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Chapter

Unfolding Effect Areas of Employee-driven Innovation: A Systematic Literature Review

Stephan Leible, Dejan Simic, Gian-Luca Gücük, Tom Lewandowski and Emir Kučević

Abstract

Over recent years, employee-driven innovation (EDI) has emerged as a prominent topic in both practical and academic circles. Particularly in economic-oriented organizations seeking growth, there is an increasing trend to involve “ordinary” employees—those whose primary responsibilities do not traditionally include innovation tasks—in the innovation process. These employees are tapped for their creativity and experience in the hope that they will generate innovative ideas beneficial to the organization. Consequently, EDI is increasingly acknowledged as a significant source of competitive edge, with employees often seen as initiating innovators that complement traditional channels, such as formal research and development departments. Despite the growing body of research in the interdisciplinary field of EDI and the interplay of multiple perspectives and effect areas, a comprehensive overview remains elusive. In this article, we conduct a systematic literature review to expose the vast effect areas of EDI, focusing on the micro (employee) and meso (organizational) levels. We identified four effect areas at the micro-level and seven at the mesolevel. Our research enhances the understanding of the multi-layered components of EDI and provides insights and implications for academics and practitioners aiming to harness its potential.

Keywords: employee-driven innovation, bottom-up innovation, effect areas, entrepreneurship, intrapreneurship, systematic literature review, participation

1. Introduction

Innovation is a crucial determinant of organizational success in the contemporary business environment. It fosters a competitive edge, augments market share, and expedites overall institutional growth [1, 2]. Historically, the pathway to innovation has been primarily top-down, with strategic vision and novel ideas originating from management echelons or specialized departments like research and development. Recently, however, there has been a paradigm shift toward employee-driven innovation (EDI), an approach that challenges the conventional hierarchical methods and advocates a participatory bottom-up strategy, enabling employees at all levels to contribute to the ideation and innovation process [3, 4]. These employees, closely

linked with the organization's operational activities, bring forth valuable insights and innovative resolutions to business challenges [5, 6]. Thus, this burgeoning potential sets the stage for our research as we explore the impacts and phenomena of EDI initiatives at the micro (employee) and meso (organization) levels.

As a complementary innovation channel to existing innovation channels, EDI signifies a transition from conventional top-down methods and underscores the pivotal role "ordinary" employees—those not primarily engaged in innovation tasks—play in ideation and innovation through their expertise, creativity, and knowledge [7, 8]. This concept has garnered substantial academic and practical interest due to its potential to harness collective intelligence and creativity within organizations [9]. The employees, deeply involved in the organization's daily operations, are aptly positioned to identify inefficiencies, opportunities, and potential improvements that could be overlooked in a hierarchical approach [10]. Furthermore, involving employees in the innovation process can yield additional benefits such as increased job satisfaction, motivation, and a sense of belonging and affiliation, fostering a virtuous cycle of (bottom-up) innovation [11]. Hence, EDI emerges as an instrumental concept in stimulating creativity, innovation, and positive workplace dynamics.

This research paper intends to scrutinize the effects of EDI, analyzing effect areas at both micro and meso levels. Specifically, our research question (RQ) is: *"What effect areas of employee-driven innovation occur on micro-level (employee-related) and meso-level (organization-related) in the literature, and how can they be described?"* For this purpose, we utilize a rigorous systematic literature review, supplemented by a concept matrix in accordance with Xiao and Watson [12] and Webster and Watson [13], referencing pertinent research articles from the EDI and related research fields. Our focus encompasses the effects of EDI on individual employees—including motivation, job satisfaction, and personal development—and organizational effects, such as innovativeness and cultural evolution. The rationale for this approach stems from the fragmented research on EDI in single- or multiple-case studies or analytical methods on specific topics. While employee roles or digital tools have been researched, no synthesis yet provides a holistic account of EDI's multilevel effects. In theory, this approach facilitates concluding the prevailing narrative of EDI and possibly under-researched aspects. In practice, the identified effects provide a framework for organizations intending to implement EDI.

This research contributes to the existing body of EDI literature, providing a comprehensive synopsis of its effect areas on micro and meso levels. We intend to facilitate an understanding of how organizations can harness their employee potential in the innovation process, offering insights into the effects and phenomena recognized in academic and practical case studies of EDI. These effects are paramount for organizations developing EDI strategies. Overall, this research proffers insights for practitioners and researchers in the field of EDI and innovation management.

2. Theoretical background

This section describes relevant background information for the further contents of the article. It commences with the conceptualization and evolution of innovation, transitioning into the natural progression of EDI in the context of digitalization, and culminates with a theoretical model encapsulating the common innovation landscapes in organizations.

2.1 Concept and evolution of innovation

Innovation, a complex and multifaceted concept, has been extensively scrutinized across a myriad of academic disciplines [14]. Fundamentally, it involves the origination and implementation of novel ideas, practices, or products, thereby creating value [2]. This divergence from established norms can result in impactful outcomes. The varying types of innovation, each with their degrees of impact on existing products, processes, or markets, are crucial to understanding, establishing an innovation strategy, and managing an innovation ecosystem [15]. In the following, we describe three known types of innovation. Various authors have differentiated between radical and disruptive innovations, while others equate them. In our approach, we treat them distinctly.

- **Incremental innovation** involves enhancements within the existing product, service, or process framework [1]. It represents a continuous effort to improve efficiency and effectiveness [16]. For instance, enhancing the speed of Google Search through a few algorithmic improvements.
- **Radical innovation** signifies a substantial deviation from existing practices [16, 17]. It often leads to significant industry shifts and customer behavioral changes [1]. For example, Tesla's development and distribution of electric cars.
- **Disruptive innovation** encompasses innovations that often initially cater to a niche market but eventually displace established market leaders as the innovation improves and gains wider acceptance [18, 19]. For example, Uber's ecosystem for ride-hailing disrupted the traditional taxi industry.

Several theories delineate the dynamics of innovation. For instance, Schumpeter's theory of innovation emphasizes the role of entrepreneurs in driving innovation and subsequent economic and institutional growth [20], whereas Roger's diffusion of innovations theory explains how innovations proliferate through social networks over time [21]. However, others, like the absorptive capacity theory of Cohen and Levinthal [22], highlight the organization's ability to recognize, assimilate, and apply new knowledge. EDI also addresses this by involving all employees in this absorption process to improve innovation capability [6, 23].

The advent of digital technologies has fundamentally transformed the concept of innovation. Digital innovation refers to the creation of new products, services, processes, or business models that are based on digital technologies or created by the use of them [24, 25]. Digital innovations, unlike traditional innovations, are characterized by a higher degree of interconnectedness, speed, and scale [26]. This technological emergence has not only accelerated the pace of innovation cycles but also blurred the boundaries between these aforementioned kinds of innovation and introduced digital innovation management [24, 27]. For example, incremental innovation in a digital context can quickly scale and become disruptive due to the high connectivity and speed of the digital landscape [28].

As we examine EDI, the implications of digitalization should be considered due to its inherent progression and influence on potential and impact within organizations. For example, digital innovations have democratized the innovation process [29]. Firstly, digital technologies have enabled a wider range of individuals to participate in the innovation process [30]. Secondly, digital innovations are self-referential, serving

as both outcomes and enablers of further innovation [31]. Digital innovations are not only becoming increasingly accessible, but they are also fostering a culture of (open) innovation [32] that encourages transcending the boundaries of innovation ecosystems and cooperating and collaborating with actors outside the internal innovation process by sharing knowledge and integrating external expertise and creativity through this widespread participation [33].

2.2 Employee-driven innovation

With EDI, the potential of employees is recognized to contribute to innovation and organizational development significantly [8]. Kesting and Ulhøi [8] define EDI as “[...] *the generation and implementation of significant new ideas, products, and processes originating from a single employee or the joint efforts of two or more employees who are not assigned to this task. Thus, EDI indicates that innovations can emerge from ‘ordinary’ employees, from shop-floor workers and professionals to middle managers across the boundaries of existing departments and professions.*” We follow this definition but expand the role of employees to organizational members in general, as in many organizations and institutions, members exist that are not employees, for example, students in schools or universities who also can be involved in the innovation process.

The rise of an information society has substantially contributed to the proliferation of EDI [16, 29]. In such a society, employees are seen not just as labor but also as valuable sources of knowledge and creativity [9]. Information technology and particularly the Internet have thereby democratized access to data and information [34, 35]. They allow for providing platforms that contribute to collaboration, idea management, and breaking down silos [31]. Furthermore, novel technologies foster specific parts of the innovation process, such as idea generation by generative artificial intelligence tools like ChatGPT or Google Bard [36, 37].

Digital tools have endowed employees with the ability to contribute to innovation beyond their specific roles and departments [38]. Collaborations across organizational boundaries, engagements with external knowledge communities, and introductions of novel insights are much more tangible now [32, 39]. This dissemination and accessibility of information have blurred the demarcations between knowledge producers and consumers, which further amplifies the potential and growth of EDI in contemporary society [31]. This digital revolution can transform employees from passive recipients of top-down innovation directives into proactive contributors to the innovation process [23]. Moreover, it has birthed employee-driven digital innovation (EDDI) [4]. We perceive this development as a natural progression within the broader trend of digitalization. Opland et al. [29] define EDDI as “[...] *the initiation, development and implementation of new digital products, services or processes originating from ‘ordinary employees’, or the use of digital tools to support employee-driven innovation processes.*” With the increasing distribution of digital tools for creating and developing innovations, EDI is likely to evolve further into EDDI.

Several theories buttress the concept of EDI. One such theory is user innovation proposed by Hippel [40], asserting that users—in this context, employees—are ideally placed to innovate due to their comprehensive understanding of issues and potential solutions. Similarly, open innovation aligns with EDI as it stresses the importance of organizations dismantling barriers and promoting widespread participation in the innovation process [32, 41]. EDI significantly overlaps with intrapreneurship in many aspects. However, we consider it a broader concept as it encompasses noncommercial innovations, such as in the public sector, and more incremental improvements instead

of focusing on radical and disruptive innovations [3, 7]. Both concepts acknowledge the potential of employees as the driving force behind innovation [4]. We distinguish intrapreneurship as typically involving a higher degree of entrepreneurial behavior, autonomy, and risk-taking, based on definitions in the literature [6, 8].

In this landscape, every employee, equipped with unique expertise, creativity, and enabling digital technologies, can become an innovator [42]. When nurtured within an organizational environment that fosters learning, promotes experimentation, and tolerates failure, employees can make significant contributions to innovation [43]. However, realizing EDI requires not only the availability of digital tools and an appropriate environment with suitable work models [44, 45] but also a robust technical infrastructure that offers digital participation opportunities [30] and a cultural shift within organizations toward greater openness and inclusivity [46].

2.3 Organizational innovation channels

It is critical to understand that while EDI provides considerable advantages, it operates concurrently with and supplements other innovation channels. Such channels may include traditional research and development departments or specialized digital innovation units [47], typically aimed at harnessing advanced digital technologies and analyzing contemporary trends to stimulate innovation. In contrast, EDI capitalizes on the creative potential embedded within the workforce [3]. Each channel offers distinct benefits and taps into varied sources of innovation potential. As such, organizations stand to gain from adopting a comprehensive approach to innovation that integrates these diverse channels. By embracing this strategy, organizations can cultivate a robust and varied innovation ecosystem, thereby maximizing innovation potential and bolstering competitiveness in the digital era. To elucidate this point, we provide a broad outline using **Figure 1**.

The internal (organizational) environment and the external (competitive) environment constitute two dynamic systems capable of consistently providing information and stimuli to various participants involved in the innovation process. External information can be derived from customer feedback or market analyses, while

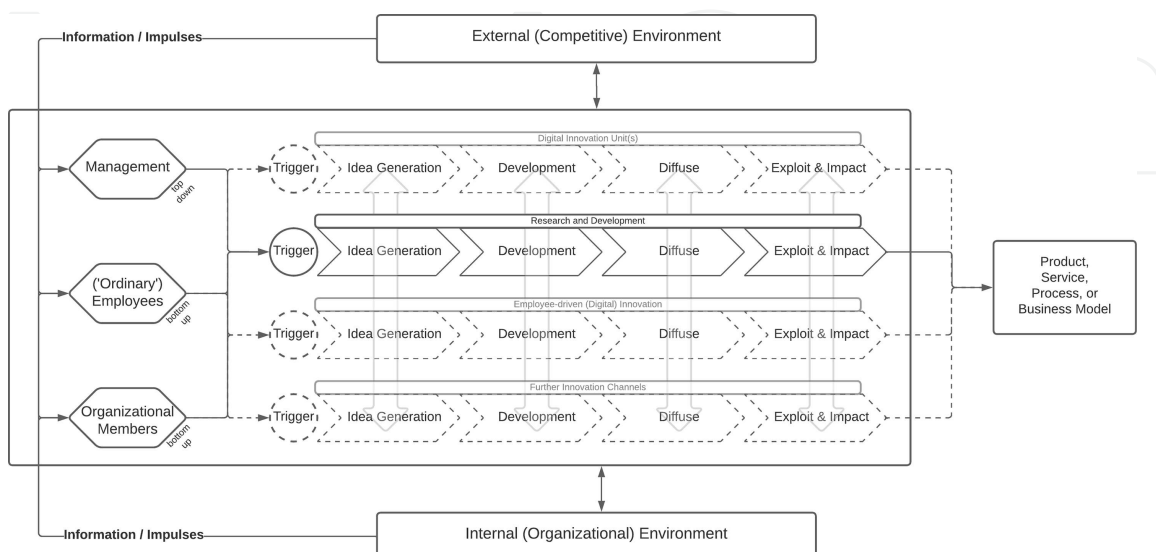


Figure 1. Theoretical model of innovation channels in organizational innovation ecosystems based on the framework of Kohli and Melville [25].

internal information may be gleaned informally or via surveys and workshops. This information can serve as a trigger for the participants, sparking ideas that initiate top-down or bottom-up efforts depending on the hierarchical level from which they originate. Corresponding with the organization's innovation ecosystem, these ideas can be disseminated through various accessible innovation channels, each of which should have a formalized process. Innovation projects situated within these channels may transition between them. For instance, an EDI project could be reallocated to the process chain of another innovation channel due to constraints or considerations related to resources (financial, temporal, or human), relevance, or competencies. These transitions can occur at varying stages. The outcome of these processes typically manifests as traditional innovation outputs, such as new or enhanced products, services, processes, or business models.

3. Method

We undertook a systematic literature review to capture the state-of-the-art research in the EDI field and classify its effect areas at the micro and meso levels. We aim to address our RQ by examining the literature incorporated within this review. Our focus was on academic peer-reviewed work, and we adhered to the methodical approach proposed by Xiao and Watson [12] to structure and execute our analysis. This approach consists of eight steps: (1) formulate the problem, (2) develop and validate the review protocol, (3) search the literature, (4) screen for inclusion, (5) assess quality, (6) extract data, (7) analyze and synthesize data, and (8) report findings. The subsequent paragraphs elaborate on our application of these eight steps.

Step (1) was undertaken within the Introduction and Theoretical background sections of this article, wherein we presented the RQ that directed this systematic literature review, which was formulated in an iterative process. Our goal was to collate and consolidate pertinent literature on EDI that explicates its effects on the micro and meso levels. As suggested by Xiao and Watson [12], we conducted a quick mapping to identify aspects such as subtopics, keywords, and publication years of the literature, thereby assessing the feasibility of our analysis in terms of the emerging volume of literature.

In step (2), we crafted and validated the review protocol, which contains the review's objective and search strategy that guided our approach. The literature was simultaneously reviewed and coded by two authors. The protocol was made accessible to all team members in a shared file, allowing for collaborative maintenance and updates.

During step (3), we determined the electronic databases to be used for the literature search. Based on our prior experiences and their diversity, we selected AISel, IEEE Xplore, Emerald Insight, and ACM Digital Library, considering that EDI synthesizes various research strands as an interdisciplinary field of study. Furthermore, we utilized Google Scholar as a complementary data source, examining the top 100 search results sorted by relevance to the search string. From the RQ and the keywords derived from the preliminary mapping, we developed a Boolean search string which was applied across the aforementioned electronic databases: “(‘*organizational growth*’ OR ‘*institutional growth*’ OR ‘*organizational development*’ OR ‘*organizational change*’ OR ‘*institutional development*’ OR ‘*institutional change*’) AND (*entrepreneurship* OR *skills* OR *training* OR *competencies* OR *intrapreneurship* OR *development* OR

management) AND ('employee-driven innovation' OR 'employee innovation')." This string incorporated identified synonyms, assisting us in locating the most pertinent literature to our RQ while maintaining a manageable volume of literature. The total search yielded 980 results (as illustrated in **Figure 2**), from which we discarded 789 deemed irrelevant to the RQ by their title, leaving us with 191 results. Where any doubt was cast on the relevance of the literature, we opted to include these results in our further analysis.

For step (4), we established a set of inclusion and exclusion criteria to facilitate the decision-making process during the content screening of the results, subsequently determining which papers would be included in the final synthesis. On a meta-level, the selected papers had to be written in English, accessible, and peer-reviewed. Additionally, they had to provide specific content that discusses and describes EDI effects to address the RQ appropriately. The information on these effects was extracted and stored within a shared document. We decided to include "conceptual" papers, for example, theoretical and meta-approaches, but to mark them explicitly. Applying the defined inclusion and exclusion criteria, we screened the abstracts of the remaining 191 results and excluded 126 due to unsuitable content and one due to being a duplicate, leaving 64 results.

In step (5), we obtained full-text versions of the remaining results and undertook comprehensive reviews to evaluate their relevance to the RQ. Discrepancies in rating a result's relevance were resolved through team discussions until a consensus was reached. Consequently, 33 results were excluded due to their lack of appropriate content and one due to lack of accessibility, leading to a total of 30. A subsequent forward and backward search of these resulted in the identification of five additional ones. After this step, we had a set of 35 articles from which we extracted and analyzed the data for synthesis.

During step (6), we coded qualitative statements pertinent to our RQ from the final literature dataset to extract all EDI effects. We adopted an inductive approach wherein the codes were directly derived from the data rather than being predetermined. This laid the foundation for further synthesis of the data and

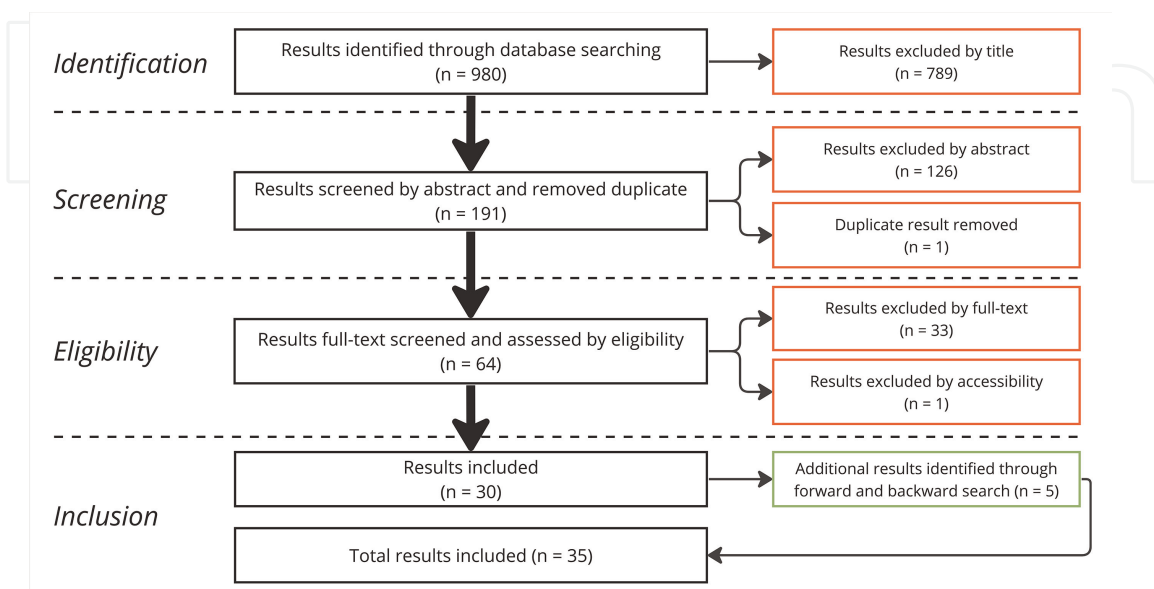


Figure 2. Literature search and assessment process based on Xiao and Watson [12].

condensing individual statements into overarching effect areas via interrelated themes, concepts, and facilitators [48].

In step (7), we organized and analyzed the coded data using an integrated design that blended both quantitative and qualitative research methods [49]. Upon completion of the coding process, we moved to data synthesis. This involved aggregating the 124 coded individual statements and identifying common effect patterns. These were collectively discussed within the author team to agree on the final EDI effect areas that form the structural basis of the concept matrix.

Finally, step (8) entailed reporting the findings, which is the objective of this article. We present a concept matrix in line with the approach proposed by Webster and Watson [13], which visualizes the curated collection of relevant literature alongside the identified EDI effect areas. Subsequently, each effect area is described, and implications and future research avenues are discussed in the following sections to complete this step.

4. EDI effect analysis on micro- and meso-level

This section presents the results of our systematic literature review. The 35 final articles are incorporated into a concept matrix, as proposed by Webster and Watson [13], which is depicted in **Table 1**. Within this matrix, the literature is initially categorized by type—either a practical case study or a conceptual approach. Subsequently, the described effects of EDI on employees and organizations are segregated into micro- and meso-level effect areas. The micro-level effect areas amalgamate effects pertinent to individuals involved in an EDI process, such as employees or organizational members. Conversely, the meso-level effect areas compile all the effect statements we discovered on an organizational level. From these 35 articles, we extracted and codified 124 effect statements, which we consolidated into 11 overarching effect areas. Four effect areas reside on the micro-level, while seven are found on the meso-level.

Our review revealed that the most commonly described effect area in the literature occurs on the meso-level, connecting EDI to heightened innovativeness within organizations. The least frequently mentioned effect area pertains to the increase in organizational affiliation. Concerning the 35 articles, 24 (69%) are classified as case studies, exploring various use cases in distinct organizations, such as Allianz and Telecom, or diverse countries, including China, the United Kingdom, and Vietnam. The remaining 11 articles (31%) are conceptual, denoting their logical argumentation and analyses rooted in secondary data on EDI topics. These could be literature reviews as meta-studies, offering a fresh perspective on a specific topic or proposing a novel framework.

4.1 Micro-level effects

The most frequently observed micro-level effects are related to motivation and engagement, with 16 articles (46%). Several articles mention increased compensation, such as monetary incentives [3, 50], and various forms of rewards like promotions, recognition, and leisure time [8, 42, 45, 55] as potent extrinsic motivational factors. These incentives can inspire employees to participate in the EDI process with their innovative ideas actively. A study notes that EDI influences the resources and technologies that employees can utilize [46], as novel tasks and responsibilities can

Concept matrix													
Results	Type		Micro				Meso						
	Case study	Conceptual	Motivation and engagement	Satisfaction and workplace	Skill and knowledge	Organizational affiliation	Organizational innovativeness	Artifact creation and enhancement	Idea perception and communication	Decentralization and entrepreneurship	Innovation process agility	Culture and mindset	Collaboration and knowledge exchange
Abdel Aziz and Rizkallah (2015) [50]	X		X				X	X	X	X			
Agostini et al. (2020) [30]		X						X	X	X			
Bäckström and Bengtsson (2019) [42]		X	X	X	X		X	X	X	X		X	
Badoiu et al. (2020) [6]	X						X	X	X	X	X		
Benbya and Leidner (2016) [51]	X							X					
Erickson et al. (2012) [52]		X					X			X			
Ghasemzadeh et al. (2019) [53]	X		X		X			X	X			X	
Grotherr et al. (2019) [34]	X		X						X				
Haapasaari et al. (2018) [7]	X							X					
Høytrup (2010) [3]		X	X	X	X		X	X					
Høytrup (2012) [11]		X	X		X		X				X	X	
Jarle Gressgård et al. (2014) [38]	X			X	X	X	X		X		X	X	
Kesting and Ulhøi (2010) [8]		X	X	X			X		X	X			
Lang and Baltes (2019) [54]		X						X	X	X			
Lidman et al. (2023) [55]	X		X	X	X					X			
Liu et al. (2020) [46]	X		X		X		X			X		X	
Muller et al. (2013) [56]	X		X		X						X		X
Muralidharan (2020) [57]	X						X						
Nguyen et al. (2023) [58]	X						X						
Nguyen et al. (2019) [59]	X						X		X			X	
Nicolajsen et al. (2012) [60]	X		X						X	X			X
Nusem et al. (2013) [61]	X							X					
Opland et al. (2020) [4]		X	X				X	X		X			
Opland et al. (2021) [62]	X						X		X				X
Opland et al. (2022) [29]		X					X	X	X				
Pätzmann (2021) [43]		X								X		X	

Table 1.
Continued.

Concept matrix													
Results	Type		Micro				Meso						
	Case study	Conceptual	Motivation and engagement	Satisfaction and workplace	Skill and knowledge	Organizational affiliation	Organizational innovativeness	Artifact creation and enhancement	Idea perception and communication	Decentralization and entrepreneurship	Innovation process agility	Culture and mindset	Collaboration and knowledge exchange
Qingrui et al. (2003) [63]	X		X				X						
Reibenspiess et al. (2019a) [45]	X		X					X					X
Reibenspiess et al. (2019b) [64]	X		X	X			X	X		X			
Saunila (2014) [65]	X				X		X			X		X	
Trabucchi et al. (2021) [66]		X					X					X	
Uddin et al. (2020) [67]	X						X						
Weigt-Rohrbeck and Linneberg (2019) [23]	X		X	X			X	X		X			
Zhang and Wang (2022) [68]	X					X							
Zhao and Liu (2008) [69]	X									X			
Total [Σ]	24	11	16	7	9	2	21	15	13	16	4	9	4
Total [%]	69	31	46	20	26	6	60	43	37	46	11	26	11

Table 1. Concept matrix of the EDI effect areas synthesized from the literature.

enhance their roles. This situation allows employees to perceive and seize career opportunities [4, 42], such as leading a small dedicated team, improving their self-image [23], and having full or partial responsibility for an EDI project [45, 64]. Such factors could boost employees' intrinsic motivation. Additionally, increased curiosity, excitement, and enthusiasm [55, 56, 63], as well as stimulating discussions [60], can enhance engagement and interest in innovations emerging from EDI initiatives [11]. However, a contrasting statement suggests that if decision-makers do not respond on time to the generated and submitted ideas, it may decrease employee motivation [53]. This situation can also occur when employees' routine operational duties conflict with the EDI process [34].

Satisfaction and workplace represent the next effect area, with seven articles (20%) containing relevant effect statements. According to these findings, EDI enhances the workplace environment by involving employees in innovation. For example, front-line employees can forward and enhance customer ideas and facilitate their implementation, fostering employee and customer satisfaction [42]. Consequently, the opportunity to participate in innovation can generate pride, enjoyment, and, ultimately, job satisfaction [8, 38, 55]. The organization's appreciation for

additional tasks or participation, such as the aforementioned responsibility can create a fulfilling job situation [64] and novel work experiences [23], promoting a healthy work environment [3]. This positive environment can cause a ripple effect, as a satisfied and content workforce generally leads to increased productivity and lower employee turnover.

Skill and knowledge development constitute another aggregated micro-level effect area. Nine articles (26%) include statements suggesting that EDI results in employees exploiting their skills [3, 11, 53], acquiring or employing operational experience [42, 53], or enhancing their knowledge about (digital) innovations and related topics like entrepreneurship [38, 46, 53, 56, 65]. Specifically, employees apply their current abilities in new contexts, explore areas beyond their regular roles, and acquire new competencies. Hence, EDI introduces effects that foster employees' skills, knowledge, and a mindset of innovation and continuous learning, enabling them to adopt new perspectives on their operational tasks and the entire organization, improving their efficiency and effectiveness [3, 11, 55].

Organizational affiliation is the least commonly found effect area on the micro-level, with two articles (6%) reporting effects resulting from EDI. This effect area implies that EDI can fortify employees' affiliation with their organization [38]. By involving employees in the innovation process, organizations offer them a platform and voice to contribute actively to organizational development and goals. This involvement can cultivate a deeper connection to the organization and its values, fostering stronger affiliation [68]. Employees who feel affiliated with their organization are more likely to demonstrate commitment, loyalty, and eagerness to contribute.

4.2 Meso-level effects

The most frequently identified meso-level effect area pertains to organizational innovativeness. We discovered effects related to this area in 21 of the 35 analyzed articles (60%). Generally, this area links EDI and employee engagement to organizational innovation. As a diverse workforce contributes their unique insights, the repository of innovative ideas becomes enriched, thus amplifying the organization's overall innovativeness. The most commonly mentioned benefit for organizations is the generation of a steady stream of ideas from employees [42, 50], which subsequently enhances the innovation capability [3, 11, 38, 42, 50, 57]. Some findings indicate that organizational innovation's practical success is notably heightened due to EDI and employee involvement [3, 23, 46, 63]. This is primarily achieved by incorporating employee creativity into the innovation process to develop superior solutions, such as improved products [58, 66, 67]. Other articles point out that harnessing employee innovation and knowledge provides organizations with a competitive edge [4, 42, 59, 65]. A few findings directly link EDI to the contribution toward short- and long-term organizational objectives [6, 66]. Furthermore, the positive impact of EDI and employee innovation on exploration and exploitation within an organization is highlighted [29]. Moreover, some articles assert that EDI significantly influences radical innovation in organizations [3, 8]. EDI has also been employed and positively impacted innovativeness in the public sector [62]. However, some literature also underscores the adverse effects of EDI on organizational innovativeness. For example, one article states that digitalized innovation processes employed for harnessing employee innovation might suffer from low user acceptance rates or exclude employees [64]. Another article points out that EDI could result in managers feeling threatened, consequently obstructing employees' innovation efforts [52].

The following effect area pertains to artifact creation and enhancement in organizations through the utilization of employee innovation. In this context, artifacts should be considered products, processes, services, and business models that benefit from employees' deep-rooted understanding of the organization and its customers. This effect is described in 15 articles (43%). Most findings directly connect employee engagement in innovation to the creation or enhancement of new artifacts [3, 50, 54]. Other findings suggest that employees are more involved in the conceptual aspects of creating artifacts [45, 53, 64], which can, for example, accelerate the pace of their enhancement and creation [4, 51]. Consequently, employees can gain more trust and responsibilities through their involvement in EDI initiatives and artifact creation, such as through the ownership of the respective development projects [30], and they can further contribute to their organizations' visions [61]. Conversely, one article elucidates the ambiguity of incorporating employees in such business matters, detailing that well-prepared EDI can yield significant positive impacts, but ill-prepared initiatives may result in various negative outcomes such as demotivation, subpar products, and reduced employee participation [6]. Several authors connect EDI and digital tools, highlighting their mutual value addition. Digital tools can serve as a collaborative environment and facilitate processes and documentation, thereby enabling employees to focus more on creativity and content by relieving them of various tasks [7, 29, 30]. Contrarily, some articles from the final dataset highlight the negative aspects of employee integration in artifact development. One article notes that it is probable to exclude certain groups of employees [64], while another warns about the risk of information overload for the departments responsible for reviewing artifact ideas [42]. Furthermore, some research indicates that most improvements are predominantly related to internal artifacts that do not have a direct link to external business capabilities [4, 23].

The next effect area in the matrix relates to idea perception and communication. We identified 13 articles (37%) containing effect statements that were assigned to this area. It aggregates all effect statements found that imply EDI resulting in more ideas being perceived by the management and communicated, and how that further benefits the organization or institution. Employees require some form of guidance and a robust as well as trusted communication channel, for example, through a digital platform, a person, or other opportunities, when undertaking innovative tasks or promoting their ideas to a higher hierarchical level to gain recognition [60]. Therefore, managerial commitment is necessary to further increase participation in EDI [8, 30, 42, 50, 62], resulting in greater employee motivation [50, 59] and aiding the creation of a communication bridge between managers and employees [6]. For this communication to function properly, knowledge and information need to be distributed bidirectionally [38], which may result in structural changes. As the EDI concept aims to involve every employee in the innovation process to contribute innovative ideas, these ideas need to be perceived so employees recognize that they are heard and taken seriously [29]. Some articles state contrary effects, where managers were not open to receiving ideas from "outsiders" to the innovation process and considering them as irrelevant [54], or the ideas submitted were overly complex [34, 53, 62], resulting in lower idea acceptance rates.

The ensuing effect area listed in the matrix is decentralization and entrepreneurship. It is mentioned in 16 articles (46%) and, hence, is one of the more frequently found areas. Decentralized decisions are primarily attributed to the autonomy of the employees during their EDI endeavors as they work independently, self-direct their projects, and decide how they proceed to a certain degree. The level of freedom is individually set by the organizations and often linked to cost and risk factors. A

common assertion is that decentralization induced by EDI leads to more entrepreneurial outcomes in organizations [6, 23, 43]. Additionally, some articles state that this decentralization directly contributes to a more proactive and situationally conducive environment for EDI [4, 8, 46]. It is described that this results in the generation of more ideas by employees [50, 64]. Consequently, employees' engagement in innovation increases [30, 69] and their drive to innovate gains momentum [42, 55]. Decentralization also contributes to more knowledge sharing across department borders, since employees may form cross-functional teams to engage in EDI projects [60]. Some less frequently found effects included in this effect area comprise better performance or more success in organizations through the promotion of entrepreneurial behavior among employees [52, 54, 65].

Another effect area identified is innovation process agility. It was found in four articles (11%). This effect area aggregates statements suggesting that EDI results in a more agile and flexible organizational environment [6], since the openness to innovate and the democratization of the innovation process requires a dynamic infrastructure [38, 56]. Therefore, EDI enforces a structure where employees can drive their innovative ideas forward, for example, in distinct EDI projects. This involves self-responsible conceptualization, prototyping, experimentation, and feedback gathering from the employees driving their projects, often without being incorporated into a lengthy bureaucratic decision-making chain. Consequently, organizations become more adaptable, capable of swiftly responding to the evolving innovation landscape. At specific points, management is required for decisions and to guide the employees according to organizational and institutional goals. In this way, traditional hierarchical structures are softened, increasing agility and flexibility for innovations [11].

One more effect area consolidated by the discovered statements is culture and mindset. Nine articles (26%) were found addressing this effect area. It describes that EDI generally results in more awareness regarding the topic of (digital) innovations and leads to a greater spread of an innovative culture and an open mindset throughout the organization or institution [11, 66]. Specifically, several articles indicate that EDI improves the openness to idea contributions, especially by top managers [46, 65], enhances an innovation-friendly, tolerant environment [38, 42, 59] and encourages a forgiving failure culture [43]. These aspects can foster the innovation process and increase the participation rate of employees [53].

The final effect area identified in the literature is collaboration and knowledge exchange. This effect area was found in four articles (11%) and describes all statements indicating that employees discuss and exchange ideas within workgroups and between departments as a result of EDI implementation and events such as idea competitions [60]. As a result, employees can expand their (internal) social network and improve cross-department collaboration in the long run [45, 56]. It is also noted that employees with different qualifications collaborating on various levels and complementing each other's competencies lead to greater impact in (complex) EDI projects, the diffusion of knowledge, and a more integrated and cohesive organizational community [62].

5. Discussion

The cataloged micro and meso effects, alongside the superordinate effect areas illustrated in the concept matrix (refer to **Table 1**), shed light on how EDI influences individual employees and organizations. The matrix shows the areas thoroughly

explored in the literature and their intensity, thus permitting inferences regarding the central EDI effect areas, their prominence, and research breadth. Two-thirds of our findings originate from case study articles, while one-third comes from conceptual articles that synthesize the literature from a specific standpoint. This indicates a burgeoning exploration and significance of EDI in practical scenarios, suggesting a shift from traditional organizational innovation generation and development toward an increasing number of innovation channels, as depicted in **Figure 1**. EDI holds promise due to its comprehensive workforce integration and synergy effects such as improved employee development and satisfaction, cross-departmental collaboration, and motivation at micro- and meso-levels, as indicated by the literature landscape. During the literature review, a myriad of facilitators influencing these effect areas were also identified. When implemented judiciously, these facilitators can foster EDI and increase its impact. The combined results of our work and the facilitators can be found in **Figure 3** as a high-level framework.

At the micro-level, the effects are particularly valuable due to the concomitant improvement in the skills and knowledge of the workforce [3, 46], as demonstrated in several case studies [53, 55, 65]. The acquisition of new skills and knowledge can assist employees in making informed decisions in their day-to-day activities, as well as in EDI projects that also affect their work variety and satisfaction [8, 23, 38]. As EDI is primarily a bottom-up innovation concept, motivation and engagement are key areas to achieve vibrant innovation behavior in the workforce, as the findings show [42, 63]. Although less frequently mentioned in case studies, employees' affiliation to their organization can be reinforced by providing them with a voice and the opportunity to carry out independent EDI projects [38, 68].

More effect areas have been identified at the meso-level, one of which addresses the effects on organizational innovativeness [4, 11, 50, 60]. The positive influence in that area represents a core idea of EDI and is likely the primary motivation for organizations to adopt it, whether private or public. Furthermore, outcomes of EDI endeavors, such as the creation of new or enhanced artifacts, as well as the connection to entrepreneurship, intrapreneurship, and the decentralization of the innovation process, are often mentioned [6, 30, 54, 64]. The communication and perception of ideas also play a crucial role in bridging decision-makers with submitted ideas [29, 34, 59]. Trust emerged as a critical issue, as employees are often reticent to share their ideas for fear of being appropriated by others or due to apprehension regarding negative perceptions if the idea is deemed inadequate [34, 50]. Moreover, EDI can help foster a culture of innovation and an open mindset among employees when organizations empower them to participate and reward their efforts [43, 46, 53, 66]. Although rarely mentioned, topics such as innovation process agility, collaboration, and knowledge exchange represent promising research streams, given their centrality to successful and productive EDI implementations [6, 45, 56, 62].

The institutional, societal, and industry-wide implications can be anticipated when considering potential macro-level effect areas. These effect areas are inferred from the authors' logical deductions and several established theories, as they have not been thoroughly examined in the literature based on our research. The institutional theory [70] postulates that organizations adapt to prevailing phenomena such as EDI in their environment in order to maintain and improve their competitiveness. In the same vein, mimetic institutional isomorphism [71] plays a significant role. According to this theory, organizations base their further development on other organizations that are perceived as exemplary, either as a whole or in specific aspects. Furthermore, the human capital theory [72] and endogenous growth theory [73] suggest that

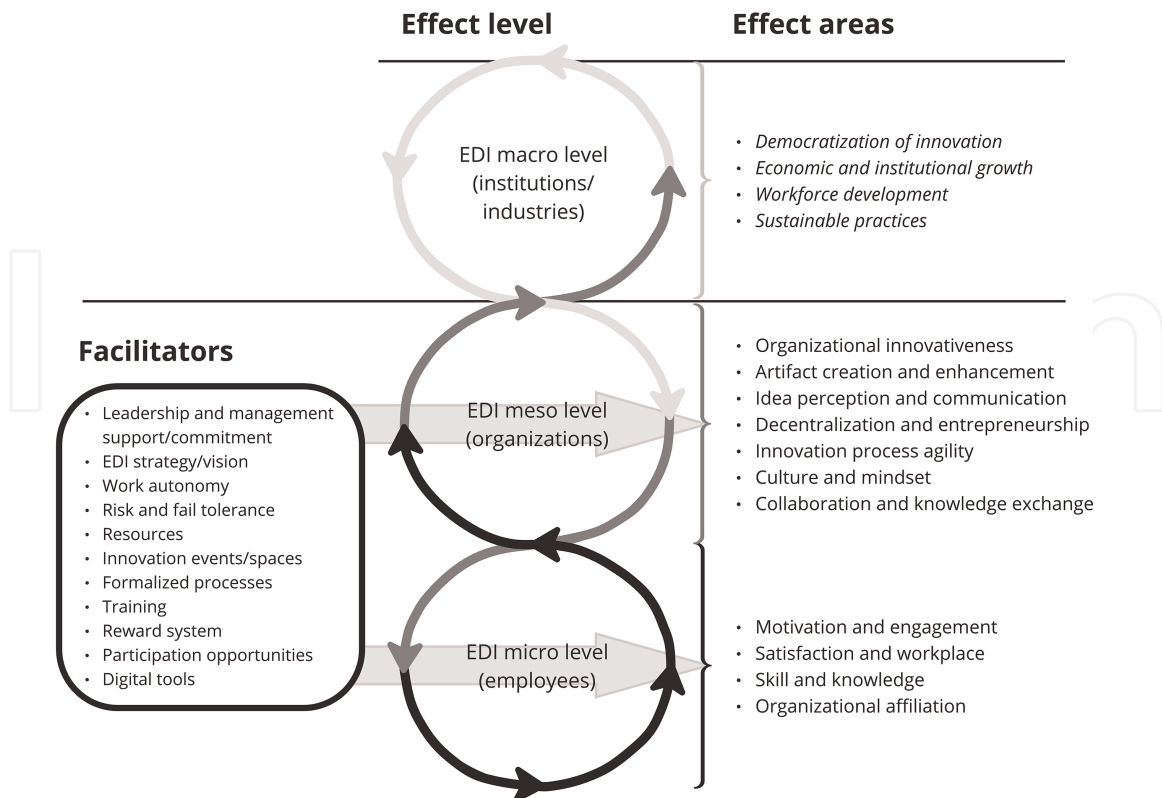


Figure 3.
 EDI effect levels, areas, and facilitators.

investments to enhance human capital, such as in intrapreneurial training, can lead to productivity gains, stimulate innovation, and foster knowledge generation, thereby accelerating economic and institutional growth. Additionally, the spillover effect [74] reinforces the knowledge exchange within and beyond organizational boundaries. Collaboration in cross-departmental settings and with customers is a frequent scenario in EDI projects, where this effect can be observed.

From this perspective, we assume several macro-level effect areas. EDI can *democratize innovation*, promoting a belief that everyone, irrespective of their status or background, has the potential to contribute to innovative initiatives. This may foster a diverse, inclusive innovation landscape. Furthermore, the widespread adoption of EDI could drive *economic and institutional growth*, for example, by creating new businesses and employment opportunities, such as EDI consulting firms, and by improving organizational productivity. One particularly promising effect area of EDI begins at the micro-level and extends to the macro-level: *Workforce development* regarding skills and competencies. When organizations recognize the significance of innovation (knowledge) and invest in employee development, the industry could benefit from a better trained and more innovative workforce. The collective of these effects can strengthen *sustainable practices* and accelerate adaptability to changes.

In addition to identifying the effect areas, we extracted EDI facilitators from the literature (refer to **Figure 3**) to ascertain the organizational elements that promote EDI when judiciously implemented. Thereby, one particularly prominent facilitator is leadership. Inappropriate leadership approaches can stifle employees' innovative potential [42, 52]. Hence, middle management, being the direct link between the workforce and top management, plays a critical role [23]. Ensuring autonomy and

independence at work, both by leadership and through the adopted work model, is also essential [10, 42, 46]. These findings also show the possible reciprocal influence of facilitators. To increase extrinsic motivation, communication of EDI should be coupled with incentives for participation, which requires a reward system [8, 43, 50]. Another facilitator that has substantial potential is digital tools. These can support the EDI process and enhance employee engagement [30, 31, 38]. Examples include idea management systems enabling employees to submit their ideas through a centralized digital platform and guide them through the process [29]. These systems also enable decision-makers to assess ideas, manage the documentation, and simplify knowledge exchange [4]. Overall, facilitators can have a positive impact on EDI effects and effect areas at the micro- and meso-levels, but they can also have a negative impact if inappropriately implemented [34, 53].

Our findings offer several opportunities for further exploration, mainly through practical case studies. The concept matrix reveals that the EDI effect areas collaboration and knowledge exchange (11%), (EDI) innovation process agility (11%), and organizational affiliation (6%) are less frequently mentioned and warrant further research. The impact of facilitators on effect areas and their interactions also merit further study. Here, research can provide more insights into how organizations can establish EDI to engender more participatory, inclusive innovation processes. However, while our work provides insights into the effect areas and facilitators of EDI, it is important to note potential challenges. For example, employees may not welcome the additional opportunities EDI offers and may be uncomfortable sharing their ideas or feel pressured to participate. Further, increased decentralization could lead to coordination issues or conflicting initiatives if there is no careful management. Therefore, organizations must thoughtfully establish an EDI process and create an innovation-friendly environment where employees feel safe and valued in their innovation pursuits.

This systematic literature review has limitations that may affect the validity of the findings. Although we aimed for high reproducibility within a rigorous review, it is likely that relevant papers were not included due to missing databases and search terms, subjective perception, or author bias during the filtering and screening process. We attempted to mitigate subjective perception and author bias by having two authors independently review the first 10 papers and then discuss their relevance to reach a shared understanding. This article includes a representative amount of literature but does not claim to cover the entire research area exhaustively. However, it provides a comprehensive foundation that can be supplemented and updated by further research to reflect new developments. In addition, although we identified and collated facilitators during the literature review, we did not systematically analyze them, unlike the EDI effect areas. This omission highlights another opportunity for future research.

6. Conclusion

This article has explored the transformative potential of EDI and its multifaceted effect areas on distinct levels of the organizational ecosystem that can contribute to the growth of organizations. Through a systematic literature review, areas of coherent micro, meso, and anticipated macro effects were identified, highlighting the importance of EDI as an innovation channel.

At the micro-level, EDI impacts employee motivation, satisfaction, skill development, and organizational affiliation, which can enhance individual performance and overall well-being. Transitioning to the meso-level, EDI can improve organizational

innovativeness, drive artifact creation and improvement, support idea perception and communication, engender decentralization and entrepreneurship, promote agility in the innovation process, foster an innovation-friendly culture and mindset, and stimulate collaboration and knowledge exchange. Adopting a more expansive viewpoint, at the macro-level EDI affects economic growth, the democratization of innovation, workforce development, and sustainable practices.


However, the realization of EDI depends largely on a spectrum of facilitators, ranging from participation opportunities and managerial engagement to appropriate incentive structures and the effective utilization of digital tools. In this context, we recommend that organizations include these facilitators in their EDI strategy. This represents also a promising starting point for further research. As we navigate an increasingly growing and dynamic world, the potential of new and complementary innovation channels such as EDI should not be overlooked. In summary, EDI represents a promising pathway for organizations to maintain and expand their competitive edge, drive continuous improvement, and create long-term value for their employees.

Author details

Stephan Leible*, Dejan Simic, Gian-Luca Gücük, Tom Lewandowski and Emir Kučević
University of Hamburg, Hamburg, Germany

*Address all correspondence to: stephan.leible@uni-hamburg.de

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