [108] also confirm this trend and acknowledge that "the main drivers of this transformation is [sic] the growth of the internet, which has resulted in digital substitution for many application of letter mail". The initial situation analysis can also serve to assess the digital maturity and ambition of the company, which should be in line with the digital strategy the top management defined.

The tools proposed in the BMI-R toolkit were well perceived and helped enormously to evaluate the initial situation of the business. For the digital technologies' layer, the digital radar was used to assess relevant technologies for the company. The digital radar comprises the following four categories: digital data, automation, digital customer access and networking. The collection, processing, and evaluation of digital data enable companies to make better predictions and decisions (digital data category). The combination of classic technologies with AI supports the development of autonomous work and self-organizing systems (automation category). Mobile internet enables direct access to the customer, who thus enjoys a high degree of transparency and new services (digital customer access category). The mobile or performance-based networking of the entire value chain via high-bandwidth telecommunications facilitates the synchronization of supply chains, which leads to the shortening of production times and innovation cycles (network

category). The business model was assessed through the 5-box framework [107], which consist of the components value proposition, value creation, value delivery, value capture and value network.

Participants engaged in an in-depth talk about the potential digital technologies, which might affect the business model. Before representing the digital technologies in the BMI-R those were mapped out in the digital radar on a separate sheet (Fig. 5). There, the closer to the center of the cross diagram, the more important is the relevance of the digital technology for the business model in the near future.

Fig. 5 *Digital Radar for Pilot Case*

After the placing of the digital technologies on the digital radar, each participant was asked to weight the importance of the digital technology for the business model. Thereafter, the most relevant technologies were transferred to the BMI-R template. Interesting to notice, is that participants prioritized digital technologies, which are more tangible, and which are realizable within a year. The group discussion confirmed the results obtained during the two interviews, being that the company needs the integration of new digital technologies in order to gain sustainable competitive advantage. So far, a clear approach for the integration of digital technologies was missing, and an identification approach as well as a categorization scheme was absent. With the toolkit including different approaches to assess digital technologies (e.g. Gartner's Hype Cycle, bibliometrics, technology radar), and the categorization of the digital technologies in four fields based on the digital radar in the BMI-R, a clear structure to weight and possibly integrate digital technologies is given.

The workshop design furthermore enhanced the vivid discussion about potential digital technologies that could affect the business model. The influence of not matured digital technologies was difficult to evaluate for the business model. Great focus was given to the development of a new digital customer database, which was linked to the value creation business model component. Participants see it as the most promising digital technology in the short-term period for the improvement and development of the business model. The categorization with the help of the digital radar was well perceived and gave some anchor points. After the categorization of the relevant digital technologies in the BMI-R template, the respective affected business model components were analyzed and identified.

For the business model representation, the five-box framework proposed in the BMI-R was used (Figure 6). As for the digital radar to categorize the digital technologies, the framework was first represented on an additional template to better plot the respective components. It was the first time the company mapped out its business model, which lead to some discordances about the content of the respective business model components. However, the five-box framework was a great help to assess the current business model. With the five respective components, the company's business model could be fairly represented. Although the business model canvas by Osterwalder and Pigneur (2010) was also presented during the workshop, participants felt more comfortable using the five-box business model representation.

Fig. 6 *Five-Box Business Model Representation for Pilot Case*

Worth noting here, it that the participants of the workshop had no previous experience and knowledge about business models, and thus a simplified representation might be more appealing and easier to understand for them. Nonetheless, one participant recognized the parallels and similarities of the two

possible business model representations, and noted that both cover in essence the same components.

The resource layer was talked through rather fast (Fig. 7). Participants had wished to focus a little bit more in detail on the needed resources, and especially to think more about the time horizon in this context. Here, further discussion would have been helpful in order to better time the required resources and capabilities in the BMI-R template. After defining the required resources for the BMI in an extra template, the respective internal and external resources were mapped in the BMI-R and linked to the other components in the middle and top layer.

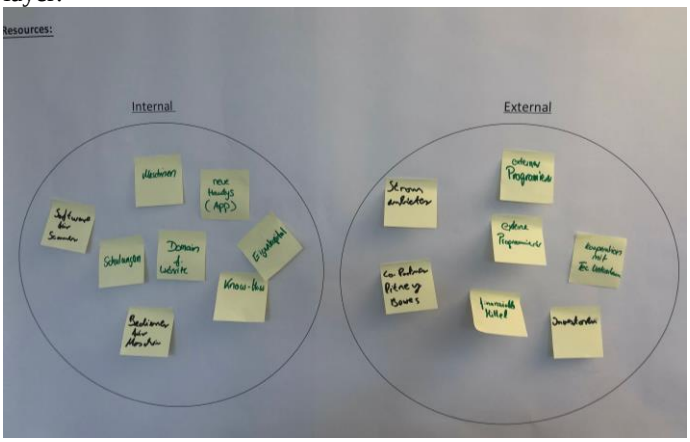

Fig. 7 *Resource Identification for Pilot Case*

Given that resources are one of the bottlenecks in transformation or change projects, no waste of existing resources is important, and thus the right allocation is determinant. Participants highly recognized that it is possible to derive activities from the BMI-R.

The tools proposed in the BMI-R toolkit were well received and significantly helped the participants in assessing the initial situation of the business. The proposed tools were not well known but seemed to make sense to the participants, who noted that a combination of the tools would best represent the environment of the company. The high acceptance of the toolkit might be due to the fact that the participants had almost no prior experience with management tools

In general, the approach is acknowledged as being well structured and overall comprehensively. In addition, the majority consented that the right components in the respective layers were included. All participants highly recommend the application of the approach in practice. One reason, besides its clear and comprehensive structure, is that the approach has the appropriate granularity to be applicable in a real-life setting. The participants note that the approach is not to meticulous, but instead has the right amount of details in order to be of use for the company. Therefore, the application of the approach is also seen as enabler for BMI and will certainly differentiate the company even more from the competitors.

The main findings for the respective three layers are:

- Digital technologies layer: Digital trends affect each industry differently, at a different grade, and at a different pace. Therefore, a company in a specific industry needs to recognize those trends early and to start integrating them into the business model in a timely manner. The participants had first difficulties identifying digital technologies relevant to their business model. However, with the categorization of the technologies within the digital radar, it seemed easier for the participants to think of possible trends which might be incorporated into the business model.
- Business model layer: This layer represents the body that is subject to the influence of the top layer and that can be redirected through the bottom layer. After an explanation of each business model component, the participants of the workshop had no difficulties to define the company's business model. The most difficult component to define was the value proposition, which is also the starting point when defining a business model. Once this component defined, the other components did not seem to cause any difficulties.
- Resource layer: This layer helps to support the innovation of the business model, incorporating considerations such as capital, finance, skills, partnerships, and supply chain interactions. The layer underpins technological capabilities and the organizational requirements, identifying the internal and external resources that need to be in place to make innovation possible. However, sometimes it is difficult for companies to identify which resources are needed to move forward with the innovation of the business model. During the pilot case study, participants had a clear idea what kind of resources, internal or external, was needed to implement the changes.

The participants also discussed some advantages, which are offered by the application of the BMI-R approach:

- The approach permits for organizational anchoring, and hence the institutionalization of BMI.
- The structured BMI-R approach allows to link the individual components (i.e. digital technologies, business model components,

resources), and thus to point out the connections and interrelations of different factors, internal or external to the organization.

- The workshop procedure allowed to collect many ideas in a relatively short period of time, and thus to get a first impression of the BMI-R for the company. As noted by the observant, the workshop environment allowed that participants with different functions sit for a longer time together to work on the future of the company without being interrupted.
- The visualization of the BMI-R helps to consolidate important information about the future of the business model. Furthermore, the visualization allows for the viewer to gain new perspectives for the future of the business model. The viewer recognizes linkages that were previously not available to him. In addition, the BMI-R can be used as a medium to pass on knowledge, and thus can be used as a communication tool. As a visual document for top management, a roadmap must ensure that the relevant information can be quickly absorbed.

Given that the innovation of a business model is not a one- or two-day activity, more time should be considered when planning for such a workshop. In addition, the goal of the workshop should be first to get a high-level picture of the situation, where each specific point can be raised again into more details in following workshops or sessions.

The approach especially helped to channel already existing ideas. Interesting to notice was that the participants were not lacking ideas, but instead had a lot of different thoughts about the potential future of the business model and the direction it should be heading. The proposed approach supported the participants to structure the various possibilities they recognize in order to get a high-level view of the overall business model and the interconnections between the single components instead of contemplating each individually. Participants were also comfortable to think out of the box and the way the company could do business in the future, and thus how a future sustainable digital business model for the company could look like.

Slight modifications such as to include the vision state at the beginning of the timeline, and to represent after each time period the business model, were suggested an incorporated into the final BMI-R approach. The following definition is proposed for the BMI-R:

The BMI-R matches digital technologies with the business model components and allocate the resources that are required to support the business model innovation process. The BMI-R helps to consolidate important information about the future of the business model.

5 Conclusion and Discussion

The objective of this research was to explore a new way for the BMI process and to investigate how BMI can be enriched through a structured approach. This research built on an analysis of the state of the art in the field of business model, BMI, digitalization, and roadmap, where an emphasis on the BMI process field was given.

The BMI-R approach was applied in a German SME in a workshop procedure. This procedure was very successful for the first development of a BMI-R. In the two-day workshop, the initial situation of the company was evaluated, followed by the individual development of the respective layers, and the linkage and connection between the single components. During the first roadmap creation, milestones and dependencies between the individual areas of analysis were identified. Noticeable and communicated consequences for the entire company were derived from the approach. Significant effects result from the clear and target-oriented visualization. The workshop procedure was suggested in literature and could also be successfully applied in practice. Therefore, based on the results of this research, a workshop procedure for the introduction of the BMI-R approach in a company is recommended, best with participants from different departments situated at the middle or top management level.

The combination of abduction and action research helped to improve the BMI-R, since a ‘back and forth’ between theory and practice was possible. The action research showed that the environment has a major role while developing the business model. Therefore, it is highly relevant to analyse the business environment at the beginning of the BMI-R approach, but also continuously during the process. This is in line with statement by Teece [112] that “a business model cannot be assessed in the abstract; its suitability can only be determined against a particular business environment or context”. The toolkit for the BMI-R provides an appropriate overview in order to cover all the environmental influencing factors that a business model may be subject to.

The practicability of the BMI-R has been assessed in an action research pilot case within the course of a workshop. However, regarding the usefulness of the approach in practice, it has to be mentioned that the approach by itself does not guarantee successful BMI. Innovation in general cannot be forced and are most of the time exposed to other inducing factors. Some key

considerations in this context are the right people and the appropriate organizational culture in order to drive BMI.

The results indicate that the use of the BMI-R approach in practice would lead to increases in efficiency and effectiveness in terms of resources allocations. Therefore, the positive empirical findings of the approach application should be further tested, and applied in a number of different real cases, possible in various industries to gain as much insight as possible for the further development of the BMI-R approach. In regard to the proposed layers, and respective sub-layers of the BMI-R, the additional case studies could provide valuable evidence for the exact structure of those layers. Consequently, a future research avenue is to explore the application and adaptation of the proposed approach in practice within different industries.

Multiple sources of evidence were used such as interviews, protocols, firm documents (e.g. financial report, presentations, webpage), and observations in order to triangulate the data. Although such effort was made to provide a scientifically as possible research, there is, as argued by Thorngate (1976) no research in social science that is able to reach the objectives of generalizability, accuracy, and simplicity at the same time. Therefore, some limitations apply in this doctoral dissertation.

The factors describing the architecture of the BMI-R approach have been derived from a wide array of literature streams. To be noted here, is that the literature is widely divergent and that a considerable part of the publications dates back 30 years or more. Due to the development and adaptation in the past years, it is difficult to make sense of the literature in the context of a BMI process influenced by digitalization. Consequently, there exist factors that have not been considered in the BMI process, because they simply were not relevant before. The approach proposed here is generic, thus the structure of the respective layers and the overall architecture of the BMI-R might differ widely depending on the industry and the environmental context.

A major limitation arises through the use of an action research strategy. The BMI-R was thus only tested in one pilot case, which is not fully comprehensive and representative. Practical restrictions and the focus of this research have been limited for a more comprehensive and in-depth analysis as well as for research-economic reasons. It hence does not permit for “statistical generalization”, though the perceived “logic of replication” allows for “analytical generalization” [84]. Due to the sample size of the empirical examination (one action research), there might be industry or firm specific contexts that contrast from the depicted circumstances.

The contributions of this research are manifold. First, this article contributes to the BMI literature by introducing a new approach to the process. Focusing on a new perspective on how to approach the BMI process, this paper offers a structured and clear guideline to start the digital transformation of a business model. It thus focuses on the digital technologies, since they promise completely new avenues on how to do business nowadays. Digitalization is considered as one of the main drivers for change. Nowadays it is possible to almost measure everything, sensors can be placed on objects, thus making them cyberized and smart. Therefore, cyber-physical systems highlight that technologies are becoming more powerful, influencing business operations, and shaping customer experiences, which at the end affect the business model. Accordingly, the trend is going towards digital business models, which are gaining in strategic importance [114]. However, the integration of digital technologies into the business model is recognized to be a difficult venture. This is especially true if it comes to innovate the business model. The importance of a technology is not always clear at first sight, and way to often only digital technologies are considered which can benefit the company in the short term, thus often ignoring technologies relevant for the mid- or long-term objectives. With the BMI-R approach, those technologies can be better assessed and their impact on the respective business model components highlighted and thus it allows to allocate the resources more strategically.

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