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RESEARCH ARTICLE

Innovation nudging—A novel approach to foster innovation engagement in an incumbent company

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Engaging employees to contribute to corporate innovation is vital for the future success of companies. In particular, incumbent companies face severe barriers in involving employees from various organizational locations. Long-term employments, highly specified organizational units, and hierarchical management structures are designed to preserve the status quo rather than promoting transformational changes. Thus, such companies often struggle with engaging their employees constantly and breaking down three kinds of innovation barriers: limited meaning, allowance, and/or capability. In this paper, we present innovation nudging as a novel approach, aiming to overcome the limitations of traditional corporate innovation management approaches. Such approaches largely pretend how employees should behave. Since such approaches are not part of employees' common behaviour, prior research has well explored the limits of such approaches. In contrast, nudging addresses subtly persons' cognition by presenting rewarding behaviour options in a way that individuals can easily deal with. Based on a 3-year observation of the introduction of innovation nudging at a leading German manufacturer of pumps, our results answer how different nudging types can be systematically used to create innovation engagement and to propel transformations in incumbent companies. Practical implications as well as avenues for future research are discussed.

KEYWORDS

corporate transformation, digitalization, foresight, ideation, innovation management, innovation tools, nudging

1 | INTRODUCTION

"If only KSB knew what KSB knows." adopted from Sieloff (1999)

Engaging employees to contribute to corporate innovation is vital for the future success of companies. Employees create, introduce, and apply new ideas within their organizations to improve their own organizational position and the performance of their group and/or the

whole organization (de Jong & den Hartog, 2010; Janssen, 2000; Scott & Bruce, 1994; Wu et al., 2014). However, the more mature, multi-faceted, and successful a company becomes, the more complicated becomes the collective innovation engagement of employees (cf. Bassett-Jones, 2005; O'Reilly & Tushman, 2013; Sonenshein & Dholakia, 2012).

This tension is well reflected in practice. Despite the known importance of innovation among executives, only 6% are satisfied with the innovation performance of their firm (Capozzi et al., 2010).

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Further, reports show that employees in growing companies seldomly make use of the popular 20% time for innovation rule, actually engaging as little as 1% in innovation (Ross, 2015; Rotenstein, 2009). Such facts come along with the traditional well-studied and largely applied approaches: corporate entrepreneurship (Baum & Locke, 2004; Stopford & Baden-Fuller, 1994; Trabucchi et al., 2020; Weiblen & Chesbrough, 2015) and rule-based management (e.g., innovation roles and phase-gate-models, cf. Cooper & Sommer, 2016; Hauschildt & Kirchmann, 2001; Schultz et al., 2013).

In this paper, we explore a new innovation management approach that bundles the benefits of the two traditional approaches and can create long-term innovation engagement: innovation nudging. By innovation nudging, we mean any aspect of the choice architecture that alters individuals' contribution to corporate innovation activities, that is, overcoming the meaning, allowance, and capability barriers, in a predictable way without forbidding any options or significantly changing individuals' economic incentives (cf. Thaler & Sunstein, 2008).

In practice, Google, JP Morgan, 3M, Bosch, or Siemens are a handful of examples, making internal use of nudging (Freibichler & Gropp, 2020; Garud et al., 2011; Rigtering & Weitzel, 2017; Ruehle, 2019). Unique to innovation nudging is its focus on human behaviour instead of intrinsic motivation—proactiveness—or incentives (cf. Thaler, 2018a). By that, nudging promises to better engage the mass and responds to the calls for new perspectives on how to manage innovation in digital, volatile, ramified ecosystems (cf. Hölzle et al., 2020).

However, nudging inside companies is still an emerging research topic (Rigtering & Weitzel, 2017; Ruehle, 2019). This provides only limited insights on how to apply innovation nudging comprehensively. Therefore, our paper asks: How does nudging create innovation engagement, thus resolving commonly known innovation management barriers in incumbent companies?

To answer, we rely on a longitudinal case study of a leading German manufacturing company, KSB. We build on qualitative and quantitative data that has been generated while accompanying the introduction of innovation nudging as a new approach over the last 3 years.

Relatedly, our contribution is twofold. First, we show and explain the nudging activities and key enablers used to overcome limited meaning, allowance, and capabilities. Our results imply that innovation nudging better unlocks the prescribed, yet often untapped potential of that “the best thinking can come from anywhere” (Dahl et al., 2011, p. 19). Second, we show how nudging increases engagement in the innovation management dimension that is supposedly reserved for top decision-makers: foresight and strategy (Rohrbeck & Gemünden, 2011).

The remainder of the paper is organized as follows. Next, we explain nudging's background, applications, and types. Based on the review, we define and anchor innovation nudging in the field of corporate innovation management. The third section explains our explorative case study approach. Afterwards, the findings describe what nudging activities have been applied over the last 3 years to

nudge employees towards innovation engagement. The remaining section conceptualizes the results and discusses its practical as well as theoretical implications.

2 | INNOVATION NUDGING

In 2008, Thaler and Sunstein popularized the term nudging. Their work is closely related to Tversky's and Kahneman's research (1974), outlining how individuals make decisions based on limited information and emotions. By such heuristics, that is, snapshot decisions, individuals make most decisions every day (Gigerenzer & Gaissmaier, 2011; Kahneman, 2011). Nudging, in turn, mimics them for moving individuals towards more optimal decisions better off, as judged by themselves (Hansen, 2016; Sunstein, 2017; Thaler & Sunstein, 2008).

Accordingly, nudging builds on three distinct characteristics. First, nudges are subtle, choice-preserving interventions, integrating seamlessly with the common ways of processing information (Thaler, 2018a). By nudging's subtle interventions, they reduce individuals' burdens and mimic automatic, Type I, processing—being visual, holistic, automatic, experiential (Van Gestel et al., 2020). This imprints nudging of being independent from choice restrictions, mandates, or rational arguments (Hansen, 2016). Such stricter interventions, in contrast, cannot be easily avoided and limit the freedom of choice (Sunstein, 2018). This independence of nudging draws a close relationship to libertarian paternalism, that is, subtly steering people in directions, but preserving freedom of choice (Thaler & Sunstein, 2003).

Second, nudging relates to cognitive processes and behaviours rather than motivational aspects (for an overview, see Münscher et al., 2016). By that, nudging differs from economic incentives as interventions that can alter the individuals' motivation towards meeting the expectations for receiving the incentive (Thaler, 2018a). Further, incentives' direct intervention suppresses individual motives and freedom of choice and, in the long run, crowds out intrinsic motivation (Frey & Oberholzer-Gee, 1997; Thaler & Sunstein, 2008). Such effects conflict with the expected persistency of nudging (Cronqvist et al., 2018) and maintenance of people's capacity for own decisions (Sunstein, 2018).

Third, nudging is done in (good) favour of the individuals being nudged (Thaler, 2018b, unethical and other nudges are called *sludges*). A nudge designer constructs the choice architecture with the intention to help people make the choice they would select if it is effortlessly obvious what their best choice should be given alternative options (Sunstein, 2017). GPS maps are illustrative examples here, presenting a recommended route that the user is free to choose or change (Thaler, 2018a). In such ways, nudging also helps to perceive options that might be hidden (or too effortful) when individuals are not being nudged (Dinner et al., 2011).

To summarize, nudging “is any aspect of the *choice architecture* that alters individuals' behavior in a predictable way *without forbidding any options* or significantly *changing their economic incentives*” (Thaler & Sunstein, 2008, p. 6, *emphasis added*). By its distinctive

characteristics (choice-preserving, cognition-appealing, and choice design-focused), it has become widely used and provides promising attributes to overcome barriers in innovation management.

Since nudging can speak to a huge number of individuals simultaneously, numerous applications and forms of nudging have emerged in the public sphere (Sunstein, 2014). This includes, for instance, default opt-ins to accept cookie policies in web pages (Weinmann et al., 2016), automatic enrolments to organ donations (Hansen et al., 2016; Voyer, 2015), graphical warnings to reduce smoking (Borland et al., 2009), or reminders on social norms to decrease food waste (de Visser-Amundson & Kleijnen, 2019).

However, such examples illustrate only a small portion of the nudges that practitioners have developed. This poses the challenge on practitioners and researchers alike on comparing and identifying effective generic types of nudging. Tackling this challenge, different authors have proposed classifications of nudging types (e.g., Hummel & Maedche, 2019; Münscher et al., 2016; Sunstein, 2014; Szaszi et al., 2018) that are similar in their meaning and shown in Table 1. It shows 10 generic nudging types based on what cognitive parts they address, that is, providing input, structuring, or assisting with decisions.

Based on this conception from behavioural psychology, we see nudging beneficial to overcome widely known innovation management barriers more permanently (D'Este et al., 2012; Hauschildt &

Kirchmann, 2001; Mirow et al., 2007). So far, research in business and management has only started to investigate nudging (Rauscher & Zielke, 2019). Such studies have focused on the use of nudging for steering customers' innovation adoption decisions (e.g., Baron & Ritov, 1994; Goldstein et al., 2008; Kuester et al., 2015; Stryja & Satzger, 2019). To the best of our knowledge, research investigating nudging in the corporate context, particularly innovation management, has only touched the nudging concept slightly (see for an example Garud et al., 2011) and is rather an emerging topic at scientific conferences (Rigtering & Weitzel, 2017; Ruehle, 2019).

Thus, our understanding on how and when to apply innovation nudging comprehensively in corporate contexts and to remove innovation management barriers more permanently is limited. Such internal innovation management barriers are commonly described by limited meaning (Hadjimanolis, 2003), allowance (Hauschildt & Kirchmann, 2001), and capabilities to contribute to corporate innovation management activities (e.g., Lifshitz-Assaf, 2018; Mannucci & Yong, 2018). Although corporate entrepreneurship (Stopford & Baden-Fuller, 1994) and rule-based management (e.g., roles and phase-gate-models, Cooper & Sommer, 2016; Schultz et al., 2013; Hauschildt & Kirchmann, 2001) can counteract such barriers, they have limitations in creating long-term innovation engagement, that is, removing barriers permanently.

In defining employee engagement, we follow Kahn's (1990) pioneering view as it is expending one's physical and mental energy at work to contribute meaningfully to their organization's mission and vision. Innovation engagement specifies this view as expending one's energy meaningfully to an *organization's future viability*. Corporate entrepreneurship's limitation, in this regard, is its resting on single persons or groups with high intrinsic motivation, making the company vulnerable to their employment (McMullen & Shepherd, 2006). Further, rule-based management creates strict processes, hindering creativity and reducing employees' intrinsic motivation to contribute to corporate innovation (Amabile et al., 1986).

Taking into account nudging's attributes, nudging differs in that it is choice-preserving and not strict, cognition-appealing and not motivational, choice design-focused and not undirected. Establishing a holistic understanding of how to use such attributes—nudging—can thus shed a new light on corporate innovation management. In this regard, we define innovation nudging as any aspect of the choice architecture that alters individuals' contribution to corporate innovation activities, that is, overcoming the meaning, allowance, and capability barriers, in a predictable way without forbidding any options or significantly changing individuals' economic incentives (cf. Thaler & Sunstein, 2008).

3 | METHOD

Given the limited knowledge on innovation nudging, we aimed to broaden our understanding of how nudging creates innovation engagement among employees in incumbent companies. By broadening this understanding, we have explored how nudging provides a new

TABLE 1 Overview of nudging types and aspirations

Nudging aspirations		
Providing information	Structuring information	Assisting with decisions
> influencing information presentation without changing choice options	> influencing decision making	> influencing decision tracing
Nudging types		
(1) Declaring > Eliciting implementation intentions (e.g., "We want you to vote because ...")	(4) Defaulting > Pre-selection of options (e.g., automatic enrolment)	(8) Reminding > Provision of positive reminders heightening the salience of a desired option (e.g., email notification)
(2) Disclosing > Increase the number of available information (e.g., CO ₂ -footprint marks on products)	(5) Marginalizing > Reduction of effort to make choices (e.g., making healthy food easier visible)	(9) Recalling > Recalling the consequences of choices from the past (e.g., past expenditures on health care)
(3) Exemplifying > Presentation of social reference points (e.g., concrete examples, images)	(6) Simplifying > Reformatting of information presentation (e.g., numerical data instead of verbal text)	(10) Committing > Increasing private or public commitment towards certain behaviours (e.g., self-imposing deadlines)
	(7) Framing > Presentation of information (e.g., visual warnings on cigarette packs)	

approach to resolve the common innovation management barriers more permanently. To do so, we accompanied the implementation of innovation nudging in one incumbent company that aimed to increase the awareness, efficiency, and outcomes of its innovation management.

The company is a leading German manufacturer of pumps, valves, and related service offerings. Annual sales revenue is €2.4 billion. Although being an innovation leader in its domains for decades, the corporate innovation management officers were dissatisfied and decided in 2017 to realign its activities and implement a new, more inclusive, company-wide approach.

At first, the objective was to increase the efficiency of existent processes by digitalizing them. Yet, over the course of implementation, it turned out that the new approach was not only about digitalization. It was rather a revision of the current innovation management activities. Going digital offered the possibility to implement innovation nudging which changed fundamentally the perception of and engagement with the company's innovation management.

3.1 | Setting

Such changes in perception and engagement spurred the authors' interest to investigate how innovation nudging increases innovation engagement. For investigating such how-questions, that is, identifying root-cause relationships in phenomena, qualitative approaches are particularly suitable (Eisenhardt, 1989; Yin, 2014). Qualitative, explorative studies allow to immerse deeply into the phenomena of interest. Such deep immersion provides the necessary breadth and depth to explain the how, what, and why of a new phenomenon (Gehman et al., 2018). Since we had access to accompany the implementation of innovation nudging over a time span of 3 years, we decided to focus on one specific company to answer our research question.

The company employs more than 15,500 people and was founded in 1871 in Frankenthal, Germany. It has 170 service centres and over 3000 service staff members to provide inspection, maintenance, and repair services with locations and regional-specific business operations on all continents. This situation allowed us to study the new implementation of innovation nudging across different business units and locations—involving thousands of employees.

Traditionally, the company has ever had a strong focus on innovation. Its R&D spending ranks among the top 40 industrial engineering companies in Europe (Hernández et al., 2020). The success of the company is founded on innovative technology that is the fruit of its own research and development activities. The company's research centres focus their efforts on hydraulics, materials technology, and the automation of pumps and valves. However, as many incumbent companies, they see new technologies and competitors on the rise and have missed some rewarding business opportunities. Further, the strong focus on manufacturing, selling physical products, and maintenance services suppressed the addition of digital services and data-oriented business models to the company's core. That is why the innovation management office asked for a new approach, allowing to tap into more strategic and radical innovation topics.

3.2 | Data collection

Our data collection is thus based on a case study. Importantly, this case is *exemplary, revelatory, longitudinally*, yet also *extreme*, making it a suitable candidate for case study investigations (Patton, 1990; Yin, 2014). It is *exemplary* since a significant number of companies struggle with the innovation performance of their firm (Capozzi et al., 2010). Yet, it is also *extreme and revelatory* because of the company's courage to implement a new, rare approach: innovation nudging. Lastly, the 3 years of investigation is *longitudinal*. This methodological approach thus allowed us to study deeply how corporate behaviour unfolds through the everyday actions of organizational members and to explore underlying causes that would be hidden in other methodological settings (Feldman & Orlikowski, 2011).

To deeply immerse into the case, the researcher should best become part of the social context. This membership helps to recognize and understand the meaning and detail of the myriad of interactions taking place permanently (Tsoukas & Chia, 2002). Typically, explorative findings are revealed by building upon what people say, the way they act, and the artefacts that they use (Van Maanen, 2006). This asks the researchers to study comprehensively personal interactions, standard formats, processes, and behavioural data.

We collected such data based on three types of sources as depicted in Table 2. All data have been collected by the one researcher who is employed at the company. The first source for data collection was personal interactions, that is, company internal conversations, meetings, personal reflections, and mails, used to get a nuanced understanding of the goals, expectations, and activities (cf. Obstfeld, 2012). We have collected the majority of such data in close consultation with nine individuals. Further, we have used background information, that is, external publications and internal documents, to understand the company's codified innovation knowledge. Third, we have enriched such qualitative data with statistics, reflecting the usage of the digital innovation platform over time. By relying on the diverse sources, we triangulated our findings and reduced the risk of overly subjective reporting (Eisenhardt, 1989; Yin, 2014).

To follow a certain structure in the data generation, we oriented on three major phases that determined the implementation of innovation nudging: digitalizing the idea management, integration of foresight activities, and the coupling of digital and analogue activities. Accordingly, we build a data storage in that we placed all documents, written communication, notes, and statistics to such phases. We also created a storage for background information in that we placed additional data. Due to the direct connection to the innovation management office, we were able to ask for additional information that was not covered by the already existing, rich data.

3.3 | Data analysis

For analysing the data, we used a four-step approach that is widely recommended to analyse qualitative data (e.g., Eisenhardt, 1989; Gehman et al., 2018; Yin, 2014). The central components of the

TABLE 2 Characteristics of the data sources

Source	Information characteristics
Personal interaction: used to collect nuanced understanding of the rationale and discuss implications of statistics	
VP Innovation, Head of Idea Management, Director Innovation Mgmt., Idea Manager A and B, Technology Scout A and B, Trend Scout A, Technology Expert A	Subjective information about the idea management: informal interviewing and reflections; lessons learned feedback
Background information: used to collect codified understanding of how the company communicates its innovation efforts	
<i>External publications:</i> paper and conference publications	Representation of the innovation and idea management function to the public (core features)
<i>Internal documents:</i> catalogue of requirements, idea management policy guidelines, internal presentations	Information about history, development, goals and guidelines of the idea and innovation management
Statistics: used to collect behavioural data and understand development of key statistics	
Idea management platform figures: user ratings, idea submission rates; provider's marketing brochure; internal statistics	System statistics, informing about the figures mentioned and timeline charts (ideas submitted, campaigns started, active users, active business units)

analytical approach are first understanding the characteristics of the data. Second, by cross-comparing the characteristics, the goal is to explore independent concepts. Third, the relationships between the concepts are explored, before logical and supportive arguments are used to explain the relationships identified (Eisenhardt in Gehman et al., 2018).

First, to understand the characteristics of the data, we have chronologically ordered the activities initiated by the innovation management office. This ordering was similar to the initial ordering according to the three major implementation phases. By that, we were able to determine the essential activities and exclude not relevant activities. Second, for exploring the independent concepts, we used a deductive approach to match the activities to the generic nudging types (cf. Table 1). We did so by classifying the activities according to the characteristics of the nudging types. This approach helped to explore similarities and differences, resulting in a classification of innovation nudging activities (Bowker & Star, 1999). This provides the first, holistic view of how to put innovation nudging into practice.

With the one author providing the data, the other author built the initial classification scheme. Afterwards, the initial scheme has been jointly discussed and differing views were reconciled. We reconciled differences by recalling the definitions of the nudging types. Further, a third independent researcher was asked to test for the logic connection between the nudging types and the activities, decreasing the influence of overly subjective views.

Third, to understand the relationships between the concepts, we explored how the innovation nudging activities influenced earlier innovation management barriers. Again, we followed a deductive approach by matching innovation nudging activities and their relationships to the three barriers: meaning, participation, and capability. In addition, we consulted the quantitative data to support our qualitatively explored relationships between the concepts. This finally resulted in a comprehensive framework, explaining the key nudging enablers—uniting single nudging activities—to mitigate innovation barriers and increase innovation engagement.

Fourth, the results have been compared with extant literature to shape underlying logical arguments of our results (cf. Eisenhardt, 1989). This helped to theoretically explain why the empirical relationships that we have explored are valid. In the following section, the findings of the data collection and analysis are presented.

4 | FINDINGS

4.1 | Situation of the innovation management before 2017

Historically, innovation is an integral part of the company's success. Its water pump can be considered as the *mother of all standard pumps* (Itasse, 2014, *emphasis added*) and set the standard worldwide. In 2019, the company has been certified as the first company for the additive manufacturing of materials and semi-finished products (Oberst, 2019). Engineering excellence and perfection have characterized the company's innovation culture over decades.

“The success of the KSB brand is based on quality, expertise and reliability. Innovation is the driving force that helps us to bring these core values to life.”
(VP Innovation)

The company's systematic innovation activities have started with the introduction of the company suggestion scheme in 1941. Employees have submitted suggestions for improvement on paper forms that idea managers have received by factory mail. By this, the options for viewing the idea processing status were limited. The processing of the ideas was generally slow and static. This lack of process transparency and slowness had an increasingly negative effect on employee motivation and contribution. Employees who were not involved in the process as submitters or evaluators could not see and, therefore, learn from others' submitted ideas.

“Each idea was a silo in itself. The idea circulated only between the submitter, the idea manager and the assessor. Thus, it was a closed-loop system and no employee got anything from idea management.” (Idea Manager A)

While the company grew, the company's innovation process has become very fragmented. Many different tools such as trend books, roadmaps, or SharePoint-pages have emerged across the different corporate units. All tools should enable and facilitate innovation projects; however, they did not have the possibility to connect and integrate all the existing streams. Furthermore, the analogue system has prevented suggestions for improvement from passing through between the company locations. In the worst case, it could be that the same proposal was submitted at three different locations and the other locations were not aware of it.

In summary, the company has faced three major obstacles with its classical innovation approach: (1) no common transfer of information across innovation departments (limited allowance), (2) rarely completely new or disruptive ideas developed (limited capabilities), and (3) decreasing interest of employees, participating in the innovation process (limited meaning).

The concept behind the new approach was to create a more participatory approach, inviting colleagues, instead of a strict corporate rule. By that, using the collective intelligence to map other organizations, competitors, trends or technologies at one central place. (Director Innovation Management)

In 2016, it was decided to implement a new innovation approach that should resolve the three major obstacles. More specifically, the new innovation approach should accelerate the innovation process, provide employees an easier access to the innovation knowledge exchange, and inspire the development of new ideas. To reach these goals, the company decided to digitalize its innovation activities along three phases: digitalizing the idea management, integration of foresight activities, and coupling digital and analogue activities.

4.2 | Phase 1 (2017): Digitalizing the idea management

The company decided to start the implementation of the new approach with the digitalization of the analogue company suggestion scheme. The decision to start with this part was based on the ease of reaching most of the employees and the promise to achieve the quickest improvements. Figure 1 captures the different nudging activities the company has used in this respect.

Our vision was to create quickly a central point of contact for all kinds of ideas from employees, regardless of whether it was a specific suggestion for improvement or a vague sketch of a potential business model. (Head of Idea Management)

With this vision in mind, the company has followed a four-stage evaluation procedure to detect the most suitable software provider. The software provider should provide an idea management, corporate foresight, knowledge management, and competitive intelligence function.

The main decision principle for the selection of ITONICS was the ability to combine the process-oriented idea management function and the more open innovation management function on one platform. As this approach is relatively unique, only a few providers were worth considering. Oftentimes, providers focus either on idea management software or on innovation management (environmental scanning, foresight, roadmapping etc.). (Idea Manager B)

When the new digital platform was introduced, the process steps and their requirements have been digitalized first. Most importantly, the accessibility to the tool has been designed as easy as possible. Users

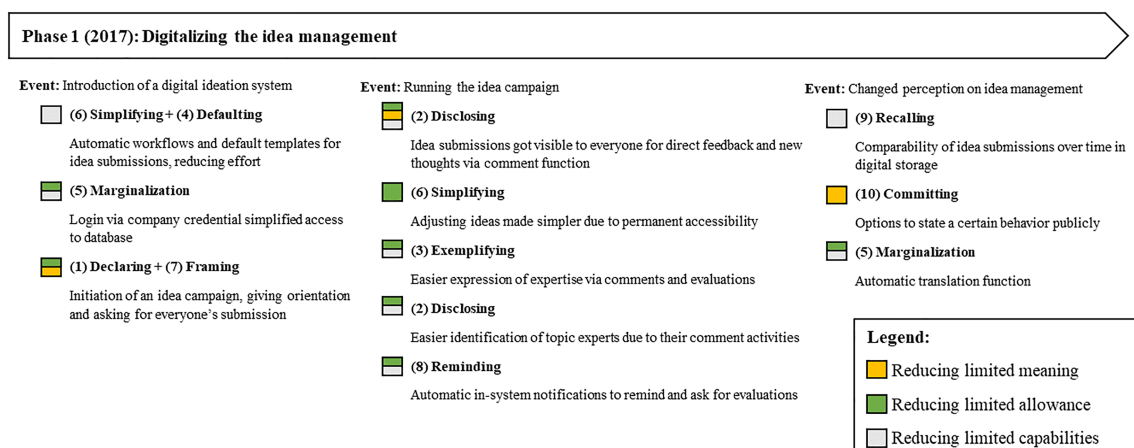


FIGURE 1 Use and targets of innovation nudging in phase 1 [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

simply make use of their company credentials to log into the system and get direct access. This *marginalized* the effort to access the innovation database significantly.

Operating with paper and pencil was a major problem, slowing down the process. Employees had hardly an opportunity to explain and enrich their writings. It was also time consuming to compare different ideas. To counteract, the digital ideation platform has provided *default* idea submission templates. By providing such templates, it was easier and more transparent for idea submitters of how to grow an idea into an implementation-ready innovation.

The process consists of three phases: creation, analysis, and assessment. By providing default templates and easier accessibility, the platform has *marginalized* the effort for idea submitters and for reviewers in knowing the phases' requirements and collecting the evaluations of different reviewers. Like for requirements, evaluation criteria have become transparent, *declaring* how ideas are judged. This gave a new meaning to the process and saved time.

When introducing the digital idea management process, it became clear to us that we cannot only increase the transparency, but that with certain mechanisms, we were able to change employees' perception of our idea management. (Head of Idea Management)

Furthermore, the system includes automatic workflows, serving a *reminding*, *recalling*, and *marginalization* function. Reviewers have been automatically notified once an evaluation was due. Idea submitters have received notifications, once someone commented on their ideas. Such notifications have increased the *commitment* to continue. The system automatics have also prevented double submissions. The digital storage of ideas *marginalized* the effort to track ideas and identify similar ideas over time. It was also easier to compare and identify similar ideas across the different locations. In this regard, the option was provided to submit ideas in the mother tongue, *marginalizing* the effort to submit ideas and lowering the participation barrier.

The more the digital platform was used, the more it became clear that it does not only increase the efficiency of the idea management process, that is, reducing time and effort. The digital innovation management has also affected the company's innovation culture. The perception of the whole innovation management was *re-framed* from rather slow and exclusive to an open participatory, flexible process. Employees have started to submit and comment on ideas at weekends. Particularly, the comment feature has become a very prominent feature; not only to help others in developing their ideas but also to show the own expertise. From a nudging perspective, the possibility to comment has helped to *disclose* varying thoughts and new suggestions. Moreover, it helped to identify more easily social reference points, that is, topic experts, that served as prominent *examples* of whom to involve on specific topics. As a result, such effects lowered the obstacles of limited capabilities, meaning, and allowance.

Until today, the processing time decreased by more than 60% (reference year 2017). The idea managers processed more than 1.500 since the introduction of the new idea management portal. Users from over 16 sites work with the system and more countries can easily be included. The system is ready to handle the idea management of the whole group and is easily adaptable to the local context (e.g., language, rewarding system). (Head of Idea Management)

Over time, such nudging activities have been coupled with a more traditional activity, that is, adding an automatic lottery to the ideation platform. The lottery is in so far different as it can change the economic incentive for engagement. The lottery specifically targets monetary compensation for ideas with a saving potential below a certain threshold. Contributors get a number of lottery tickets. The number of tickets depends on the stages an idea passes. At the end of each quarter of the year, idea managers start the lottery and the idea management system automatically draws the winning tickets. For each contribution, the submitter gets two tickets, for a positive assessment of the idea two additional tickets and another ticket for the actual implementation. Thus, instead of only relying on saving and market potentials of ideas, the motivation to participate is included in the reward mechanism. In addition, ideas that have a potential above a certain threshold are rewarded separately by the idea management committee.

4.3 | Phase 2 (2018–2019): Integration of foresight activities

In the second step, the platform was expanded to the fuzzy front-end of corporate innovation management. Besides collecting internal ideas, the platform should then also include the collection of external developments, that is, trends, technologies, competitors, and patents.

As the global pump and especially valves market is highly fragmented, local and regional competitors prevail. Linking this information about local competitors with current trends and technologies creates a more holistic picture of the industry. (VP Innovation)

Previously, the results of the strategic foresight process have been condensed in comprehensive presentations. This has caused some problems. First, although emerging trends or technologies seem to change relatively slow, deriving corporate conclusions needed to be accelerated. Second, only few employees in the company have been involved in the process. Third, trends and technologies develop at different speeds across regions; that is why respecting and disseminating local and regional aspects requires to involve local perspectives. The success of including more employees by the digital ideation process has awakened the hope to achieve a similar outcome by introducing a digital foresight process. Figure 2 summarizes the nudging activities to increase engagement about foresight and strategic topics.

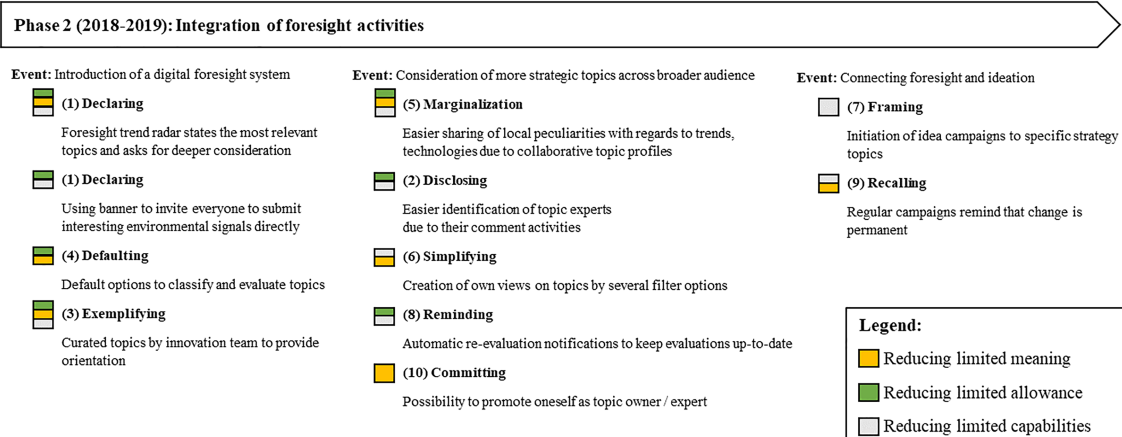


FIGURE 2 Use and targets of innovation nudging in phase 2 [Colour figure can be viewed at wileyonlinelibrary.com]

Working together on a digital platform initially simplifies the exchange and gains in value when the different specialist areas come into discussion with one another (e.g., R&D, product management, sales). (Technology Scout A)

In the first phase, the foresight team has started to enter the trends, technologies, competitors, and patents that they have already investigated. Employees had then the chance to learn more about them with detailed descriptions publicly available on the platform. This *exemplar* provision of information has animated employees to submit own thoughts and experts to share their thoughts on respective topics. This *declaration* of thoughts has created new interest between experts from different regions and locations to submit their specific perspectives.

We actively entered information on diverse trend topics such as climate change, economic developments in other countries or the rise of AI. The existing content stimulated the colleagues to think beyond our core business of pumps and valves. Further, as users can see what other users created, they feel encouraged to contribute themselves on the platform. (Trend Scout A)

This availability of insights has spurred thinking about more strategic topics and also the inclusion of a broader audience than in the previous strategy processes. Employees had now the possibility to contribute to the company's strategy by submitting interesting environmental signals on their own. Therefore, *default* templates have been designed, *marginalizing* the effort to intake information, first, and *simplifying* comparability, second.

By the help of the structured templates, the most relevant topics have become visible in a foresight radar. The display of different topics within one radar has created a holistic view on interesting topics and also provided orientation by *declaring* what the most

relevant topics are. As shown in Figure 3, the radar depicts the ecosystem holistically according to five dimensions: technology, markets and competition, politics and regulation, and society.

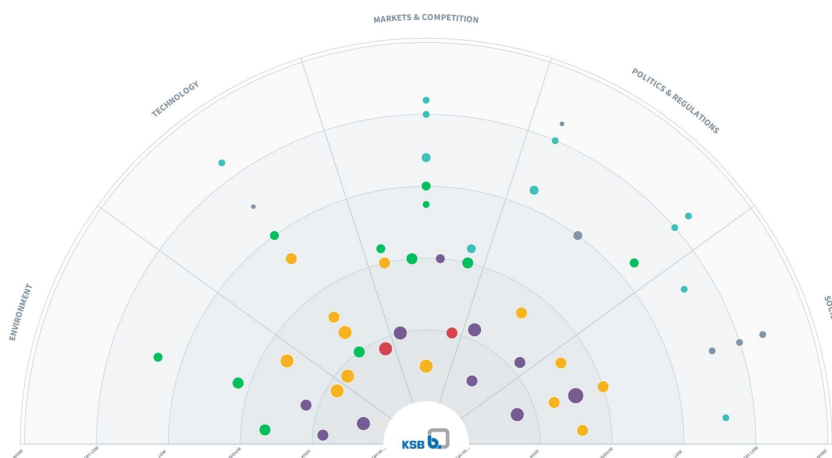
Filtering has become a very actively used feature. Our colleagues from the different business units want to know what trends affect their business. With just a few clicks, it is possible to see which applications we observe in which market. (Director Innovation Management)

Moreover, other classification criteria such as “business unit,” “applications,” or “markets,” stemming from the initial trend template, have provided the option to create own *frames*; that is, employees can easily filter for the ecosystem—radar view—of interest. Besides categorizing the information, the system embarks *default* criteria for collective evaluations on aspects that can be hardly assessed accurately by a single individual. Such criteria are, for instance, impact, market readiness, or complexity. By using aggregations of such individual ratings, it is *less effortful* and *simpler* to capture a company-wide, common perspective on topics of interest, for example, what will be the impact of AI in the market of pumps and valves.

To further strengthen the connection between the foresight and ideation processes, campaigns have become an important feature of the platform. Campaigns can draw the attention to a specific topic from the trend radar in order to collect the employees' opinions. With the formulation of specific challenges, the employees are asked and *framed* to think about strategically relevant topics constantly. They can then submit their ideas of how to approach a trend or engage in useful, strategic conversations via the commentary function.

Comments come from all the different areas of the company, such as production, logistics, or R&D for example. It was rarely the case that we [campaign organizers] have seen short comments of agreement or disagreement such as “I agree!” or “I would do the

FIGURE 3 The foresight trend radar [Colour figure can be viewed at wileyonlinelibrary.com]



Phase 3 (2019-2020): Coupling digital and analog activities

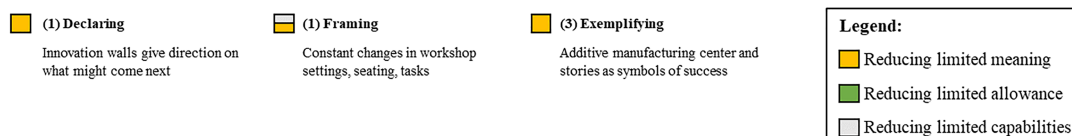


FIGURE 4 Use and targets of innovation nudging in phase 3 [Colour figure can be viewed at wileyonlinelibrary.com]

FIGURE 5 Company representatives in front of an inspiration wall [Colour figure can be viewed at wileyonlinelibrary.com]



same.” that we know from open social networks. The comments are rather all of high quality and lead to lively discussions. (Idea Manager B)

truth for holistic innovation management.
(VP Innovation)

The radar, in sum, *marginalizes* the effort to compare different topics, for example, technologies, or companies, and *declares* permanently the most important topics. Furthermore, the foresight platform provides *reminding* options, so that experts are asked to reassess certain topics after a defined time and keeping the system up-to-date. By that, the radar has widened the number of people, dealing with strategic topics, and accelerated the derivation of own conclusions.

The system serves as a global knowledge and information hub. Trends and technologies can be discussed, shared and rated in real-time which lowers the barriers of knowledge sharing. KSB created a single point of

4.4 | Phase 3 (2019–2020): Coupling digital and analogue activities

After introducing and establishing the digital innovation platform, the interactions and interest also transcended in the offline world. Also, in the offline world, the company has taken actions to make the innovation process more inclusive, participatory, and engaging. Figure 4 covers the initial steps in the offline world.

One example involves what the company calls “inspiration walls” (cf. Figure 5). The inspiration walls consist of material that can help to stimulate creativity and future thinking. The company use pictures, articles and reports about future trends, and technologies in the hall

ways to *declare* what is perceived as new and inspiring. In such way, employees pass by the walls and can get inspired on the go. Such implicit stimuli nudge employees towards more open thinking.

Our inspiration walls have helped moving the boundary of what is accepted as new and different from the past. It might be a small thing, but, at least, it is a conversation starter and creates attention for our activities.
(VP Innovation)

Furthermore, the innovation walls are used in innovation workshops and conferences. By constant variation in team settings, seating, tasks and responsibilities in workshops, the goal to establish constant change as the normal rather than the exception is furtherly stressed. These changes in settings are also a way, helping to *re-frame* perspectives in a subtle way.

Besides presenting information on the innovation walls, the company has built an additive manufacturing centre. The centre *exemplifies* the success of the foresight activities. There are also less expensive activities to celebrate and showcase success, such as posters, pictures and success reports to stimulate a positive attitude on a regular basis.

We have invested a lot in technology assessment and foresight to estimate the right point where we have needed to invest in this future technology [additive manufacturing]. This success, being audited as the first world-wide company, is a good example, because it also shows that innovation requires anticipation and future thinking. (Technology Expert A)

To summarize, the nudging activities have turned out to create a new approach that has increased employees' engagement with the company's innovation management. They have given new meaning, allowance, and capabilities to contribute. Figure 6 summarizes the key nudging enablers that the company has used to leverage nudging,

mitigating innovation barriers and, thus, promoting increased innovation engagement. This approach is based on an easy-to-access digital home for innovation, holistic radar, recurrent campaigns and curated stimuli.

5 | DISCUSSION

We aimed to answer how nudging creates innovation engagement, thus, resolving commonly-known innovation management barriers in incumbent companies. Answering the question is important since the majority of mature companies struggles with their innovation performance (Ross, 2015), and new perspectives on how to manage innovation in digital, volatile, ramified ecosystems are requested (Hölzle et al., 2020). We had the unique opportunity to study the implementation of this novel approach over the last 3 years.

Based on the results, our contribution is twofold. First, we explored the nudging activities and key enablers used to overcome limited meaning, allowance, and capabilities. Our results imply that innovation nudging can better unlock the prescribed, yet often untapped potential of that “the best thinking can come from anywhere” (Dahl et al., 2011, p. 19). Second, we explored how nudging increases engagement in the innovation management dimension that is supposedly reserved for top decision-makers: foresight and strategy. Following, the underlying rationale arguments and implications for research and practice are discussed.

5.1 | Theoretical contribution and avenues for future research

As a first contribution, we explain how and why nudging creates more permanent innovation engagement compared to corporate entrepreneurship and rule-based management. In contrast to such approaches, nudging is choice-preserving and not strict, cognition-appealing and not motivational, choice design-focused and not undirected

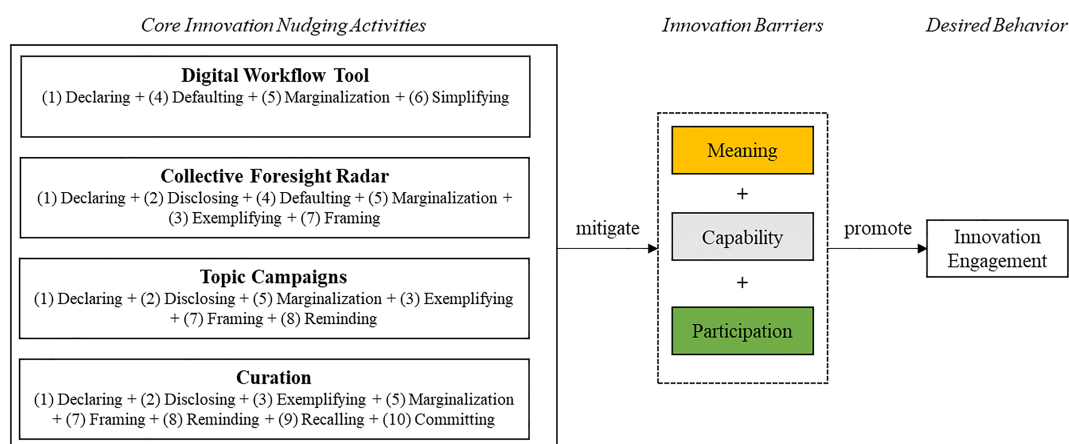


FIGURE 6 Core innovation nudging enablers [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

(cf. Thaler & Sunstein, 2008). Nudging speaks to the freedom of choice and automatic—Type I—processing. Nudging mimics such cognitive characteristics—being visual, holistic, automatic, and experiential—thus reducing individuals' burdens (Van Gestel et al., 2020).

In broadening our understanding of how innovation nudging works, our results show four key enablers: digital workflow tool, collective foresight radar, topic campaigns, and curation. All four enablers build on a set of different nudges, collectively mitigating the meaning, participation, and capability barriers. This, in turn, increases innovation engagement more permanently what is the precondition for collecting various opinions and identifying the right resources for execution (e.g., de Jong & den Hartog, 2010).

The *digital workflow tool* mitigates the barriers because the automation reduces individual efforts, while, for instance, submitting or reviewing ideas. By reducing such efforts, participation is eased and the necessary capabilities are provided to contribute to corporate innovation activities. Further, establishing a collective, easy-to-access platform itself gives a new meaning to the importance of innovation activities. In contrast, the *radar* draws on the holistic and visual cognitive characteristics, providing meaning to see the bigger company interests, the capabilities to dive deeper into the topics of interest and allowance to do so. Lastly, *curation* and *campaigns* build on experience and automation. By sharing current campaigns and curated topics, receivers can more easily leverage their expertise and build new relations to explore new ideas, expose their opinions, and contribute to the corporate innovation activities.

The exploration of the four key nudging enablers has important implications for future research. While we have explored them in a specific context, the question is in how far the concepts and their relationships are robust in other contexts. As for other qualitative studies, this opens up the avenue for quantitative studies. More specifically, the question is interesting to understand what other nudging enablers exist and whether nudging enablers need to address all three barriers simultaneously to be effective. Our research implies so since the enablers build on a combination of different nudges. It is also interesting to see whether nudging reaches at some point a saturation, either requiring new nudging as stimuli or removing nudges' promises at all. This is also a question of interest in behavioural economics (cf. Cronqvist et al., 2018).

It is also of interest to better understand the relationship between nudging and the well-studied and largely applied approaches: corporate entrepreneurship (e.g., Trabucchi et al., 2020) and rule-based management (e.g., Cooper & Sommer, 2016). In our situation, nudging has been established based on a large company innovation history and previously used rule-based management. It is by no means that “we can solve most of the world's problems with mere nudges” (Thaler, 2017). In this regard, we need to investigate the relationship between all three approaches and how they can jointly increase innovation performance, that is, coupling the cognitive nudging and the others' motivational aspects.

As a second contribution, we explored that nudging increases engagement for foresight and strategic topics. By leveraging more

opinions on what will be important for the company's future, companies might be better equipped against own biases, disruption and for identifying new business opportunities (Rohrbeck & Gemünden, 2011). Like for idea generation, the probability of exploring such pressing outside developments increases the more individuals contribute or be in opposition (Dahl et al., 2011). As our results show, nudging helps in this direction because it reduces the burdens to contribute and provides meaning of what to look for.

This has important implications for research and practice. By engaging individuals across innovation management activities, innovation management in sum gets more democratic. Although an open, co-determining innovation management is aspired, knowledge work happens often within clearly defined boundaries, protecting it from individuals outside those boundaries (e.g., Lifshitz-Assaf, 2018). By stronger engagement already in the foresight process, employees can co-determine the important topics of the future, further driving engagement. In this regard, another avenue for future research is to investigate nudging's contribution—libertarian paternalism—to cultivate open innovation in companies (Weiblen & Chesbrough, 2015).

5.2 | Practical implications

Important for practice, we have studied a manufacturing company with a long-standing successful history that has yet seen the time come for a fundamental change. They have experienced new technologies, competitors on the rise, and some missed business opportunities. By introducing the nudging concept with its four enablers, the company has changed within 3 years the perception of and engagement with its innovation management fundamentally. Since the majority of incumbent, classic brick-and-mortar companies struggle with their (digital) transformation, following a similar path like our company might be fruitful to start a new movement and step into today's digital business world (Bammert et al., 2020).

Our exploration has also shown how quickly efficiency and effectiveness of the innovation management has been increased. By going digital, the processing time decreased by more than 60%, while employees from 16 different locations contributed. Further, rich conversations between formerly unconnected topic experts have occurred by bringing them together virtually on their topics of expertise. This provides a new way to collectively engage and more efficiently organize employees (cf. Bassett-Jones, 2005; Sonenshein & Dholakia, 2012).

Our contributions thus provide practical guidance on what nudging activities to use for reaching certain outcomes with regard to increasing meaning, participation, and provoking new perspectives. The nudges presented in this paper may help practitioners to think about alternative approaches in innovation and idea management. Companies still use directive communication, for example: Submit your ideas now! By building a digital home, the effort will be reduced and an open inviting channel emerges to pick up ideas anytime and anywhere.

In conclusion, we hope contributing with a fruitful starting point for the further exploration of nudging in innovation management. Our work introduces the first holistic answer how to incorporate a set of nudges for increasing innovation engagement and resolving commonly-known barriers. The explored enablers provide guidance for practical application and provide an explanatory basis for theory development. Answering the future research questions will help expanding our knowledge of how companies can create the best conditions for innovation.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

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