# A Bibliometric Review of Brand and Product Deletion Research: Setting a Research Agenda

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*Abstract*—In order to succeed in today's dynamic and competitive marketplace, it is of paramount importance for firms to manage their brand and product portfolios such that they not only create or acquire new brands/products, manage the existing ones, but also delete the ones that are underperforming. Brand/product deletion is an important but daunting strategic choice for firms. It deserves focused academic research attention, especially theory development, due to the fragmented nature of the literature in this field. This article conducts a comprehensive bibliometric review on relevant publications in the brand/product deletion literature with an aim to provide insights into the field's current intellectual structure and thematic classification of the published studies, and offers avenues for future development of this critical area of strategic brand and product management.

*Index Terms*—Bibliometric review, brand deletion, intellectual structure, product deletion, service elimination, supply chain management.

## I. INTRODUCTION

"Much has been written about managing the development and marketing of new products, but business literature is largely devoid of material on product deletion" — Alexander, [3], p. 1.

" … organizations generally tend to devote relatively less managerial time, attention, and effort to the question of what to delete. Similarly, extant marketing literature focusing on innovation and new product development is quite extensive but relatively sparse on issues relating to product and brand deletions" — Varadarajan, Defanti, and Busch [117], p. 195.

THE two quotes above tell the tale of a strategically important domain of brand and product management which, despite its strategic, financial, and operational benefits, is generally a neglected strategic choice in practice and a sparsely researched topic in academia. Until the 1960s, there was no academic research paper about deletion. By the late 2000s, the field had progressed relatively; though this development was gradual, scattered over time, and dispersed in varied themes. The brand/product deletion strategy is of paramount importance in the brand and product management strategic toolkit. When a firm decides to delete a weak brand/product, resources dedicated to that weak brand/product are redeployed to bolster the value of strong brands/products in the firm's portfolio [103], [117]. With the deletion of underperforming brands/products, firms can not only reduce costs and improve profits but also reduce process complexities and dilution of brand portfolio value [1], [48], [67], [69], [95].

Despite these advantages, managers are reluctant to delete brands/products from their portfolios because it is a complex, challenging, controversial, and daunting task [69], [107]. Managers fear the reactions from various stakeholders involved, especially customers, channel partners, and the media [102], [104], [117]. However, if managed well, brand/product deletion brings several gains for the firm as discussed above. Given, its practical importance, this domain deserves more systematic research attention. Finance, marketing, operations, supply chain, human resources, and strategy research can all inform and be informed by research on this cross-functional strategic decision.

Although from the 1960s to 2020 many scholars have investigated this field and provided answers to many important questions, the marketing landscape has changed drastically since the 1960s and it continues to advance every day. There still remain many mysteries to unfold and several questions to address in the domain of brand/product deletion. The intellectual structure and current and emergent topics in this field are still relatively underdeveloped. This article seeks to answer the following research questions: 1) how has the field evolved and what research has been done? 2) where does the field currently stand and how can the field progress and mature? and 3) what additional research opportunities exist in this field and what directions might they take? Methodologically, a bibliometric review can help to address these research questions.

In order to understand what is known and what further needs to be known in a research domain, it is imperative to first understand the evolution or intellectual history, the state of scientific knowledge, and the intellectual structure of this field. With this purpose and contribution in mind, this article conducts a bibliometric review of the contributions made in the brand and product deletion literature and based on these

insights, offers ideas for further developing research in this field. A comprehensive evaluation of 96 most relevant published studies and cross validation across three major scientific databases is conducted in this bibliometric review. The findings set the stage for thematic classification of the published works and the evolution of this field since its inception in the 1960s.

The rest of this article is organized as follows. Section II describe: an overview of brand/product deletion literature. Section III describe an elucidation of the structured methodology including data collection, preprocessing, and refinement. Section IV presents an illustration of the bibliometric findings using relevant visualizations. Section V describe the discussion of future research areas and implications of this artice. Finally Section VI concludes this article.

## II. Brand/Product Deletion Literature

Brand/product deletion is the strategic choice of a firm to discontinue, remove, or withdraw a brand or product from its brand portfolio or product line [20], [107]. One might think that brand/product deletion is a strategic decision for only mature brands/products. From this perspective, deletion decisions are taken in the decline stage of a brand/product life cycle. However, brand/product deletion can occur in any stage of its lifecycle. For example, new product failure could lead to the brand/product being deleted in its introduction stage itself [21]. The decision to delete a brand/product is as crucial as the decision to introduce a new one. It is an advantageous for firms to delete weak brands/products from their portfolios because this can help firms reduce hidden costs, boost their profits, and avoid dilution of the brand/product portfolio [67], [69], [103]. Despite these strategic advantages, managers are reluctant to delete brands/products from their portfolios because it is a complex strategic decision and impacts customers, competition, and financial performance [104]. This field has received research attention since early 1960s; however, it has remained scattered over time with paucity of research involving theory building, robust empirical investigations, causal studies, and models for managerial decision-making.

The development of a field can be categorized into the following four stages.
1) Gestation and Innovation.
2) Development and expansion.
3) Institutionalization.
4) Maturity [56], [92].

In brand/product deletion literature, stage I began in 1960s with two papers—Alexander [3] and Kotler [67]. In the 1970s, several authors proposed varied decision-making models to facilitate and improve PD decisions in firms (e.g., Hamelman and Mazze (1973); Banville and Pletcher [26]; Evans [51]). Stage I involved the introduction and description of the deletion strategy and challenging the view that only adding and managing existing products well can bring financial gains for the firm. The practical and strategic role of deletion in brand and product portfolio management was introduced and highlighted in stage I, and models to facilitate deletion decisions were proposed. Empirical investigations are absent in this stage.

Stage II began in the 1980s when George J. Avlonitis published his dissertation [12] and conducted a stream of empirical research (though exploratory in nature) highlighting many facets of *product elimination*. Around the same time, with Levitt [72], firms started realizing the demerits of product proliferation and set out to delete redundant underperforming brands and products from their portfolios. This stage continued with the extension of this field into the service industry. Paraskevas Argouslidis led this substream of research on *service elimination*[1] in the early 2000s, which again was initiated through his dissertation [7]. Along with him, David Harness also contributed to this substream of service elimination research. Thereafter, in the past decade, this field further gained momentum into brand deletion with a dissertation [101] and several research studies conducted by Purvi Shah. Several authors contributed one paper each to this field (e.g., [76], [82], [117]).

An interesting interdisciplinary expansion of the deletion literature was initiated recently when Zhu investigated the influence of product deletion on supply chain management and sustainability [125] and coauthored research papers with Sarkis and Shah [24], [126]–[128]. The highlights of stage II were: 1) beginning of empirical research in this field; 2) expansion of the field from product elimination to service elimination and later to brand deletion; and 3) the inception of interdisciplinary research perspectives in the domain of brand/product deletion. Stage II marked the progress of brand/product deletion research.

The deletion field has still not reached the third stage of institutionalization and is far from maturity. In order to reach the third and fourth stages, the concepts or brand/product deletion should be theoretically well-established in academia and regularly practiced or applied in the industry. To further this research domain, several avenues for future research with implications for multiple stakeholders, disciplines, and industries can be pursued. Understanding the current intellectual structure will assist future scholars in identifying what has been done and what needs to be done in this strategic and growing research domain of practical import.

## III. Method and Data Collection

Bibliometric analyses apply mathematical and statistical methods to evaluate the productivity and impact of scientific production in a research domain [33], [46], [93], [118], [121]. Bibliometric analyses are widely used for summarizing the most representative scholarly works. Bibliometric studies have been applied in many research areas, including management [94], economics [30], [43], econometrics [25], innovation [52], entrepreneurship Landstrom *et al.*, [70], marketing [77], and operations management [53], [78].

Bibliometric analysis is one of the key methods that provide objective measures of the structure and impact of publications

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[1]Service elimination is an offshoot or substream of product elimination or deletion. Therefore, it is not reflected as a distinct field like product deletion and brand deletion. Similarly, product deletion and supply chain management is also an interdisciplinary substream of the product deletion domain.

while others include betweenness centrality (i.e., the frequency of users or publications citing or being cited through publications) and output data (i.e., internet-based statistics such as total number of views and downloads). Due to the increase of data availability and emergent computational tools, many bibliometric metrics and measurements have been developed and applied at many levels of research review and evaluation—including individual researchers, research groups, institutions, and nations.

This article uses science mapping, a quantitative bibliometric analysis method, that applies social network analysis and multivariate analysis to summarize and visualize trends in accumulated knowledge and sheds light on a research field's cognitive and intellectual structure [38], [54], [129]. We ran a web-based search on the lead author and utilized selected metrics to illustrate the thematic depth and diversity in search outcomes. These metrics include descriptions of total number of research publications, publication outlets and journals, key scholars and authors, and average total citations per year. We also conducted cocitation analysis and keywords analysis, providing a dynamic mapping of patterns and evolution of the extant literature streams. Science mapping provides values beyond systematic literature reviews such as citation behaviors, cocitations, order of authors, order of publication networks, number of authors, and the scholarly impact at multiple levels from individual to groups to macro levels.

Even with this variety of analytical information from bibliometric analyses, some thematic analysis should also be completed to provide appropriate context of the literature. Bibliometric analysis alone is not capable of providing a robust analysis and some form of thematic analysis is recommended by closely evaluating publication content (e.g., [53], [75]).

Based on the steps involved in science mapping [39], the next section describes the retrieval, preprocessing, and refinement of data followed by the bibliometric review.

### A. Defining the Research Scope and Search Terms

According to past literature, brand/product deletion is defined as discontinuing, withdrawing, or eliminating a brand or product from a firm's portfolio. Deletion can occur at multiple levels within a firm. This bibliometric review encompasses research studies involving deletion at various levels of brands, subbrands, and product variants in manufacturing and service firms.

In the brand/product deletion research domain, authors have used wide-ranging keywords to represent the phenomenon. For example, product elimination, product deletion, product withdrawal, product abandonment, brand deletion, brand killing, and so on. The keywords that are frequently used in core publications of this field [7], [8], [12]–[16] were used as a starting point for database search. These initial keywords include "brand deletion," "brand discontinuation," "brand elimination," "product deletion," "product elimination," and "service elimination." After a detailed review of these core articles, related expressions for "deleting a product/brand/service" were found and included as search terms; these additional search terms included "remove/withdraw/kill/replace/phase out product/brand/service" and "prune/rationalize brand/product portfolio."

### TABLE I
### DESCRIPTION OF THE SAMPLE DATASET

| Description | Results |
|---|---|
| Documents | 96 |
| Sources (Journals, Books, etc.) | 56 |
| Keywords Plus (ID) | 189 |
| Author's Keywords (DE) | 207 |
| Period | 1970 - 2019 |
| Average citations per documents | 12.74 |
| Authors | 165 |
| Author Appearances | 222 |
| Authors of single-authored documents | 17 |
| Authors of multi-authored documents | 148 |
| Single-authored documents | 32 |
| Documents per Author | 0.582 |
| Authors per Document | 1.72 |
| Co-Authors per Documents | 2.31 |

Overall, 23 keywords were identified and used for the bibliometric search. Six brand specific phrases/keywords included brand delet*, brand discontinu*, brand eliminat*, brand abandon*, kill brand, and brand remov*. Seventeen product related phrases/keywords included product delet*, product discontinu*, product eliminat*, service eliminat*, product abandon*, product prun*, product lifecycle AND product decline, product phase out AND upgrade, kill product, product remov*, product rollover, product replac*, product turnover, drop product, and product rationali*.

### B. Initial Search Results

The publication database representativeness determines the validity of scientific bibliometric analysis [84]. Applying the systematic search method for literature reviews and using the title, abstract, and keywords search categories, the 23 keywords were searched in the Web of Science (WoS), Scopus, and Google Scholar online databases. These are the most frequently used databases for bibliometric studies ([59]; Kumar *et al.*, [68]; [89], [98], [108]). In addition, the references of these articles were also examined. The search results included 113 publications.

### C. Preprocessing and Refinement of the Search Results

Of the sample of 113 publications, publications which: 1) did not belong to the business domain; 2) were beyond the scope of research defined above; and 3) involved duplication, were discarded, thereby generating the final publication database of 96 articles. Table I presents a sample description of these 96 documents.

In summary, a systematic review process was followed ([130], [135]) using Google Scholar, the WoS, and Scopus databases to identify papers using 23 keywords. There was no time restriction applied in our search because one of the goals was to study the intellectual evolution of the field since its inception. Papers from the beginning of this field in the 1960s were included, generating
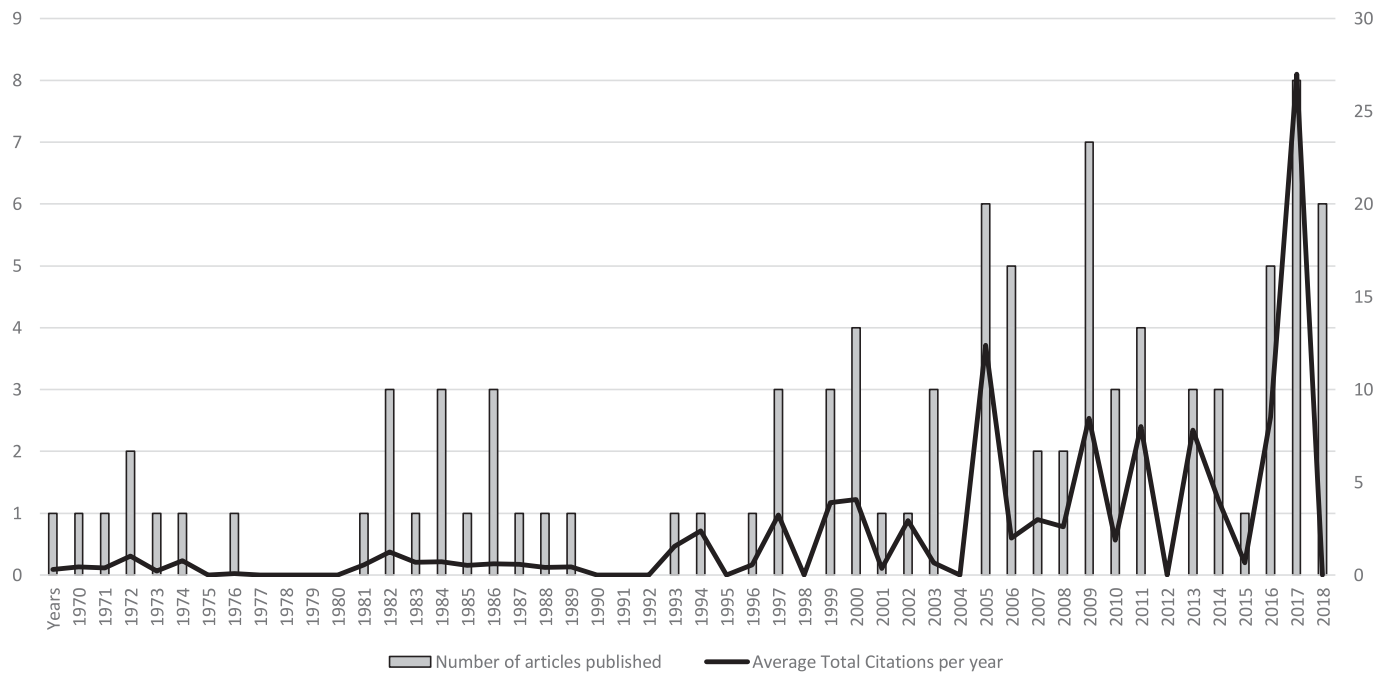
Fig. 1.    Temporal evolution of scientific production in the brand/product deletion research domain.

the final publication database of 96 articles. These articles, related to brand, product, and service deletion, were published in a wide range of journals, including economics, management, marketing, general business, supply chain management, and operations research. This shows the cross-functional impact and interdisciplinary nature of this field. The next section will highlight the intellectual history and structure of the brand/product deletion literature through a bibliometric review of these publications.

## IV.  BIBLIOMETRIC REVIEW

In this article, *R* package's *Bibliometrix* was used for bibliometric analyses. It offers flexibility in merging and managing data from various data sources (including Scopus and WoS) and is capable of providing comprehensive and sophisticated data analysis and visualization [6]. In addition, *VOSViewer* has multifaceted visualization capabilities and was therefore used to visualize patterns in data and construct bibliometric networks [115]. These tools have been used in many bibliometric analyses and literature reviews (e.g., [6], [114]). This section first presents a descriptive analysis of the 96 publications, 165 authors, and 56 journals which is followed by a detailed discussion of the intellectual history and structure of the field.

### A.  Descriptive Bibliometric Analysis

A descriptive analysis of the brand/product deletion scholarly literature elucidates the structure of this research with a focus on scientific productivity and impact and analysis of the publications/articles, scholars/authors, and publication outlets/journals.

*1) Publications/Articles:* This article sample includes 96 documents which are deletion articles published in 56 academic peer-reviewed journals. These articles were written by 165 authors, tagged with 207 keywords, and earned an average of approximately 13 citations per article. The sample consists of articles from 1970 to 2019. In these 50 years, articles in this field have been scattered and unstable. Twelve years of the 50 years have no published articles in this field. Thirty years have one to three articles published while more than three articles were published in only eight years of the 50 years. The year 2010 had seven and 2018 had eight articles published. These were the maximum number of articles published each year in the 50 years of research in this field. The average number of articles published each year is approximately two articles whereas the median is one article.

Fig. 1 demonstrates the publication trend over a period of time along with average total citations per year. The average total citations per year provide an evidence of impact and allow for comparison across years. The average total citations per year also confirms the variation of publication activity in the field of brand/product deletion. The years 2006, 2017, and 2018 exhibit the top three average total citations per year. A total of 19 articles were published in these three years.

Table II supports the evidence provided by Fig. 1 in addition to highlighting the prominent themes/topics investigated in four time periods across the 50 years of publications. The early literature (stage I) exploring this field with few conceptual papers and models was initiated in the 1960s and 1970s. This was followed by the 1980s and 1990s (stage II) with empirical research investigating product elimination. This period saw a

TABLE II
TEMPORAL EVOLUTION OF SCIENTIFIC PRODUCTION IN THE BRAND/PRODUCT DELETION RESEARCH DOMAIN

| Years | Number of articles published | TC | Citable Years | Average Total Citations per year |
|---|---|---|---|---|
| 1970 | 1 | 15 | 50 | 0.30 |
| 1971 | 1 | 21 | 49 | 0.43 |
| 1972 | 1 | 18 | 48 | 0.38 |
| 1973 | 2 | 47 | 47 | 1.00 |
| 1974 | 1 | 10 | 46 | 0.22 |
| 1975 | 1 | 34 | 45 | 0.76 |
| 1976 | 0 | 0 | 44 | 0.00 |
| 1977 | 1 | 3 | 43 | 0.07 |
| 1978 | 0 | 0 | 42 | 0.00 |
| 1979 | 0 | 0 | 41 | 0.00 |
| 1980 | 0 | 0 | 40 | 0.00 |
| 1981 | 0 | 0 | 39 | 0.00 |
| 1982 | 1 | 20 | 38 | 0.53 |
| 1983 | 3 | 45 | 37 | 1.22 |
| 1984 | 1 | 24 | 36 | 0.67 |
| 1985 | 3 | 24 | 35 | 0.69 |
| 1986 | 1 | 17 | 34 | 0.50 |
| 1987 | 3 | 19 | 33 | 0.58 |
| 1988 | 1 | 18 | 32 | 0.56 |
| 1989 | 1 | 12 | 31 | 0.39 |
| 1990 | 1 | 13 | 30 | 0.43 |
| 1991 | 0 | 0 | 29 | 0.00 |
| 1992 | 0 | 0 | 28 | 0.00 |
| 1993 | 0 | 0 | 27 | 0.00 |
| 1994 | 1 | 39 | 26 | 1.50 |
| 1995 | 1 | 57 | 25 | 2.28 |
| 1996 | 0 | 0 | 24 | 0.00 |
| 1997 | 1 | 12 | 23 | 0.52 |
| 1998 | 3 | 68 | 22 | 3.09 |
| 1999 | 0 | 0 | 21 | 0.00 |
| 2000 | 3 | 74 | 20 | 3.70 |
| 2001 | 4 | 73 | 19 | 3.84 |
| 2002 | 1 | 6 | 18 | 0.33 |
| 2003 | 1 | 47 | 17 | 2.76 |
| 2004 | 3 | 10 | 16 | 0.63 |
| 2005 | 0 | 0 | 15 | 0.00 |
| 2006 | 6 | 161 | 14 | 11.50 |
| 2007 | 5 | 24 | 13 | 1.85 |
| 2008 | 2 | 33 | 12 | 2.75 |
| 2009 | 2 | 26 | 11 | 2.36 |
| 2010 | 7 | 76 | 10 | 7.60 |
| 2011 | 3 | 15 | 9 | 1.67 |
| 2012 | 4 | 56 | 8 | 7.00 |
| 2013 | 0 | 0 | 7 | 0.00 |
| 2014 | 3 | 39 | 6 | 6.50 |
| 2015 | 3 | 16 | 5 | 3.20 |
| 2016 | 1 | 2 | 4 | 0.50 |
| 2017 | 5 | 17 | 3 | 5.67 |
| 2018 | 8 | 27 | 2 | 13.50 |
| 2019 | 6 | 5 | 1 | 5.00 |

spike in the number of publications from eight in the 1970s (1970–1979) to 21 by 1999. Thereafter in the 2000s, while investigating product elimination continued, research extended in the subfield of service elimination. In this period (2000–2014), 44 articles were published. Then, since 2015, the domain further expanded to investigate brand deletion and to study the

TABLE III
INFLUENTIAL ARTICLES IN THE BRAND/PRODUCT DELETION RESEARCH DOMAIN

| Rank | Author | Year | Title | Journal | TC | TC/Year |
|---|---|---|---|---|---|---|
| 1 | Stavins, J. | 1995 | Model Entry and Exit in A Differentiated Product Industry: The Personal Computer Market | *Review of Economics and Statistics* | 57 | 2.28 |
| 2 | Greenstein, S. Wade, J. | 1998 | The Product Life Cycle in The Commercial Mainframe Computer Market | *RAND Journal of Economics* | 54 | 2.45 |
| 3 | Hitsch, G. | 2006 | An Empirical Model of Optimal Dynamic Product Launch and Exit Under Demand Uncertainty | *Marketing Science* | 50 | 3.57 |
| 4 | Putsis, J. W. Bayus, B. | 2001 | An Empirical Analysis of Firms Product Line Decisions | *Journal of Marketing Research* | 49 | 2.58 |
| 5 | Wiles, M. Morgan, N. Rego, L. | 2012 | The Effect of Brand Acquisition and Disposal on Stock Returns | *Journal of Marketing* | 48 | 6 |
| 6 | Kumar, N. | 2003 | Kill A Brand Keep A Customer | *Harvard Business Review* | 47 | 2.76 |
| 7 | Varadarajan, R. Defanti, M. Busch, P. | 2006 | Brand Portfolio Corporate Image and Reputation Managing Brand Deletions | *Journal of the Academy of Marketing Science* | 45 | 3.21 |
| 8 | Saunders, J. Jobber, D. | 1994 | Product Replacement Strategies for Simultaneous Product Deletion and Launch | *Journal of Product Innovation Management* | 39 | 1.5 |
| 8 | Karakaya, F. | 2000 | Market Exit and Barriers to Exit Theory and Practice | *Psychology and Marketing* | 39 | 1.95 |
| 9 | Mazis, M. Settle, R. Leslie, D. | 1973 | Elimination of Phosphate Detergents and Psychological Reactance | *Journal of Marketing Research* | 37 | 0.79 |
| 10 | Lim, W. Tang, C. | 2006 | Optimal Product Rollover Strategies | *European Journal of Operational Research* | 35 | 2.5 |
| 11 | Avlonitis, G. Hart, S. Tzokas, N. | 2000 | An Analysis of Product Deletion Scenarios | *Journal of Product Innovation Management* | 34 | 1.7 |
| 11 | Hise, R. McGinnis, M. | 1975 | Product Elimination Practices Policies and Ethics | *Business Horizons* | 34 | 0.76 |
| 12 | Liang, C. Çakanyıldırım, M. Sethi, S. | 2014 | Analysis of Product Rollover Strategies in the Presence of Strategic Customers | *Management Science* | 32 | 5.33 |
| 13 | Avlonitis, G. | 1983 | The Product Elimination Decision and Strategies | *Industrial Marketing Management* | 30 | 0.81 |
| 14 | Li, Z. Gao, L. | 2008 | The Effects of Sharing Upstream Information on Product Rollover | *Production and Operations Management* | 26 | 2.17 |
| 15 | Chisholm, D. et al. | 2006 | When to Exit a Product Evidence from the Us Motion picture Exhibition Market | *American Economic Review* | 24 | 1.71 |
| 15 | Avlonitis, G. | 1984 | Industrial Product Elimination Major Factors to Consider | *Industrial Marketing Management* | 24 | 0.67 |
| 16 | Eckles, R. | 1971 | Product Line Deletion and Simplification Tough But Necessary Decisions | *Business Horizons* | 21 | 0.43 |
| 17 | Avlonitis, G. James, B. | 1982 | Some Dangerous Axioms of Product Elimination Decision making | *European Journal of Marketing* | 20 | 0.53 |
| 17 | Koca, E. Souza, G. Druehl, C. | 2010 | Managing Product Rollovers | *Decision Sciences* | 20 | 2 |
| 18 | Ward, J. et al. | 2010 | HP Transforms Product Portfolio Management with Operations Research | *Interfaces* | 19 | 1.9 |
| 19 | Hamelman, P. Mazze, E. | 1972 | Improving Product Abandonment Decisions | *Journal of Marketing* | 18 | 0.38 |
| 19 | Simester, D. Zhang, J. | 2010 | Why Are Bad Products So Hard to Kill | *Management Science* | 18 | 1.8 |
| 19 | Hart, S. | 1988 | The Causes of Product Deletion in British Manufacturing Companies | *Journal of Marketing Management* | 18 | 0.56 |
| 20 | Avlonitis, G. | 1986 | The Identification of Weak Industrial Products | *European Journal of Marketing* | 17 | 0.5 |

role of product deletion in supply chain management. In five years (2015–2019), 23 articles were published in the field of brand/product deletion. The 96 articles received a total of 1223 citations, the average being 24 citations per year, and the median is approximately 17 citations.

Table III supplements Fig. 1 and Table II portraying the 20[2] most influential, i.e., the most cited articles in the field. The five most cited articles are from the marketing and economics disciplines [57], [64], [95], [111], [122]. This is not surprising since 48 articles out of the total 96 articles are published in a marketing journal and eight are published in an economics journal. This accounts for 58.33% of the sample. Furthermore, these five most cited articles are published in the top-ranking journals of the two fields with high impact factors such as the *Journal of Marketing, Journal of Marketing Research, Marketing Science, RAND Journal of Economics,* and *Review of Economics and Statistics*. Also, 14 of the 26 articles in Table III are from the marketing discipline and three are from economics. This accounts for 65.38% of the most cited articles list.

In summary, articles about brand/product deletion have existed for over five decades; it is not a new field of research. Yet the breadth and depth of the literature is limited. This observation is especially striking given brand/product deletion's critical significance to firm performance and competitiveness.

*2) Publication Outlets/Journals:* The 96 articles in the sample dataset were published in 56 journals or publication outlets. Based on the number of articles published, the total citations of those articles, and the h-index, Table IV presents the most prolific journals that have published brand/product deletion articles. These are the only nine journals in the dataset that have published three or more brand/product deletion articles each. Ten journals published two articles each whereas 37 journals published only one article in the field of brand/product deletion; these articles represent 59.3% of the sample dataset. The three most prominent journals, based on the number of articles published in this field, are *Industrial Marketing Management*, *European Journal of Marketing*, and *International Journal of Bank Marketing*. *Industrial Marketing Management* published seven product elimination articles from 1973–2018 with a TC of 85 and h-index of four. The *European Journal of Marketing* published seven product elimination, service elimination, and brand deletion articles from 1982–2017 with a TC of 56 and an h-index of four. The *International Journal of Bank Marketing* published five articles which studied product/service elimination in the banking and financial services industry from 1997–2007 with a TC of 23 and h-index of four. These are niche articles investigating the role of product elimination in a specific industry. Harness and Argouslidis were key scholars researching in this niche.

Furthermore, marketing journals dominate the field by publishing the most articles followed by general business and management journals. Publication outlets from other disciplines include economics, operations research/management science (OR/MS), and operations management (OM) journals. There is academic consensus that brand/product deletion falls under the marketing and brand/product management domain, as evident in the journals that have published articles in this stream of research. As the research developed over the years, the domain integrated with the general business and management field through a linkage with strategic positioning, resources, and competitive advantage. Thereafter, operations and supply chain management disciplines weaved in a new thread by investigating product deletion across operational processes and competencies in product, material, and financial flows. The marketing and management journals have published brand/product deletion articles throughout the 50-year period. However, the OM and OR/MS journals started publishing product deletion research only in the 2000s. This shows a recent burgeoning interdisciplinary interest in this field and a potential to expand the field through collaborations with other disciplines in the future.

*3) Scholars/Authors:* The 96 articles in the dataset are written by 165 authors, i.e., an average of 0.58 articles per author and approximately two authors per article. Seventeen authors have contributed 32 solo-authored articles. Of the 96 articles, 28 articles were written by two authors, 31 were written by three authors, and five articles were written by more than three authors.

Table V showcases the most prolific authors from the dataset. Though the dataset does not include all the articles written by these authors, the authors shown in Table V have made a significant contribution to this field of research. The nine authors who have published at least three articles in this field are highlighted in grey. George J. Avlonitis published 13 articles with 183 total citations and an average of 14 citations per article since 1982. He has an h-index of eight, i.e., at least eight of his 13 publications have eight or more citations. The second most influential author in this field is Purvi Shah (h-index: 5) who has published seven articles since 2015 and has received 43 total citations (i.e., six citations per article). Other two noteworthy contributors are David R. Harness and Paraskevas C. Argouslidis, each with an h-index of four. Argouslidis has published eight articles since 2001 with 40 total citations (i.e., five citations per article) while Harness has published seven articles since 1997 with 41 total citations (i.e., approximately six citations per article). These authors are mainly concentrated in Greece, U.K., and the USA.

Fig. 2 offers another interesting perspective on the scientific production by the scholars in this field. This figure illustrates scientific productivity, i.e., the link between authors and the number of articles they have published in this field of research. The dashed line represents the frequency distribution of scientific productivity, according to Lotka's inverse square law [73]. Lotka's Law is known as the "inverse square law" due to the inverse relationship between the number of publications and the number of authors producing those publications [37], [87]. The frequency distribution of scientific productivity in the brand/product deletion field does not match the dashed line, which is the expected distribution of Lotka's Law. The shaded area under the dashed line depicts a lack of a "core" set of continuously producing scholars in the brand/product deletion

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[2]Articles with an equal number of total citations share the same rank and therefore, the table shows 26 articles that fall in the ranks of 20 most prolific articles in the field.

TABLE IV
PROLIFIC JOURNALS THAT HAVE PUBLISHED BRAND/PRODUCT DELETION ARTICLES

| Rank | Journals [Authors (Year) – TC] | Number of articles published | Year range in which articles were published | TC of all articles | h-index |
|---|---|---|---|---|---|
| 1 | *INDUSTRIAL MARKETING MANAGEMENT* | 7 | 1973-2018 | 85 | 4 |
| | McSurely and Wilemon (1973) – 10 | | | | |
| | Evans (1977) – 3 | | | | |
| | Avlonitis (1983) – 30 | | | | |
| | Avlonitis (1984) – 24 | | | | |
| | Avlonitis (1985a) – 14 | | | | |
| | Avlonitis (1985b) – 4 | | | | |
| | Prigge, Homburg, and Fürst (2018) – 0 | | | | |
| 2 | *EUROPEAN JOURNAL OF MARKETING* | 6 | 1982-2017 | 56 | 4 |
| | Avlonitis and James (1982) – 20 | | | | |
| | Avlonitis (1986) – 17 | | | | |
| | Hart (1989) – 12 | | | | |
| | Papastathopoulou, Gounaris, and Avlonitis (2012) – 4 | | | | |
| | Argouslidis, Baltas, and Mavrommatis (2014) – 3 | | | | |
| | Hebblethwaite, Parsons, and Spence (2017) – 0 | | | | |
| 3 | *INTERNATIONAL JOURNAL OF BANK MARKETING* | 5 | 1997-2007 | 23 | 3 |
| | Harness and Mackay (1997) – 12 | | | | |
| | Argouslidis and Mclean (2001) – 7 | | | | |
| | Harness (2004) – 3 | | | | |
| | Harness and Marr (2004) – 1 | | | | |
| | Argouslidis (2007) – 0 | | | | |
| 4 | *JOURNAL OF THE ACADEMY OF MARKETING SCIENCE* | 4 | 1974-2010 | 78 | 4 |
| | Banville and Pletcher (1974) – 10 | | | | |
| | Varadarajan, Defanti, and Busch (2006) - 45 | | | | |
| | Argouslidis and Baltas (2007) - 12 | | | | |
| | Homburg, Fürst, and Prigge (2010) – 11 | | | | |
| 4 | *JOURNAL OF PRODUCT AND BRAND MANAGEMENT* | 4 | 1998-2011 | 28 | 4 |
| | Harness, Marr, and Goy (1998) – 9 | | | | |
| | Harness and Marr (2001) – 9 | | | | |
| | Olson and Thjømøe (2010) – 4 | | | | |
| | Godey and Lai (2011) – 6 | | | | |
| 4 | *JOURNAL OF GENERAL MANAGEMENT* | 4 | 1983-2012 | 15 | 3 |
| | Avlonitis (1983) – 5 | | | | |
| | Jevons, Ewing, and Khalil (2007) – 4 | | | | |
| | Muir and Reynolds (2011) – 5 | | | | |
| | Harness and Harness (2012) – 1 | | | | |
| 5 | *BUSINESS HORIZONS* | 3 | 1971-2011 | 59 | 3 |
| | Eckles (1971) – 21 | | | | |
| | Hise and Mcginnis (1975) – 34 | | | | |
| | Berman (2011) – 4 | | | | |
| 5 | *JOURNAL OF SERVICES MARKETING* | 3 | 2006-2008 | 15 | 3 |
| | Gounaris, Avlonitis, and Papastathopoulou (2006) – 4 | | | | |
| | Argouslidis (2007) – 4 | | | | |
| | Argouslidis (2008) – 7 | | | | |
| 5 | *JOURNAL OF BRAND MANAGEMENT* | 3 | 2015-2019 | 11 | 1 |
| | Shah (2015) – 10 | | | | |
| | Mishra (2018) – 1 | | | | |
| | Temprano-Garcia, Isabel, and Rodriguez-Pinto (2020) - 0 | | | | |

field. The results show that 87.1% of the authors have published an occasional article in this field.

The lack of scholar production longevity is further supported by Fig. 3. This bubble chart illustrates the publications of the nine prolific authors highlighted in Table V above and their influence over time. The size of the bubble represents the number of articles published while the color shading shows the average total citations received by that author for all her/his publications in that particular year. The shading moves from indigo and violet shades, depicting low average total citations per year, to

TABLE V
PROLIFIC AUTHORS IN THE BRAND/PRODUCT DELETION RESEARCH DOMAIN

| Author | Author's Affiliation | Author's Location | h_index | TC | # of articles | Year of First article | TC/article |
|---|---|---|---|---|---|---|---|
| Avlonitis, George J. | University of Strathclyde; Athens University of Economics and Business | Glasgow, UK; Athens, Greece | 8 | 183 | 13 | 1982 | 14.08 |
| Shah, Purvi | Worcester Polytechnic Institute | Worcester, MA, USA | 5 | 43 | 7 | 2015 | 6.14 |
| Harness, David R. | Huddersfield University; Leeds University; Hull University | West Yorkshire, UK; Leeds, UK; Hull, UK | 4 | 41 | 7 | 1997 | 5.86 |
| Argouslidis, Paraskevas C. | Athens University of Economics and Business | Athens, Greece | 4 | 40 | 8 | 2001 | 5.00 |
| Hart, Susan J. | University of Strathclyde | Glasgow, UK | 3 | 64 | 3 | 1988 | 21.33 |
| Zhu, Qingyun | Worcester Polytechnic Institute | Worcester, MA, USA | 3 | 26 | 6 | 2018 | 4.33 |
| Baltas, George | Athens University of Economics and Business | Athens, Greece | 3 | 19 | 3 | 2007 | 6.33 |
| Sarkis, Joseph | Worcester Polytechnic Institute | Worcester, MA, USA | 3 | 18 | 4 | 2018 | 4.50 |
| Marr, Norman E. | Huddersfield University | West Yorkshire, UK | 2 | 19 | 3 | 1998 | 6.33 |
| Ewing, Michael T. | Monash University | Victoria, Australia | 2 | 19 | 2 | 2007 | 9.50 |
| Jevons, Colin P. | Monash University | Victoria, Australia | 2 | 19 | 2 | 2007 | 9.50 |
| Khalil, Elias L. | Monash University | Victoria, Australia | 2 | 19 | 2 | 2007 | 9.50 |
| Gounaris, Spiros P. | Athens University of Economics and Business | Athens, Greece | 2 | 8 | 2 | 2006 | 4.00 |
| Papastathopoulou, Paulina G. | Athens University of Economics and Business | Athens, Greece | 2 | 8 | 2 | 2006 | 4.00 |
| Mavrommatis, Alexis | EADA Business School | Barcelona, Spain | 2 | 7 | 2 | 2014 | 3.50 |
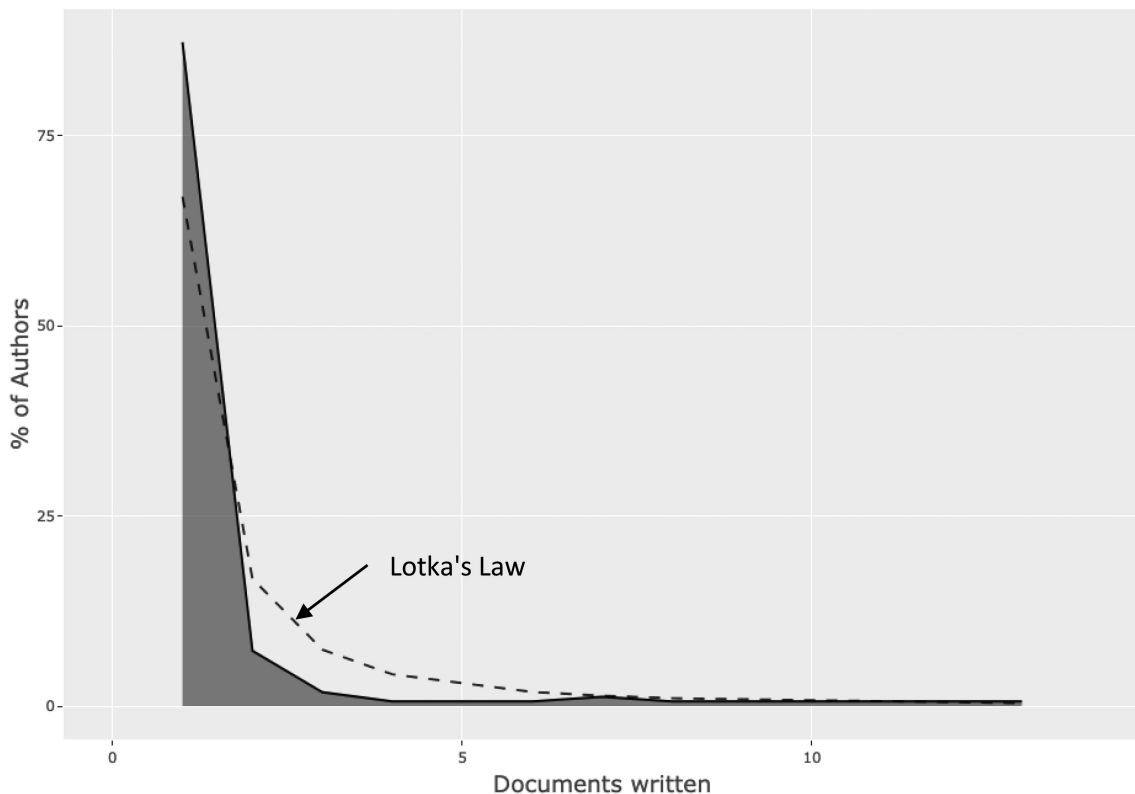


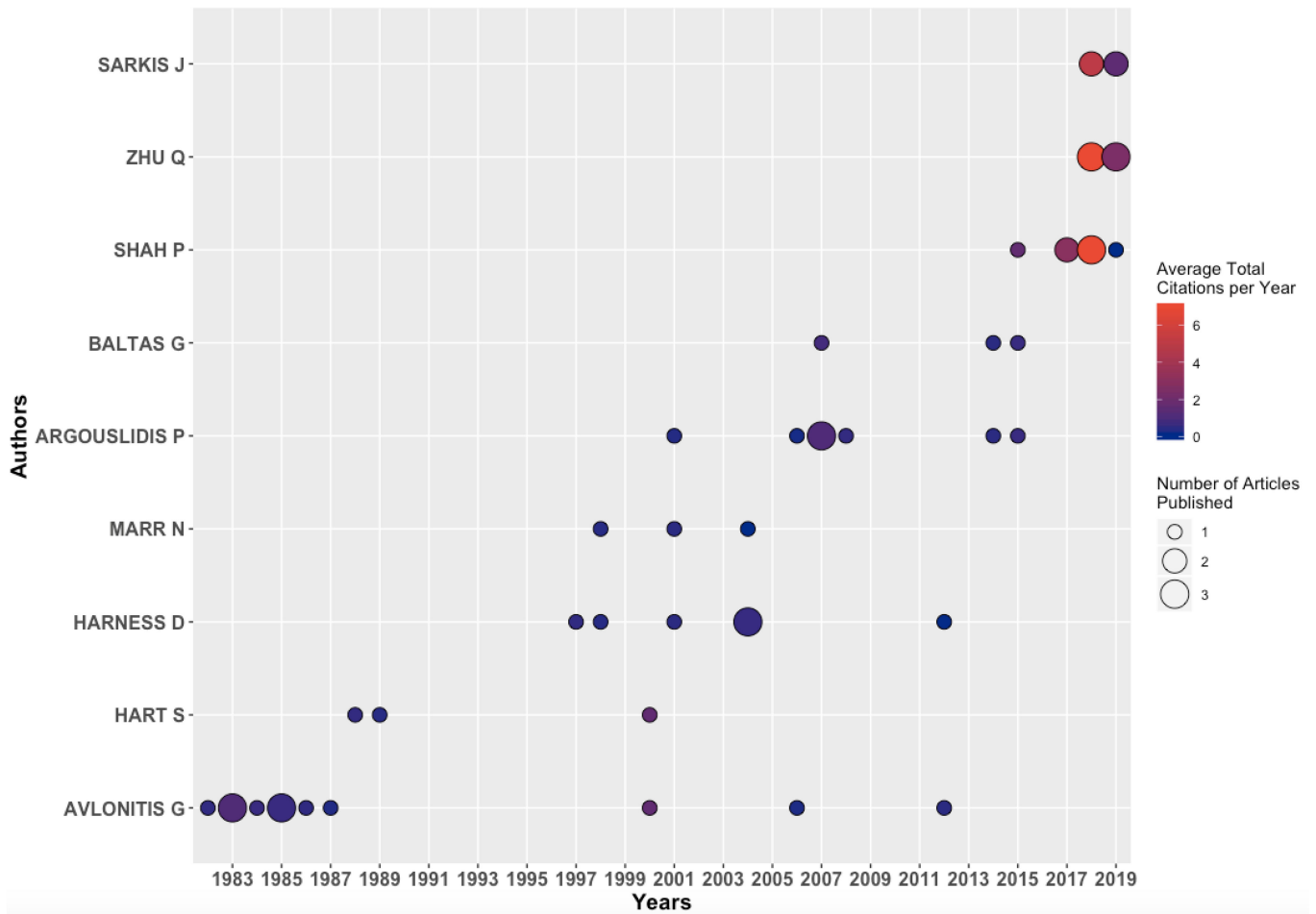Fig. 2. Lotka's law: Scientific productivity.

Fig. 3.    Prolific authors in the brand/product deletion research domain.

red and orange shades, highlighting relatively higher average total citations per year. The average total citations per year are calculated as follows:

$$\text{Average total citations per year}$$
$$= \frac{\text{Total citations from all publications in that year}}{[(\text{Current year} + 1) - \text{Year of publication}]}.$$

According to Fig. 3, Avlonitis is the earliest and most influential research scholar who continued to publish in this field from 1982 until 2012. After Avlonitis, Harness and Argouslidis produced several articles and contributed to this field of research in the 1990s and 2000s. Since 2015, Shah, Zhu, and Sarkis have started investigating and impacting this field and have received the most average total citations per year on their publications.

These authors also clearly work in their areas of specialization within the deletion domain and thus, have facilitated the expansion of this domain. For instance, Avlonitis dominated the product elimination stream (e.g., [13], [16], [18], [19]), and Argouslidis (e.g., [8]–[10]) and Harness (e.g., [60], [61]) worked prominently in the area of service elimination, whereas Shah's research focus is on brand deletion [102]–[106]. In addition, Shah, Zhu, and Sarkis have created an interdisciplinary stream to investigate the role of product deletion in supply chain management [24], [126]–[128].

The rationale underlying this uneven scientific productivity over time may be three-fold. First, data about brand/product deletion are difficult to gather or access from firms. Few organizations would be willing to share detailed information about why and how they deleted brands and products from their portfolios. Deletion is a sensitive and controversial decision in addition to being complex and challenging. Firms are reluctant to share information on brand/product deletions to anybody outside the decision-making team as this may hurt the reputation and eventually the financial performance of that organization because deletion could be viewed as a strategic failure by the market.

Second, this stream of research lacks a strong theoretical foundation. Articles that develop new ideas or synthesize them into integrative frameworks [123] are missing in the brand/product deletion literature, thus limiting the growth of knowledge in this field and the production longevity as seen in the scattered research production in Fig. 3.

Third, in academia and practice, brand/product deletion has not been a mainstream topic or strategy of interest. In practice, deletion is generally a last resort reactive strategy in many firms. In academia, there is abundant research on brand and product extensions, new product development, product innovation and acquisition, brand proliferation, and managing brand equity. These are considered core topics of brand and product management research in the scholarly community, and appealing and useful tools in a manager's strategic toolkit. Furthermore, for a very long time, firms focused on proliferation to meet every consumer need and preference, and therefore, deleting anything from the huge brand and product portfolio was not even considered. This was until they realized that these bulky portfolios were draining out valuable resources which could have earned greater returns if they were invested in few strong brands [27], [107]. Eventually, firms understood the importance of the brand/product deletion strategy and started optimizing their portfolios by deleting weak brands (e.g., [41], [113]). This changing focus in the industry and academia may have also impacted the production longevity and research advancement in this field.

### B. Intellectual History and Structure of Brand/Product Deletion Literature

In order to understand the intellectual history and structure of the brand/product deletion literature, bibliometric techniques such as cocitation analysis and coword analysis were used. These techniques enable the tracking of published research, study the patterns of evolution of an academic discipline or research topic, and reveal the structure of relationships among articles and associations between authors, and major changes in the direction of the field. Specifically, a cocitation analysis examines the continuity in the intellectual base of a field whereas a coword analysis such as, the keyword co-occurrence network, explores the evolution of research themes over time [38].

*1) Cocitation Analysis:* Citations are a measure of scholarly value and influence [80] as well as a means to offer credibility to one's knowledge claims [71]. Citation analysis helps examine the growth and popularity of articles over time, indicate their historical value and their generative nature, define the major research clusters in a field and how they evolved over time, and reveal the relationships among authors and their structural groups [79], [91], [110]. Cocitation analysis of articles enables determining if any two articles are cocited (i.e., cited together in another article) and if this cocitation pattern is frequent, it helps reveal a structural knowledge group. The intellectual structure of a field is formed by a compendium of such knowledge groups [38], [86], [96].

Fig. 4 illustrates the cocitation network of 50 most cited articles (from the dataset of 96 documents) in the brand/product deletion field calculated using degree centrality, i.e., the number of connections each node has. In this case, it means the number of articles to which one article is directly connected.

In cluster 1, [3] has the highest centrality of 84.99 linkages with a total link strength of 2567 making it the most influential and seminal article in this field. In this *Journal of Marketing* paper, Alexander discusses a normative process for deleting "sick" products from a firm's product portfolio. The second most prominently cited article is [67] with a centrality of 79.11 and a total link strength of 2228. In this *Harvard Business Review* article, Kotler presents as six-step control system for "phasing out" weak products. It is interesting to note that [3] was an academic peer-reviewed article whereas [67] was targeted at practitioners. These two articles also share the strongest cocitation link, the link strength being 484. These two articles are cited even today and still influence the field of brand/product deletion. They form the core of cluster 1. Other highly cited publications in cluster 1 include: 1) [131] with a degree centrality of 45.03 and link strength of 1182 and 2) Eckles [48] with a degree centrality of 27.14 and link strength of 972. Both these articles discuss the product deletion process and the challenges associated with implementing it. Eckles [48] developed a product deletion decision system based on observations from the veterinary ethical drug industry and small electrical goods manufacturing industry. Avlonitis and James (1982) was the first ever empirical study to provide a descriptive understanding of product elimination in the industrial field. Until then, only prescriptive research was offered in the literature.

Cluster 2 is made up of 17 articles and is dominated by product elimination articles written by Avlonitis and service elimination articles by Argouslidis and Harness. The time period reflected in this cluster is primarily the 1980s and 1990s. The articles with high degree centrality are [132], [133], [134]. The articles with the strongest links in cluster 2 are Avlonitis ([16]-2) with a link strength of 1037, followed by Avlonitis [14]-1 with a link strength of 1015, and then, Avlonitis [15]-1 with a link strength of 986. These are empirical papers that present exploratory findings about industrial product elimination, the factors considered in identifying weak products for deletion, and the role of formalization in this process.

Cluster 3 includes 24 articles and marks the evolution of the field into brand deletion research. The influential articles in this stream of research are: 1) Vyas [119] with a degree centrality of 76.79 and total link strength of 819, clarifying the difference between product deletion and product replacement strategies; 2) Varadarajan *et al.* [117] with a degree centrality of 17.54 and total link strength of 401, explaining the impact of brand deletion on corporate image and reputation; and 3) Kumar [69] with a degree centrality of 12.42 and total link strength of 204, a practitioner-oriented article elucidating how brand deletion can help retain customers and grow profits. Many articles in this cluster were published in the past two decades. These three clusters are interrelated and cross cite each other. These cocitation clusters describe the intellectual history and evolution of the field of brand/product deletion of how it started with product elimination, then expanded to service elimination, and eventually brand deletion gained research attention.

Cluster 1 represents early product deletion field developments—Stage I: Gestation and innovation. The foundation of this field is driven by [3] and [67]; these two
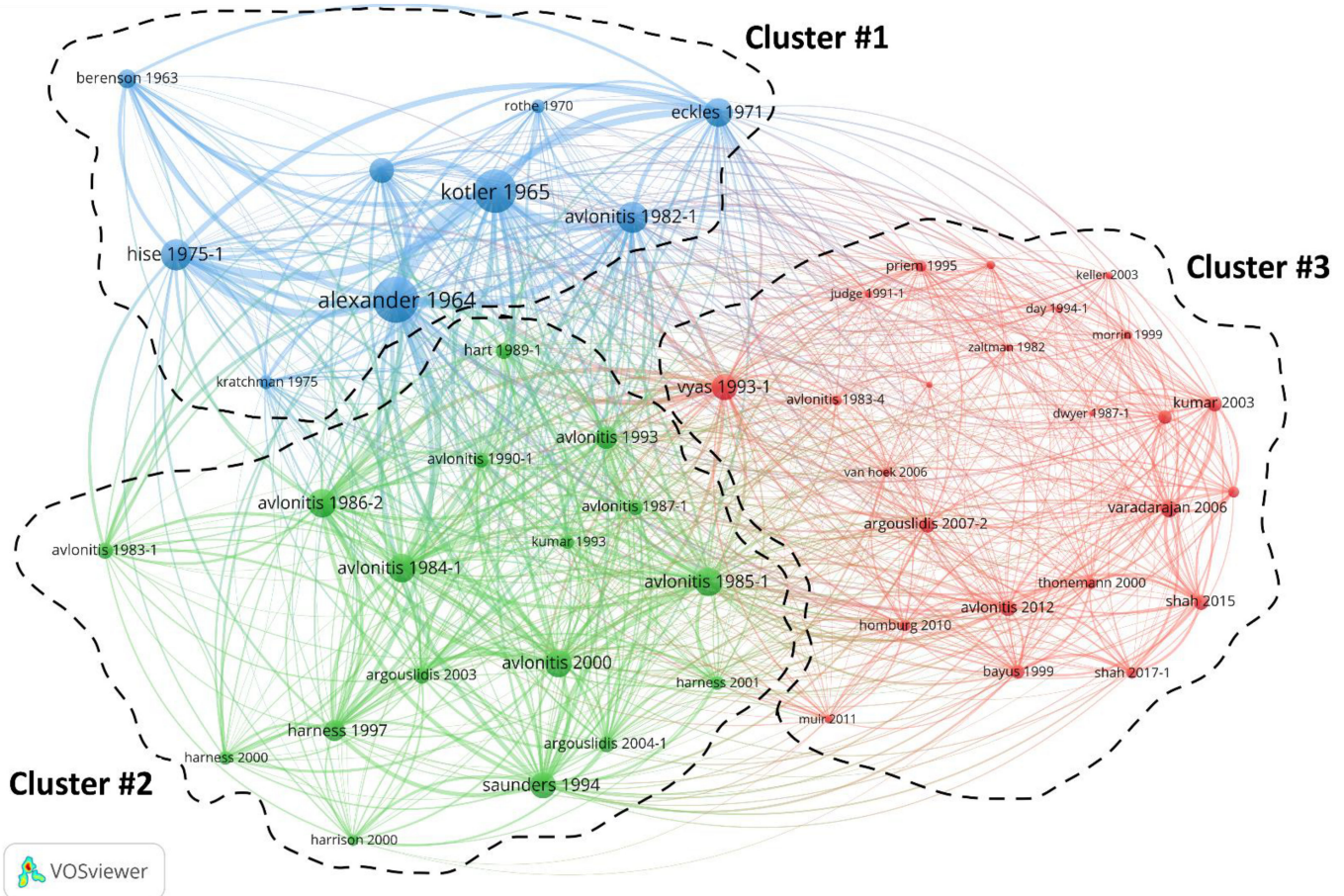
Fig. 4.    Cocitation network of articles.

articles defined product deletion from a strategy perspective. The early investigations in cluster 1 are in the marketing strategy domain, which includes nine articles that form the foundation of this field. All cited references of cluster 1 have relatively high cocitation link strength among them when compared to clusters 2 and 3 links. Cluster 2 represents Stage II: Development and expansion of this field. This cluster is driven by empirical research informed by field and case studies. Cluster 2 also extends the product deletion definition by introducing service elimination. In this stage, researchers differentiate between product and brand deletion, adding another layer to this research stream and deepening some nuances. Cluster 3 represents further advancement of the product deletion field—as product deletion has extended its relationship to organizational behavioral, supply chain management, and operations research. Broader product deletion implications are investigated. Cluster 3 also implies that the brand/product deletion field has still not reached Stage III: Institutionalization and is far from Stage IV: Maturity.

The next step is to understand the intellectual structure of the field from the thematic perspective using authors' keywords analysis [34].

*2) Authors' Keywords Analysis:* The authors' keywords analysis provides insights into the core topics that evolve in the literature of a field over a period of time. A frequency distribution of keywords allows not only the determination of the relative popularity of the topics but also the gaps and potential research directions. Research databases, such as Scopus and WoS, provide two types of keywords—authors' keywords and database keywords. Usually, database keywords are more generic than the authors' keywords. Therefore, to understand more specific keyword co-occurrences, 207 authors' keywords from the 96 sample documents were used for analysis. Keywords with the term *product*, such as *product elimination, product management, product deletion,* and so on, makeup 17% of the total 207 keywords. This is because, chronologically, the deletion field was initiated by product elimination research and still continues. The second most frequent keywords are related to the methodology used in the research, such as *semistructured interviews, survey data, quasi-experiment, scanner panel data,* and so on. These account for 15% of the total authors' keywords. Brand related keywords, such as *brand deletion, brand portfolio management, brand deletion success, brand death,* and so on add up to 10% of the total keywords. This highlights that *brand deletion* research is the second most popular substream in the deletion literature. An upcoming and growing stream of research interest is *product deletion and supply chain management* as is evident in the 8% keywords such as *supply chain management,*
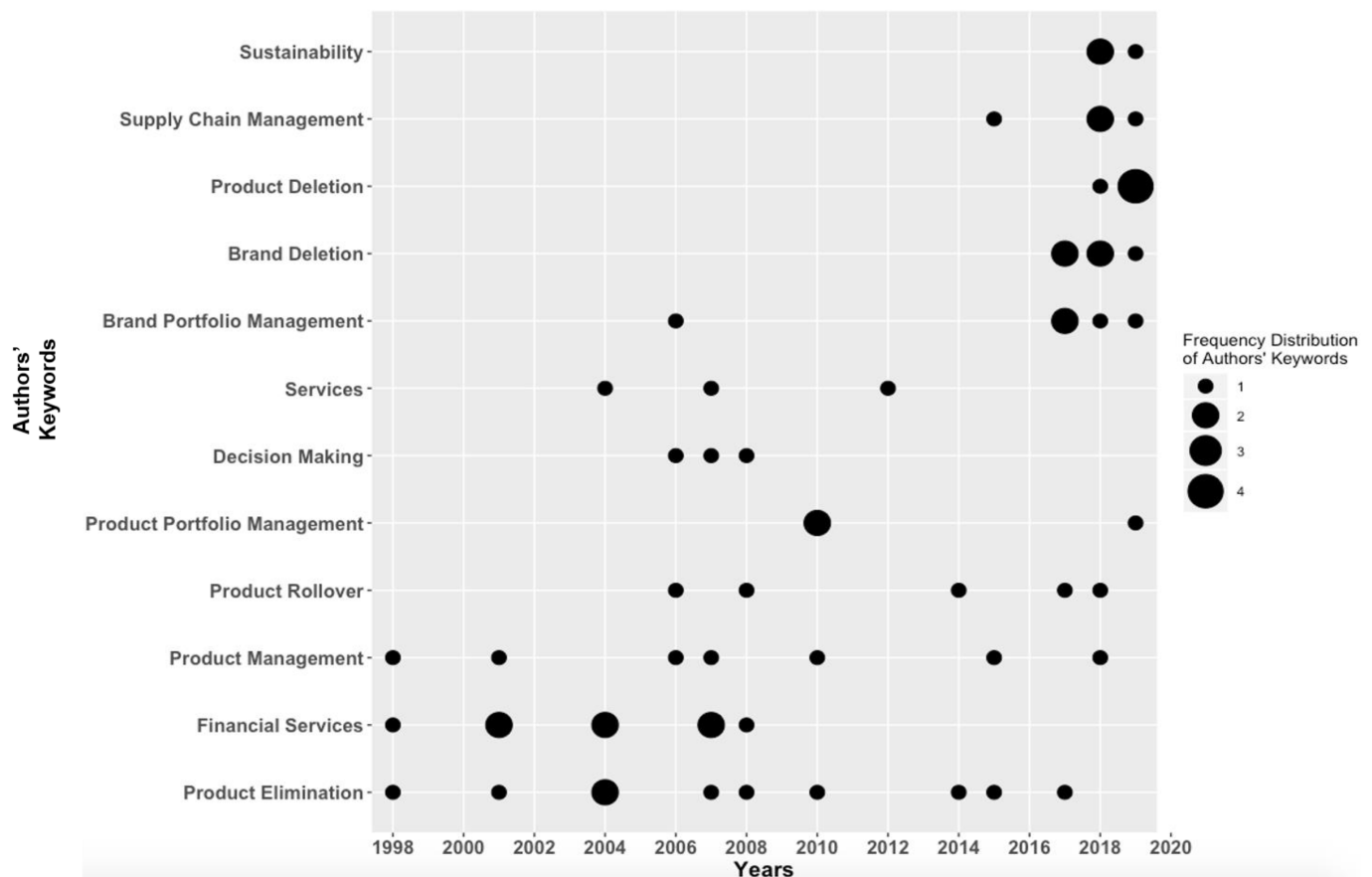
Fig. 5.    Frequency distribution of authors' keywords.

*sustainability, supply chain, manufacturing*, and so on. It is also interesting to note that 40% of these keywords include disparate keywords that do not represent the core themes in the brand/product literature. For example, keywords such as *decision-making, corporate reputation, decision speed, formalization, rationalization, resources deployment*, and so on are generic in nature and not specific to one of the deletion thematic areas discussed above.

Fig. 5 illustrates the frequency distribution of 12 author keywords over time that had a frequency count of at least three occurrences. The bubble chart shows the frequency of authors' keywords for the period of 1998–2019.[3] The three most frequently occurring authors' keywords are *product elimination, financial services,* and *product management*. The bubble chart also shows an evolution of these most frequently occurring keywords. The keywords within the *product* domain (which started in the early 1980s) are followed by keywords from the *services* domain before the year 2000. Since 2006, *brand* related keywords were being used and finally since 2015, keywords associated with the *supply chain management* have emerged.

Another coword analysis is the authors' keywords co-occurrence network which is used for finding subgroups or clusters of keywords. The clusters in this analysis are composed of keywords that represent evolving research interests in a field of research and thereby helps define its intellectual structure ([136], [129]). In a keyword co-occurrence network: 1) occurrences mean the number of articles in which a keyword occurs; 2) links mean the number of co-occurrence connections a keyword has with other keywords; and 3) total link strength means the number of publications in which two keywords occur together and the higher this number, the stronger the connection.

Fig. 6 illustrates the authors' keywords co-occurrence network for the 96 deletion articles in the dataset and includes 18 keywords with at least two occurrences. It also presents an evolving timeline of each keyword and four prominent clusters of keywords defining the developing research focus in this field. Fig. 6 provides further support to the findings from Figs. 5 and 6.

The largest cluster of keywords in Fig. 6 comprises of keywords such as *product elimination, product management, product portfolio management, product rollover, decision-making*, and *manufacturing*. These keywords depict the research focus to be on product elimination. Therefore, this cluster is called the *product elimination* cluster.

[3]The keywords data for 43 articles were missing when the documents were downloaded from Scopus and WoS. The 53 articles for which the keyword data were available were tagged with 207 keywords, i.e., an average of approximately four keywords per article. Most of the articles with missing keywords were published before 1998.
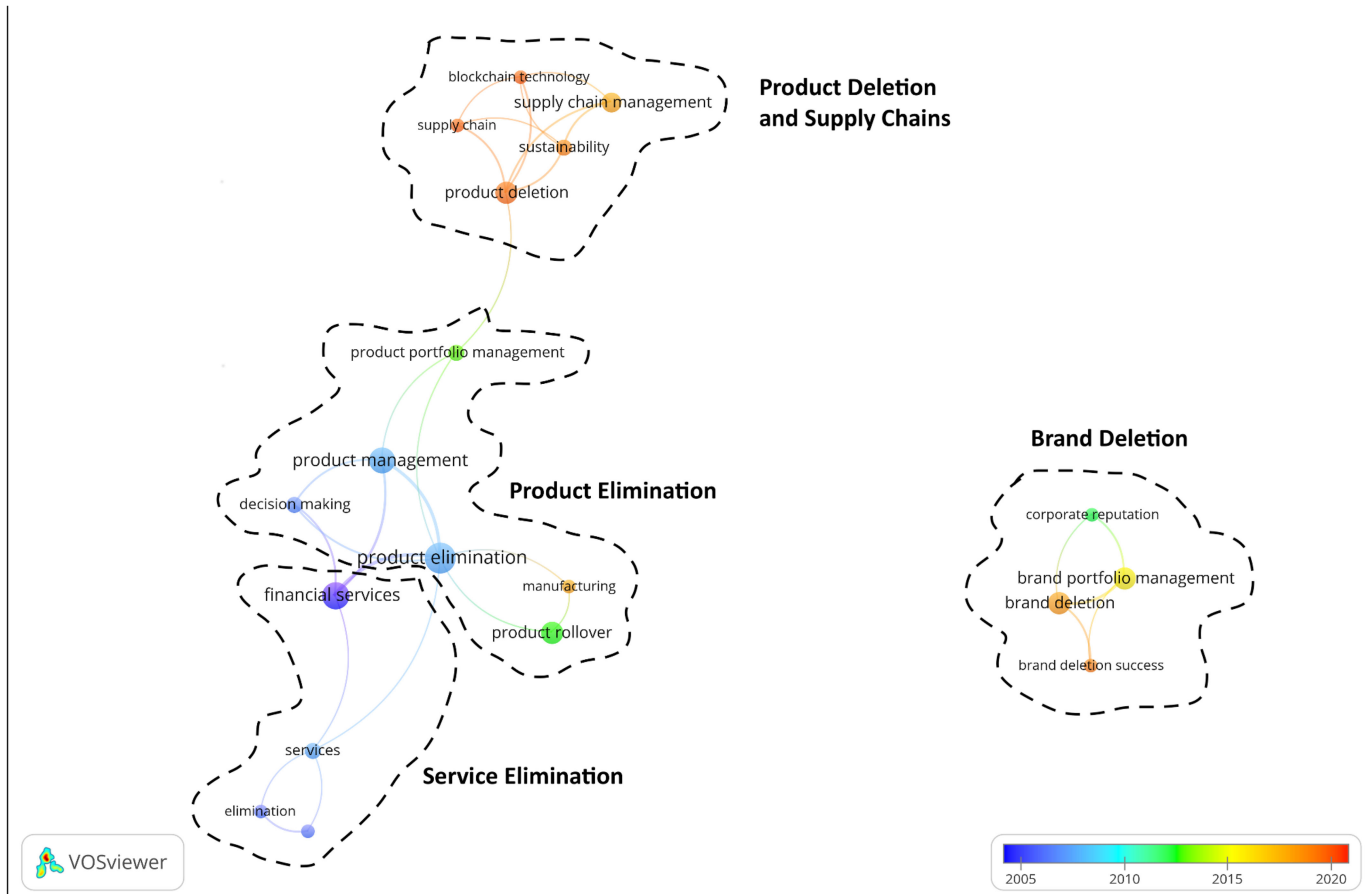
Fig. 6.    Co-occurrence network of authors' keywords.

The keywords *product elimination* (10 occurrences; total link strength 9; 7 links), *product management* (7 occurrences; total link strength 6; 4 links), and *product rollover* (5 occurrences; total link strength 1; 2 links) are central in this cluster. The link strength between product elimination and product rollover is 0.5 while the link strength between product elimination and product management is 2.83. The color shading of the keyword nodes depicts the temporal dimension of these keywords and tells the story of their evolution. For example, the multiple colored nodes of *product elimination* cluster illustrate the longevity of the research conducted using these keywords through the 1998–2020 timeline.

The second network focuses on keywords such as financial services (8 occurrences; total link strength 6; 4 links), services (3 occurrences; total link strength 2; 4 links), and elimination (2 occurrences; total link strength 2; 2 links). This smaller cluster is an extension of product elimination into the service sector and is connected, though not strongly, with the *product elimination* cluster. This cluster is named as *service elimination.* The keyword *financial services* is interesting to note because it signifies the fact that service elimination research is mostly conducted in the context of the financial services industry (e.g., [8]–[10], [60], [61]). The keyword *financial services* is linked to *product elimination* (link strength 3.33), *product management* (link strength 1.33), and *decision-making*

(link strength 0.83). The color shading shows that service elimination keywords emerged between 2000 and 2012, which shows that the research focus is in this stream during that period.

The third cluster includes keywords such as *brand portfolio management* (5 occurrences; total link strength 5; 3 links), *brand deletion* (5 occurrences; total link strength 5; 3 links), *brand deletion success* (2 occurrences; total link strength 2; 2 links), and *corporate reputation* (2 occurrences; total link strength 2; 2 links). This cluster is named *brand deletion. Brand portfolio management* and *brand deletion* keywords are connected with a link strength of three and are typically related to the marketing and brand management fields. The keywords in this cluster started emerging mainly after 2012. It is interesting to note that the *brand deletion* cluster is completely disjoint and does not have linkages with the other three clusters. A rationale for this is the difference between the concepts of brand and product [90] and the distinction between the brand and product deletion strategies [107].

The most recent cluster emerging in the past five years includes keywords such as *product deletion* (5 occurrences; total link strength 5; 5 links), *supply chain management* (4 occurrences; total link strength 3; 3 links), and *sustainability* (3 occurrences; total link strength 3; 4 links). *Supply chain management* and *product deletion* keywords are connected with

TABLE VI
BRAND/PRODUCT DELETION: RESEARCH DEVELOPMENTS AND EVOLUTIONARY HIGHLIGHTS

| Development Stage | Key Literature Streams | Themes/Focuses | Research Type | Key Constructs/Topics | Key Authors & Publications |
|---|---|---|---|---|---|
| Stage I - Gestation and Innovation | Marketing Strategy | ▪ Firms<br>▪ Resources<br>▪ Strategy<br>▪ Financial Performance<br>▪ Knowledge<br>▪ Weak/sick products | Descriptive research | ▪ Product elimination<br>▪ Product management<br>▪ Product deletion<br>▪ Resources-based view<br>▪ Exploration | Alexander (1964); Kotler (1965); Eckles (1971); Avlonitis and James (1982). |
| Stage II - Development and Expansion | Marketing Strategy | ▪ Decision making<br>▪ Process formalization<br>▪ Industrial practice<br>▪ Product portfolio performance<br>▪ Weak product identification | Empirical research | ▪ Product elimination<br>▪ Product rollover<br>▪ Service elimination<br>▪ Financial services<br>▪ Product lifecycle analysis<br>▪ Semi-structured interviews, survey data, quasi experiment, scanner panel data | Avlonitis (1984-1; 1985-1; 1986-2; 2000); (Hart, 1989-1; Argouslidis (2004; 2006; 2007; 2008). |
| | Business Strategy, Organizational Behavioral, Supply Chain/Operations Management, Sustainability | ▪ Decision making<br>▪ Corporate reputation<br>▪ Decision speed and frequency<br>▪ Formalization<br>▪ Rationalization<br>▪ Resources deployment | Empirical research | ▪ Product deletion<br>▪ Product replacement<br>▪ Brand deletion<br>▪ Stakeholders view<br>▪ Sustainability<br>▪ Supply chain<br>▪ Manufacturing | Vyas (1993); Kumar (2003); Varadarajan, Defanti, and Busch (2006); Shah (2015; 2017a; 2017b, 2019; 2020); Zhu et al., (2018; 2020); Bai et al., (2018). |

a link strength of 0.83. These keywords highlight the inter-disciplinary expansion of the product elimination stream into supply chain management and sustainability. The research focus is on understanding the role of product deletion in supply chain management and the impact of supply chain factors in product deletion decision-making. This cluster is therefore called *product deletion and supply chain management*. This cluster is linked to the *product elimination* cluster, though not strongly, through the connection between *product deletion* and *product portfolio management* keywords (link strength 1). Table VI provides a snapshot of the key highlights in the brand/product deletion research domain, including the development stages, key literature streams, themes, key constructs, key authors, and publications of each development stage.

## V. DISCUSSION, IMPLICATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

Effective brand and product portfolio management impacts a firm's sustainable competitive advantage and long-term survival [74], [99]. Brand/product portfolio management aims for strategic alignment, balance within the portfolio, and optimum utilization of resources [65]. Managing brand and product portfolios involves not only adding new brands/products and modifying existing ones, but also deleting underperforming brands/products. Although adding new brands and products is exciting, while deleting weak brands and products is challenging and controversial [3], [48], [107], deletion cannot be neglected as it can help reduce costs, ensure appropriate use of limited resources,

and boost profits [69], [117]. These financial, operational, and strategic benefits along with the challenges involved in deleting brands and products make it an interesting area of academic research with practical implications.

Despite the strong practical implications of brand/product deletion, research in this domain has been progressing slowly and has been dispersed over time. The scope of the domain still needs to be defined and there are several avenues for future research in this crucial area of brand/product portfolio management. This bibliometric review of the brand/product deletion literature has the following research implications: 1) understanding the current knowledge in the field of brand and product deletion and acknowledging that it is disparate and still growing with a need for clearer definitions and reducing polysemy; 2) identifying research gaps in this field with a need to bridge the gaps and build on the existing studies; and 3) providing an understanding of the intellectual history structure of this field to scholars who would like to direct their attention and efforts to this generative field of research. Due to the underinvestigated nature of the product and brand deletion literature streams, structured thematic literature reviews with rigorous qualitative and content analysis could complement the bibliometric analysis and contribute to future research directions. Based on the content analysis of existing intellectual structure, thematic patterns, and theoretical gaps of brand and product deletion research stream, future research can advance this field in various areas. The antecedents, decisions, and outcomes (ADO) framework [88] is used to present the potential research gaps of this critical strategic field in the area of brand and product management.

## A. Future Research Theme 1: Defining Brand/Product Deletion

The brand/product deletion literature is strongly influenced by the marketing and strategy domains. However, brand/product deletion involves cross-functional decisions and therefore, they influence and are influenced by several other functional areas such as operations and supply chain management, financial management, and human resource management. Recently, scholars have started investigating the impact of supply chain management factors on product deletion and also how product deletion influences supply chains [24], [125]–[127]. The scope of this research domain is not restricted to marketing and strategy; it extends to other business functions. Future research can look into the effect of brand/product deletion on a firm's operations strategy, financial planning, manufacturing, and human resource management as well as how these functions impact brand/product deletion.

Deletion decisions in firms occur at many levels including the product category, brand, subbrand, product, and SKU levels. In the future, researchers could investigate the variety and complexity of factors to be considered while deleting brands and products at these different levels. For example, when an SKU is deleted, the product category and the brand will continue to exist in a multibrand and multiple product portfolio. However, if an entire product category is deleted, will the brands representing those products continue to exist, or would they be deleted too? Here, the brand extension strategy will play an important role. Many such crucial and practical questions will arise when deleting brands and products at different levels of the portfolio.

Another interesting topic of deliberation is the deletion of brands/products from the manufacturer's brand/product portfolio versus a retailer's merchandise portfolio. Deleting a brand/product from the manufacturer's portfolio (i.e., if the manufacturer stops producing it) means it will not be available to retailers to resell it to end consumers. However, if the product/brand is deleted at the retail level, it will still be available to consumers from other sources. The roles of these entities in the supply chain differ and therefore, it is important to define this scope which in turn will influence the themes for future research at each of these levels.

In the existing literature, the scope of brand/product deletion decisions has not been stated clearly and explicitly. In fact, different studies present a different level and scope of deletion decisions. This lack of clarity in scope definition and semantics restricts the field from maturing. These *variegational* characteristics of the field highlight a lack of *cognitive consensus* [2], [45], [83]. There is a need to offer a systematic definition of scope with consensus in terminology and semantics to future researchers in this domain.

In addition, brand/product deletion research could further benefit from theory development. Theories from various disciplines, including economics, operations management, consumer research, social psychology, and finance and accounting could be used to provide a theoretical foundation to this research domain. Theory development could contribute to the advancement of brand/product deletion research and help it evolve *progressively* [2], [45].

## B. Future Research Theme 2: Antecedents

The current literature presents various financial and nonfinancial factors that trigger brand/product deletion in a firm. In the marketing domain, these antecedents include dynamic market trends, product performance, changing customer preferences, brand portfolio and product management strategy, type of market, differentiation, substitutability, and new product development (e.g., Avlonitis, [21], [58], [62], [81], [100], [103]). The operations and supply chain management stream studied triggers such as, capacity and resource constraints, manufacturing ability, operational issues, and product design/redesign factors (e.g., [11], [24], [127]). Strategic factors such as corporate image, performance outcomes, and corporate strategy have also been evaluated (e.g., [18], [103], [104], [117]).

Strategic brand/product deletion decisions can be made when the right candidates for deletion are identified based on a logical rationale. This involves identifying what triggered the brand/product deletion in the first place. These factors could be initiated by the top management or by several business functions including marketing, finance, manufacturing, operations and supply chain, and human resources, or even by various internal and external stakeholders such as consumers, retailers, stockholders, brand managers, and others. These antecedents could also vary by the type of firm (branded house versus house of brands), industry, markets (consumer versus industrial), and customers (B2B versus B2C). Identifying and understanding how these factors influence the brand/product deletion decisions in firms is crucial and an open avenue for future research.

At the practitioner level, this encourages a cross-functional involvement in the brand/product deletion decision-making and implementation process. An established business routine to review, detect, measure, monitor, and revisit brand and product portfolios on a regular basis is recommended for firms.

## C. Future Research Theme 3: Decisions

The current literature presents a four-step process for deleting a brand/product as follows.
1) Identify candidates for deletion.
2) Assess these candidates and try to revitalize them.
3) Evaluate the consequences of deletion and decide which candidates to delete.
4) Carry out the deletion [20].

In practice, product life cycle assessment has been commonly used as a diagnostic technique for brand/product deletion. Brands and products that were found to be declining in terms of marketability, profitability, and production capability are considered to have reached the decline stage in their lifecycle and become likely candidates for deletion (e.g., [19], [57]).

There is no specific data-driven tool to evaluate the candidates for brand/product deletion and to predict postdeletion outcomes and impacts on firm performance. The lifecycle assessment

TABLE VII
BRAND/PRODUCT DELETION: RESEARCH GAPS AND FUTURE RESEARCH AGENDA

| | Research Gap | Potential Research Questions | Potential Theories/Concepts That Can Be Applied |
|---|---|---|---|
| ***DEFINITION*** | 1. Define brand/product deletion<br> a. Complete/partial deletion<br> b. Deletion level: Product category, brand, sub-brand, product, or SKU levels<br> c. Firm perspective: Manufacturer or retailer<br><br>2. Develop a more comprehensive understanding of brand/product deletion by including diverse cross-functional perspectives.<br> a. The marketing perspective<br> b. The supply chain/operational perspective<br> c. The financial perspective<br> d. The social perspective<br><br>3. Develop a more comprehensive understanding of brand/product deletion by including diverse stakeholders' perspectives.<br> a. The top management team perspective<br> b. The cross-functional team perspective<br> c. Individual employee perspective<br> d. Customer perspective<br> e. The stockholder perspective<br> f. The community perspective | ▪ What are the relationships across various definitions of product elimination, withdrawal, abandonment, phasing out, delete and replacement? What are the differences and uniqueness in each definition? What constructs are needed to provide more cohesive definitions?<br><br>▪ How can researchers arrive at cognitive consensus and provide a standardized definition for product deletion, by considering different deletion type/level and firm perspective?<br><br>▪ What are the underlying differences amongst product deletion, brand deletion and service deletion to firms?<br><br>▪ What are the influences of product deletion decisions to various organizational cross-functional teams?<br><br>▪ How to better understand the mechanism of product deletion from a multiple stakeholder perspective? Who plays a bigger role in different research contexts?<br><br>▪ How social practices inform the understanding and formalization of product deletion academic field? | ▪ Product lifecycle<br>▪ Product portfolio rationalization<br>▪ Product portfolio management<br>▪ Supply chain management<br>▪ Cognitive consensus<br>▪ Social practice theory<br>▪ Resource-based view<br>▪ Resource advantage theory<br>▪ Stakeholder theory<br>▪ Dynamic capabilities |
| ***ANTECEDENTS*** | 1. Explore product deletion triggers from diverse cross-functional perspectives.<br> a. marketing factors<br> b. supply chain/operational factors<br> c. financial factors<br> d. social factors<br><br>2. Investigate product deletion factors from different levels, from macro to meso to micro levels. Factors can be associated with:<br> a. The top management team characteristics<br> b. The cross-functional team characteristics<br> c. Individual employee characteristics<br> d. Customer characteristics<br> e. The stockholder characteristics<br> f. The community characteristics<br> g. Market characteristics<br> h. Competitor actions | ▪ How product lifecycle mitigated in product deletion decision in early stages such as introduction and development stage?<br><br>▪ What is the role of product portfolio complexity and diversity in product deletion decision making? what are the tradeoffs.<br><br>▪ What relational competencies and governance mechanisms drive sound product deletion decisions?<br><br>▪ How does decision maker identity formation act as a motivator in product deletion decisions?<br><br>▪ How the role theory can explain stakeholders' involvement in product deletion decision making?<br><br>▪ How often should brand and product portfolio audits be conducted? | ▪ Social network theory<br>▪ Network leaning<br>▪ Alliance learning<br>▪ Relational view theory<br>▪ Role theory<br>▪ Identity theory<br>▪ Core competence<br>▪ Resource-based view<br>▪ Dynamic capabilities<br>▪ Resource Advantage theory<br>▪ Institutional theory<br>▪ Stakeholder theory |
| ***DECISIONS*** | 1. Formulate product deletion strategy.<br><br>2. Involve development of user-friendly tools, mathematical models, and empirical justifications to advance methodological understanding and practical application of this field.<br><br>3. Involve various business functions and stakeholders in the brand/product deletion decision making process. | ▪ How can product/brand deletion be formalized as a regular proactive business routine?<br><br>▪ What are the user-friendly diagnostic techniques to identify brand/product candidates for deletion?<br><br>▪ What decision making tools can be developed to facilitate brand/product deletion decision making? | ▪ The lifecycle assessment tool<br>▪ Prescriptive/predictive/causative analytics<br>▪ Scorecard<br>▪ Stage-gate model<br>▪ Optimization models<br>▪ Parametric and non-parametric methods<br>▪ Bayesian analysis<br>▪ Stakeholder theory<br>▪ Power Structure theory |

tool could be useful but is not always the optimum solution to evaluate the candidates for deletion. Some applied quantitative techniques to identify and evaluate deletion candidates that exist in the extant literature include multicriteria decision analysis and soft computing (e.g., [24], [64], [127]). Future research could involve the development of user-friendly tools, mathematical models, and empirical justifications to advance methodological understanding and practical application of this field. Possible tools may include scorecard and stage-gate models. Optimization models may also facilitate brand/product deletion decisions

TABLE VII
CONTINUE

| | | | |
|---|---|---|---|
| | | ▪ In what ways can prescriptive/predictive/causative analytics can help inform sound brand/product deletion decisions?<br><br>▪ What kind of conflicts of interests among stakeholders could impact the brand/product deletion decision making process?<br><br>▪ What role will power structure within the organization play in the brand/product deletion strategy? | |
| **OUTCOMES** | 1. Identify and comprehend the outcomes (financial and non-financial) and success factors of brand/product deletion.<br><br>2. Develop performance measurement matrix for product deletion outcomes and post-deletion performance.<br><br>3. Theorize and test effective approaches to manage potential risks, negative outcomes, and impending consequences of brand/product deletion. | ▪ How does brand/product deletion affect internal organizational resources from a resource-based view perspective?<br><br>▪ How does brand/product deletion affect collaborative and shared resources from a social network and relational view perspective?<br><br>▪ How does brand/product deletion affect learning and knowledge mechanisms between focal firm and its business partners?<br><br>▪ What are the potential risks in brand/product deletion? How can managers mitigate the benefits and risks of brand/product deletion? How can the potential risks be managed?<br><br>▪ What are the financial and strategic performance impacts of brand/product deletion? How does this affect the various stakeholders involved? | ▪ Resource-based view<br>▪ Resource advantage theory<br>▪ Stakeholder theory<br>▪ Relational view<br>▪ Social network theory<br>▪ Network leaning<br>▪ Alliance learning<br>▪ Collaborative capabilities<br>▪ Risk management<br>▪ Cause-effect analysis<br>▪ BOCR (benefit, opportunity, cost, risk) analysis<br>▪ Balanced Scorecard<br>▪ Continuous quality improvement and measurement techniques<br>▪ Event studies |

to arrive at a more rationalized portfolio. Traditional parametric and nonparametric methods can also be deployed. Bayesian analysis or other likelihood estimation techniques may help answer questions such as the likelihood of some brands or products being deleted or retained, given the business strategy and objectives. Brand/product deletion decision-making tools also vary by industry, company, brand, and product specific characteristics. This opens several other opportunities for future research. Advanced tools can be developed and tested in boarder research contexts to improve external validity, and continuous practical validation in real-life business scenarios can enhance the accuracy of these models and tools.

### D. Future Research Theme 4: Outcomes

Brand/product deletion offers several organizational, financial, operational, marketing, and strategic benefits to firms. Overall, firms can focus on the core market offerings, and thereby improve their competitive position. Resources, both tangible (e.g., capital and labor) and intangible (e.g., time), freed due to deleted weak brands/products can be redeployed to stronger brands/products that deliver higher returns and boost profits. Although brand/product deletion offers several advantages to a firm, it is a complex and risky strategic decision. The decision to delete brands and products may hurt business relationships with customers, suppliers, and retailers. Firms need to invest resources in managing the inventory of deleted products, in dealing with negative reactions from consumers and media, and

in maintaining the image and reputation of the firm postdeletion [104]. Such outcomes may create strategic and operational issues and/or financial losses.

Despite these repercussions of a deletion decision, there is research gap in the literature related to identifying and comprehending the outcomes (financial and nonfinancial) and success factors of brand/product deletion. In addition, future research could also develop metrics to measure the financial and nonfinancial impact of deletion decisions. Here, the effect of brand/product deletion outcomes on various stakeholders is an interesting area to investigate in the future. There is room for further development of tools using cause–effect analysis and BOCR (benefit, opportunity, cost, risk) analysis to measure the outcomes or consequences of brand/product deletion. Another direction for future research could be theorizing and testing effective approaches to manage potential risks, negative outcomes, and impending consequences of brand/product deletion. This will provide a strategic toolkit to managers while deleting brands and products successfully such that they do not make financial losses, do not alienate their loyal customers, and maintain the image and reputation of the firm.

In summary, Table VII presents these four research avenues along with potential research questions, and suggests relevant organizational, management, marketing, supply chain, and business analytics theories and/or concepts that may be applied to further advance the field of product/brand deletion. This table is organized based on the ADO framework [88] and the research gap-research questions-theories conceptualization

[97]. The integration of theoretical and practical perspectives from dynamic disciplines can help pave the way to enrich the product/brand deletion domains, in turn enabling product/brand deletion to have a more significant positive impact on a wider research and business community.

## VI. CONCLUSION

The brand and production deletion field has existed for decades. The field has emerged and continues to evolve. It holds strategic importance within the broader brand/product management field and has also expanded to other disciplines such as supply chain management.

To help map the intellectual structure of the field, identify its evolution and current state, along with helping to identify and develop future research directions, a bibliometric review of this literature was conducted in this article. This bibliometric review presented the influential authors, journals, publications, and research themes/topics in the field of brand/product deletion.

One major finding was that although the literature on brand/product deletion has been in existence for many decades, the relative number of publications and authors in this field are still relatively few as compared to other mature fields such as new product development. A major characteristic of this field is that it is *variegational* due to a lack of cognitive consensus [2], [45], [83]. There is a need to offer a systematic definition of scope with consensus in terminology and semantics to future researchers in this domain. Some clarity in definition is offered by delineating the topics covered in the field. Undoubtedly, more work is required to solve the polysemy issue related to exact terminology and constructs. In addition, most of the research to date has been missing a theoretical foundation, so grounding future research in theory that can explain the phenomenon is crucial.

This article also mapped the field's evolution and classified it in different clusters. In the early stages of the field, the field was based in the marketing strategy literature. Further delineation of research highlighted the operational and practical characteristics of product deletion. The field moved further from solely a product deletion perspective to incorporate service elimination and then brand deletion. More recently, the field also evolved to expand its considerations cross functionally to supply chain concerns from and involvement in product deletion decisions. This evolution shows that not only has the work expanded beyond marketing strategy, but more broadly across disciplines. The interdisciplinary focus of brand/product deletion expands to broader corporate strategy cross-functional relationships.

This identification of the evolution led us to our third major contribution of this article. It is found that the field has not yet reached Stage III, i.e., institutionalization with clearly defined and accepted constructs. Stage IV, i.e., maturity, is not yet on the horizon. This bodes well for those seeking to advance brand/product deletion to broaden the brand/product management field.

Research directions for the brand/product deletion field were categorized under the ADO framework [88]. This framework provides an interesting map for future research and direction of the field. In each dimension of the ADO, research gaps and research directions are identified and tabulated in Table VII. Theories were identified that can serve as important lenses for future study and understanding of the field. Varying theoretical perspectives can address issues facing each of the ADO dimensions. After this initial—yet comprehensive—analysis of future research directions, it comes to light that the area is fertile given the complex decisions that will go into brand/product deletions as well as the outcomes of those decisions and the various stakeholders involved.

Although this article provided a number of potential contributions, limitations do exist. A rigorous bibliometric analysis—although technically accurate—is also dependent on larger datasets. This small dataset was a limitation in achieving a profound and thorough bibliometric analysis. Thus, structured literature reviews with rigorous qualitative and content analysis could complement the analysis presented in this article. Although a brief thematic analysis of the topics in this body of literature was conducted, a formal structured literature review would add more value. The epistemological evolution of this field needs further evaluation and confirmation. This bibliometric review highlighted an important opportunity and need for both theory development and crucial practical development of tools and managerial practices in this vital domain of brand/product management.

This field is important for broader strategic as well as operational decisions for organizations and their stakeholders. It is known that corporations are practically dealing with the challenges of planning and implementing brand/product deletions. This is a field where academia can make a big practical impact through further research and theoretical underpinning of brand/product deletion. This timely bibliometric review provided a fitting and beneficial springboard for this advancement.

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