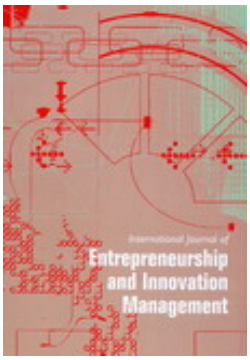

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Benedict Seiferlein, Dominik K. Kanbach, Claudia Lehmann

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Internal antecedents for systematic business model innovation: insights from the German automotive manufacturers

Benedict Seiferlein* and Dominik K. Kanbach

Dr. Ing. h.c. F. Porsche AG Chair of Strategic Management and Digital Entrepreneurship,
HHL Leipzig Graduate School of Management,
Jahnallee 59, 04109 Leipzig, Germany
Email: benedict.seiferlein@hhl.de
Email: d.kanbach@hhl.de
*Corresponding author

Claudia Lehmann

Center for Leading Innovation and Cooperation (CLIC),
HHL Leipzig Graduate School of Management,
Jahnallee 59, 04109 Leipzig, Germany
Email: claudia.lehmann@hhl.de

Abstract: Despite considerable interest from academics and management professionals in creating sustainable, competitive advantages through business model innovation (BMI), and highly-prominent BMI success stories, the contemporary understanding of how company-internal antecedents can enable systematic BMI remains limited. However, this specific knowledge is necessary if companies are to repeatedly exploit BMI's strategic and financial benefits. Therefore, this paper aims to reveal the internal antecedents by applying an in-depth qualitative research approach to the systematic BMI of all five German automotive manufacturers. The results show that systematic BMI is enabled through: 1) unified orientation; 2) dynamic orchestration; 3) flexible operations; 4) adjacent fields, which are underpinned by 16 distinct second-order themes. These findings significantly enhance the theoretical and managerial understanding of the enabling factors for BMI, and contribute unique empirical insights to the ongoing academic debate – particularly from the perspectives of dynamic capabilities and strategic agility.

Keywords: business model innovation; enabling factors; support conditions; German automotive industry; internal antecedents; qualitative research; unified orientation; dynamic orchestration; flexible operations; adjacent fields.

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Biographical notes: Benedict Seiferlein is a PhD candidate at the Dr. Ing. h.c. F. Porsche AG Chair of Strategic Management and Digital Entrepreneurship at HHL Leipzig Graduate School of Management. He received his graduate

degree in Management and an undergraduate degree in Business Studies from the University of Erlangen-Nuremberg, Germany. His research interests include business model innovation, disruptive innovation, and strategic management, especially in the mobility sector. He has been working in the automotive industry since 2016, including in Silicon Valley, Germany, and the UK.

Dominik K. Kanbach holds the Junior Professorship for Strategic Entrepreneurship at HHL Leipzig Graduate School of Management in Germany where he also obtained his PhD. He also leads the Strategic Entrepreneurship Research Group at the Dr. Ing. h.c. F. Porsche AG Chair of Strategic Management and Digital Entrepreneurship. He is the Academic Director of Digital Space – The HHL Digital Transformation Platform focused on incubating digital business models. His research interest covers the fields of strategic management and entrepreneurship with a special focus on business model innovation.

Claudia Lehmann is a Professor of Digital Innovation in Service Industries and Executive Director of the Center for Leading Innovation and Cooperation (CLIC) at HHL Leipzig Graduate School of Management. Her work focuses on methods and tools for the development and provision of digitally enabled services and business models. In particular, the focus is on the interdisciplinary and interactive communication of innovation competence for service engineering in digital transformation with the aim of enabling companies to design and implement digital services and business models.

1 Introduction

In the last two decades, business model innovation (BMI) has demonstrated its potential to shape new markets (Kim and Mauborgne, 2005), create and strengthen competitive advantages (Casadesus-Masanell and Tarzijan, 2012), increase an organisation's resilience (Christensen et al., 2016), and yield better economic outcomes than product and process innovations (Chesbrough, 2007, 2010). Consequently, BMI – which Casadesus-Masanell and Zhu (2013, p.464) describe as "the search for new logics of the firm and new ways to create and capture value" – has received substantial interest from academics and business professionals alike (Zott et al., 2011).

Researchers recognise that changes in the macro-environment, such as industry convergence (Frankenberger et al., 2014), novel technologies (Kraus et al., 2022), and a shift in customer expectations (Kraus et al., 2020b) serve as external antecedents for BMI. However, knowledge of the firm-level factors that facilitate BMI in incumbent firms which would allow a systematic development of BMI is still limited (Bucherer et al., 2012). Furthermore, it should be noted that several literature reviews published since 2013 have consistently highlighted this research desideratum and strongly encouraged the study of BMI's internal antecedents (e.g., Foss and Saebi, 2017; Schneider and Spieth, 2013; Spieth et al., 2014, 2016; Wirtz et al., 2016).

Moreover, the practical relevance for narrowing this research gap has been further emphasised in academic studies with a more practitioner-orientated focus. For instance, Chesbrough (2010) underscored the challenges of incumbent firms in achieving BMI due to the presence of organisational barriers (e.g., culture and processes). Similarly, Mosig et al. (2021) argued in their recent study on German insurance incumbents that firms have

yet to find effective strategies for overcoming these barriers, and called for further research to derive managerial guidance for enabling BMI through firm-internal levers.

This lack of understanding of the internal antecedents for systematic BMI might explain why even the majority of Fortune 500 firms do not repeatedly apply BMI (Johnson and Euchner, 2018) despite its proven strategic and financial advantages. Moreover, this observation becomes even more intriguing when considering that a one-time successful BMI has been the key for over half of the new entrants to the Fortune 500 list between 1997 and 2007, and BMI has been described as "the fastest path to greatness" by Forbes (Kanani, 2012). Finally, since – according to Schneider and Spieth (2013) – incumbents today have to innovate business models faster, more frequently, and more extensively than in the past, the importance of understanding how systematic BMI can be fostered by internal factors increases even further.

Gaining a profound understanding of what enables companies to do BMI systematically is thereby also important for three practical reasons: First, BMI innovators significantly outperform product and process innovators of the same industry in shareholder returns in a three-year, five-year, and even ten-year period by the factor 5, 61, and 1.6, respectively (Lindgardt et al., 2009). These substantial performance differences underline the long-lasting competitive advantages that can be gained through BMI (DaSilva, 2018), which can be leveraged through systematic BMI (Mitchell and Bruckner-Coles, 2004). Second, an innovative business model can be the decisive factor in the commercial success of a technological invention (Chesbrough, 2010). Therefore, Chesbrough (2010) advises companies to develop the necessary antecedents that enable them to do BMI to increase the economic efficiency of their entire innovation activities. Naturally, this recommendation is particularly relevant for R&D-intensive industries since they benefit especially from additional paths to market for technological inventions, which cannot be commercialised (ideally) through existing business models (Chesbrough and Rosenbloom, 2002). Third, BMI allows companies to create and capitalise on unexploited market opportunities (Johnson and Euchner, 2018). However, doing this repeatedly requires a systematic proceeding which differs substantially from established organisational routines of incumbents (Christensen et al., 2016). Thus, Christensen et al. argue that firms should optimise their internal levers for systemising BMI and "build a business creation engine, capable of turning out a steady stream of innovative new business models" (2016, p.38) while also highlighting the managerial appeal and difficulties of accomplishing this. Hence, their assessment is in line with Johnson and Euchner that attaining systematic BMI "remains both the challenge and the opportunity for Fortune 500 companies" (2018, p.17).

Despite these calls to action and the high practical relevance of internal antecedents for systematic BMI, the academic understanding is still limited and can be divided into two streams:

- The first stream takes a high-level perspective and argues that companies should use their dynamic capabilities, foster their strategic agility, or engage in open innovation. However, these recommendations frequently lack empirically-driven guidance and are derived from anecdotal evidence from sporadic business model changes instead of systematic BMI (c.f. Chesbrough and Rosenbloom, 2002; Doz and Kosonen, 2010; Teece, 2018a). Moreover, they contrast with the need to derive recommendations with managerial relevance for eliciting BMI, and provide many opportunities for future research (e.g., Filser et al., 2020).

- The second stream emphasises a lower-level perspective and focuses on single firm-level antecedents, such as organisational culture, experimentation, and the need to overcome organisational inertia. These findings have enabled firms to create more suitable BMI environments in organisational units, most notably detached from the core organisation, such as incubators or dedicated BMI subsidiaries. However, as Foss and Saebi (2017, p.217) have argued, the internal antecedents for BMI "may be many, different in nature, and placed at different levels". Thus, organisations that pursue BMI only in separated entities miss out on utilising the many levers for BMI found within the core organisation. This is particularly challenging when the basis of competition transcends from traditional factors, such as technological innovations to BMI (Chesbrough, 2007), the competitive environment requires BMI more frequently, and, consequently, BMI must be integrated deeply and centrally into the systematic innovation activities of incumbents.

Therefore, we agree with the persistent calls found in the literature that a more profound understanding for the firm-internal antecedents for systematic BMI is needed. To that end, we define an antecedent as internal if it can be influenced by management. Furthermore, since our focus goes beyond studying the internal antecedents for sporadic BMI, we define an antecedent as systematic when it fosters the development and use of new business models in a continuous, repeated, and intentional way, which differentiates systematic BMI from non-recurrent business model changes or sporadic BMI.

To explore these antecedents, this paper uses an in-depth, exploratory research approach, taking all five German automotive manufacturers as a unique sample. These companies have an academic track record in BMI research (e.g., Christensen et al., 2016; Spieth et al., 2020) and are currently forced to develop a series of BMI. Their most recent BMIs include selling entire vehicle architectures to competitors, offering innovative connected car services, and new mobility choices (e.g., car-sharing and car subscriptions), to name but a few (Seiferlein et al., 2022).

In response to this context, we address the following research question: How is systematic BMI enabled by firm-internal antecedents in German automotive manufacturers?

The remainder of the paper is structured as follows: First, we establish an understanding of BMI and its internal antecedents; then, we outline our research method, present our findings and reflect on them in the context of the ongoing BMI discussion, highlight our theoretical contributions and managerial relevance, and suggest directions for future research.

2 Theoretical underpinnings

BMI has been gaining momentum in both academia and professional practice in recent years (Chesbrough, 2007; Frankenberger et al., 2013), demonstrating its relevance and the continued interest it garners. At this time, however – despite over 20 years since its inception (Foss and Saebi, 2017) – BMI research is still in its infancy (Hossain, 2017), remains highly fragmented (Kraus et al., 2020b), and continues to be characterised by definitional discrepancies (Wirtz et al., 2016). Nevertheless, researchers commonly accept the idea that BMI frequently requires a holistic perspective on organisations since "it often affects the whole enterprise" [Casadesus-Masanell and Zhu, (2013), p.464]. This

also reflects Foss and Saebi's (2017) claim that organisations have internal antecedents at various levels, although academic research has yet to point out how these can be utilised systematically (Wirtz and Daiser, 2018).

In line with the multifaceted nature of enabling BMI, the existing literature has proposed numerous perspectives for the theoretical anchoring of the internal antecedents. For example, 8 recent literature reviews and meta-analyses list 11 different theoretical angles, those of the dynamic capabilities and strategic agility seem to be the most prominent (see Tables 1 and 2).

According to the dynamic capability perspective, incumbents need to:

1 sense their environment for new business opportunities

2 seize such opportunities through business models which create and capture value

3 periodically transform their assets, culture, organisational structures, and routines (Teece, 2018a).

To perform these three entrepreneurial activities, companies should rely on the higher-order competencies of their top management executives, analyse potential opportunities thoroughly, experiment with different business models, orchestrate resources, and establish separate units to foster BMI (Teece, 2018a).

Analogous to the dynamic capability perspective, the strategic agility view emphasises three 'meta-capabilities' based upon conceptual works to advance changes in business models. These are:

1 sensitivity to changes with potentially strategic consequences, such as new business opportunities and the need to adapt value creation and capture mechanisms

2 unity of leadership among top management for accomplishing a commitment to change

3 fluidity of resources (particularly of employees) to be conducive for BMI (Doz and Kosonen, 2010).

For each of these dimensions, the aforementioned conceptual works propose five activities for a companies' leadership team, including the suggestion to experiment with business models, align stakeholders, and organise business units around customer segments and their desires.

Thus, both perspectives share a focus on the enabling factors of the leadership team for BMI, while paying little attention to the antecedents residing in the entire hierarchical spectrum of incumbents. Likewise, both theoretical angles are primarily concerned with facilitating sporadic business model changes while opening the potential to build upon their findings to explore the antecedents for systematic BMI (Doz and Kosonen, 2010; Teece, 2018a).

Consequently, despite almost a decade having passed since Schneider and Spieth's (2013) highly-cited literature review proposed a research agenda for the antecedents of BMI, recent reviews have underlined the need for further empirical studies to complement anecdotal and conceptual works (e.g., Spieth et al., 2016; see Table 2 for details).

Table 1 Overview of approaches to recent BMI literature reviews and meta-analyses

Authors (year)	*Applied methodology*	*Quality filters*[a]	*Studied period*	*Searched databases*	*Reviewed papers*	*Citations*[b]
Schneider and Spieth (2013)	Structured literature review following Tranfield et al. (2003)	(✓)	1981–May 2012	ISI Web of Knowledge's Social Sciences Citation Index SSCI, Social Science Research Network	35	806
Spieth et al. (2014)	Non-structured literature review	-	Not mentioned	Not mentioned	Not mentioned	596
Spieth et al. (2016)	Non-structured literature review	-	Not mentioned	Not mentioned	Not mentioned	116
Wirtz et al. (2016)	Structured literature review and survey of BMI scholars	✓	1965–2013	EBSCO Academic Search Complete, EBSCO Business Source Complete	681	1,318
Foss and Saebi (2017)	Structured literature review	✓	2000–2015	EBSCO Business Source Premier, manual addition of articles from practitioner-oriented journals	150	1,434
Filser et al. (2020)	Bibliometric citation analysis, following Zupic and Čater (2015), and qualitative trend analysis	(✓)	Before 2022 for bibliometric citation analysis, 2019 for qualitative trend analysis	ABI Inform/ProQuest, EBSCO, Emerald, Google Scholar, IngentaConnect, JSTOR, Mendeley, ScienceDirect, Scopus, Springer	380 for bibliometric citation analysis, 30 for qualitative trend analysis	17
Kraus et al. (2020b)	Structured literature review following Kraus et al. (2020a)	✓	2016–2019	Web of Science	40	24
Zhang et al. (2021)	Meta-analysis of quantitative studies following Borenstein et al. (2011)	-	2007–October 2017	EBSCO Business Source Premier, Google Scholar, Web of Science, Wiley InterScience, manual addition of special issue articles published in leading academic journals, CSSCI articles in the China National Knowledge Infrastructure	74	12

Notes: [a]✓ = peer-reviewed papers only, (✓) = peer-reviewed and non-peer reviewed papers, - = no quality filters applied or mentioned.
[b]Citations as of 13 March 2022, according to Google Scholar.

Table 2 State of research on firm-internal antecedents according to recent BMI literature reviews and meta-analyses

Authors (year)	*Suggestions for theoretical anchoring*	*Key contribution*	*Identified research gaps and proposed future research questions*
Schneider and Spieth (2013)	Dynamic capabilities Opportunity exploration Resource-based view Strategic agility Strategic entrepreneurship	Proposed experimentation and leadership for overcoming BMI barriers Suggested detailed agenda for further research on BMI antecedents	"The question of what enables firms to conduct business model innovation needs to be further addressed." (p.26) "How can firms identify relevant trends and emerging opportunities under explicit consideration of their extant initial solution in terms of resources, competences, and capabilities?" (p.22) "How can firms emphasise the identification, development, and support of ideas for business model innovation within their firm?" (p.22)
Spieth et al. (2014)	Dynamic capabilities Organisational ambidexterity Strategic agility	Found that organisational antecedents have been 'largely' (p.243) ignored in the literature Emphasised experimentation as an essential part of BMI strategy formulation Underlined the need to adapt organisational structures recurrently	"We encourage contributions that […] provide new insights into interdependencies between constituent sources for business model innovation, investigate its enabling conditions and organizational processes" (p.242–243) "How can firms for example systematize business model innovation as subject within their corporate innovation frameworks and develop it as an organizational capability?" (p.243) "How can firms ideally create supporting conditions and organise these types of business model innovation processes with entrepreneurs and in established companies?" (p.243) "How should managers […] organise cross-functional firm-level collaboration and boundary-spanning intrafirm partnerships for business model innovation?" (p.244)
Spieth et al. (2016)	Dynamic capabilities Organisational ambidexterity Strategic agility	Observed that internal BMI antecedents and barriers to BMI have been primarily studied conceptually and through anecdotal evidence Remarked on a lack of empirical studies and "substantial, evidence-based research on firm-level prerequisites of business model innovation" (p.406) Described the academic unclarity by which a firms' strategy leads to BMI Found that an organisations' culture is conducive to BMI Recognised willingness for risk-taking and the need for experimentation as necessary for BMI	"How to systematise business model innovation as subject for innovation and as organisational capability?" (p.410) "The question of how the firm innovates its business model […] provides a relevant direction for further research." (p.405) "From an organizational ambidexterity perspective, how can we balance explorative and exploitative phases in business model innovation?" (p.409) "How can organisational processes look like to embrace business model innovation?" (p.410)

Table 2 State of research on firm-internal antecedents according to recent BMI literature reviews and meta-analyses (continued)

Authors (year)	*Suggestions for theoretical anchoring*	*Key contribution*	*Identified research gaps and proposed future research questions*
Wirtz et al. (2016)	None	Outlined the relevance of overcoming organisational inertia and resistance of employees regarding the implementation of BM, without providing insights on how this could be achieved Identified structural changes in the cost or revenues of an existing BM as antecedents for BMI	"The management-process-oriented areas of design, change and innovation within business model research […] are assessed by experts as the most important fields for future research." (p.16)
Foss and Saebi (2017)	Dynamic capabilities Open innovation	Provided a conceptual research framework which emphasises the influence of internal and external antecedents for BMI on various levels Identified a lack of "systematic research on the antecedents […] of BMI" (p.201), particularly for internal antecedents	"Our review did not result in the identification of articles that clearly deal with the antecedents of BMI." (p.208) "We argue that the literature […] has gaps with respect to the identification of antecedent conditions." (p.200) "In spite of attention to the managerial side of BMI, there are still significant gaps in the understanding of the internal drivers of BMI." (p.217)
Filser et al. (2020)	Dynamic capabilities Open innovation Strategic agility	*Citation analysis:* Underscored the significance of closing the research gaps identified in previous reviews Found alignment with strategy, culture, experimentation, organisational learning, leadership, sensitivity to opportunities, fast redeployment of resources, and the application of a customer perspective conducive to BMI *Trend analysis:* Emphasised the increasing scholarly attention to dynamic capabilities as enabling factors Listed the following capabilities as known dynamic capabilities for BMI, while underlining that they might be firm- or BMI-type specific (e.g., BMI in family firms or BMI with strong emphasis on sustainability) and thus cannot be generalised to broader settings: 'internal coordination', 'stakeholder engagement', 'organisational', and 'founders' capabilities' (p.12)	*Citation analysis:* Reference to the gaps identified by Schneider and Spieth (2013), Spieth et al. (2014) and Foss and Saebi (2017) *Trend analysis:* "All of the [dynamic capabilities'] articles identified the need for further quantitative empirical research in these fields." (p.12) "Additionally, several authors wanted a more detailed and general framework for dynamic capabilities, which could be built on these findings." (p.12) "Other than the identified emerging trends, scholars have addressed themes such as circularity […], digitalisation […], and leadership in the previous year. This offers insight into topics that are gaining awareness, but not as quickly as the identified emerging trends. Thus, scholars could contribute to theoretical and empirical studies on these topics, as they could be lacking further scientific evidence." (p.14)

Table 2 State of research on firm-internal antecedents according to recent BMI literature reviews and meta-analyses (continued)

Authors (year)	*Suggestions for theoretical anchoring*	*Key contribution*	*Identified research gaps and proposed future research questions*
Kraus et al. (2020b)	Not mentioned	Found that "organisational factors are the core for every BMI and [that] they are absolutely essential for the success of the BM of a company" (p.15) Clustered organisational factors into 'organisational culture', 'entrepreneurial thinking/acting' and 'strategy' (p.16)	Not mentioned
Zhang et al. (2021)	Absorptive capacity Dynamic capabilities Transaction cost Social network Upper echelon theory Resource-based view	Provided evidence for a positive and statistically significant relationship between internal antecedents and BMI performance Clustered internal antecedents into 'managerial cognition', 'internal resources and capabilities', and 'organisational characteristics' (p.6), and identified them as 'important internal motivators of BMI' (p.10) Found statistical evidence for additional factors moderating and mediating the antecedent and performance relationship beyond the known determinants	"The empirical literature on BMI is relatively recent and still growing; this means that a limited number of studies are available for examining the antecedents-BMI and BMI-firm performance relationships." (p.11) "Future research could also focus on the mediation and moderation mechanism when exploring the factors influencing BMI and their role; this would enrich the understanding of the research on BMI." (p.11)

Among those theoretical works is Bashir and Verma's (2019) purely conceptual model for internal antecedents. They proposed that organisational structure, culture, and inertia, as well as leadership and technology, are the company-internal factors for BMI. However, this model lacks an empirical foundation, an in-depth investigation of what underpins those antecedents, and how the proposed factors elicit BMI (Bashir and Verma, 2019). Moreover, Zhang et al.'s (2021) recent meta-analysis of the quantitative studies on the antecedent and performance relationship provides statistical evidence for the existence of additional factors moderating and mediating this relationship beyond the known determinants. Hence, they have called for industry-specific research on incumbents to deepen our understanding.

Similarly, Kraus et al.'s (2020b) structured literature review underlines the essential importance of internal antecedents for successfully conducting BMI; simultaneously, in their recent bibliometric citation and trend analysis, the same authors reiterated the call of other literature reviews to further advance our understanding of what enables companies to conduct BMI (Filser et al., 2020).

Thus, the persistent calls to establish an understanding of the internal antecedents on a level with theoretical and managerial relevance underscore the need to contribute to a more comprehensive body of scholarly commentary in the form of original research and extend the ongoing academic debate, particularly with a dynamic capabilities and strategic agility perspective (Doz and Kosonen, 2010; Teece, 2018a). With this goal in mind, the following section outlines the approach we applied to answer the research question.

3 Methodology

3.1 Research design

BMI is an emerging phenomenon with enabling factors on multiple organisational levels (Foss and Saebi, 2017). As such, we followed the recommendations of Bluhm et al. (2011), Eisenhardt and Graebner (2007), and Graebner et al. (2012), and apply an inductive, qualitative research approach to advance theory building and explore the antecedents on multiple levels. Gioia et al.'s (2012) methodology, which builds upon grounded theory, is particularly well-suited to answer "research question[s] framed in 'how' terms aimed at surfacing concepts and their inter-relationships" (p.26). This method provides deep insights into the dynamics of organisations (Gioia et al., 2012) and BMI (e.g., Mosig et al., 2021; Spieth et al., 2020), while yielding empirical results with a high degree of qualitative rigour. Finally, Saebi et al. (2017) highlighted the need for interview-based studies in this under-represented area of scholarly inquiry, making an inductive approach highly appropriate in this instance.

According to Urquhart (2013), a research design that incorporates multiple cases, a diverse range of informants, and a variety of data collection methods increases a study's usefulness. Accordingly, we incorporated these recommendations for the sample selection, data collection, and data analysis. Following Eisenhardt (1989), four to ten cases are suitable for advancing theory building through case study research. Moreover, this research design enables a constant comparison between cases, which is particularly valuable for solidifying emerging concepts when theoretical sampling is applied for data collection (Urquhart, 2013). Thus, we decided to base our research on

five companies from the same industry, thereby enabling us to gain insights into BMI across organisational boundaries (Stake, 2005) while controlling for extraneous factors (Eisenhardt, 1989).

3.2 Sample selection

We selected German incumbent automotive manufacturers as our sample for four reasons. First, according to Teece (2018b, 2019), these manufacturers are currently having to develop new business models due to external changes in the environment while, at the same time, facing a high level of uncertainty. Hence, they provide an opportunity to study the BMI of incumbents according to similar exogenous conditions. Second, the sample covers various organisational forms for BMI – for instance, through close integration in the core organisation and dedicated subsidiaries, as well as joint ventures with direct competitors (Seiferlein et al., 2022). Thus, the sample reflects the diversity of how BMI is organisationally established and contributes to a more complete picture of the internal antecedents (Markides, 2013). Third, the industry operationalised systematic BMI to a significant degree in order to address new and existing customer segments with innovative value propositions, value chains, and revenue models (Proff and Fojcik, 2015). Hence, they can be considered as being highly experienced in fostering BMI. Fourth, BMI is more frequently emphasised as a top priority by practitioners in the automotive industry than in any other sector (Ringel et al., 2020). Likewise, the frequent use and academic interest in studying BMI in the automotive industry (e.g., Landau et al., 2016; Spieth et al., 2020) compared to other industries (cf. Johnson and Euchner, 2018) further underline the industry's outlier position. Thus, following Yin's (2018) reasoning, the automotive industry represents an exceptional case that is particularly well-suited for an in-depth investigation.

Since all five German car manufacturers participated in this study, this sample covers Germany's entire incumbent automotive landscape of systematic BMI in this industry sector, thereby aligning with Foss and Saebi's (2015) appeal for small-N studies. Accordingly, we define an incumbent as a company that is well-established in conventional markets, such as automobile development and production, and originates from the era in which the internal combustion engine was the dominant technological design (Bohnsack et al., 2020). The companies in the sample generated a combined 529.59 billion euros in revenue (Statista, 2020b), sold 16.8 million vehicles across their brands (Statista, 2020a), and employed 1.1 million people globally as of 2019 (Fortune, 2020). Moreover, they are the worldwide market leaders in the premium automotive segment, with a global market share of 67% and over 80% in Europe (Germany Trade and Invest, 2020).

3.3 Data collection

Following an inductive research approach, the first author conducted 22 open-ended, semi-structured interviews. As suggested by Flick (2014), we collected interview data over an extended period of time – in our case nine months – to mitigate the potential influence of time-bound events.

We identified potential interviewees through open-invitation events of automotive manufacturers within a BMI context (e.g., professional pitch events), publications about

their BMIs, our own professional network, and the snowballing technique (Biernacki and Waldorf, 1981).

Our interviews included questions on BMI enablers and processes, approaches to barriers, and the identification of BMI opportunities (see Table 4 in the Appendix). We continuously refined the interview questions during the data-collection phase (Gioia et al., 2012). They emerged from multiple data sources, including the existing literature, observations, internal-meeting memos, informal follow-up conversations, and such publicly available information as annual reports, media coverage, industry reports, press releases, and public interviews. In line with Flick (2014) and Yin (2018), and since a variety of data collection methods increases the results' credibility (Urquhart, 2013), we also used these sources to complement our data collection and triangulate between our data sources.

Table 3 Sample description

#	*Company*	*View*	*Role*	*Code*	*Interview length*
1	OEM-alpha	IN-EX	Intrapreneur	IN-EX-alpha-1	53 minutes
2	OEM-alpha	IN-EX	Intrapreneur	IN-EX-alpha-2	47 minutes
3	OEM-alpha	IN-EX	Intrapreneur	IN-EX-alpha-3	53 minutes
4	OEM-beta	IN-EX	Intrapreneur	IN-EX-beta-1	70 minutes
5	OEM-gamma	IN-EX	Intrapreneur	IN-EX-gamma-1	30 minutes
6	OEM-gamma	IN-EX	Intrapreneur	IN-EX-gamma-2	40 minutes
7	OEM-delta	IN-EX	Intrapreneur	IN-EX-delta-3	68 minutes
8	OEM-alpha	IN-MA	Director	IN-MA-alpha-1	47 minutes
9	OEM-beta	IN-MA	Vice President	IN-MA-beta-1	38 minutes
10	OEM-beta	IN-MA	Manager	IN-MA-beta-2	56 minutes
11	OEM-beta	IN-MA	Manager	IN-MA-beta-3	56 minutes
12	OEM-epsilon	IN-MA	Manager	IN-MA-epsilon-1	37 minutes
13	CON-alpha	EX-CON	Senior Consultant	CON-alpha-1	55 minutes
14	CON-alpha	EX-CON	Consultant	CON-alpha-2	47 minutes
15	CON-alpha	EX-CON	Consultant	CON-alpha-3	42 minutes
16	CON-alpha	EX-CON	Manager	CON-alpha-4	60 minutes
17	CON-alpha	EX-CON	Consultant	CON-alpha-5	57 minutes
18	CON-alpha	EX-CON	Consultant	CON-alpha-6	59 minutes
19	CON-alpha	EX-CON	Senior Consultant	CON-alpha-7	36 minutes
20	CON-alpha	EX-CON	Manager	CON-alpha-8	30 minutes
21	CON-alpha	EX-CON	Manager	CON-alpha-9	86 minutes
22	CON-beta	EX-CON	Partner	CON-beta-1	78 minutes

Note: OEM – original equipment manufacturer, IN-EX – internal execution view, IN-MA – internal managerial view, EX-CON – external consulting view.

Each interview lasted approximately 52 minutes on average, and was recorded and transcribed, yielding 443 pages of transcripts. The sample consists of 12 employees of German automotive manufacturers, seven of whom work on BMI daily (providing an

internal execution view), while another five are in charge of initiatives but do not work on BMI operationally (for an internal managerial perspective). Additionally, we interviewed ten consultants throughout the hierarchy of two award-winning management consultancies in the automotive industry (providing an external consulting view) who advise and support the sample companies, and who thus provided us with insights into BMI activities at multiple German automotive manufacturers. This perspective reflects the industry-specific virtual integration of partners among the automotive manufacturers (Parry and Roehrich, 2009), in which external partners contribute to roughly three-quarters of the added value (Schuster and Brem, 2015). By considering three different perspectives, our sample offers a more holistic view of the relevant phenomena, and answers Foss and Saebi's (2017) call for studies with a multidimensional perspective. The combined interviews served as our primary data source (see Table 3).

3.4 Data analysis

We applied the Gioia method to structure and analyse the large volume of data. The first author formed first-order concepts based on open coding in MAXQDA, labelling them with terms used by interviewees (Gioia et al., 2012). In parallel, the second author coded randomly selected interview data and achieved an initial agreement on the codes for over 90%, and engaged with the first author until a consensus on 100% of all codes was reached. According to Flick (2014, p.183), this in-depth involvement of at least two researchers leads to an investigator triangulation' and reduces biases induced by a single researcher.

Next, as suggested by Gioia et al. (2012), the first author grouped the informant-centric first-order concepts into theory-centric, second-order themes, and grouped these into aggregate dimensions. The second author played devil's advocate during the iterative process and challenged the emerging patterns with the goal of increasing the analysis' objectivity – again, as suggested by Gioia et al. (2012).

After the tenth interview, we began asking for feedback and performing member checks of the emerging data structure at the end of each interview, in line with Shah and Corley (2006). Likewise, we conducted informal follow-up conversations with the first interviewees to further increase the analysis' internal validity. Additionally, we presented the research at three national, and one international, research colloquium to academic and BMI professionals in order to gather external feedback from multiple perspectives, as advised by Urquhart (2013). In sum, we thus followed Corbin and Strauss's (1990) recommendation to extensively establish robustness through constant revision of the data structure.

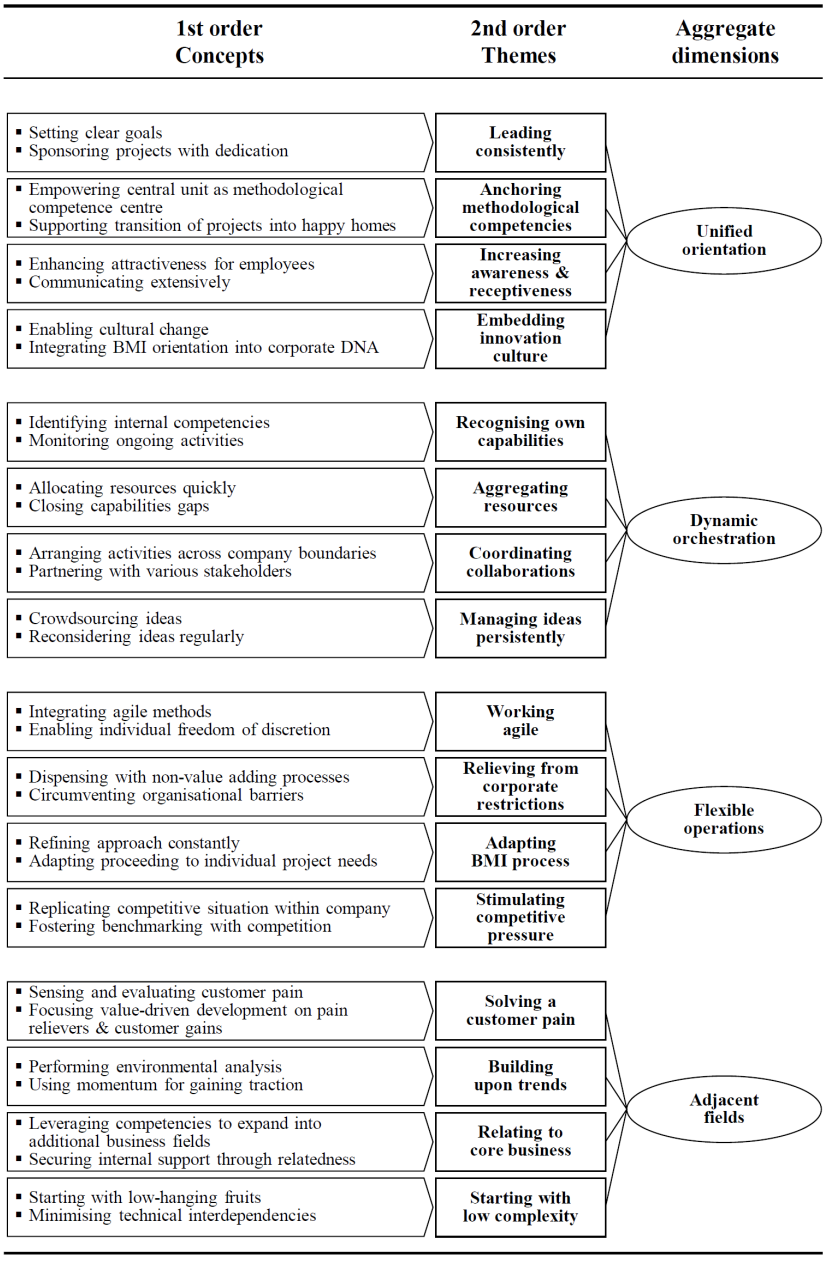
Furthermore, we kept collecting and analysing data until we reached theoretical saturation, as defined by Thornberg and Charmaz (2014). In this process, the data points for addressing internal organisational barriers (e.g., duration of budget cycles) and the necessity for nurturing a distinct cultural attitude (e.g., a low hierarchy culture that tolerates pivoting) saturated first, potentially due to the frequent notion of these factors in the BMI (see theoretical underpinnings) and automotive industry-specific literature (e.g., Donada and Attias, 2015; Hoeft, 2022; Seiferlein et al., 2022).

Finally, we performed triangulation across multiple data sources to increase our findings' trustworthiness (Yin, 2018).

4 Findings

The data structure (see Figure 1) reveals that systematic BMI requires four internal antecedents at a higher order: unified orientation, dynamic orchestration, flexible operations, and adjacent fields. Each of these four antecedents is undergirded by four secondary themes. We explain our results in detail in the following section.

Figure 1 Data structure for internal antecedents for BMI



4.1 Unified orientation

Unified orientation reflects the necessity of directing an organisation towards BMI.

Our data reveal that leadership is crucial from the beginning for all three perspectives. As one manager put it, "The first thing to do is to set the direction of march" (IN-MA-epsilon-1). In addition to articulating goals, at least one member of the top leadership team must demonstrate personal dedication that goes beyond mentoring and involves risk-taking for BMI projects in the case of failure, especially for projects with extended financial exposure. As one vice president explained, "There has to be one who says: 'I take the risk that we take 400 million euros to address a big thing, and I know that this can go down the drain, and I know what it means if you run 400 million euros into the ground'. This sponsorship, this 'I take the risk' has to be incarnated in most cases" (IN-MA-beta-1).

Our interview partners also highlighted the benefits of assigning one unit to have BMI as its central competence area, as well as responsibility for integrating it into the organisation. This was encouraged particularly by the internal managerial and external consulting perspective. This unit "at a higher level takes the lead for the topic, structures BMI contextually and methodologically, and guides employees" (IN-MA-epsilon-1) and is "open for all departments" (IN-EX-gamma-1).

It is also crucial to increase the employees' awareness of and receptivity to BMI, to attract the best workers and to secure lasting support throughout the organisation. Interestingly, all of our internal interviewees mentioned this as a vital antecedent, but only six out of ten consultants did so. As one employee from the operational level emphasised, "We are extremely active in internal and external communication. […] We publish new content every two days on the intranet, […] do things which our board members talk about and have very, very high visibility, and, as a consequence, also have the support of people we need it from" (IN-EX-alpha-2).

Finally, in terms of unified orientation, our data reveal a connection between systematic BMI and company culture, accentuated primarily by the internal managerial and company-external perspectives. As one director stated, "The real question is whether you have a company culture that first tolerates BMI and second carries it through until the end" (IN-MA-alpha-1). Further interviewees added that "it needs a culture where BMI finds acceptance" (CON-alpha-8) that "allows adaptions" (CON-alpha-3), and enables an "open exchange of ideas" (IN-EX-alpha-1), without running the risk of "taking somebody's job away" (IN-MA-beta-2).

4.2 Dynamic orchestration

Dynamic orchestration recognises the entrepreneurial task of transforming, recombining, and extending a company's abilities by using resources across organisational boundaries.

Our empirical evidence shows that, to do this, companies must be aware of their capabilities in the first place. All perspectives emphasised this to the same extent. For instance, CON-alpha-9 explained that "At the beginning, we look which capabilities we have in the organisation and construct a capability map, which describes which competencies are needed to realise a business model and to perform a fit-gap analysis." Finding the right talent within the organisation is, however, "not trivial" (IN-MA-alpha-1), given the large workforce of German automotive manufacturers throughout the world.

Building upon this notion, measures to enable the rapid aggregation of resources, particularly of skilled labour, were explained in detail by all 22 of our interviewees. According to one vice president, "There is a challenge to identify and arrange the right employees together, but even more to achieve a 'burst moment' that they can disabuse themselves of their current duties and go into such [BMI] topics. Your organisation must be organised in such a way that the core business tolerates consolidating those people and pull them into new business models" (IN-MA-beta-1).

The analysis also reveals that all manufacturers work extensively with different partners within their organisation and beyond, and acknowledge this as an important contribution for BMI regardless of the professional perspective. As one interviewee put it, "We approached teams and individuals specifically of whom we knew that we'll be working with them in the long run, pitched to them and aligned how we can work together and what we can achieve together. […] This onboarding was the main factor that got it going" (IN-EX-delta-1). As CON-alpha-4 added, this must also be done externally: "In today's world, you neither can nor should do everything on your own; instead, you have to open your business model and connect it with other business models to generate the full customer value". In this regard, the interview partners suggested working with multiple stakeholders such as "company builders" (IN-EX-alpha-2; CON-beta-1); "competitors" (IN-EX-alpha-1; CON-alpha-6; CON-beta-1); "consultancies" (e.g., IN-EX-alpha-1; IN-EX-alpha-2; IN-EX-alpha-3; IN-EX-beta-1; IN-MA-alpha-1; IN-MA-beta-1; IN-MA-beta-3; IN-EX-delta-1; IN-EX-gamma-1; CON-alpha-8; CON-alpha-9); "ecosystems" (IN-EX-alpha-1; CON-alpha-4); "innovation labs" (IN-EX-alpha-2; IN-EX-beta-1; IN-MA-beta-2; CON-alpha-5); "media agencies" (IN-EX-beta-1); "start-ups" (IN-EX-beta-1; IN-MA-beta-2; IN-MA-beta-3; CON-alpha-6), "public authorities" (IN-MA-beta-2); "universities" (IN-MA-beta-2; IN-MA-epsilon-1; CON-alpha-1); and "existing and potential clients" (IN-EX-alpha-2; IN-MA-epsilon-1; CON-alpha-6).

Finally, our data for this antecedent underscore the benefits of collecting ideas for BMI projects and reconsidering them from time to time across all perspectives. Our sample companies "enable much internal idea management" (CON-alpha-6) and run, for instance, "accelerator programs" (IN-EX-alpha-2; IN-EX-gamma-2; IN-MA-epsilon-1; CON-alpha-1), "idea contests" (IN-EX-alpha-1; IN-EX-delta-1; IN-MA-epsilon-1; CON-alpha-4) and "hackathons" (IN-EX-alpha-2; IN-MA-alpha-1; CON-alpha-8), and manage the output as a valuable asset. IN-EX-beta-1 exemplified this, saying, "We have an 'idea backlog' where we pin all ideas we find appealing but can't use right away. […] The underlying motto is that we never throw away ideas since we might be able to use them some day".

4.3 Flexible operations

Flexible operations transform visions and capabilities into business models that can be validated, while reducing financial exposure through a systematic process.

We found empirical evidence that the application of 'agile' working methods is essential for all perspectives in this dimension. One interviewee explained that "Everything has to be done agile. If you approach BMI in a waterfall model approach, you have already lost" (CON-alpha-8). Part of this agile working method is empowering employees to "act fast" (CON-alpha-4) by "giving maximum freedom of discretion and also responsibility for the results into the teams" (IN-EX-alpha-2). The agile working

method is underpinned by multiple agile concepts. For instance, "design thinking" (IN-EX-gamma-2; IN-MA-beta-2; CON-alpha-7), "double diamond" (IN-EX-alpha-1; IN-MA-beta-1; CON-beta-1) and the "lean start-up approach" (IN-EX-alpha-2; CON-alpha-4) to "get customer feedback early" (IN-EX-delta-1; CON-alpha-3).

In addition to individual freedoms, our three perspectives also revealed the necessity of relieving BMI projects of corporate restrictions and focusing on value-adding processes instead. As IN-EX-delta-1 noted, "We have certain freedoms. Officially we had to follow the processes, but for many things we were able to get approval from the board or head of division so that we did not have to comply with the standard procedure […] For instance, you cannot upload pictures to external ticketing tools, which made it impossible to create bug tickets for the developers and attach screenshots. Thus, we received equipment to circumvent this barrier".

Furthermore, we found that the process for developing BMI itself is iterated continuously and adapted to specific project needs. These adoptions were recognised mainly by the internal execution and external consulting perspective. As IN-EX-gamma-1 described it, "We orientate ourselves on the design-thinking process, but individualise it for every project". IN-EX-alpha-2 added, "We figured out the entire concept within the last four years on our own. There was no one who predefined anything; it was all trial and error. As it is now, is the result of countless iterations, and I am curious how it will be in one year".

Our data also show that competitive pressure is fostered intentionally – on the one hand, through constant comparison with the company-external competition and, on the other hand, through company-internal competition between BMI ideas and teams. While all interviewees from the internal perspective perceived this antecedent as inspiring, CON-alpha-8 noted that "We realised that the teams were extremely motivated, and you have the advantage to test multiple BM configurations". IN-EX-alpha-2 explained, "We have a process with multiple steps through which we increase the competitive pressure. After three months, a jury – consisting of BMI experts and stakeholders who are not involved in the day to day business of BMI – decide together which projects will not be continued".

4.4 Adjacent fields

Adjacent fields are about finding distinct topics suitable for BMI which match the market needs and the company-specific position.

Our analysis reveals that the interviewees representing all perspectives emphasised a customer-centric approach combined with analytical rigour in regards to selecting topics for BMI. As IN-EX-beta-1 put it, "You must scout for customer pain points, elaborate on customer gains, customer jobs, and pain relievers. We start from the customer." A vice president added, "You have to start with the questions 'what is the problem' and 'how large is it?' and then go deep into analytics at full throttle. […] It's not about whether it's a large or extra-large problem, but about quantifying this in units of million transactions, million-dollar market size, time units and so forth, and not only look for B2C business models, but also B2B […] This helps tremendously to focus, to tackle new things and in particular to tackle the right things" (IN-MA-beta-1).

Multiple interviewees across hierarchical ranks also stressed that there is a "very strong correlation" (IN-EX-beta-1; IN-MA-beta-1; CON-alpha-9) between customer

pains and trends to "meet the zeitgeist" (CON-alpha-6), and to secure the company-internal "attention and support for the topic" (IN-MA-beta-2). As one interviewee recognised, "We scout for trends together with a consultancy and scout internally which topics are currently addressed. The trick is to find topics that aren't tackled in the organisation yet, but are not too far away either in order to integrate them into the company later" (IN-EX-alpha-3).

This finding corresponds to our empirical evidence that BMI topics must align with internal and external requests, particularly from the managerial perspective. One informant told us, "Our clear finding is, the closer you stay to your core business, the better it is in the beginning; and then you can pull the customer slowly and iteratively away to businesses, which are more distant from the core" (IN-MA-epsilon-1). A managing partner of a consultancy added, "There is the term 'adjacent possible' in the field. That is not to chase a BM which is entirely on the green field but to aim for one which is the next possible. Hence, the next step in which I can extend and complement my resource base. Therefore, it is crucial to consider the corporate perspective […] and to look for topics that are right at the intersection between customer needs and organisational skills. This considers the best possible execution" (CON-beta-1).

Our data also reveal the desire to choose topics with low technical and legal complexity, which was elaborated upon exclusively by interviewees of the internal managerial and external consulting perspectives. This choice enables companies to start quickly, reduce implementation risks, and gain experience with the 'low-hanging fruits' of BMI. As IN-MA-beta-3 described it, "Low complexity in the implementation and few dependencies in the system are highly desirable because this has an effect on efforts. It is no knockout argument, but a very, very important criterion".

5 Discussion

BMI is on the verge of becoming an essential part of innovation management with increasing relevance in numerous industries (Chesbrough, 2007), but, as Chesbrough argues, it is also 'very difficult to achieve' [Chesbrough, (2010), p.362]. It is thus vital to comprehensively understand company-internal antecedents for systematic BMI in order to achieve long-term success and lasting competitive advantages. Our analysis identifies 'unified orientation', 'dynamic orchestration', 'flexible operations', and 'adjacent fields' as four central and distinct antecedents. In the following, we reflect upon these and their relation to the ongoing academic debate.

First, the aspect of unity and the support of a company's leadership team for enabling BMI have been widely debated in the literature (see Table 2). Our data confirm this decisive role of executives in setting strategic goals. However, contrary to the notion outlined in the strategic agility literature (Doz and Kosonen, 2010), we provide empirical evidence that uniting the leadership team may not be sufficient. Instead, based on our empirical insights, we argue that the entire organisation across multiple hierarchical levels must be aligned towards BMI in order to maximise the opportunities for it. Next, we also enrich the literature with the finding of anchoring methodological competencies in a dedicated, yet highly-integrated, organisational unit, which acts as a central knowledge broker for business modelling. This finding of a cross-domain approach challenges the current understanding that BMI requires frequent changes to existing organisational structures (e.g., Spieth et al., 2014). It instead suggests that enablement can

be achieved through connecting otherwise separated units through a methodological competence centre. Likewise, this finding responds to the call of Wirtz and Daiser (2018), who called for research on clarifying whether BMI should be pursued within regular operational structures of an organisation or in isolated project structures. Based upon our data, we reveal that systematic BMI is fostered by a third way, which draws operationally from the resources of established organisational structures but is also fostered through project-based support of a dedicated competence centre. Moreover, we demonstrate that the competencies for sensing business opportunities for BMI are not rooted solely in the executives' suites, as suggested in the dynamic capability literature (e.g., Teece, 2018a), but also reside in lower hierarchy levels and can be stimulated through increasing the attractiveness and ease for employee engagement with BMI. Finally, we empirically confirm the importance of an organisational culture that tolerates and encourages BMI, as proposed by recent literature reviews (e.g., Filser et al., 2020; Zhang et al., 2021).

The second dimension, dynamic orchestration, confirms and comprises elements of the resource-based view and the dynamic capabilities' perspective. In the BMI context, the former concerns the efficient *employment* of capabilities and resources, and the latter focuses on their *development* (Schneider and Spieth, 2013).[1] We argue that companies must consider both simultaneously in order to achieve systematic BMI, thus carefully evaluating which resources they have at their disposal, which additions are needed, and how missing elements can be efficiently acquired. With these findings, we provide empirical evidence for the conceptually-driven proposition of Schneider and Spieth (2013), who initially proposed that systematic BMI needs a combined perspective of the two theories. Furthermore, our findings reveal how the automotive manufacturers use formal and informal networks across their organisations to connect and utilise competencies distributed throughout the organisation with the aim of overcoming organisational segregation. Thus, this finding enriches the literature with an additional concept to organise for BMI, which has thus far predominantly argued for separating BMI from the core business (e.g., Teece, 2018a). However, based on our insights, we argue that systematic BMI benefits from an integrated approach.

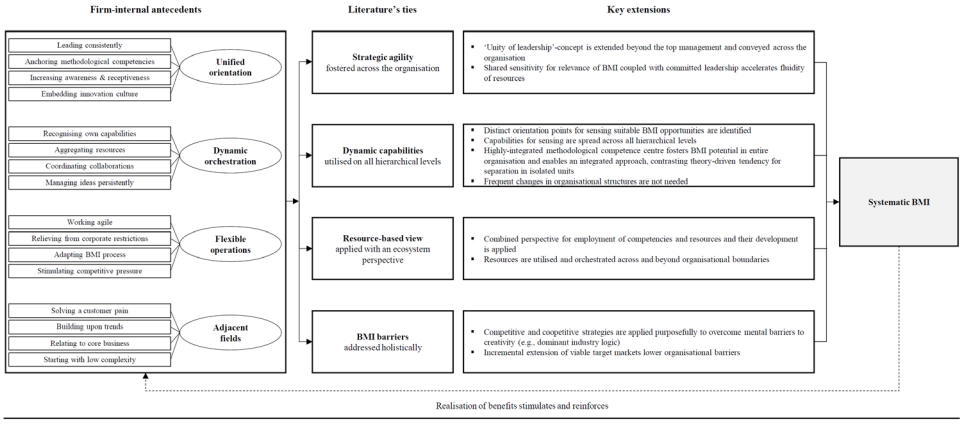
The third dimension, flexible operations, empirically confirms the frequently proposed notion that organisational barriers, such as inertia, must be addressed proactively (Spieth et al., 2016). Thus, the findings presented in this study also serve as a counterpart to the discussion on barriers to BMI (Chesbrough, 2010), since we demonstrate how these are addressed in an asset-intensive industry with considerable path dependencies (Proff and Fojcik, 2015). We provide evidence that the companies in our sample use agile working methodologies, increase the individual scope for individuals' decision-making, and systematically address previously identified barriers to BMI, such as company-internal regulation (e.g., Mosig et al., 2021), to foster BMI. Most importantly, however, we contribute – with the positive effect of stimulating competitive pressure – a novel antecedent to the BMI literature. Based upon our data, we argue that the intentional creation of competitive environments within organisations, and the constant benchmarking of competitive offerings, enable companies to develop more creative BMIs. Our data also underline that this theme provides a previously unknown method for breaking and overcoming such mental barriers as dominant industry logics.

Finally, the adjacent fields dimension enriches the literature by highlighting distinct markets suitable for systematic BMI from an incumbent's individual perspective.

Accordingly, while the strategic agility – and especially the dynamic capability perspective – emphasise the need to sense for BMI opportunities (Teece, 2018a; Doz and Kosonen, 2010), the adjacent fields dimension unveils four distinct orientation points on where, and for which topics, companies should aim to detect these possibilities. In particular, we confirm the critical aspect of assuming a customer perspective in the initial stages, as described by Filser et al. (2020), but also conclude that the experts additionally consider the relation to the core business, incorporate an outside-in perspective, and reflect upon the complexity of a BMI to strategically define suitable search areas. These findings thus respond to Bogers et al.'s (2019) recent call to unveil how incumbents evaluate their environment and leverage their capabilities to strategically venture into new business fields through BMI.

Taken together, these antecedents explain how firm-internal factors enable systematic BMI. Moreover, we argue that the realisation of the benefits of systematic BMI stimulates and reinforces the antecedents across the hierarchical spectrum and thus iteratively extend a firm's opportunities to venture into additional business models more distant from already established business models over time (Figure 2).

Figure 2 Key extensions of the academic debate



6 Theoretical contributions

Collectively, this paper makes four distinct contributions to the BMI literature.

First, by researching BMI's internal antecedents, we significantly narrow a research gap which has been consistently identified in highly-cited literature reviews since 2013 (see Table 2). By empirically investigating these from three different perspectives and with methodological rigour, our paper responds to several calls to examine these factors and derives evidence-based findings on how BMI can be systematised (e.g., Spieth et al., 2014, 2016). Furthermore, we empirically validate Foss and Saebi's (2017) assumption that internal antecedents reside on various organisational levels, and present insights that some second-order themes (e.g., starting with low complexity) are more meaningful to representatives of one perspective than of the other.

Second, we respond to Filser et al. (2020) and Teece (2018a) by explicating the relationship between BMI and dynamic capabilities. Through studying an industry heavily-dependent on dynamic capabilities for eliciting BMI (Teece, 2018b, 2019), we detail this relationship and provide, for instance, empirical insights on where companies sense for BMI opportunities and how they seize them on an ongoing basis. Moreover, our study underlines the usefulness of Doz and Kosonen's (2010) strategic agility concept, and confirms that sensitivity to changes, unity of leadership, and fluidity of resources are conducive to BMI. However, while this concept has been criticised providing insufficient insights into how the concept's three elements enable BMI (Schneider and Spieth, 2013), we transparently demonstrate how these levers are undermined. Thus, our findings can be used to advance Doz and Kosonen's (2010) strategic agility leadership agenda in terms of, for instance, considering the role of employees at hierarchy levels below the top management.

Third, we also respond to Filser et al.'s (2020) call to derive insights on internal antecedents that are not restricted to family firm- and sustainable BMI-specific settings. Our findings – gained from studying a variety of different BMIs (e.g., car-sharing and connected car services) of companies with and without family ownership in an industry with over 4,670 billion euros in global revenues (Statista, 2019) – thus clearly represent one building-block towards the desired research direction. Moreover, we significantly enhance Bashir and Verma's (2019) research model, which outlined organisational culture, structure, overcoming inertia, leadership, and technology as five internal antecedents. By presenting a comprehensive list of 4 overarching antecedents underpinned by 16 second-order themes, we extend the breadth and depth of this model, and empirically validate the enabling potential of 4 of Bashir and Verma's (2019) antecedents.

Fourth, we identify the methodological anchoring of BMI in a cross-domain approach and the intentional stimulation of competitive pressure within corporates as two previously overlooked antecedents to BMI. Based upon our empirical insights, we argue that these antecedents are two levers for activating BMI potential, which lies dormant in employees across organisation but could be systemically deployed.

7 Managerial implications

Our findings also provide three valuable implications for managers who are striving to begin, or optimise existing, systematic BMI.

First, we empirically demonstrate the possibility of systematising BMI. Using German automotive manufacturers as an example, the findings show how the firm-internal conditions can be adjusted to achieve this goal. This insight is particularly valuable given BMI's enormous potential but infrequent systematic use when compared to other innovation forms (Bucherer et al., 2012). Thus, pursuing BMI systematically opens another viable form to innovate and differentiate from the competition.

Second, we provide a comprehensive and empirically-validated list on internal antecedents. We thus significantly transcend the conceptually-derived notion that firms should sense and seize business opportunities, and transform their capabilities so as to achieve BMI (Leemann et al., 2021). Instead, we identify 16 factors in four categories that enable them to do so. Thus, this paper adds to the scarce scholarly-rooted managerial

guidance for systemising BMI. Following DaSilva (2018), we argue that a more profound understanding of this matter is conducive to increasing systematic BMI's application and success rates, especially since incumbents frequently do BMIs as a one-time reactive measure against exogenous events so far (Chesbrough, 2007). Moreover, we contend, based upon our data, that the antecedents increase their impact the more the benefits of systematic BMI become visible within the organisation. This implies that the firm-internal antecedents and systematic BMI are in a mutually reinforcing relationship, since the success of previous BMIs, for example, lowers organisational barriers, reinforces the leadership commitment to BMI, and extends the addressable scope for the next BMI. Thus, albeit our sample companies are highly experienced in fostering systematic BMI, our managerial implications are in line with Christensen et al.'s (2016) proposition that companies can further advance their proceeding for systematic BMI iteratively.

Third, our data suggest that enabling systematic BMI is possible even without extensive changes to organisational design, such as by the formation of dedicated BMI units separate from the core organisation to address frequently-discussed barriers. Instead, our data underline that an overarching approach to BMI across business units is also possible if administered through one integrated instance, and the prioritisation of BMI is clearly conveyed throughout the organisation. Consequently, the findings imply that the management level needs to create one environment within the corporate structures in which already established business models are exploited, but also new business models adjacent to the core business can be nurtured. This creates an inherent tension between the need for increasing the efficiency of old business models and the distinct needs of BMI, such as shorter budget cycles, extended autonomy of decisions, organisational slack, and a more explorative culture. Our data suggest that the top management's commitment to embracing this challenge, setting strategic guidelines that reflect BMI's inherent entrepreneurial character, and establishing an integrated organisational unit that acts as a knowledge broker for BMI competencies are central to enabling systematic BMI. Simultaneously, the operational levels need to be empowered to interact with existing and potential new customers to identify and evaluate potentials for insufficiently served needs, monitor trends in the market and within their organisations, network effectively, and finally, be the driving force to put systematic BMI into every day's practice.

Given the sample selection, our findings will be of particular interest to leaders within the automotive industry. Especially, they might serve as a blueprint for setting up BMI and optimising systematic BMI beyond German automotive manufacturers. Thus, the study might help other car manufacturers and further participants in the automotive ecosystem (e.g., suppliers, dealers, and insurance companies) to take advantage of the ongoing industry transformation and capitalise on additional business opportunities through systematic BMI. Furthermore, utilising this study's findings might ultimately help them in bringing their BMI activities to the same advanced level as the German automotive manufacturers, which are recognised as the global innovation leaders among their peers (Bratzel, 2022).

Finally, this study may also serve to inspire industry executives beyond the automotive industry to intensify their BMI engagement due to the benefits of systematic BMI and the analytical generalisability of our findings (Gioia et al., 2012).

8 Limitations and future research direction

This study has some limitations that may encourage further research.

First, our sample consists of automotive manufacturers in Germany, in order to mitigate cross-industry and cross-country biases. It may be worthwhile to explore the internal antecedents in different industries, countries, and ownership settings to determine whether other antecedents are in play (for start-ups or SMEs, for example); however, we sought to diminish these risks by using a highly globalised industry with various customer groups as our sample, and by including an external consulting perspective in our study. It is worth mentioning in this regard that not even the consultants with the most experience from numerous projects – including with clients outside of the automotive industry – mentioned sample-specific limitations.

Second, our findings are a snapshot of current management practices; hence, even a replication of the study at a later time, potentially after the automotive industry's current transformation, would be interesting. Although this is an inherent limitation for all innovation-management research (Ritala et al., 2020), we mitigated this risk by studying the entire German automotive manufacturers' spectrum, capturing the companies at different points in their transformation.

Third, the paper aims to provide an overview of internal antecedents, but an in-depth investigation of the second-order themes would also be rewarding. For instance, studies that focus on how BMI initiatives stimulate competitive pressure through intra-firm and inter-firm coopetition and how this affects BMI would also be valuable.

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Notes

1 According to Winter (2003), capabilities can be brought into the following hierarchal order: Ordinary capabilities enable firms to 'make a living' in the short run (e.g., access to resources). First-order (dynamic) capabilities are needed to exercise established routines "to change the product, the production process, the scale, or the customers (markets) served" [Winter, (2003), p.992]. Finally, higher-level competencies are the highest-order of dynamic capabilities and allow the intentional transformation and development of first-order capabilities.

Appendix

Table 4 Themes and guiding questions for semi-structured interviews

Themes	*Questions*
Personal background	• What is your role?
	• What do your responsibilities include?
	• What's your involvement in BMI?
BMI approach	• Please describe how you (or your customers) 'do' BMI systematically.
	• Please provide examples of BMI.
	• How do you enable systematic BMI (for the customer)?
	• What does your company do to support systematic BMI?
	• How do you (and your company) come up with new ideas for BMI?
	• Which obstacles do you face? How do you navigate them?
	• What roles do incentives play?
	• What was surprising to you regarding BMI in your company (or your clients' companies)?
Recommendations and suggestions	• What would you do differently regarding systematic BMI if you could change anything?
	• Is there anything you would like to add?
	• To whom else should I speak?

Table 5 Additional proof quotes

Aggregate dimensions	*2nd order themes*	*Additional representative quotations*
Unified orientation	Leading consistently	"As it happens, I was on a plane with our chief digital officer […] and demonstrated the topic to him for one hour. I pitched in front of our chief sales officer. The chief procurement officer knows my idea; I talked with him three times for one hour each. I've also pitched one level below the board […]. Everybody knows the topic. It only lacks the igniting spark. Nobody has the guts to say I do it now." (IN-EX-gamma-2)
		"The most critical step is always to anchor the topic in the top management. For this, you run around with your idea, talk to many people, and once you have found a sponsor, you receive a budget to scale up the project." (CON-alpha-7)
	Anchoring methodological competencies	"You need one strategic unit, which has the competencies to initiate such topics, to develop them, and uses a systematic approach […] Hence an own, but still an integrated unit, which can do it systematically." (CON-beta-1)
		"We have one unit, which has been established just for that and which holds resources. And we have departments, which specialise themselves in new business models over time." (IN-MA-beta-1)
	Increasing awareness and receptiveness	"We practice 'do good and talk about it'. We demonstrate what's possible and bring people together, for instance, in formats like hackathons, learning journeys, and action days." (IN-MA-alpha-1)
		"We have a dedicated team, which is responsible for engaging with employees for innovation." (IN-EX-delta-1)
	Embedding innovation culture	"The cultural barrier is one of the largest barriers which the companies face, and this is tough. […] The problem is 'how can an employee be proud of a service, which isn't touchable?" (CON-alpha-4)
		"Culture is always an important aspect [when it comes] to which extent new BM are tolerated." (CON-beta-1)
Dynamic orchestration	Recognising own capabilities	"Knowledge management is essential that someone is aware of 'who knows what' or creates a platform for that. That does not necessarily have to be related to the employee's current tasks. Then you detect that this one colleague is, for instance, a passionate modeller or beekeeper and so forth. Particularly if you want to learn from other industries or completely other topics, it would be exciting to have an overview of 'which knowledge do we have in the company? How can we connect them ideally, and how can you match employees to an idea?" (IN-MA-epsilon-1)

Table 5 Additional proof quotes (continued)

Aggregate dimensions	*2nd order themes*	*Additional representative quotations*
		"We only know rudimentarily what the competencies of our employees are and where they can be found. My experience is that you have your personal network at a certain point of time, which helps you to either find the right people directly or via intermediaries. But, with this approach, you don't find every person and all competencies, especially in those areas which you don't know well. There you're groping in the dark quickly." (IN-MA-alpha-1)
	Aggregating resources	"Essentially, you always have process know-how, technological know-how; you have people who know creativity techniques […] The question is, how do you bring these different competencies together?" (IN-MA-alpha-1)
		"[At the one automotive manufacturer] is a network in which employees of all brands and subsidiaries are combined […] It's about giving the employees the basic conditions that they can start projects outside of their department and organisational borders." (CON-alpha-7)
	Coordinating collaborations	"Interesting is what we had in an ecosystem BMI project […] There the question is not only 'how to carry it through internally?' but also 'how can I coordinate various external stakeholders?' That's a different level of complexity because I have to do everything that I have to do internally also with the external partners. Hence, setting clear goals early, integrate stakeholders, develop solutions, etc. […] However, for BMI in service areas, new cooperations are necessary." (CON-beta-1)
		"You need a core competencies approach as a company that is to determine which core competencies differentiate yourself and what is relevant to your brand […] Therefore, you go into partnering if you have a capabilities gap and you don't intend to develop competencies in this area, either because it's you're way behind or it's just not your business […]. We look very carefully on what we can do in the future. Those are the very bold questions regarding partnering, but I say we're screwed if we don't partner." (IN-MA-beta-3)
	Managing ideas persistently	"There is a program for BMI, which is super cool. Every employee can submit ideas, and they receive around 300 ideas per year [for this program alone]. They filter them after specific criteria […], and then they form teams which consist of those people who had the idea […] Entire departments emerged from those ideas already." (IN-MA-beta-2)

Table 5 Additional proof quotes (continued)

Aggregate dimensions	*2nd order themes*	*Additional representative quotations*
		"We have many sources for new ideas, particularly for IT innovations. We organise, for instance, hackathons and continued to work on projects which seemed to have a high likelihood of success and which fit the most to our company – that's one option. Then our colleagues and employees have much creative potential, which we use. We pursue many ideas that are born there." (IN-MA-alpha-1)
Flexible operations	Working agile	"We give our teams maximum freedom of discretion, but also responsibility for the outcome. Initially, we decided who is a personal and professional match, and then we realised start-up teams are not cast either, not even in The Lions' Cave [German version of the TV show Dragons' Den]. This is the reason why we let the people decide on their own on which topic they would like to work and with whom they want to work with." (IN-EX-alpha-2)
		"I come from the 'waterfall development time,' but that doesn't work any longer for BMI. A company has to work agile to act fast, especially if you work in ecosystems. I often faced the challenge as a project leader to align the development process in ecosystems, set 'go-live-dates,' etc. But that doesn't work if everybody has its waterfall model with a planning horizon of two to four years. They are outdated already when they launch […] for the agile reaction to new customer needs, the collaboration with customers […] the organisation must work agile." (CON-alpha-4)
	Relieving from corporate restrictions	"In the automotive business, you calculate with fixed margins, and everything is measured against these. However, we are in a premium segment where such margins are possible. BMI, however, doesn't always target the same segment and […] therefore, we need other criteria so that they have time to grow and reach the turning point in market maturity, and don't stop them very early, just because the business case is not positive yet or doesn't get positive fast enough." (IN-MA-epsilon-1)
		"What matters is that not everything gets blocked or choked off through processes and other things, which exist in such large organisations." (CON-alpha-6)
	Adapting BMI process	"The BMI topics, which we work on, are comprehensive ones. Therefore, also the BMI process itself has to be adapted from time to time." (IN-MA-epsilon-1)
		"It always depends on the company, what are important factors, what are barriers, and how you deal with them. Hence, where do I make innovation? How do I proceed methodologically? How do I validate the core hypothesis? How do I endow the unit with a budget?" (CON-alpha-9)

Table 5 Additional proof quotes (continued)

Aggregate dimensions	*2nd order themes*	*Additional representative quotations*
	Stimulating competitive pressure	"We have weekly progress reviews in which we get challenged by BMI experts. We have midterm pitches in front of start-ups […], and then there's a company-wide voting on the intranet." (IN-EX-alpha-3)
		"It's always a creativity boost for employees when they have to accomplish something under competitive pressure." (CON-alpha-4)
Adjacent fields	Solving a customer pain	"The central factor is that you need a customer who recognises the added value and is willing to spend money on it." (IN-MA-alpha-1)
		"What I always do first is to look: how big is the customer pain? Is the customer willing to pay for the pain relief? That is the main priority because, if no one wants to pay for it, it gets complex to argue for it." (CON-alpha-9)
	Building upon a trend	"You need a topic that is wanted right now; for instance, sustainability has become a top priority and still gains relevance. And then you get the people easily, who want to contribute. […] you have more opportunities, and it is just way more accessible than if you have a topic where no one cares any longer. […] It has to be a trend somehow." (IN-MA-beta-2)
		"We say it's not enough to focus on the BM canvas, but we have to acknowledge that there are strong factors around us. We look at key trends, market forces, market segments, changing costs, revenue attractiveness, and macroeconomic factors, but also industry-specific influences." (CON-alpha-2)
	Relating to core business	"We figured out that it is very, very hard to establish a BMI within a large, established company, which targets a completely different core segment. That is a big challenge, organisationally, financially, and also because you rely on the commitment of single persons. To give an example: If you need legal advice to evaluate legal issues and the people know that you work on a project which has absolutely nothing to do with the core business, then there's often not the willingness that they say 'of course I'll help you. I'll figure something out although it's completely new to me'. Instead, you often hear 'you do something independent; therefore, it makes sense to get your own legal advice.' And such things are a barrier." (IN-EX-delta-1)
		"I'm responsible for granting the first budgets, and I always ask: Does the BMI idea fit us? Can it be integrated into our company? Can we bring it in front of the customer? How can we offer it? Are there any legal or security concerns? […] It's about setting strategic guidelines." (IN-MA-beta-3)

Table 5 Additional proof quotes (continued)

Aggregate dimensions	*2nd order themes*	*Additional representative quotations*
	Starting with low complexity	"We started with a straightforward one-time purchase. Hence the customer had a one-year contract term and that's it. Then we worked on extending the offer to subscription-based and other BM configurations." (CON-alpha-5)
		"Lower complexity is helpful because then you face fewer barriers where you can potentially fail." (CON-alpha-9)