

Bibliometric Analysis on Product Innovation

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ABSTRACT

This paper examines the idea of product innovation, highlighting the vital role it plays in promoting technical developments, increasing competitiveness, and accelerating economic progress. The article provides the numerous definitions and classifications of innovation put forth by different researchers through a thorough analysis of the literature. The neo-Schumpeterian paradigm is used to analyze the distinction between invention and innovation as well as the classification of innovations based on their nature and impact. Furthermore, the discussion revolves around the importance of the product life cycle in comprehending innovation dynamics. Using the Web of Science (2024) publications database, research trends from 2014 to 2022 are analyzed. Notable contributions from prestigious academic journals show a consistent rise in scholarly interest. This study emphasizes the significance of product innovation in academic research and practical implementation while offering a theoretical framework for comprehending its complex character.

Keywords: product innovation, strategies of success in innovation, bibliometric analysis, dimensions of product innovation.

1. Introduction

The notion of product innovation has been thoroughly examined in scholarly works, demonstrating its pivotal function in propelling economic expansion, augmenting competitiveness, and cultivating technical breakthroughs. Nonetheless, there is still diversity and complexity in the definition of innovation since different academics from different fields place emphasis on different aspects of the idea according to their own viewpoints.

According to Biemans (1992), there is variation in the definition of innovation, with different authors emphasizing different features that they deem most essential. This variety highlights how intricate the idea of innovation is. Under the neo-Schumpeterian paradigm, Roberts (1988), for example, distinguishes between invention and innovation, holding that the former is the generation of new ideas, while the latter entails the use and exploitation of these ideas in real-world contexts to produce value.

The categorization of inventions enhances our comprehension even further. Karlsson (1988) explored standard product and process innovation categories. Thom (1990) expanded these by introducing social innovations. This inclusion emphasizes how innovation affects society more broadly than just advancing technology. Additionally, it is clear that many forms of innovations are interdependent as advancements in manufacturing techniques frequently result in changes to products (White et al., 1988).

The article aims:

1. To conduct a bibliometric analysis of articles focusing on product innovation in business and management and to identify main clusters of keywords.
2. To provide a theoretical justification of product innovation performance on business development.

2. Literature Review

Technological improvement, competitive advantage, and economic expansion are all significantly influenced by product innovation (Babina et al., 2024). The idea covers a broad spectrum of tasks, from coming up with original ideas to putting them into practice and making them profitable. Owing to its complexity, product innovation has been thoroughly researched in a wide range of academic fields, producing a substantial yet intricate body of work. This section examines significant contributions made to the area, emphasizing various viewpoints and classifications of innovation and looking at how research patterns have changed recently (De Backer et al., 2017).

2.1 Definition of Product Innovation and Its Development

The term "innovation" is not universal. "Every writer presents a new definition, emphasizing the elements he or she deems relevant," as noted by Biemans (1992, p. 6). Roberts (1988) draws a sharp contrast between invention and innovation in the context of neo-Schumpeterian thought. He claims that invention involves the creation of an idea, whereas innovation combines exploitation and invention. Elam (1993, p. 102) defines innovation as *"the combining of materials in a novel fashion to produce other things, or the same things by a different method,"* according to the same tradition. Urabe (1988), however, contends that an invention must, by definition, also lead to a favorable development, such as an expansion of the national economy, a rise in employment, or the inventive enterprise's only profit.

Thom (1990) adds a third category, social innovations, which includes various advancements in human resource management, to the most widely used classification of innovations, which is likely the distinction between product and process innovations (Karlsson, 1988). These many kinds of innovations, however, do not always occur independently; for example, improvements made to the manufacturing process typically result in modifications to the final product (White et al., 1988; Utterback & Abernathy, 1975).

The degree of "radicalness" of the innovation serves as another categorization factor. There are four distinct types (Freeman, 1992):

- i) Incremental innovations, which happen almost continuously and have little effect on the economy (Noone et al., 2024).
- ii) Radical innovations are abrupt occurrences that bring forth significant advancements in technology (Naranjo - Valencia et al., 2017).
- iii) New technological systems are collections of inventions that have significant effects on the economy and a significant level of advancement in technology.
- iv) Shifts in the techno-economic paradigm that profoundly transform society as a whole and happen gradually.

These lengthy waves are comparable to the 50–60-year Kondratieff cycles proposed by Josef Schumpeter in 1939 when new technologies render whole industries obsolete through a process known as "creative destruction," a Kondratieff cycle results.

A new techno-economic paradigm, or a new method of approaching science, is the outcome of this process, and once it is established, progress proceeds down a new technical path (Nelson et al., 1977). The existence of technical trajectories suggests that creative endeavors are extremely focused and narrowly focused.

It is also essential to comprehend the life cycle of the product in order to comprehend the nature of product innovations (Sahi et al., 2023).

Vernon (1966) makes the assumption that a product goes through an innovation phase, which is a time of adaptation and improvement after it is launched—a growth phase, a maturation phase, and ultimately, a decline phase after this.

Accordingly, the product life cycle hypothesis proposes that the majority of product development takes place in the initial phases of a product's existence. Utterback and Abernathy (1975) advanced this notion further by asserting that process development peaked at the product's maturity phase.

2.2 Review of Product Innovation in Publications

Web of Science (2024) publications database has 137,230 papers and publications with the keyword "Product Innovation." The results can be categorized into sections, e.g., by year over 6 years from 2017 to 2022. A positive trend from 2014 up to 2022 can be observed in Table 1 below.

2021, researchers' focus on the topic started to shift. The highest number of publications, 20,382 units, was in 2022. In 2023, there has been a slight decline in publications for the first time since 2014, with 19,134 units.

Table 1: Number of publications on Product Innovation (Source: Web of Science (2024) publications database using the keyword "product innovation")

Year	Number of publications
2023	19,134
2022	20,382
2021	18,941
2020	16,746
2019	15,097
2018	11,879
2017	10,765
2016	9,247
2015	7,840
2014	7,183

As shown in Table 1, the number of publications increased gradually from 2014 till 2022. Following Figure 1 shows the 10 journals with the highest publications showing the "product innovations" keywords.

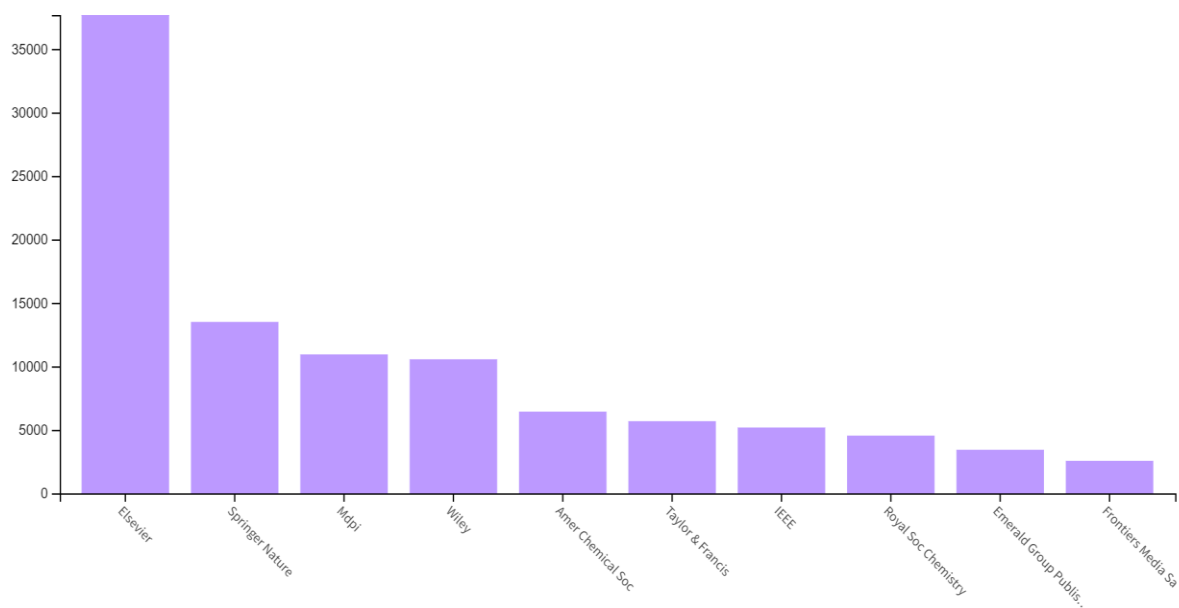


Figure 1: Publications by Journal Title

The leading journal with 37,675 publications, which accounts for 27.45% of the 137,230 publications found, is *Elsevier*. *Springer Nature* is in second place with 13,502 publications (9.84%), *Mdpi* is in third place with 10,945 publications (7.98 %), *Wiley* is in fourth position with 9,489 publications (7.43%), and *Amer Chemical Soc* is in fifth place with 6,435 publications (4.69%). These are the main journals publishing papers in the field of research. *Frontiers Media Sa* is at the bottom of this ranking, in 10th place, with 2,560 publications (1.87%).

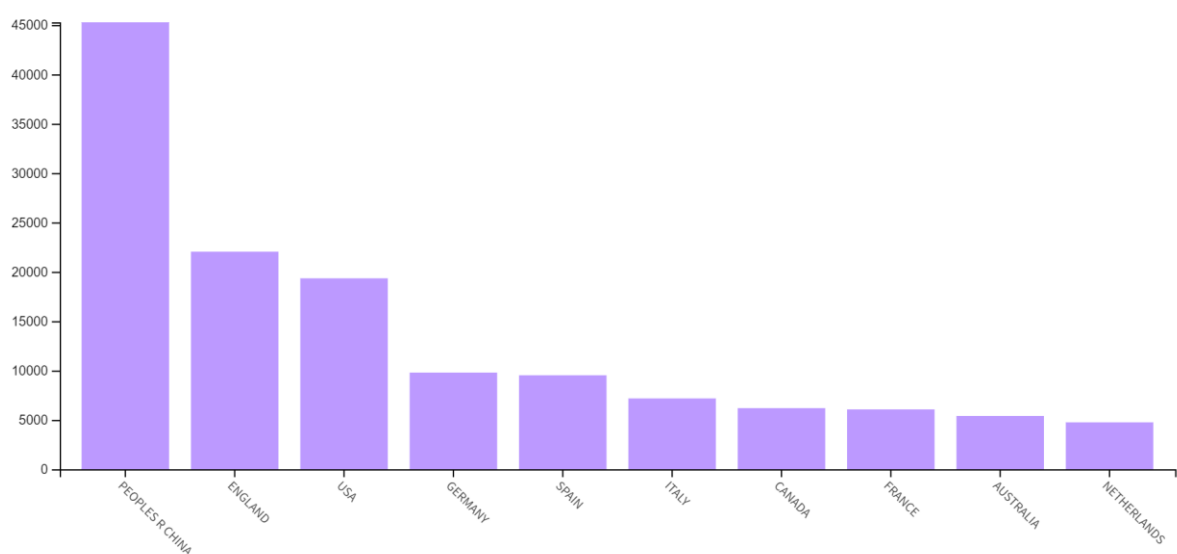


Figure 2: Publications by Country

The highest contributor is China, with over 45,271, forming 32.98 % of 93,810 publications found. The second place is taken by England, with 22,036 (16.05%) publications found. The USA takes third place with 19,336 (14.09%) of publications found. Germany is ranked fourth with a share of 9,790 (7.13%) of publications. In fifth place is Spain, with a record count of 9,519 (6.93 %). Italy ranks sixth with 7,174 (5.22%) of publications found. Canada, France, Australia, and the Netherlands occupy the seventh to tenth place, respectively, with 6,189 (4.51%), 6,060 (4.41%), 5,398 (3.93%), and 4,751 (3.46%) of the publications found.

Table 2 sources the number of enterprises that introduced new or improved processes by type of innovation, NACE Rev. 2 activity, and size class 2018 and 2020 (Eurostat, 2024).

Furthermore, this paper calculates the correlation coefficient between the number of product innovative enterprises and the number of publications across the countries for the years 2018 and 2020. The countries are alphabetically ordered in Table 2.

For the years 2018 to 2020, there is a 0.48 correlation coefficient between the number of product innovative firms and the total number of publications across countries France, Germany, Italy, the Netherlands, and Spain. The moderately positive association between the number of publications and the number of product-innovation firms is indicated by a positive relationship. This suggests that the number of product-innovation-driven businesses tends to rise in parallel with an increase in publications.

The association suggests that although there is a tendency to link more publications to more innovations in products, impacting innovations in products.

It is crucial to keep in mind that a correlation does not imply causation. It is not shown that growth in publications leads directly to an increase in innovative enterprises, even though the evidence indicates a favorable association between publications and innovative enterprises. There are other elements and factors that play significant roles.

Table 2: Publications by Journal Title

Year	Country	Number of enterprises applying Product Innovation	Number of publications
2018	France	23,274	580
	Germany	59,29	913
	Italy	43,159	610
	The Netherlands	7,455	424
	Spain	10,298	678
2020	France	15,8	743
	Germany	57,194	1,230
	Italy	35,535	892
	The Netherlands	7,996	590
	Spain	13,212	1,210

The information is consistent with the theory that, although the association is modest and other factors might be at work, product innovations tend to rise in parallel with an increase in publications.

Figure 3 below also shows the analysis of Web of Science (2024) of the publications with the "Product Innovation" keyword from 2017 to 2022 based on Web of Science Categories. The results are meant to explain key aspects that publications on product innovations relate.

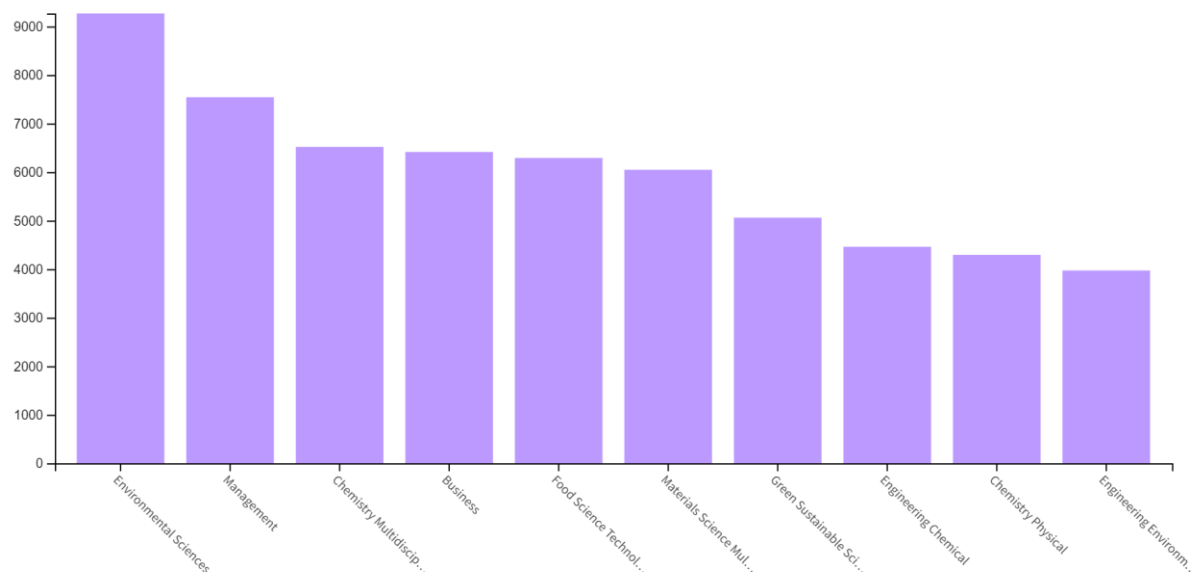


Figure 3: Research areas (Source: Web of Science (2024) publications database result analysis using the keywords "product innovation" from 2017 to 2022)

As shown in Figure 3, Environmental science has the highest relevance, with over 9,000 occurrences suggesting that the main focus of publications on product innovations concerned Environmental science. The second aspect that publications mainly focused on is management, showcasing the academic focus on product innovations in managerial aspects with nearly 8,000 occurrences. The third aspect concerning academic writers on product innovations is Chemistry. Chemistry is Multidisciplinary, with nearly 7,000 occurrences. The fourth aspect attracting academic publications is business, with over 6,000 occurrences. Food science technology, Materials Science Multidisciplinary, Green Sustainable Science Technology, Engineering Chemical, Chemistry Physical, and Engineering Environmental rank relatively in the fifth to tenth place, with 6,290, 6,046, 5,059, 4,460, 4,293, and 3,971 occurrences in the publications.

Figure 3 categorizes publications with the keyword "product innovations" over the period from 2017 to 2022 by countries showcasing the top ten countries publishing research with the keyword "product innovations." The top ten countries contributed 98.47% of the publications for the 6 years period from 2017 to 2022.

The highest contributor is China, with over 31,217 contributing to 33.27 % of 93,810 publications. The second place is taken by England, with 14,577 (15.53%) publications found. The USA takes third place with 13,084 (13.94%) publications found. Germany is ranked fourth with a share of 6,779 (7.22%) publications. In fifth place is Spain with 6,435 (6.86 %) record count. Italy ranks sixth with 4,979 (5.30%) of publications found. France, Canada, Australia, and the Netherlands occupy the seventh to tenth place, respectively, with 4,243 (4.52%), 4,089 (4.35%), 3,753 (4%), and 3,222 (3.43%) publications found.

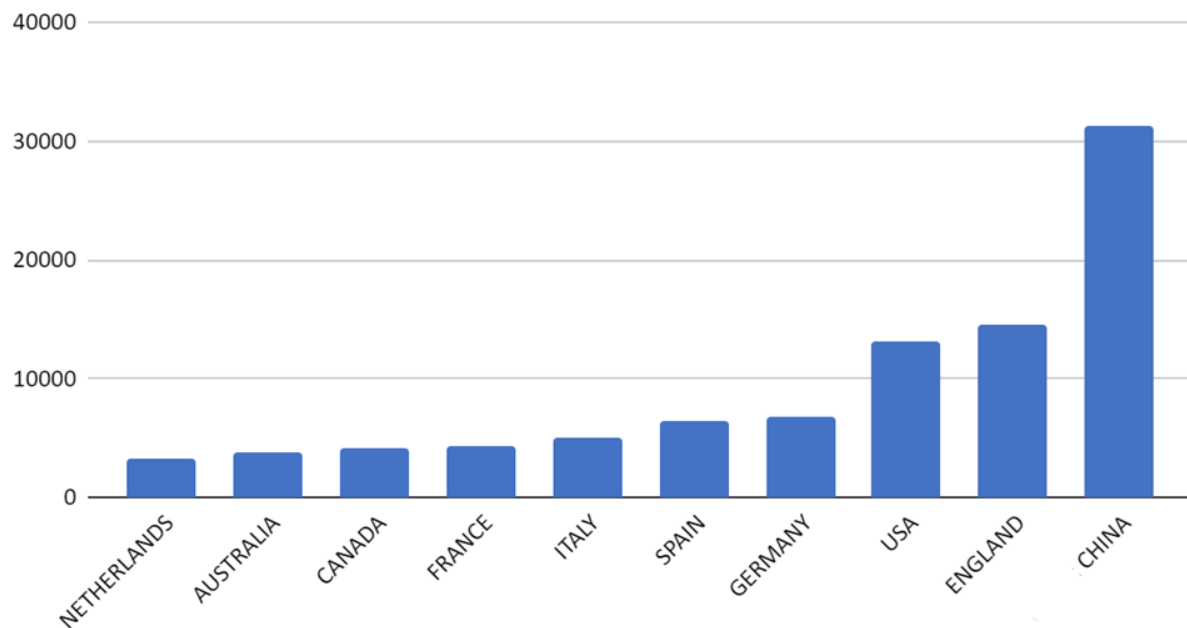


Figure 4: The countries of publications authors (Source: Web of Science, 2024)

3. Importance of Product Innovations in Business

Product innovation plays a pivotal role in boosting commercial achievement by impacting an organization's capacity to compete, expand, and adapt to evolving market circumstances. Businesses that innovate will have a greater advantage over their competitors as they can better seize emerging opportunities and adapt to changing consumer demands (Gyau et al., 2023). As an illustration of the transformative potential of innovation, companies such as Apple have used radical breakthroughs, like the launch of the iPhone, to redefine and open up new markets (Rösch et al., 2023).

Higher customer satisfaction and loyalty can result from product creation that takes into account the demands and preferences of the customer (del Rosario et al., 2017). Businesses can produce goods that better satisfy consumer expectations, increase retention rates, and build enduring connections by implementing customer-centric techniques that include feedback and insights into the innovation process (Tuominen et al., 2022). This customer-focused strategy promotes positive word-of-mouth and referrals in addition to improving the entire customer experience and sustaining business growth.

Product innovation also enhances profitability and financial success. Profitability can rise, and new revenue streams can be created by introducing creative items. Businesses can enhance their value proposition and promote customer loyalty by applying incremental innovations, which enable them to make minor but significant improvements to current products. However, despite carrying greater risks, radical and disruptive inventions have the potential to open up whole new markets and income streams and bring in large sums of money.

Additionally, innovation increases a company's flexibility and resilience. Companies can ensure long-term viability by anticipating and adapting to future trends more effectively by regularly updating their product offers. In the fast-paced corporate world of today, when consumer preferences and technological breakthroughs are always changing, adaptability is essential (Ramdani et al., 2019). Furthermore, companies with a reputation for innovation tend to draw and hold on to top individuals.

Workplaces that are innovative and dynamic encourage loyalty, job satisfaction, and employee engagement. Organizations that place a high priority on innovation frequently give staff members the time and tools they need to experiment with new concepts, which results in a more driven and effective workforce (Zeb et al., 2021).

Product innovation also contributes to the growth and development of organizations. A company can expand its market reach and increase its tolerance for risk by launching new products and services. Furthermore, innovation can result in the creation of fresh business plans, which boost expansion and profitability even more (Tuominen et al., 2022; Ramdani et al., 2019).

These observations have been confirmed by academic research, which emphasizes the many advantages of product innovation. Developing innovative abilities and ensuring that products satisfy consumer needs depend heavily on customer orientation and relationship management (Tuominen et al., 2022). Additionally, iterative problem-solving techniques and design thinking are crucial for developing an innovative culture in businesses (Rösch et al., 2023).

The Web of Science (2024) database provided the information needed for this bibliometric study. The research focuses on articles on product innovation and spans publications from 2014 to 2022. Based on inclusion and relevancy criteria, including keywords and topic areas related to product innovation, a total of 639 articles were chosen.

Text mining techniques were employed to identify and extract keywords from the chosen articles. To determine each keyword's relevancy and thematic grouping, data on its frequency and co-occurrence with other terms was gathered.

Clustering: Fundamental Aspects, Impact and Capacity, Competitive and Financial Aspects, and Dynamics and Challenges were the four main clusters into which the keywords were divided. Utilizing network analysis techniques, the keywords were clustered to identify theme regions within the product innovation industry.

Cluster Analysis: Keywords were grouped into theme groups using clustering methods like k-means and hierarchical clustering.

Network Strength: In network diagrams, the co-occurrence frequency of keywords—shown as thicker lines—was used to estimate the strength of the relationships between them.

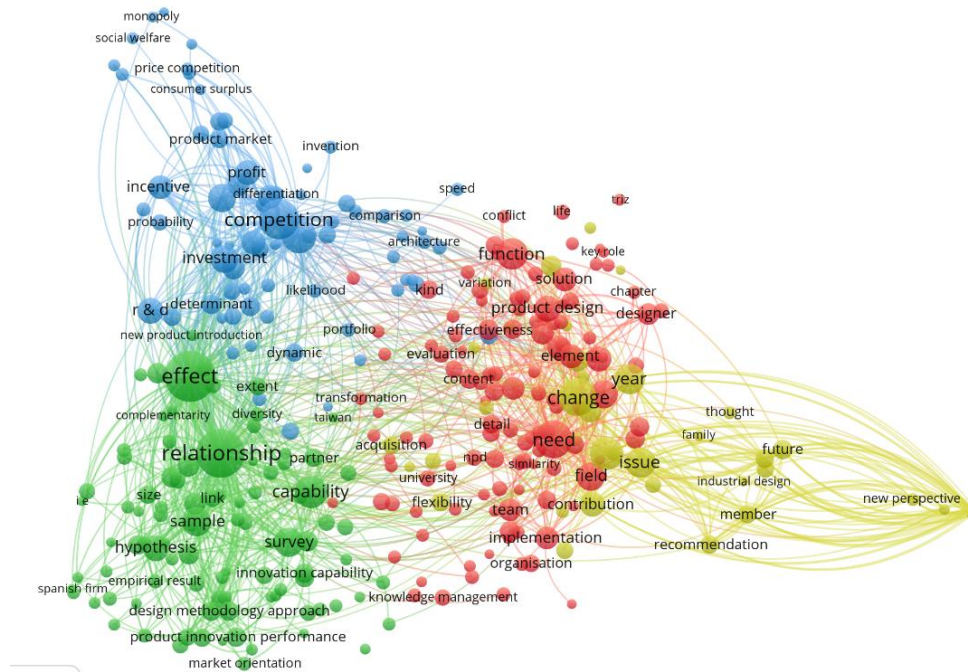


Figure 5: Bibliometric map

A bibliometric analysis was collected from 639 articles and 327 keywords, which were divided into 4 clusters. Articles were selected from the Web of Science (2024) publications database, whose keyword is "product innovation." The lines indicate the links among keywords. The strength of links specifies the number of publications in which two keywords occurred together; thicker lines indicate stronger links. The sizes of the circles show the importance of keywords. The same colors of circles show that keywords belong to the same cluster.

Table 3: Keywords in formed clusters

No of cluster	Keywords	Number of Links	Occurrence	Strength of links
1	Fundamental aspects	566	174	1241
	need	220	78	575
	field	187	44	353
	function	159	52	313
2	Impact and capacity	754	319	2491
	relationship	271	126	1034
	effect	263	136	971
	capability	220	57	486
3	Competitive and financial aspects	553	191	1304
	competition	205	85	520

	cost	195	64	468
	investment	153	42	316
4	dynamics and challenges	630	188	1498
	change	221	77	593
	opportunity	214	60	465
	issue	195	51	440

Table 3 shows the top 12 keywords in the articles that were collected from the Web of Science (2024) with the topic "product innovation." The keywords are divided into 4 clusters, and they are filtered based on the number of links, occurrence, and strength of links. The keyword "need" has the highest strength links in the first cluster, followed by the field and function relatively.

The keyword "relationship" has the highest strength of links in cluster 2 with a score of 1034, and then effect and capability. In cluster 3, the keyword "competition" has the highest strength of links, followed by "cost" and "investment." The keyword "change" ranks the highest in cluster 4, followed by opportunity and issue.

Once the most common terms in the cluster are examined, each section of the topic can be separated into several clusters. The strong number of leverage (links) represents the distinct topic areas and relationships that each cluster has with other clusters. We can have a better understanding of the subjects that are discussed and examined more in-depth in contemporary business because of this examination. For instance, there is a clear relationship between the "Fundamental aspects" cluster and the needs, fields, and functions of the second cluster. In addition, "Impact and capacity" is a very wide research topic being discussed in the cluster; it shows the keen interest that academic publications have in this problem.

Each cluster is important in the analysis, and the strength of leverage links allows for understanding the topics that are especially important in today's business environment or require deep research.

Figure 6 shows four of the most important keywords, explained below.

Impact and capacity: links 754. It indicates the connections or associations between different elements of innovation, the outcomes or consequences of innovation, and the ability or capacity to innovate

Dynamics and challenges: links 630. Research in this cluster may include the need for adaptation and evolution in innovation, the potential advantages or openings created by innovation, and the challenges or problems encountered in innovation.

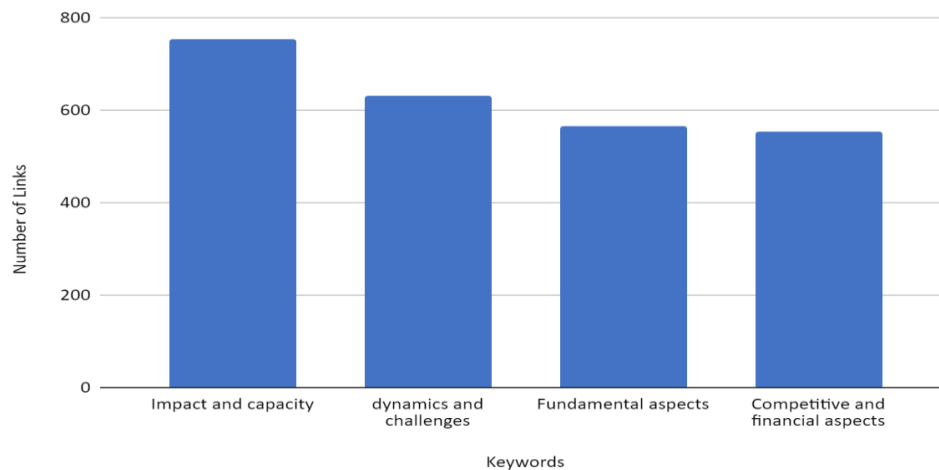


Figure 6: Keywords with the highest number of links

Fundamental aspects: links 566. This keyword indicates the necessity or demand for innovation, the area or domain in which innovation is taking place, and highlights the role or purpose of the innovation.

Competitive and financial aspects: links 553. This keyword highlights the competitive landscape and challenges in innovation, the financial implications and expenses associated with innovation, and the resources allocated for innovation.

4. Dimensions of Product Innovation

Different dimensions of the product performance were investigated to better analyze the performance of a newly introduced and innovative product. Three independent and strong dimensions that summarize the performance of a new product were identified using factor analysis. These dimensions are as follows.

Financial performance indicates the product's overall financial performance. This dimension includes payback duration, profitability level, fulfilling profit and sales targets, and relative profits and sales.

The opportunity window illustrates how the new product gave the company access to new product categories and markets, hence creating new opportunities.

Market impact refers to the product's effect on both home and international markets, including domestic market share and foreign market share. It also, to a lesser extent, discusses relative sales and achieving profit and sales targets (Cooper & Kleinschmidt, 1987).

4.1. Financial Performance

The study found that project definition, product superiority, and synergy are key to strong financial performance in new products. Key components include a superior product, a well-defined project, and strong technological, management, and marketing synergy. However, non-components like market size, growth, competition, and customer importance were not strongly tied to financial success. Product advantage was key, but other common characteristics like advanced technology, industrial design, innovation, unique task capabilities, or lower pricing were not decisive (Cooper & Edgett, 2005). Figure 7 shows 6 different preferences that have the same importance on financial performance.



Figure 7: Financial performance (Cooper & Kleinschmidt, 1987)

4.2. Opportunity Window

Some new goods were deemed successful because they gave the company access to new markets or product categories, creating new opportunities. What elements make up these kinds of success stories?

- Introducing a product that enabled the customer to perform a unique task.
- Entering a market where customers' needs and wants for products in this category were changing quickly.
- Entering a product category or market that featured many other new product introductions.
- Introducing a product that solved a problem the customer was having with a competitive product.
- Introducing a product that made use of new or advanced technology in its design.

Success elements in a market or industry that is changing or dynamic seem to center on the uniqueness of the product—that is, how well it performed a specific task or resolved a client's issue—as well as the introduction of numerous products, new and cutting-edge technology, and shifting consumer requirements. The opportunity window was unrelated to any of the synergy metrics, project description, or protocol measures (Utterback & Abernathy, 1975).

Figure 8 shows that Window on new product and Sales opportunity have the highest importance.

4.3. Market Impact

The third performance dimension, market impact, is influenced by new products achieving high market shares both domestically and internationally. Success factors are primarily product advantage, with five of the seven major components describing the product itself. External conditions like market size and growth rate have little impact on market share. Project definition or protocol is moderately linked to market share, with defining customer needs and preferences correlated with market impact (Cooper, 2006). Figure 9 shows that domestic market share is the most important element in analyzing market impact cases.

Importance

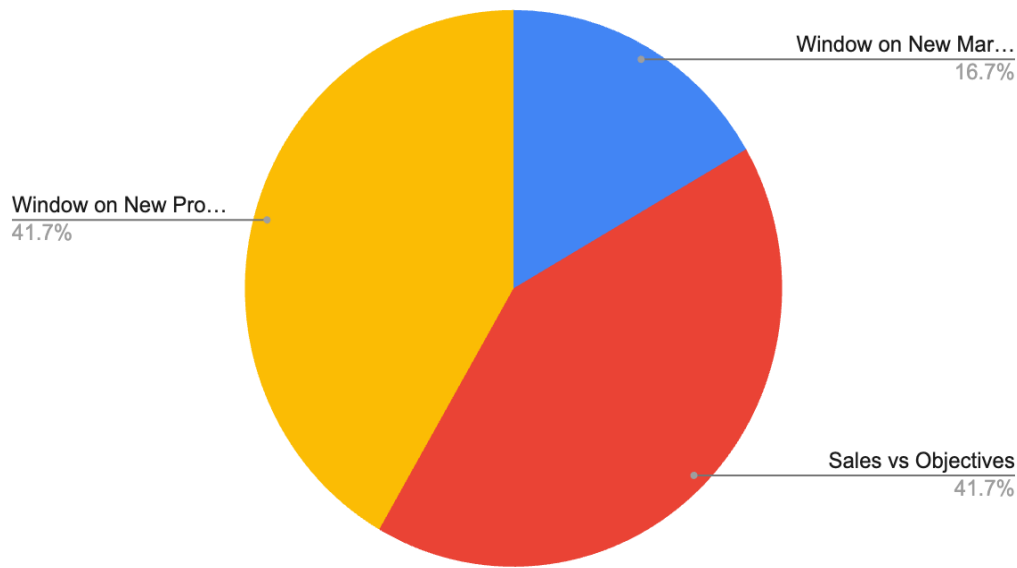


Figure 8: Opportunity window (Cooper & Kleinschmidt, 1987)

Importance

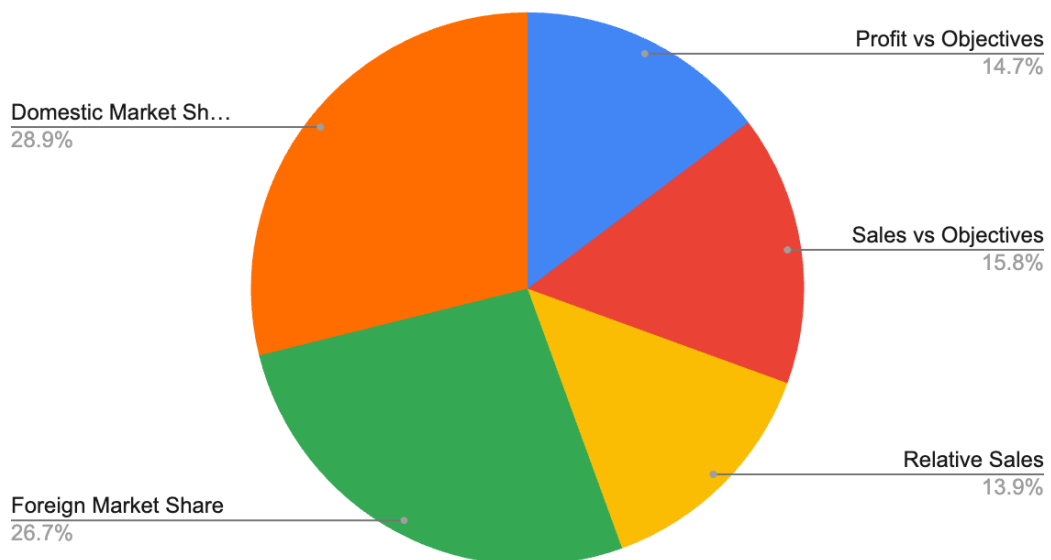


Figure 9: Market impact (Cooper & Kleinschmidt, 1987)

4.4. Product Performance

Three pillars of high-performing enterprises were identified in the benchmarking research of 160 businesses with regard to new product performance:

1. Having a new product process that functions as a tactical road map or template to get new product initiatives onto the market in a timely and effective manner.

2. Resources: having enough money set out for product innovation as well as the appropriate resources.
3. Developing a new technological and product strategy for the company.

The first two are recognizable. However, the majority of organizations were far too often lacking the third element—having a product innovation and technology strategy for their business. The survey revealed that, on average, firms in the study received unsatisfactory rankings for the clarity of their goals, the definition of their strategic emphasis areas, and the long-term direction of their new product activities (Cooper, 2005).

5. Strategies of Success in Innovation

There are two main strategies for successful product innovation. Doing projects correctly is the first step, and doing the proper projects is the second.

Numerous project-level success variables have been identified by research conducted over the past 20 years. It has been discovered that some practices, such as using real cross-functional teams, incorporating consumer feedback, completing homework ahead of time before the development stage, and creating a clear, concise, and stable product definition, all have a favorable effect on the results of new products.

Selecting the appropriate projects is a crucial aspect of research that is sometimes overlooked in traditional methods. According to one manager: "Even a blind man can get rich in a goldmine by swinging a pick-axe; it's not so much how you mine the trick is picking the right mine!" It follows that the secret to success is both project execution (performing projects correctly) and project selection (doing the proper projects).

Throughout the 1990s, completing projects correctly has been emphasized about the creative process. Approximately ten to twelve key success elements that are related to the actions (or, much too frequently, inactions) of the project team have been identified by research.

Many competitors have thus looked to innovative product methods as the solution. As per the most recent best practices report by the PDMA, "the majority of the firms surveyed use Stage-Gate in one way or another." By outlining a plan from conception to implementation, project teams are supposed to incorporate these success criteria intentionally rather than by accident (Cooper, 2005).

6. Productivity in Product Innovation

According to recent data, productivity in new product development (NPD) is reportedly dropping; that is, at a certain relative spending level, there is a decrease in production (as assessed by the impact on the firm).

Based on research on NPD practices and performance, this article presents seven practices or principles that, when adopted, will boost NPD productivity.

These guiding ideas include well-known ideas like incorporating consumer feedback, front-end loading initiatives, and approaching product creation from a more comprehensive standpoint. Even though they are well known, it is astonishing how few businesses have adopted them. Other less well-known ideas include using spiral development as opposed to linear development, incorporating metrics, team responsibility, and continuous improvement, and using portfolio management strategies to produce projects with more value.

Lastly, some of the top performers are revamping their idea-to-launch procedures and switching to the next-generation Stage-Gate system. They also use lean manufacturing techniques to cut waste out of their development processes and make them more flexible, scalable, adaptable, and externally facing (Cooper & Edgett, 2008).

Productivity in product innovation is defined as output minus input, or expressed as "the most bang for the buck." More precisely, productivity in the context of new product development is defined as the product of input (measured as R&D expenses) divided by output (measured as new product sales or profits).

There are not many precise statistics on productivity because the idea is still relatively new in business. In fact, hardly any businesses track or report their R&D as a business statistic, according to best-practices research conducted by the American Productivity and Quality Center (APQC). However, there is compelling evidence that productivity in product innovation is declining. According to the most current Product Development & Management Association (PDMA) best-practices survey conducted in the US, new product sales are down during a time when R&D investment has stayed stable: from 32.6 percent of the company's overall sales in the mid-1990s to 28.0 percent by 2004, new product sales declined. Meanwhile, USA R&D investment stays constant; for instance, it was 2.76 percent of GNP in 1985 compared to 2.70 percent in 2004. That is a sharp decline in NPD productivity of 14% in less than a decade in terms of output per outlay (Hippel, 2005).

It is concerning that there has been such a notable decline in a short period. What is happening? There is no proof that individuals are performing poorly nowadays, not even in terms of subpar market research, design and development work, or product launches. In fact, there has been no change in the quality-of-execution scores when comparing the major activities from initial screening to market introduction between 1985 and now. However, there is another reason for concern: product developers have not raised the quality of execution at a time when most analysts feel they ought to have (Adams & Boike, 2004).

The balance of projects performed now compared to 1990 is the one component that does, however, exhibit a major change and explains the decline in profitability, impact, and productivity.

Product development has taken a backseat as organizations focus more on little product changes, adjustments, and small reactions to salespeople's demands (Lilien & Morrison, 2002).

7. Conclusions

To sum up, the analysis of product innovation in academic literature emphasizes how important it is for promoting technical developments, increasing competitiveness, and accelerating economic growth. There is agreement that innovation is complicated and multifaceted despite the differences in definitions and focus between researchers. A thorough grasp of this idea is provided by the neo-Schumpeterian paradigm's distinction between invention and innovation, as well as the categories of innovation kinds and their effects on society and technology.

The Web of Science (2024) database shows an increasing trend in papers on product innovation, which highlights the field's growing relevance and attention over the previous ten years. This pattern suggests that the academic community is actively investigating and broadening the scope of innovation research. The intricacies of innovation and its consequences for company development are further clarified by the thorough classification of innovation kinds and the examination of product life cycles.

Overall, this extensive body of research not only deepens our theoretical understanding of product innovation but also highlights its practical significance in shaping economic and technological landscapes. The dynamic and complicated character of innovation in diverse contexts will require constant theoretical investigation and study as the area develops.

This study has a limitation. The latest data available at Eurostat was for 2020. However, in the next research, the authors may use updated data from the Eurostat and present more contemporary insights for the readers.

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