New Product Development During the Last Ten Years: The Ongoing Debate and Future Avenues

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Abstract—Research on new product development (NPD) has grown considerably over the last 30 years interweaving with serval fields of study such as strategy, marketing, supply chain management, and project management. This article offers an overview of the development of the NPD management literature published over the last ten years (2008 to 2018) in 1226 peer-reviewed articles. By applying bibliometric analysis, we have discovered the existence of five research clusters focused on the following main thematic areas: the NPD process, the integration of diverse knowledge sources for NPD optimization, the relationship between NPD and corporate strategy, the role of users and consumers in the NPD process, and the supplier involvement in the NPD activities. In respect of each area, we selected and reviewed the most relevant contributions and presented the emerging theoretical approaches and best practices. Also, the analysis has helped us to uncover the existence of promising research areas that have been scarcely explored. As a result, we formulated some suggestions for further research to fill in the existing gaps.

Index Terms— Agile, bibliometrics, cross-functional integration (CFI), cocreation, cross-functional integration, dynamic capabilities, family firms, lead users, literature review, market orientation, new product development, new service development, new product development (NPD), new service development (NSD), open innovation, small and medium enterprises (SMEs), stagegate, strategic alliances, supply chain integration, VOSviewer.

I. INTRODUCTION

RESEARCH on new product development (NPD) has grown exponentially over the last 30 years, making this topic an autonomous and established field of research, ranging from management to engineering [1]–[3]. Over the years, NPD research and practice have changed a great deal, as the various

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surveys on NPD best practices, which the Product Development & Management Association (PDMA) sponsored showed [4]–[7]. During the last ten years, NPD research has been intertwined with other research areas, such as Strategy and Strategic Management, Marketing, Consumer Behavior, Organizational Studies, and Supply Chain Management. Studies dealing with alliances [8], [9], competition [10], and dynamic capabilities [11] recognized the NPD process as a critical element in defining companies' strategic positioning. On the other hand, marketing studies highlighted the importance of users' involvement in the NPD process's various stages [12], focusing on how users can increase new products' performance and time to market [13], and how brand communities can provide new ideas for NPD processes [14]. As a result, while the interest in NPD related studies has increased over time, the NPD literature has dramatically evolved into a multidisciplinary direction by integrating diverse sources of practitioners' insights and academic studies. From 2000 onward, several literature reviews have shown the increasing importance of the interconnection between engineering and management for the NDP research and highlighted that NPD should be considered as a vital element of the company strategy [1]–[3]. Furthermore, many emerging engineering issues, such as the increasing need for flexibility and the constant pressure for NPD's cost reduction, are heavily impacting on the strategic, marketing, and operational choices made by managers. As a result, on the one hand, an increasing number of management scholars consider today NPD a key element in their studies; on the other hand, engineering management journals are increasingly paying attention to NPD managerial issues [15]. Based on these considerations, along with the absence of a recently available literature review of the field [1]–[3], this article focuses on the latest developments of the NPD research carried out in the field of business and management from 2008 to 2018.

Our analysis identified five areas of NPD literature research: the NPD process and its best practices, the integration of different sources of knowledge and information for the NPD optimization, the relationship between NPD and corporate strategy, the role of users in the NPD process, the supplier involvement in the NPD activities.

The article is structured as follows. In Section II, we describe the methodology, after which we present the bibliometric analysis's results, the VOS analysis, and the literature review of the five research areas. Section V proposes an agenda for the future NPD research, while Section VI concludes the article and describes its limitations.
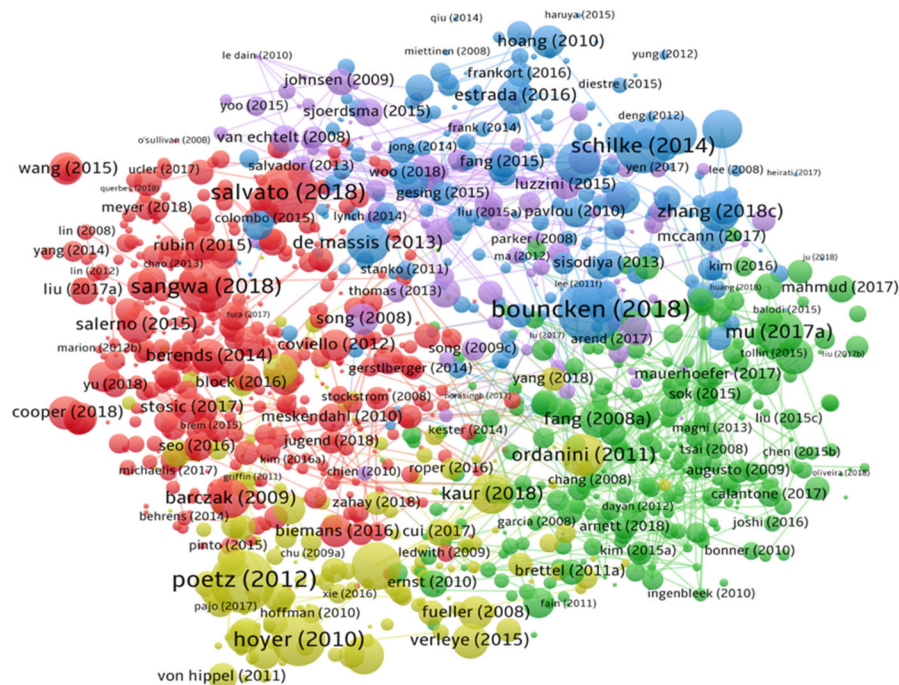
Fig. 1.   Graphical output of the VOS analysis.

II. METHODS

Our literature review is based on a bibliometric analysis of the bibliometric activity indicators [16] and the visualization of similarities (VOS) [17]. This method has been widely used across multiple study fields, demonstrating its effectiveness in synthesizing and representing high volumes of bibliographic data [15], [18], [19]. We developed a five-step process to explore the NPD scientific production and present the results.

As a first step, in early January 2019, we started a review of NPD papers in order to have an updated overview of the topic and create a list of the key terms used in this area of study. After several iterations with additional keywords and in line with the suggestions coming from previous literature reviews in the field [1]–[3], we identified the two following terms that permitted us to retrieve all the relevant material for this article: "new product development" and "npd." After that, we searched the two terms in the Web of Science Core Collection database [20], [21] by applying the operator "TS," which searches for titles, abstracts, and keywords, as follows: "*TS = ("new product development") OR TS = (npd)*." Furthermore, following previous literature reviews [1]–[3] and best practices [20], we limited the search documents published in English and to the "articles" category in order to include only high-quality material that had undergone a double-blind peer-review process. In line with the purpose of our study, we only considered articles between 2008 and 2018 in the Web of Science's categories of "business" and "management." The query produced 1315 documents. A cross validation of the results made by using Scopus and EBSCO databases did not show any significant discrepancy with the Web of Science's data.

Next, we started the core phase of our bibliometric study by using the VOS viewer 1.6.10, where we carried out a VOS analysis based on the bibliographic coupling aggregation mechanism

[17]. Bibliographic coupling occurs when two papers cite the same third paper in their references. We decided to use bibliographic coupling due to its ability to identify the development of a given field's intellectual structure by highlighting the main theoretical approaches and the relationships between them [22]. The graphical output of the VOS analysis emerges from a routine that builds a similarity matrix by normalizing a cooccurrences matrix of items; in this case, the shared cited references [23]. The script performs a set of routines to build a 2-D map in which the items are positioned to represent their similarity in terms of cited references. In the map that the VOS algorithm builds, items are close to one another if they share more references, which means they belong to the same theoretical perspective or approach [17]. Also, clusterization is performed with additional mathematical steps grouping items with a larger number of shared references. Papers belonging to the same cluster are strongly linked as a group, indicating a possible area of research [17].

In order to effectively analyze the high volume of obtained data, we limited the similarity analysis to papers sharing a minimum level of relatedness to the rest of the dataset. We subsequently used a calculated link strength measurement interval (max 3803; min 50), which ensured the inclusion of all the relevant papers focusing on the NPD research. The result was a dataset of 1226 interconnected papers (93% of the initial dataset) whose bibliometric activity indicators are presented in the following section. The graphical output of the VOS similarity analysis shows five well-defined clusters linked by a strong matrix of interconnections (see Fig. 1 in the following section).

The fourth step comprised the literature review based on VOS aggregation results [24]. We analyzed each cluster's content to highlight the main papers within each stream and the primary connections between the clusters. Due to the high number of
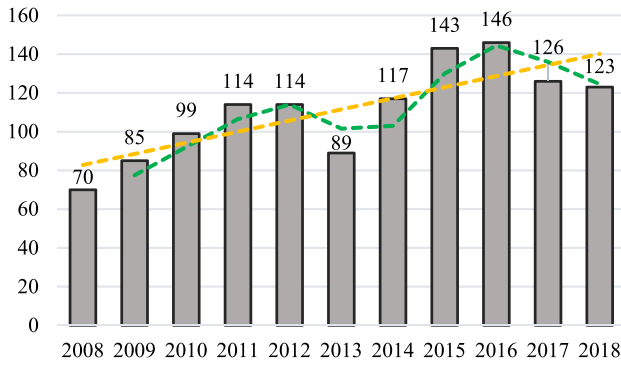
Fig. 2. Distribution of the papers by years (left) and years-clusters (right).

papers (NPs) included in the main dataset, we selected a sample of the most relevant papers to review. Based on similar studies on a massive NPs [1], [21] and the best methodological practices [20], we manually selected papers to review within each cluster by using the following criteria, in order of priority: normalized citations ≥ 0.50, total citations, authors' manual and independent refinement of the dataset. The latter criterion was necessary in order to avoid losing little cited but relevant papers. The manual selection led us to a restricted dataset of 899 papers. On this restricted dataset, three of the four authors performed three multiple human subjects independent reading process. The first one was aimed to generate a series of topics within each cluster. Following the prescriptions proposed by the existing relevant methodological literature [20], [21], [24]–[26], each of the three authors performed an autonomous and independent open coding of all the 899 papers by creating a series of topics that could summarize the main areas of research within each cluster. The authors then performed a series of meetings to exchange ideas and debate on the topics previously identified by each of them independently. The results of these meetings are represented by the lists of topics in Table III. The second multiple human subjects independent reading process was aimed to assign each paper to a specific topic, while through the third one, we scored all these 899 papers in the function of their significance for the topics to which it had been assigned and its relevance for the NPD field of study. We made a series of meetings between authors in order to reach an agreement regarding which topic a paper should be assigned as well as regarding the score assigned to each paper. The process led us to select 74 representative papers.

In the fifth and final step, in order to assess the reliability of our topic creation and paper selection processes we performed in the previous step, paper allocation to the topics, selection of a reduced amount of relevant papers to be reviewed in this article—we asked a panel of five experts in NPD (external to the authorship of this article) to examine and review our paper selection process and results [20], [24]. This review process led us to conclusively identify 78 papers, representative of the business and management NPD studies over the last ten years (2008 to 2018).

Please note that from this point forward, we use the following keys:

1) NP, reflecting the sum of the NPs published in a journal, by an author, or within a cluster;
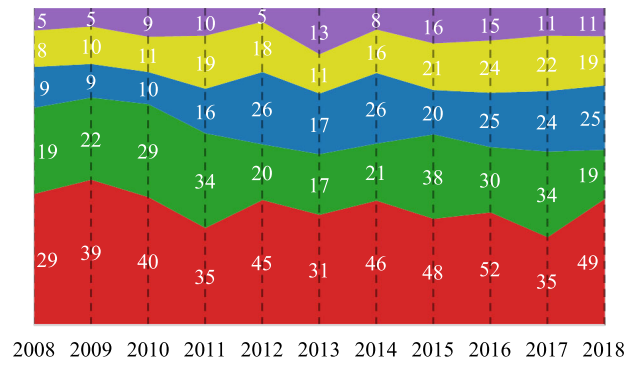
2) TC, reflecting the total number of citations collected by a paper, an author, a journal, or within a cluster;

3) Normalized total citation (TCN), reflecting the normalized citations of a paper, an author, a journal, or within a cluster. The TCN is calculated by weighting the TC by the number of citations distributed within the dataset's time frame. While the TC tends to highlight older papers, the TCN is balanced to equally highlight newer papers that have had less time to collect citations. The size of the bubbles in Figs. 1 and 3 reflects the TCN value.

4) AGR-NP, showing the average growth rate of the NPs inside a cluster. It is measured by averaging the percentage growth within each couple of years included in the 2008–2018 period.

5) TC/NP, which represents the average number of citations per paper and is calculated by dividing the TC by the NP.

III. RESULTS OF THE BIBLIOMETRIC ACTIVITY INDICATORS AND THE VOS ANALYSIS

Table I shows the leading journals on which NPD studies in the field of business and management have been published in the 2008 to 2018 period.

Journal of Product Innovation Management has the highest NPs and citations. IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT is in the podium of the leading journals ranking as the third journal in terms of the NPs, thus confirming its prominent role also in the field of business and management [15]. *Technovation*, despite having only 30 published papers, collects 1018 TC to demonstrate its strong relevance in the NPD field.

Fig. 1 shows the graphical output of the VOS analysis. It highlights the presence of five well-polarized clusters characterized by the following themes:

1) Red cluster: the NPD process;
2) Green cluster: Diverse knowledge sources' integration for the NPD success;
3) Blue cluster: NPD and corporate strategy;
4) Yellow cluster: The role of users and consumers in the NPD process;
5) Purple cluster: Supplier involvement in the NPD process.

In the red cluster, which represents the core of the NPD field of study, we find the largest number of traditional studies on how to
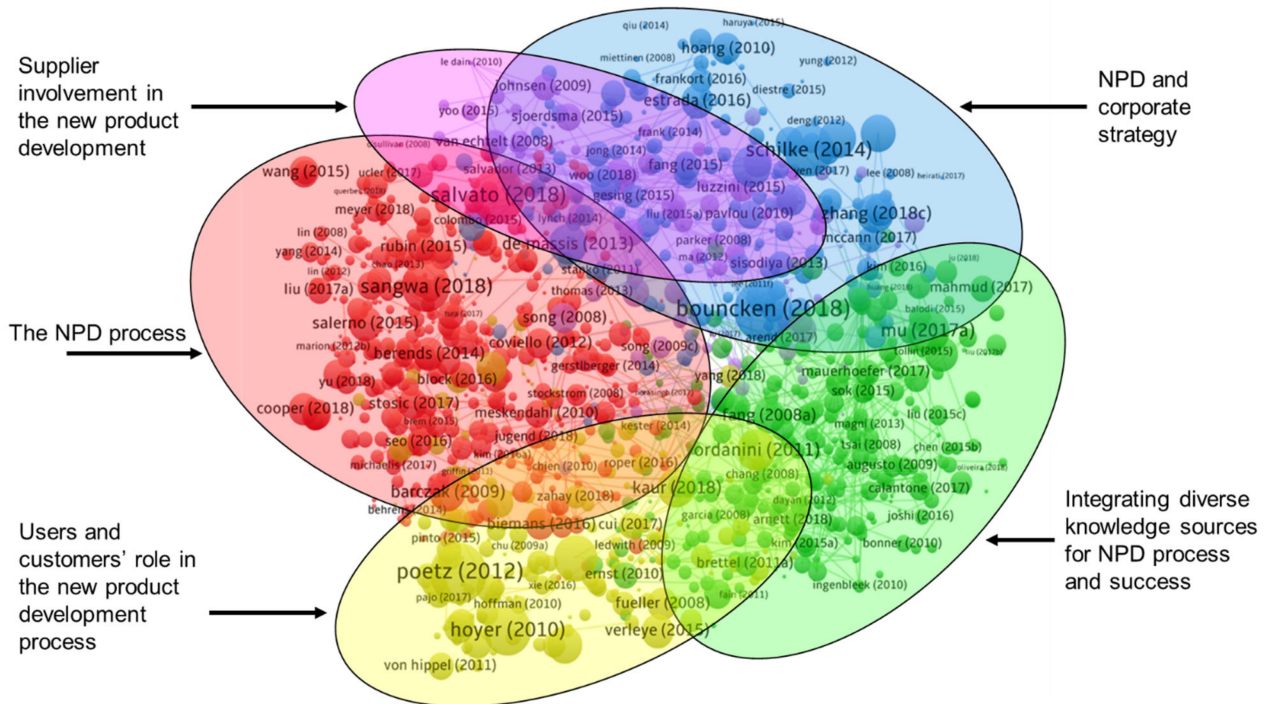
Fig. 3. Themes emerged from the VOS analysis.

TABLE I
MAIN JOURNALS ON THE TOPIC OF NPD WITH AT LEAST 15 PAPERS PUBLISHED

Journal	NP	TC	TCN
Journal of Product Innovation Management	234	6158	289.89
Industrial Marketing Management	60	1302	88.40
IEEE Transactions on Engineering Management	46	537	31.58
R&D Management	37	617	33.32
Journal of Business Research	35	394	44.31
Research-Technology Management	34	353	26.99
Journal of Engineering and Technology Management	32	453	31.31
International Journal of Innovation Management	31	13	4.18
Technovation	30	1018	45.26
International Journal of Operations & Production Management	30	370	34.50
International Journal of Technology Management	30	229	8.02
Journal of Business & Industrial Marketing	29	250	16.58
African Journal of Business Management	20	39	1.23
Management Science	18	524	23.81
International Journal of Project Management	17	278	18.36
Creativity and Innovation Management	17	171	16.01
Journal of Marketing	16	1039	41.79
European Journal of Operational Research	15	198	15.86

develop new products effectively and manage the NPD process. The green cluster is the most heterogeneous one in terms of subtopics, such as the NPD team management, market orientation, and speed to market, which are, however, tied together by the knowledge-based view theory [27]. Based on the assumption that NPD is crucial for companies' strategy, the blue cluster encompasses strategic issues related to NPD, such as alliances and coopetition, company openness, and R&D strategy. Following the growing importance of users' involvement in the NPD process, the yellow cluster mostly comprises papers published in marketing journals and concerned with user cocreation, lead users, and users' ideas. Finally, the purple cluster explores how to strategically involve suppliers in the NPD process, thereby being strictly linked to the blue cluster.

TABLE II
BIBLIOMETRIC ACTIVITY INDICATORS OF EACH CLUSTER

	Red cluster	Green cluster	Blue cluster	Yellow cluster	Purple cluster	**Totals**
Number of Papers (NP)	449	283	207	179	108	1,226
Total Citations (TC)	6,966	5,101	3,174	4,028	2,172	21,621
Normalized Total Citations (TCN)	415.4	264.1	233.9	224.2	113.5	1,251.1
Number of Papers' Average Growth Rate (AGR-NP)	+9.0%	+6.1%	+15.4%	+13.3%	+22.9%	--
Total Citations/Number of Papers (TC/NP)	15.8	21.4	15.3	22.5	20.1	--

In Table II and Fig. 2, we provide a descriptive analysis of each cluster and its development over time. The red cluster is the biggest in terms of the NPs, being almost double the size of the green cluster, which is the second biggest. The growth rate in terms of published papers in the 2008–2018 period (GR-NP) was +9.0%, over the dataset's average growth rate of +13.4%. Similarly, the average number of citations per paper (TC/NP) is 15.8, while that of the dataset is 18.6. In contrast, this cluster's TCN is much higher (415.4) than the average TCN of 248.3. These findings suggest that the red cluster, which represents the core traditional NPD literature, is reaching a maturity period, as previous NPD literature reviews predicted years ago [1], [3]. Likewise, as shown in Fig. 2, the size of the red cluster remains stable over time, providing NPD research with continuous theoretical support. The green cluster, the second largest in terms of the NPs and TC, has a relatively low AGR-NP (+6.1%). However, its TC of 5101 and TC/NP of 21.4 are particularly high, showing that, though growing at a relatively slow rate, research on diverse knowledge sources for NPD is receiving more citations. The blue cluster is among the fastest-growing (+15.4%) in terms of NPs. Fig. 2 shows its constant NP growth, which reflects scholars' increasing attention to NPD's role in corporate business strategy. Like the blue cluster, the yellow one represents a recent and fast-growing area of research (AGR-NP +13.3%), which has seen continuous NP growth from 8 in 2008 to 19 in 2018. Its TC/NP is high (22.5), showing that it has a high impact in terms of TCs per paper. Finally, the purple cluster is the smallest but the most stable in terms of NPs over the years. AGR-NP is the highest (+22.9). Data suggests that, while supplier involvement in the NPD process is a relevant topic (as confirmed by a high TC/NP of 20.11), the space for academic research advancement within this cluster seems currently relatively limited.

IV. RESULTS OF THE LITERATURE REVIEW

In the following section, we present the results of the literature review as emerged from the VOS analysis. Fig. 3 highlights the themes that emerged from the literature review process.

A. Red Cluster: The NPD Process

The red cluster represents the core of the NPD field of study. We start our literature review with PDMA-sponsored best practice research projects [4], [5], which is designed to help managers improve their NPD practices. The results from these studies highlight that, compared to the last decade, companies had become more cautious regarding NPD portfolio projects (resulting in a lower percentage of new-to-the-world projects) experiencing a decline in sales and profits due to their conservative approach. The 2012 update of the PDMA study [7] identifies an urgent need for NPD best practices' to be diffused among practitioners together with the demand to translate into practice the tools developed by researchers. The study highlights that successful NPD processes are strongly connected with the company's strategy. Therefore, the NPD strategy and process should go hand-by-hand with a company's strategic development.

In this vein, researchers call for new, flexible, and iterative approaches to NPD compared to traditional linear and sequential NPD models such as the Stage-Gate approach [28]. For example, based on a survey of 120 projects using the Stage-Gate process for NPD, Sethi and Iqbal [29] demonstrate that the strict application of linear and rigid NPD models reduces organizational learning and affects new products' performance negatively.

Following the abundant shreds of evidence regarding the drawbacks associated with linear approaches to the NPD process, several authors propose less structured approaches by adopting an Agile-Stage Gate hybrid philosophy [30], [31] or by integrating open innovation into the NPD practice [32]. Salerno *et al.* [33] highlight that the NPD process should follow a nonlinear pace by adapting itself to the market and/or technology needs. After a new product's preliminary launch, the company should wait for the existing market to develop, reducing the uncertainty before launching a new version of the product.

In line with the new trend and necessity to develop flexible NPD models, several authors propose operative tools aimed to increase the flexibility of the traditional NPD approaches [30], [31], [34], [35]. The creators of the Stage-Gate model [34] propose an examination and update its original principles in order to increase the NPD process's productivity based on:
1) a customer-focused approach;
2) an extensive NPD assessment (financial, market, and technical) in the early stages of the development process;
3) a spiral development;
4) a holistic approach driven by effective cross-functional teams who share knowledge effectively;
5) metrics, accountability, and continuous improvement to keep track of the NPD process's performance;
6) a focus and active portfolio management to integrate all the developed products into the company strategy;
7) and the implementation of the NexGen Stage-Gate Process (Agile–Stage-Gate Hybrid Model), which represents the

evolution of the NPD process toward a more flexible approach by including Agile principles.

The effective application of the Agile–Stage-Gate Hybrid Model has been demonstrated by an extensive study on the toy company LEGO [30], where these new principles are applied and resulted in a more efficient response to customer needs and preferences, better team communication, and improved NPD productivity. The lean manufacturing approach also demonstrated its ability to reduce the time of the development cycles by transforming the linear NPD processes into flexible and iterative ones [36]. In particular, recent research proposes an integrated lean manufacturing performance measurement framework that managers can apply to measure lean implementation's effect [37]. It focuses on 26 subdimensions and 119 key performance indicators able to capture lean manufacturing's impact on finance, supplier management, human resource management, administration, manufacturing process, new product development, and customer management.

Few scholars explore the organizational factors affecting the NPD process, even though there is a consensus that it involves the organizational dynamics intensely [6], [7], [38]. For example, the role of organizational memory could play a crucial, albeit ambiguous, role in the NPD success [39]; memory and knowledge sharing between organization members through open communication and cross-functional teams could help accomplish tasks on time and more effectively, especially when a project is highly innovative [39]. Similar to the organizational memory, an effective balance between the conflicting organizational goals of NPD design quality and NPD efficiency is facilitated by specific organizational routines such as 1) splicing, i.e., the recombination of activities and participants, resulting in a broader debate on the NPD project and aiming to include different perspectives on and opinions about the project; 2) activating, i.e., encouraging people involved in an NPD project to work together in order to find a balance between their conflicting points of view; and 3) repressing, i.e., switching the NPD process's activities and participants off when they are no longer necessary to minimize different points of views that could create barriers to a fluid NPD process [40].

There is also a substantial body of knowledge related to NPD in small and medium enterprises (SMEs) showing that the characteristics and requirements of the NPD process in SMEs are quite different compared to those of large companies. For example, the frequent presence of highly centralized family governance structures strongly impacts the NPD design decision making [41], as well as the entire NPD process. In family-owned SMEs, cross-functional teams are associated with a lower NPD performance, because they face severe conflicts between the established routines and innovation activities. Furthermore, unlike larger companies, in family-owned SMEs it is usual that the same person handles different roles, such as project leader and product champion [41]. The NPD practices of SMEs differ from those of large companies also regarding market orientation as for these firms competitors orientation represents a crucial market orientation element in generating a superior new product performance [42]. These findings suggest that SMEs should be aware of a new product's impact on their market positioning,

on what their competitors offer, on their financial performance, and should avoid the trap of overfocusing on just a small market segment [42].

Thus, the role of customers' involvement seems crucial for the success of SMEs' NPD processes [43]. Coviello and Joseph [43] compare three successful innovation projects with three unsuccessful ones and find that successful projects are those where the customers are actively involved in the following six NPD activities: opportunity recognition, customer-based funding, development, testing, commercialization, and feedback. These activities provide SMEs with continuous input from their customers during the NPD process, using an approach similar to the Agile method for software development. Given the difficulties of explaining SMEs' NPD process using traditional innovation theories, Berends *et al.* [44] propose an interpretative framework based on effectuation theory that distinguishes between two approaches to decision making: causation, which assumes that means are selected in order to reach the goals, and effectuation, which assumes that the available means shape the goals. The study shows that SMEs approach the NPD process differently compared to larger firms. SMEs use their existing resources creatively, limit their innovation process to those advancements considered possible with available resources, use external knowledge sources extensively, prioritize their existing businesses instead of creating new ones, and rely strongly on customer feedbacks and knowledge. This set of findings opens an interesting debate on shaping NPD practices based on the company size category in which they have to be applied.

A relevant topic identified within the red cluster concerns new service development (NSD). NSD has grown considerably over the last ten years due to the increasing servitization of businesses and changes in manufacturing industries [45]. Kindstrom and Kowalkowski [46] propose a four-stages circular service development framework for manufacturing companies. The framework starts with sensing the external environment in order to create long-term relations with the relevant actors to cocreate new services. Next, during the development, the identified actors are actively involved in the process to a more considerable extent compared to NPD projects. The third stage, sales, should focus on understanding how the service could increase the entire customer experience (e.g., through effective maintenance services and after-sale support). Finally, during the last stage, i.e., delivering, the companies need to account for long-term relations with the costumers due to the very nature of services that are cocreated by interacting with users throughout the delivery process itself. In this regard, NSD should encompass modularity principles coming from products [47]. Complex products often require services like maintenance and training; consequently, NPD often goes hand in hand with NSD. The importance of integrating new products and complimentary services is pivotal to increase customers' satisfaction [48]. The value-in-use of a product and its relative attached service is related to the presence of an effective relational dynamic and access [48]. The first is the capacity to create a positive relationship with customers by offering each client a tailored experience (e.g., a dedicated repair and support service for professional/business users). The second refers to offering a support service available to clients

outside regular business hours. It is essential for professional and business users, who, for example, may need a repair over the weekend in order to have their appliance working during the week. Therefore, companies should pay keen attention to developing support services that could increase the final products' quality, primarily for advanced-user categories.

Finally, Biemans *et al.* [49], by analyzing 230 empirical papers, showed that applying NPD approaches to the NSD domain has biased most published research. In other words, few scholars paid adequate specific attention to NSD, with the result that the NSD research field still lacks a comprehensive and holistic theoretical framework.

B. Green Cluster: Integrating Diverse Knowledge Sources for the NPD Process and Success

The two most recent studies on NPD best practices, which we reviewed at the beginning of [6, subsection 3.1], [7], highlight that among the various aspects that need urgent improvements there are cross-functional integration, team communication support, and the integration of a diverse set of knowledge sources. The studies included in the green cluster adopt the knowledge-based view of the firm, which considers knowledge as a critical resource that organizations need to manage, integrate, and use to enhance their corporate performance [50].

The first issue emerging in business processes involving a high level of knowledge, such as the NPD process, is the storage and diffusion of the knowledge that is necessary to implement these processes effectively. Recent studies confirm that a first step to effectively manage knowledge within complex processes is to seek the help of IT tools [51]. Market data management tools allow companies to understand market needs, generate ideas, and select these ideas in a data-driven process supported by analytical software. Studies show that the effectiveness of IT tool usage is positively associated with NPD performance because it facilitates the retrieval and the use of knowledge among the company's functions involved in the NPD process [52].

Based on the knowledge-based view, a large amount of literature inside the green cluster focuses on cross-functional integration (CFI) among R&D, marketing, sales, and other functional areas.

While it is clear that a high level of collaboration between sales and R&D is crucial in the concept development stage, and has significant positive effects on the NPD performance [53], other moderators affect the CFI impact on the NPD performance [54]. A successful CFI depends on a complex combination of factors such as the climate of cooperation as well as information sharing, no more than two functions being involved, using product effectiveness instead of market indicators to measure the NPD performance [54]. CFI's effect on the NPD process performance is also discontinuously distributed across the entire NPD process [55]. For example, integrating the R&D and marketing functions impacts NPD process efficiency positively, but not effectiveness because, in the latter case, the impact also depends on the NPD stage. On the other hand, the integration of R&D and manufacturing has a positive impact on efficiency during the development stage [55]. Finally, pursuing explorative

(instead of exploitative) innovation and an aggressive innovation approach positively affect the relationship between CFI and NPD performance, while environmental uncertainty does not affect it [56].

Recent studies focus on how to manage CFI at the microlevel of the team. Nakata and Im [57] explored the difficulties of integrating team members with divergent orientations and expertise. Team characteristics, such as social cohesion, process formalization, and managerial encouragement to take risks, can influence teams' CFI. Specific team behaviors (caring), beliefs (psychological safety), task-related processes (shared problem solving), and governance mechanisms (clear management direction) can create a climate that fosters CFI and team effectiveness [58]. Shared problem-solving and caring behavior can support learning and the time efficiency of interfunctional teams. Team psychological safety is positively related to learning; clear management direction is positively associated with CFI efficiency; shared problem-solving is positively related to an NPD outcome [58]. These findings clearly show that team management's best practices are among the most significant factors of NPD process success.

Finally, a subarea of research relates to the role that a company's market capabilities and orientation play with regard to NPD success. Ramaswami *et al.* [59] show that if a company is strongly connected to the market, its functions can respond to market feedbacks quickly, resulting in a better NPD's financial performance. Also, market orientation, CFI, and NDP performances are strongly connected [60]. When companies are market- and competitor-oriented, they are more likely to spot trends and customer needs; resulting in the better implementation of new-to-the-world products. However, the company's innovativeness, competitive strength, and market orientation are less effective if CFI is not adequately developed and managed across the organization [60].

C. Blue Cluster: NPD and Corporate Strategy

The dynamic capabilities theory recently focused on the NPD process and its pivotal for the company's superior performance and survival [10], [11]. By reconfiguring the NPD process according to the market and technology needs, the company can effectively adapt to turbulent environments and deal with uncertainty and rapid technological changes [11]. The capacity to continuously reconfigure the NPD process is not only connected with the company's survival in a dynamic environment, but is also linked with a superior NPD performance [10]. The development of specific capabilities such as sensing the environment and learning, coordinating, and integrating resources allow a company to adapt and better respond to an uncertain environment, thereby allowing to obtain increased the NPD efficiency and new products' effectiveness [10]. However, empirical evidence demonstrates that when the environment is highly turbulent or extremely static, the dynamic capabilities' beneficial role is weak as dynamic capabilities are inverse U-shaped connected to competitive advantage and environmental dynamism [61]. In this line, the NPD alliances represent an alternative way for

companies to acquire the knowledge, resources, and capabilities needed for effectively developing new products. However, managing one or more NPD's strategic alliances presents a series of critical issues, especially related to the counterpart opportunism [62]. Several barriers, such as the environment's legal and regulatory characteristics, can influence the integration of complementary knowledge in strategic alliances [8]. When the partners' interdependence is high, the knowledge complementarity allows the development teams to interact significantly, resulting in a higher NPD process innovativeness [8]. However, when the knowledge expropriation risk is high due to weak legal and regulatory environments, the interdependence between the partners impacts the NPD process innovativeness negatively due to possible opportunistic behaviors [8]. Having a high level of technological capabilities helps companies to gain significant advantages from alliances and reduces the risks connected to partners' opportunism, especially when dealing with partners from emerging economies where knowledge integration is difficult due to the lack of trust and intellectual legal protection that characterizes the legal systems of these economies [62]. Another aspect to be considered in the context of NPD's strategic alliances refers to the timing in product codevelopment with upstream and downstream partners [9]. The first generally face a higher risk of opportunism, which is associated with product specificity and the high amount of resources invested in a technology tailored to the downstream partner's need. The latter has significant bargaining power and consequently tends to adopt opportunistic behaviors by overturning most of the risks to the upstream partners [9]. Considering that cooperation has different effects, depending on the NPD process's stage [63], knowing when and with whom to cooperate is crucial for a successful NPD alliance.

The company's innovation capabilities are primarily improved if cooperation occurs during the concept and product development stage, but it more positively affects the NPD success if it occurs during the implementation stage [63]. On the other hand, vertical, horizontal, and institutional cooperation with other companies fosters a business's success, while cooperation with institutional partners has an additional positive effect on the entire NPD process's performance [63]. Also, the type of innovation, radical, or incremental, strongly influence collaborations' effectiveness [64]. When innovation is incremental, cooperation with competitors leads to better results concerning design, functionality, product features, and quality in all the development phases, but it has a stronger positive effect on the prelaunch phase. Conversely, when innovation is radical, coopetition benefit emerges in the product launch phase only. Therefore, when innovation is incremental, it is better to cooperate with competitors through the entire NPD process, while when it is radical is a good practice to protect the own knowledge until the product's launch [64]. Finally, an effective internal R&D capability is needed to master the R&D alliances since a low-external exploration experience could facilitate opportunistic behaviors from the other counterpart [65].

Scholars have also explored open innovation's effects on the NPD process in respect of the interactions and the information flows that fosters the innovation performance. Findings suggest that companies need time to develop the capabilities required to successfully incorporate the open innovation approach into the NPD process [66], while an excessive openness may have adverse effects on the NPD process [67]. Although companies have a better short-term NPD performance if they adopt open collaboration strategies, when the level of openness significantly increases the medium-term NPD performance tends to get worse as projects tend to become slower and more expensive compared with the industry average [67]. Also, the extensive use of an open approach does not often provide a superior innovation outcome in terms of product quality and performance and often results in higher costs compared with nonopen projects [68]. Therefore, a significant degree of openness brings to negative NPD performance, as does a low degree of openness [68]. Finally, also contingency projects' characteristics affect performance in open innovation-driven NPD projects. When NPD projects are explorative, an open approach is better in the ideation stage; if the NPD project leader has prior open innovation and management experience and an organizational climate that supports creative endeavors is present, the open approach seems to perform better [68]. Open innovation may be a useful source of knowledge under certain conditions, but pursuing an extreme open strategy might not always be the best choice.

D. Yellow Cluster: Users and Customers' Role in the NPD Process

After the introduction in 1968 by Eric von Hippel [69] of the concept of lead user as a source of product innovation, the entire body of knowledge regarding the role of users in the NPD process moved toward a "democratizing innovation" direction [70]. In 2011, von Hippel *et al.* [71] reinvigorated the attention of the scholars on this point by identifying a new three-phase paradigm that sheds fresh light on the mechanisms through which users' innovation emerges. Initially, users themselves develop products that satisfy their needs. Next, when the product is on the market, other users evaluate, reject, copy, or improve products developed in the first phase. Finally, once a product's potential has become clear and the uncertainty has decreased, mass producers enter the market [71]. As they adopt new products more readily and faster than ordinary users, lead users play a crucial role in the creation and diffusion of new product concepts, thus becoming a highly valuable resource for marketers [72]. Also, cocreation communities provide feedbacks on lead users' ideas and help them diffuse their innovations outside communities' boundaries, facilitating the development of prototypes and the products' diffusion to the early majority [73]. Recent studies also propose a reflection about the NPD performance implication of users' generation of ideas [13], [74]. By comparing the characteristics of ideas generated by two groups, "crowds" of users and professionals, it has been shown that, even if the feasibility degree of novel ideas from the crowd is lower, the overall benefit generated by involving both groups of users seems higher than the costs [74]. The metaanalysis by Chang and Taylor [13] highlighted that users should be involved in two critical stages of the NPD process: idea generation and the launch stage. Users' involvement has a positive impact on

the speed to market and a moderate impact on the NPD financial performance. Also, market turbulence influences the need for user's involvement: the higher the market turmoil, the more user contributions are needed. The metaanalysis also shows that the NPD performance obtained through users' involvement is far more effective in low-tech industries, as in less complex industrial contexts it is easier to integrate users' knowledge into NPD activities. Finally, users' involvement results in a superior NPD performance in SMEs rather than in large companies, which also applies to firms from emerging countries, where users' needs have been less explored [13]. The involvement of users in the cocreation process also positively impacts the market image of the company. Involving users tends to spread a positive word of mouth about the company even within the mass not involved in the cocreation process [75], thus generating positive effects on the demand for cocreated products compared to the same products which have not been cocreated [76].

Though the abovementioned studies clearly outline the positive effect of involving users in the NPD process, they do not clarify where and how a company should look for engageable users and how to obtain insights from them. In this vein, brand community members are valuable users to involve in the cocreation process since their brand community identification and brand knowledge are significant factors affecting consumers' inclination to share their knowledge with producers [14]. For example, the LEGO company succeeded in creating a sustainable producer—user ecosystem in order to ensure users' continuous and active involvement [77]. Several companies, such as Coca-Cola, Toyota, and Mazda approached the users' involvement through the use of automated online tools and virtual worlds [78]. The use of virtual worlds to simulate users' behaviors and gain insight from them is a recent development of cocreation techniques [78]. With a relatively low investment, companies can gather insights from users that are geographically distant, thus allowing both managers and final users to interact effectively and share their insights for a sound NPD management [78]. Contrary to virtual worlds, which can only involve a relatively limited number of users, automated methods based on machine learning allow insights to be gathered from a much larger number of users [79]. Machine learning approaches are particularly useful in assisting managers and NPD developers in screening ideas that users produce in real time, which can then be evaluated in the development process's subsequent stages, resulting in a 48.1% increase in the NPD process performance [79]. Machine learning approaches can effectively process online customers' reviews by combining automated analysis tools with conjoint analysis in order to collect insights about which product's attributes are must-have and which are optional [80]. Finally, the automated screening process can now be effectively supported by artificial intelligence, which reached a screening performance comparable with humans manual screening but requiring less time and resources [81].

Cocreation processes and user involvement are also crucial in the case of NSD, where the role of experience and experimentation is even more critical because customers create the service when they use it [82]. The use of classic techniques, such as brainstorming, does not seem adequate for new service

cocreation processes because, unlike the NPD case, the limited experience of involved users represents a significant barrier to their involvement [74]. Ordanini and Parasuraman [83] explored the type of innovation users could contribute to in the NSD process and find a substantial divergence between the user contribution to the cocreation of new services and physical products. In the NPD cocreation process, users often produce ground-breaking ideas, while in the NSD cocreation process, users' contribution is focused on incremental innovation and is unlikely to produce radical innovation [83].

Identifying the right users to be involved in the NPD cocreation process represents an emerging topic. In this regard, Hoffman *et al.* [84] propose an inventory test aimed at measuring certain personality traits of the users involved in the cocreation process. Their results show that consumers can be characterized by an "emergent nature," which is defined as the unique capability to imagine how new product concepts should be developed. These consumers can improve a product concept effectively, but also help make it useful, appealing, and thriving to the market. While lead users tend to be visionary and to propose products with futuristic features emphasizing the product's hedonic value, users with a pronounced "emergent nature" prefer to accentuate the product's utilitarian attributes, which are more useful for the average final user [84].

E. Purple Cluster: Supplier Involvement in NPD

The NPD process involves different categories of actors. The core aspect of the purple cluster is the supplier involvement in developing new products. Companies increasingly outsource stages of the NPD process to suppliers in order to benefit from their expertise, reduce the NPD processes' costs, and improve the time to market [85]. The interest in integrating suppliers' knowledge and expertise in the NPD process starts from the 1980s in the automotive industry, where it proved to be one of the main sources of competitive advantage for Japanese companies [2]. Later on, several other studies have focused on how to integrate the supplier into the NPD process effectively and confirmed that suppliers' involvement is a crucial variable for superior performance even for U.S. and European firms. The evolution of this field raised several questions regarding the role of trust and commitment, especially in B2B relations with suppliers [2], [85].

However, despite how research on supplier integration into the NPD process has largely evolved, a holistic framework embracing all the aspects concerning the knowledge exchange and relationship management connected to supplier involvement is still lacking. To address this need, Sjoerdsma and Weele [86] proposed a framework highlighting 12 constructs that positively affect supplier involvement in the NPD process. The quality of the relationship between the supplier and the customer is a crucial predictor of NPD performance in terms of product quality, cost, and time to market. Organizational and individual variables also affect this relationship. Satisfaction, adaptability to relationships, loyalty, reputation, attractiveness as a customer or supplier, and competency influence the quality of the relationship positively from the organizational side. Trust, quality of the

communication, knowledge sharing, cooperation, commitment, transparency, and flexibility are fundamental for suppliers' and buyers' successful integration into the NPD process from the individual side [86]. Furthermore, a high level of collaborative competences is required from both sides, especially for the activation of effective knowledge sharing mechanisms [87]. If a supplier does not meet the buyer's quality expectations, the company should intervene to evolve the supplier's capability by activating a bilateral knowledge-sharing process aimed to improve the supplier's creative and technological capabilities [88].

Finally, Cousins *et al.* 's [89] findings confirm that knowledge sharing mechanisms and the technical proficiency offered by suppliers are vital for developing breakthrough product innovation. In this regard, Song and Di Benedetto [90] explored the antecedent and the performance implication of supplier engagement in radical innovation. Their results show that suppliers' specific investments in technology and a company's effort to improve their suppliers' abilities are critical drivers of supplier involvement that ultimately results in better NPD performances and radical innovation outcomes.

V. AGENDA FOR FUTURE RESEARCH ON NPD

Intending to propose a guide for scholars interested in exploring the main research gaps that emerged from our literature review, in this section, we present a research agenda for the NPD future research composed of a series of wide-spanning research questions. We hope that these questions can help researchers and practitioners to reflect on the emerging research themes described below and effectively unpack them in specific pieces of research.

A. Red Cluster: The NPD Process

While traditional linear NPD models are still the dominant approach for the NPD process [4], [5], [7], attention to more flexible or "hybrid" approaches is increasing [28], [91]. Although recent literature broadly supports the need for these approaches, their identification, design, and implementation need to be further investigated [92]. The first questions that scholars and practitioners should investigate refer to *how companies that are using linear NPD models could easily and quickly evolve their process to the new flexible or hybrid approaches*. Especially for Agile-based flexible approaches, which are mainly coming from the software industry, there is a need to clearly understand *"what" principles can be applied to the manufacturing companies*, *and more broadly, to NPD and NSD outside the software industry* [92], [93]. Also, there is a strong demand to identify and develop an efficient system of key performance indicators capable of effectively monitoring NPD activities carried out using flexible approaches [94]. The available literature presents only a few pilot tools to measure Stage-Gate and Agile approaches' effects on the speed, costs, and quality of the NPD process [94]. However, there is no extensive tool that can capture the combination of Stage-Gate and Agile principles cooccurring in the same project, or sequentially across multiple projects [94]. Therefore, *how can we easily measure and compare the performance of linear and flexible models? What are the performance indicators that should be included in a measurement tool?* There is also a need for a tool that can measure, monitor, and manage contingent factors such as complexity, uncertainty, and other specific issues related to the different industrial contexts, where these emerging principles models are applied. Regarding the nascent topic of start-ups and lean start-ups [95], *how can Agile and Hybrid models be beneficial for those type of embryonic companies?*

Furthermore, the research on NPD has mostly focused on the "hard" aspects of NPD success factors without fully explaining "which," "how," and "to what extent" nontechnical "soft" aspects such as organizational culture, ambidexterity, or idea generation practices can influence the NPD process [96]. Few studies partially explored the role played by organizational issues [40] and family firms' climate [41]. Nevertheless, there is still broad scope for research on the "soft" aspects, such as the organizational culture and the human factors [96]. Therefore, *how does organizational culture impact the NPD process performance? Are there any organizational culture characteristics that could foster the outcomes of the NPD process?* There is also a shortage of empirical research on NPD practices that could be implemented in contexts that differ from those of large for-profit companies, such as SMEs, benefit corporations, or nonprofit organizations. With specific regard to SMEs, whose NPD process is usually strongly interweaved with entrepreneurship, using the effectuation–causation approach to the NPD process might be an up-and-coming research option [44]. More generally, there is a need for cross-national studies, further exploring the potential of using the effectuation–causation approach to the NPD process in organizations of different sizes and characteristics [44]. In connection with the organizational culture: *is it possible to identify specific routines depending on where a product or a service is developed?* Regarding the entrepreneurial culture: *which is the different impact of using the causation–effectuation approach in large companies compared to SMEs? How does the causation–effectuation approach affect NPD teams in large companies compared to SMEs?*

Finally, the NSD research field needs to be further explored [49], also by implementing an updated bibliometric and/or literature review. The service-dominant-logic theory (SDL) [83], which encompasses a company's collaborative competences, the dynamic capability of its customer orientation, and its knowledge interfaces [83] could be used as the theoretical lens. The SDL lens regards the NPD and NSD processes as nested together in an overarching service that integrates both tangible goods and connected services. SDL assumes that only services exist and that products are merely enablers of services. Therefore: *what are the implications of the SDL for NPD processes and best practices? Which are the best practices to develop a new "product-as-a-service."?* [97]

B. Green Cluster: Diverse Knowledge Sources' Integration for the NPD Process and Success

Most of the research gaps in the green cluster relate a better understanding of the knowledge dynamics of CFI. Several papers outline a need to explore better the knowledge sharing and utilization dynamics behind the CFI process of information

sharing [55], [56]. The analysis of the knowledge diffusion mechanisms should be better developed both at the business unit/department level, as well as within and between the teams involved [53], [54]. Therefore, *what is the most effective CFI approach to store and diffuse the increasing level of knowledge available into departments? What are the implications of the increasing availability of data for the mechanisms aimed to share knowledge between departments?* While the literature has already proposed some best-practices to foster CFI at the business unit/department level, there is a need to explore the CFI best practices further to be adopted at the team level. In other words, *how can team collaboration be fostered between employees involved in a CFI initiative? What is the most suitable team composition for an effective CFI?* In connection with the research avenues of the red cluster, the role of organizational climate seems crucial for the CFI-NPD performance relationship [58]. As a result: *do we need to consider other moderators of the relation between CFI and NPD performance? What is the role of organizational culture in CFI at the team and the department level?*

There is also a need to explore the effect of involving other functions, such as operations, manufacturing, design, and purchasing in CFI initiatives [53]. Most of the contributions related to CFI are focused on marketing, R&D, and sales, while other forms of integrations still need to be explored. Therefore: *how can additional company functions be involved in CFI? What could possibly be their contribution to a better NPD performance?*

Furthermore, the need for additional comparative studies in different contexts has emerged. For example, the following questions need to be answered: *What could be the effect of CFI in a business-to-business industry and in a business-to-consumer industry? Is CFI characterized by the same success factors and effects in different sectors? Are the CFI's success factors the same for NPD and NSD?*

C. Blue Cluster: NPD and Corporate Strategy

The research gaps which need to be bridged within the blue cluster are primarily focused on finding a new and effective pathway to leverage the NPD process within the company's strategy. A first exciting research avenue is related to the theoretical understanding of dynamic capabilities' role within the NPD process [10], [61]. Some of the questions that need answering are: *what are the dynamics capabilities linked to and involved in the NPD process? How do the company capabilities interrelate with and influence the NPD process?* Furthermore, given that our findings show that the NPD process plays a crucial role in a company's strategy, we could provocatively ask: *can we consider the NPD capability itself as a dynamic capability?*

Concerning the ongoing debate on alliances, collaborations, and coopetition, while some best practices regarding when and with which partner to cooperate have already been proposed, there is still a need to explore more in detail this pivotal topic and provide more generalizable guidelines for managers [63]. Consequently, *are the timing and selection processes of partners similar across different countries and industries?* If not, *what*

are the differences and best practices that should be adopted in different contexts? About selecting a private or public partner to cooperate with, *can we propose a comprehensive set of best practices linked to the different stages of the NPD process?* If not, *under which conditions it is better to select a private or a public partner?* There is also a need to better explore and exploit the role of users in strategic collaboration and how their contribution can be integrated into a company strategy [64]. Therefore, *how could the capacity of a company to involve users be integrated into a strategic alliance aimed at codeveloping new products?*

Finally, the debate about the role that openness plays for NPD and company performance is in turmoil [67], [68]. In order to define best practices for managers, the relationship between openness and different levels of performance should be investigated, as well as contingency factors such as the industry, country, and the role of the institutions [98]. Straddling the red and the green clusters, contingencies concerning organizational culture, managerial style, level of market competition, type of CFI approach, and the technological turbulence should also be better explored, paying particular attention to their influence on the effects of company openness on the NPD performance [68]. Several replication studies are therefore needed to understand better and exploit the short-term and long-term effects of openness on the NPD and overall company performance, also in the light of the above-mentioned contingencies. Finally, there is a need to identify at which stage of the development process openness is positive for both the NPD and the NSD process beyond the idea generation stage [98].

D. Yellow Cluster: The Role of Users and Customers in the NPD Process

The studies in the yellow cluster have not bridged the two following main research gaps yet*: in which markets and conditions is cocreation a viable business strategy? How should a firm allocate its resources between internal NPD routines and cocreation activities in order to optimize the NPD performance* [12]? These two gaps raise three future research avenues: 1) *Where can firms find valuable users to involve in the cocreation processes?* 2) *Which kind of users should be involved in order to achieve a better cocreation performance?* and 3) *How can information be extracted effectively and efficiently from these users?*

Regarding the first subarea, a significant part of the above-mentioned literature focuses on involving users from online communities. However, there is still a need to investigate how these communities should be managed in order to facilitate the multiple user-to-user and user-to-producer interactions, thus maximizing the effectiveness of the community-based cocreation process [77]. Moreover, while users are certainly a valuable source of knowledge, little attention has been paid to the role of employees as a source of new ideas and a liaison between the company and its final users [99]. Furthermore, the intense attention paid to communities has resulted in scant attention to the role of individual users not belonging to communities. Exploring this role could provide fascinating insights into how

TABLE III
MAIN TOPICS DISCUSSED AND FUTURE RESEARCH AVENUES

Topics	Exemplary references	Future Research Avenues
Red cluster		
NPD best practices: rigid, sequential and hierarchical vs. flexible, unstructured, and open.	[30], [31], [34], [35]	• Moving from linear to flexible models; • The impact of Agile principles in no-software companies; • KPIs suitable to measure the impact of flexible models in the NPD process; • The impact of "soft" aspects on the NPD process; • Best practices for the NPD process outside the context of large companies; • Servitization of the products and their impact on NPD.
Contextual and contingent factors limiting the generalizability of linear approaches.	[29], [32], [33]	
Integration of NPD processes and structures within the organization of the company.	[39], [40]	
Contextualizing NPD in specific domains: small companies, family-owned companies, not for profit organizations, etc.	[41]–[44]	
New service development as a specific domain of studies.	[46]–[49]	
Green cluster		
Sharing knowledge within the company and across functional teams using IT tools.	[51], [52]	• Managing the increasing amount of knowledge flows between and within departments and teams; • Storing and selecting the right knowledge for the cross-functional units; • Team management best practices for cross-functional teams; • "Soft" moderators of CFI performance; • CFI best practices in different contexts; • CFI success in NSD.
Cross Functional Integration (CFI): organizing departments and SBUs for a superior NPD performance (macro-level).	[53]–[56]	
CFI: managing teams and fostering collaboration between members for a superior NPD performance (micro-level).	[57], [58]	
Knowledge of the market and market orientation for successful product launch and development.	[59], [60]	
Blue cluster		
Dynamic Capabilities theory and NPD.	[10], [11], [61]	• Further exploration of NPD as an independent dynamic capability; • Extended best practices for partners selections in trans-national and turmoil contexts; • Best practices for selecting between various form of collaboration, openness, public and private partners; • The intersection between strategy and CFI.
Strategic Alliances and Coopetition for a successful NPD process: managing partners, sharing knowledge, and organizing an effective collaboration.	[8], [9], [62]–[65]	
Open innovation and the NPD process: positive and negative outcomes of the company's openness.	[66]–[68].	
Yellow cluster		
Lead users and user communities: a critical look of their role in NPD and idea generation processes.	[13], [14], [71], [73]–[77], [84]	• Looking for the right users to be involved in the co-creation process; • Looking for alternatives to online communities and focusing on a comprehensive set of users; • When selecting between lead users and users with an "emergent nature"? • Contextualizing the automated tools considering the industry where they are used.
Automated machine learning tools to screen, capture, and classify ideas and needs from online users.	[78]–[81]	
Developing new services through usage: users' contribution to NSD and testing.	[82], [83]	
Purple cluster		
The critical role of suppliers in NPD.	[2], [86]	• Exploring the stages of the NPD process where suppliers play a critical role; • How to foster the suppliers' collaboration for radical innovation.
Managing the knowledge flows to and from suppliers and the role of suppliers in developing radical and incremental innovation.	[87], [89], [90]	

single final users–company daily interactions work regardless of the role of communities, for example, in the context of the selling points [100]. In this regard: *could a practice-based innovation approach to NPD be an effective method to find users to involve in the NPD process beyond the online communities* [101]?

In respect of who should be involved to achieve a better cocreation performance, lead users may provide a valuable contribution [74]. However, the rising importance of users with an emergent nature reopen the debate about who should be involved [84]. Promising research avenues need to investigate

the psychological facets of users' emergent nature and its effectiveness in different cultural, social, and economic contexts as well as the contribution of different degrees of emergent nature and their combination with other psychological traits of the user. Therefore: *under which circumstances should a company select a lead user rather than a user with an "emergent nature"?*

Finally, in terms of how to extract information from users effectively and efficiently, most of the research focuses on the development of effective automated tools based on machine and deep learning to extract information from users' online behavior. However, there is a need to investigate the relationship between online idea generation tools, the industry, and company performance. In other words, the following questions need answering: *could we extend automated tools to a broad spectrum of industries or are they effective in specific sectors only?* Moreover, *is the innovation performed in a given industry always reflected in online conversations* [81]? Although these tools have gone far beyond simple sentiment analysis, there is still a need to refine data processing algorithms in order to not only determine "the what," but also "the why and how" of users' behavior.

E. Purple Cluster: Supplier Involvement in New Product

Even if the purple cluster is the most stable in terms of papers and new research perspectives, there is a still need to clarify better the role of suppliers in fostering the success of breakthrough NPD projects and the related interorganizational relations aimed at promoting radical innovation [89], [90]. Unpacking the NPD process stages, the following questions become relevant: *which are the specific contributions of suppliers to radical innovation in the different phases of product design, testing, and commercialization? Which specific investments should suppliers and buyers make in the different stages of the NPD lifecycle? What specific capabilities should both suppliers and buyers develop for more effective collaboration in radical innovation projects?*

Finally, in the intersection between the purple and red clusters, there is a need to better map the industrial, organizational, and cultural contextual factors affecting the effectiveness of the supplier–buyer integration [2]. As a result, additional replication and comparative studies are needed to explore the industry-specific moderators, the cultural issues affecting the relationship between suppliers and buyers, and the organizational characteristics that foster a climate of effective supplier–buyer collaboration in the NPD process.

VI. CONCLUSION

In this article, we identified and reviewed the main contributions concerning NPD that the business and management literature offered over the last ten years (2008–2018) and proposed practitioners and scholars with some suggestions for further research to fill the existing gaps. Table III summarized the main topics discussed and the possible future research avenues within each of the five clusters analyzed in our review.

We focused on topics directly related to the management field, such as the development of best practices to manage NPD, the management of knowledge required to create new products, the NPD process's role in the business strategy domain, as well as end-user and supplier involvement in the process of designing and testing new products. The main limitation of this article is that specific literature gaps have not been addressed due to the limited available space. However, given the size of the field, we picked the most relevant and impactful areas of research, highlighted the major unsolved issues, and suggested possible approaches to tackling these. Our intention is and was to offer scholars useful insights for their future contributions to the topic of NPD.

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