The Global Research Trends in Customer Knowledge **Management (CKM)**

Zahra Sadeqi-Arani
Assistant Professor in Management and Entrepreneurship;
University of Kashan; Kashan, Iran;
Email: SadeqiArani@kashanu.ac.ir

Elmira Janavi*
Assistant Professor in Knowledge and Information Science;
Policy Evaluation and STI Monitoring Department;
National Research Institute for Science Policy (NRISP);
Tehran, Iran Email: Janavi@nrisp.ac.ir

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Abstract: Although there have been many publications on the subject of CKM, particularly in recent years, not much research has been conducted on the performance analysis and science maps of these studies. To overcome this constraint, a bibliometric study of the current body of academic literature on CKM is conducted the study's methodology involved conducting a bibliometric examination of publications indexed in the Web of Science (WoS) and Scopus from 1992 to 2022. The search strategy employed for this review was guided by the PRISMA standards, resulting in 255 papers being located during the search procedure. To visualize and quantitatively analyze bibliometric networks the VOS viewer tool and the bibliometric R-package were utilized. The descriptive statistics reveal a significant increase in CKM studies since 2011, with the majority of publications occurring in 2021, 2019, and 2013, respectively. China, Iran, and the United States are the countries with the highest number of publications, respectively. The "JOURNAL OF KNOWLEDGE MANAGEMENT" is a core journal in this field, and "Hussin A" is the most prolific author in this scientific domain. The results of the thematic analysis indicate that "co-creation" has gained popularity in recent years, and over the past seven years, "knowledge sharing" and "customer knowledge development" have replaced "market orientation" and "customer relations", respectively. Additionally, the co-word

* Corresponding Author

analysis of the author's keywords identified six clusters, including "Knowledge Management and Market Orientation," "Knowledge Sharing and Co-Creation," "CKM and Customer Engagement," "CKM, Tools and Technique," "Knowledge Management and CRM," and "CRM."By identifying and deriving key CKM themes, this study makes a significant contribution to the CKM literature. Researchers can utilize the scientific analysis of a variety of sectors, such as customer knowledge management, to understand the scientific boundaries and gain a general understanding of the scientific method. Another goal is to identify research goals for policymakers in many scientific disciplines and modify them to meet future societal requirements.

Keywords: Customer Knowledge, Customer Knowledge Management, Bibliometric Analysis, Bibliometrix R-package, VOS Viewer

1. Introduction

In the current era, when the industrial revolution has given way to the knowledge revolution, companies rely on knowledge as a critical component of success. The most valuable resource within a business is now widely acknowledged to be knowledge. It is a crucial differentiator in the business world of today. Businesses must actively contribute to the creation and application of knowledge in today's knowledge-based economy if they are to thrive in a changing economic environment (He et al., 2019). One of the most crucial resources that help businesses achieve continuous development and other long-term advantages in addition to gaining a competitive advantage is knowledge. Companies need to find and gain customer insights to achieve a competitive advantage (Chaithanapat & Rakthin, 2021). Andrew (1995) used the term "customer knowledge" (CK) for the first time in the banking business (Ourzik, 2022).

Knowledge about customers, knowledge of customers, and knowledge from customers can be broadly categorized into these three categories, (Hutauruk & Lusa, 2022). First, customer knowledge describes the fundamental customer knowledge management (CKM) data related to customer knowledge management about customers, such as their personal details, transaction history, the products and services they have used, their preferred language, and so on. The second definition of customer knowledge is the flow of information inside an

organization that supports suppliers, markets, customers, and products. Third, customer knowledge is information gathered from customer interactions, including their requirements and the emotional and practical facets of the relationship. Companies can use this information as a great tool to better understand their clients, iteratively improve their goods and services, and come up with new business ideas (Lakshmi & Jesiah, 2020). CKM has developed into a crucial strategic instrument that businesses may use to boost marketing performance and innovation, help businesses discover new market opportunities, and, assist long-term customer relationship management. This is a result of high-end clients' complex and constantly changing preferences, which has caused the KM paradigm to change to a customer-centric, dynamic approach, (Barker & Hanekom, 2022; Fidel et al., 2015).

Even though there have been many publications on the subject of CKM, particularly in recent years, there has not been much research effort put into the performance analysis and science maps of these studies. To get around this limitation, a bibliometric study of the published studies on scientific research on the subject of CKM in WOS and Scopus during 30 years (1992–2022) is done. This article presents a detailed and current analysis of customer knowledge management by utilizing bibliometric maps to review the literature from the past three decades. Finding the most significant and useful contributors—such as authors, journals, papers, and nations—is the primary goal of contemporary research. To identify connected and key concepts (themes or clusters of topics), a co-word analysis is also used. The purpose of this review is to advance the theoretical basis for the concept of CK and outline potential areas for future research. The study was conducted in impartially to inform researchers, educators, policymakers, and other professionals in this field. For individuals who are new to this area of study, reading this review is crucial to obtain a thorough understanding of the literature on CKM. Educators can identify colleagues, policymakers can pinpoint critical research areas, and funding agencies can make informed investment choices.

We respond to the following four research questions (RQs):

RQ1: What are the trends in scholarly publications for CKM research?

RQ2: What are the most productive authors, journals and countries, and the most cited documents in CKM?

RQ3: How have research topics and areas in CKM changed over time?

RQ4: What are the conceptual structures and knowledge clusters in CKM research?

2. Methodology

According to Leung et al. (2017), bibliometric is a type of statistical analysis of publications that offers a numerical perception of the scholarly literature (Leung et al., 2017). It is a quantitative analysis that is both exploratory and driven by data allowing for the formation of a dispassionate assessment of the field's performance as well as a visual representation of all of the scientific knowledge in that area (Lim et al., 2022). The two most used methods of bibliographic analysis are scientific visualization and performance analysis. The evaluation of performance analyzes how well certain authors, journals, documents, and nations have performed in terms of their contributions to a particular academic subject. Science mapping is a bibliometric technique to establish the conceptual building blocks of literature to discover the dynamics of the intellectual structure of a topic. Science visualization is a bibliometric method that identifies the topics associated with a specific area of research, builds the conceptual building blocks of literature to identify these subject areas, and tracks the development of key concepts in that field (Donthu et al., 2021). To aid future studies, the bibliometric analysis serves to highlight the current state-of-the-art themes and show trends in the body of existing literature (Kunosic & Zerem, 2019).

The five stages of this research's normal workflow are: 1. Study design; 2. Data collection; 3. the data analysis; 4. Data visualization; and 5. Interpretation (Aria & Cuccurullo, 2017; Donthu et al., 2021).

This study depends on the usage of both the Web of Science core collection (WoS) and Scopus databases due to their complementary nature and similar publication coverage (Echchakoui, 2020). The majority of bibliometrics suggest them as having a larger coverage of scientific publications across all fields. They are helpful online scientific information aids that include research papers and scientific documents. The bibliometrix R-Tool was employed to create the analysis, and the metadata from two databases (WoS and Scopus) was collected.

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis

(PRISMA) guidelines (Rethlefsen et al., 2021). For conducting systematic reviews of studies served as a guide for the search architecture utilized in this review. The four steps of PRISMA are study identification, screening, eligibility, and inclusion (Figure 1).

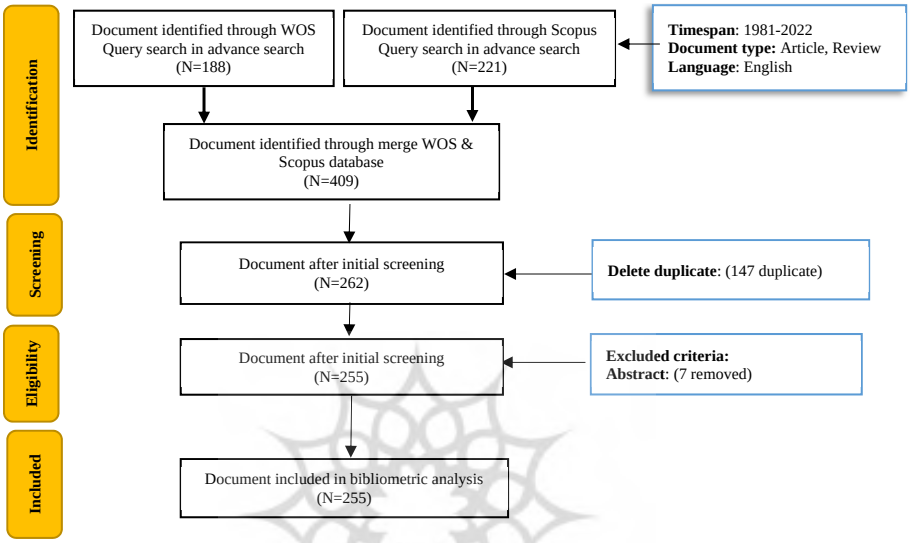

Figure 1. PRISMA diagram outlining CKM research search outcomes from the WOS and Scopus databases

To find any documents related to this subject, we created a search string based on a preliminary assessment of prior literature. we used a suitable combination of keywords, including "consumer knowledge management", "consumer knowledge assessment", "consumer knowledge creates", "consumer knowledge storage", "consumer knowledge sharing", "consumer knowledge applicate" and "consumer knowledge transfer" employing conditional operators such as OR, AND, and NOT.

In the initial stage of the analysis, we identified 255 English-language documents from 1992 to 2022 indexed in Scopus and WoS. After merging the global database and deleting duplicate items (147 duplicated documents), we identified 261 distinctive studies published. Seven studies were removed based on their abstracts, leaving 255 scientific documents (article and review) included in this study.

Several software programs facilitate bibliometric analysis; however, many of them do not help academics follow the full recommended workflow (Aria et al.,

2021). To analyze the data, we used the RStudio package Bibliometrix (Derviş, 2019; Moral-Muñoz et al., 2020), which allowed for the presentation of the conceptual, social, and intellectual structures of the research field. Additionally, we built and visualized bibliometric networks using the VOSviewer software. Creating and viewing bibliometric maps can be done using a free computer tool (Van Eck & Waltman, 2010).

3. Results

The results are described as follows:

RQ1. What are the trends in scholarly publications for CKM research?

3-1. Performance analysis

According to Table 1, the findings of descriptive statistics show that in the studied time, a total of 255 documents (articles and reviews) were published in the WOS and Scopus databases, which received an average of 24.86 citations.

Additionally, the findings revealed that 560 authors contributed to the field of CKM during this course. Of these, 528 were multi-authored document authors, while 32 were single-authored document authors.

The Collaboration Index, which calculates the co-authors per article cooperation, is 2.48. This implies that researchers in the field of CKM, prefer to work in teams rather than individually. The number of writers per document (2.2) and the number of co-authors per document (2.76) both attested to the authors' collaboration.

Table 1. Summary statistics

Description	Results
Timespan	1992:2022
Sources (Journals, Books)	173
Documents (Article, Review)	255
Average citations per documents	24.86
Authors	560
Author Appearances	703

Description	Results
Authors of single-authored documents	32
Authors of multi-authored documents	528
Single-authored documents	42
Documents per Author	0.455
Authors per Document	2.2
Co-Authors per Documents	2.76
Collaboration Index	2.48

Figure 2 illustrates the annual growth trajectory of scholarly publications on CKM from 1981 to 2022. Notably, a noticeable upsurge in scientific articles on this subject has been observed since 2010, with the years 2021, 2019, and 2013 having the highest number of publications.

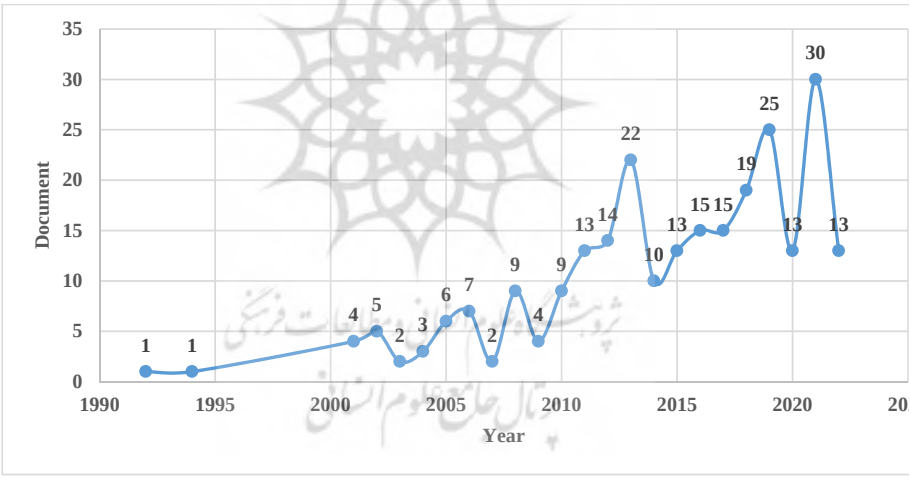

Figure 2. Annual scientific production in CKM (1992-2022)

RQ2: what are the most productive authors, journals and countries and the most cited documents in CKM?

To answer this research question, the frequency distribution of authors, documents, journals, and countries productive in CKM was extracted. Tables 2 to 6 show the performance of 20 top of these.

Performance of authors: Table 2 lists the 20 most prolific authors according to

the number of papers indexed in WoS and Scopus. The ranking of the authors is as follows: HUSSIN A. and KHOSRAVI A. (both with 6 publications) secured the first and second positions respectively, followed by BEHNAM M. and SALOJARVI H. (both with 5 publications), while BRENNER W., EISENBARDT M., KOLBE L., LIN C., LIN J., NATTI S., ROWLEY J., and ZIEMBA E. (all with 4 publications) occupied the third to ninth positions, respectively. Authors with three or fewer publications are assigned lower ranks.

Table 2. Most Productive Authors

Rank	Authors	Articles	Rank	Authors	Articles
1	HUSSIN A	6	11	ROWLEY J	4
2	KHOSRAVI A	6	12	ZIEMBA E	4
3	BEHNAM M	5	13	AL-BUSAIDI K	3
4	SALOJARVI H	5	14	BIZ A	3
5	BRENNER W	4	15	CHANG T	3
6	EISENBARDT M	4	16	DANDOLINI G	3
7	KOLBE L	4	17	DELSHAB V	3
8	LIN C	4	18	FIDEL P	3
9	LIN J	4	19	MULLINS R	3
10	NATTI S	4	20	MUNIZ E	3

Results are shown in Table 3 and demonstrate the authors' scientific productivity and application of Lotka's law to CKM. 83% of authors in this subject only produce one piece of writing on occasion. According to the law, "the proportion of all the authors who make a single contribution is about 60%, and the number (of authors) making 'n' contributions is about 1/n2 of those making one." In other words, 60% of authors in a field or discipline create one publication, 15% create two (1/32*60), 7% create three (1/32*60), and so on. Lotka's law may be generally correct, but it is not statistically accurate, unless it is applied to a sizable body of literature over a long enough time. According to Law, you can estimate how many authors have authored two, three, or more articles if you know how many authors have published a single article (Lotka, 1926).

Table 3. Frequency of Publication by Authors (Lotka law)

Documents written	N. of Authors	The Proportion of Authors (%)
1	465	0.83
2	65	0.116
3	18	0.032
4	8	0.014
5	2	0.004
6	2	0.004

Performance of Journals: The 20 journals that have made the biggest contributions to the publication of CKM research findings are listed in Table 4. The greatest contribution came from "JOURNAL OF KNOWLEDGE MANAGEMENT," which contained 14 articles. The findings show that 38% of the publications on this subject were published in the 20 journals listed in Table 4, while 62% were dispersed over 157 journals.

Table 4. Most Relevant Sources

Rank	Sources	Articles
1	JOURNAL OF KNOWLEDGE MANAGEMENT	14
2	JOURNAL OF BUSINESS RESEARCH	7
3	KNOWLEDGE AND PROCESS MANAGEMENT	7
4	INTERNATIONAL JOURNAL OF ELECTRONIC CUSTOMER RELATIONSHIP MANAGEMENT	6
5	JOURNAL OF BUSINESS & INDUSTRIAL MARKETING	6
6	JOURNAL OF THE ACADEMY OF MARKETING SCIENCE	5
7	INDUSTRIAL MARKETING MANAGEMENT	4
8	MARKETING AND CONSUMER BEHAVIOR: CONCEPTS METHODOLOGIES TOOLS AND APPLICATIONS	4
9	SUSTAINABILITY	4
10	AFRICAN JOURNAL OF BUSINESS MANAGEMENT	3
11	EUROPEAN MANAGEMENT JOURNAL	3
12	INDUSTRIAL MANAGEMENT & DATA SYSTEMS	3
13	INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT	3

Rank	Sources	Articles
14	INTERNATIONAL JOURNAL OF KNOWLEDGE MANAGEMENT	3
15	JOURNAL OF INFORMATION & KNOWLEDGE MANAGEMENT	3
16	JOURNAL OF THEORETICAL AND APPLIED INFORMATION TECHNOLOGY	3
17	SERVICE INDUSTRIES JOURNAL	3
18	ASIAN SOCIAL SCIENCE	2
19	BUSINESS INFORMATION REVIEW	2
20	BUSINESS PROCESS MANAGEMENT JOURNAL	2

Bradford's law can be used to calculate the distribution frequency of sources, which can then be used to identify the journals having the most influence in each scientific subject, or core journals. Samuel C. Bradford was the first to explain how the distribution of definitions determines how much knowledge is available on a given issue. Bradford discovered that the citations for the first area would originate from a small "core" group of journals if all citations in a given field were divided equally into three groups or regions. To receive the same number of citations in the second region, additional journals are needed, and in the third area, the requirements are exponentially higher. Bradford observed a "decline in efficiency" from Area 1 to Region 3, which is now known as Bradford's scattering law or the Bradford distribution (Chaturbhuj et al., 2020; Venable et al., 2016). Figure 3 shows that 19 journals in Zone 1 that contributed a third of the articles to CKM are considered key journals.

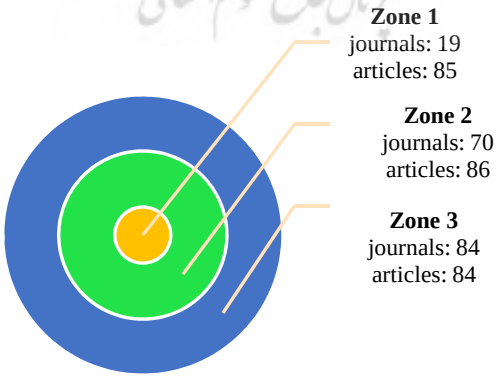

Figure 3. Bradford's Law Zones as a source

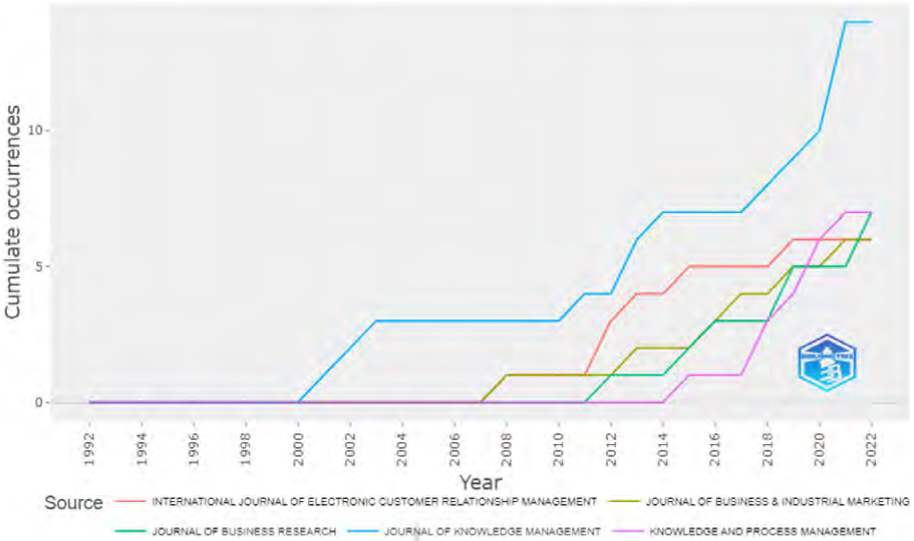

Figure 4. Source dynamics

Figure 4 shows the annual growth of the top 5 journals in publishing GKM articles, which illustrates that "The Journal of Knowledge Management", as a core journal in this field, is highly growing between the years 2010 and 2022. Furthermore, the figure shows that other journals also experienced significant growth in publishing CKM articles, with their growth trajectories closely resembling that of the "Journal of Knowledge Management" since 2014.

Performance of Documents: Table 5 presents the 20 most cited articles in CKM indexed in WoS and Scopus. In terms of total citations, PARK's article entitled "Consumer Knowledge Assessment" which was published in 1994, is the most cited article with 387 citations. After that, HOLLEBEEK's article earned the second-highest citation count at 381. In addition, when considering citations per year, HOLLEBEEK's article emerges as the most productive among the top-cited works. Notably, several highly influential articles based on this metric were published after HOLLEBEEK, including a notable publication from 2019.

Table 5. The 20 most cited articles

Rank	Paper	Title	Total Citations	TC per Year	Normalized TC
1	PARK CW, 1994, J CONSUM RES	Consumer Knowledge Assessment	387	13.34	1.00
2	HOLLEBEEK LD, 2019, J ACAD MARKET SCI	S-D logic–informed customer engagement: integrative framework, revised fundamental propositions, and application to CRM	381	95.25	13.49
3	BUCKLEY A, 2002, EUR MANAGE J	Five Styles of Customer Knowledge Management, and How Smart Companies Use Them to Create Value	355	16.90	2.31
4	JOSHI AW, 2004, J MARKETING	Customer Knowledge Development: Antecedents and Impact on New Product Performance	323	17.00	2.12
5	GEBERT H, 2003, J KNOWL MANAG	Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts	320	16.00	1.98
6	GARCIA-MURILLO M, 2002, J OPER RES SOC	Customer knowledge management	170	8.10	1.11
7	CHUA AYK, 2013, J KNOWL MANAG	Customer knowledge management via social media: the case of Starbucks	152	15.20	7.07
8	DAVENPORT TH, 2001, MIT SLOAN MANAGE REV	how do they know their customers so well	150	6.82	2.84
9	JAYACHANDRAN S, 2004, J ACAD MARKET SCI	Customer response capability in a sense-and-respond era: The role of customer knowledge process	134	7.05	0.88

Rank	Paper	Title	Total Citations	TC per Year	Normalized TC
10	SALOMANN H, 2005, EUR MANAGE J	Rejuvenating Customer Management: How to Make Knowledge For, From and About Customers Work	126	7.00	2.75
11	KHODAKARAMI F, 2014, INFORM MANAGE-AMSTER	Exploring the role of customer relationship management (CRM) systems in customer knowledge creation	125	13.89	4.14
12	LEE MKO, 2006, INTERNET RES	Understanding customer knowledge sharing in web-based discussion boards: An exploratory study	114	6.71	2.25
13	SU CT, 2006, TECHNOVATION	Linking innovative product development with customer knowledge: a data-mining approach	99	5.82	1.96
14	ARNOLD TJ, 2011, J ACAD MARKET SCI	The effects of customer acquisition and retention orientations on a firm's radical and incremental innovation performance	99	8.25	5.09
15	ROWLEY J, 2002, J KNOWL MANAG	Eight questions for customer knowledge management in e-business	95	4.52	0.62
16	LOPEZ-NICOLAS C, 2008, INT J INFORM MANAGE	Customer Knowledge Management and E-commerce: The role of customer perceived risk	94	6.27	4.67
17	ROWLEY JE, 2002, QUAL MARK RES	Reflections on customer knowledge management in e-business	91	4.33	0.59
18	TAHERPARVAR N, 2014, J KNOWL MANAG	Customer knowledge management, innovation capability and business performance: a case study of the banking industry	83	9.22	2.75

Rank	Paper	Title	Total Citations	TC per Year	Normalized TC
19	ROWLEY J, 2007, MARK INTELL PLAN	Customer community and co-creation: a case study	82	5.13	1.56
20	WU JB, 2013, EUR MANAG J	Customer knowledge management and IT-enabled business model innovation: A conceptual framework and a case study from China	76	7.60	3.53

Performance of Country: As shown in Figure 5, China, Iran, and the USA had the highest number of scholarly works on CKM, with 38, 29, and 28 articles, respectively. Additionally, France demonstrated a high ratio of multiple country publications (MCP), at 80%, indicating significant international collaboration among the top 20 countries. On the other hand, Jordan, India, Tunisia, Bangladesh, and Brazil did not participate in scientific research collaborations with other countries.

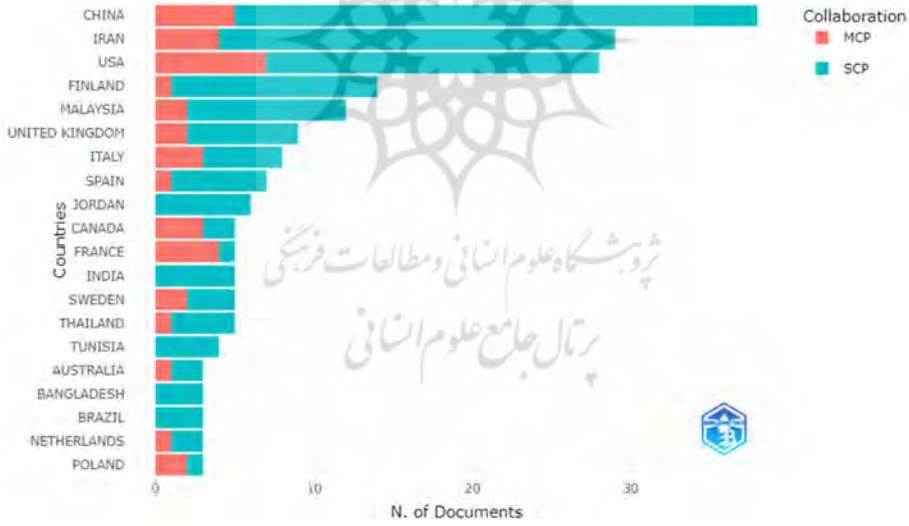

Figure 5. Most productive countries

Table 6. Most productive countries

Rank	Country	Articles	Freq	SCP	MCP	MCP_Ratio
1	CHINA	38	0.165	33	5	0.13
2	IRAN	29	0.126	25	4	0.14
3	USA	28	0.122	21	7	0.25
4	FINLAND	14	0.061	13	1	0.07
5	MALAYSIA	12	0.052	10	2	0.17
6	UNITED KINGDOM	9	0.039	7	2	0.22
7	ITALY	8	0.035	5	3	0.38
8	SPAIN	7	0.030	6	1	0.14
9	JORDAN	6	0.026	6	0	0.00
10	CANADA	5	0.022	2	3	0.60
11	FRANCE	5	0.022	1	4	0.80
12	INDIA	5	0.022	5	0	0.00
13	SWEDEN	5	0.022	3	2	0.40
14	THAILAND	5	0.022	4	1	0.20
15	TUNISIA	4	0.017	4	0	0.00
16	AUSTRALIA	3	0.013	2	1	0.33
17	BANGLADESH	3	0.013	3	0	0.00
18	BRAZIL	3	0.013	3	0	0.00
19	NETHERLANDS	3	0.013	2	1	0.33
20	POLAND	3	0.013	1	2	0.67

Figure 4 illustrates the collaboration paths between the 20 most productive nations, as shown in the national collaboration map. The color blue represents the presence of international study networks. The findings reveal that “China-USA” has had the highest scientific cooperation in creating CKM articles, with a total of 6 joint papers. The second-highest scientific cooperation ratings were achieved by “China-United Kingdom” and “Iran-Australia,” each with 3 joint papers. Furthermore, Iran, Italy, the United Kingdom, and the United States collaborated on two articles with other countries.

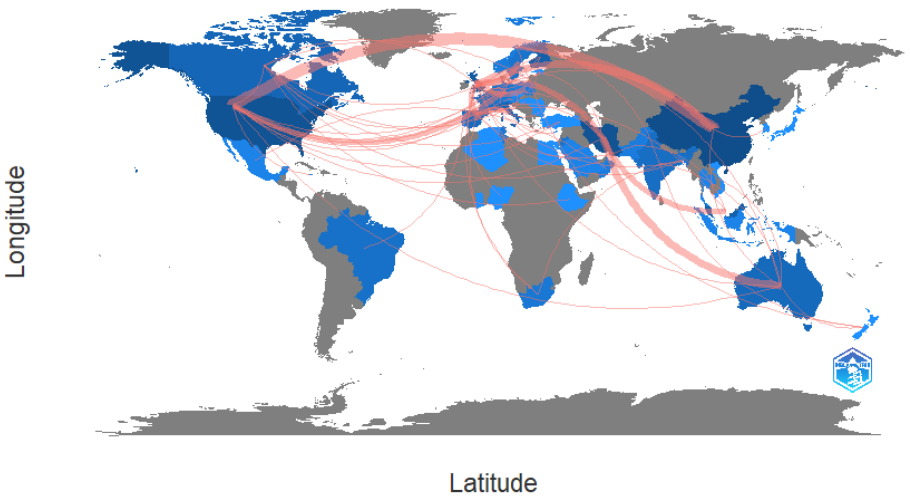

Figure 6. Country collaboration map

Table7. RQ3. How have research and topical areas in CKM changed over time?

Rank	From	To	Freq
1	CHINA	USA	6
2	CHINA	UNITED KINGDOM	3
3	IRAN	AUSTRALIA	3
4	IRAN	MALAYSIA	2
5	IRAN	UNITED KINGDOM	2
6	ITALY	SPAIN	2
7	UNITED KINGDOM	FRANCE	2
8	UNITED KINGDOM	POLAND	2
9	UNITED KINGDOM	SWEDEN	2
10	USA	GERMANY	2

3-2. Conceptual Structure

This research introduces the main areas of interest and potential gaps in the field of content marketing using co-word analysis to depict the conceptual structure in a network of words. To achieve this, the words had to undergo a normalization

process first to homogenize with typographical errors, full words or phrases instead of abbreviations or acronyms (such as CKM versus “customer knowledge management”), and British versus American English (such as “behavior” vs. “behaviour”). The conceptual organization of a network of words is then visually represented.

Frequency and Evolution of Words: According to Figure 6, the top 20 frequent words that occur in the author’s keywords are ‘customer knowledge management’, ‘knowledge management’, “CRM, ‘customer knowledge’, ‘performance’, and ‘innovation’.

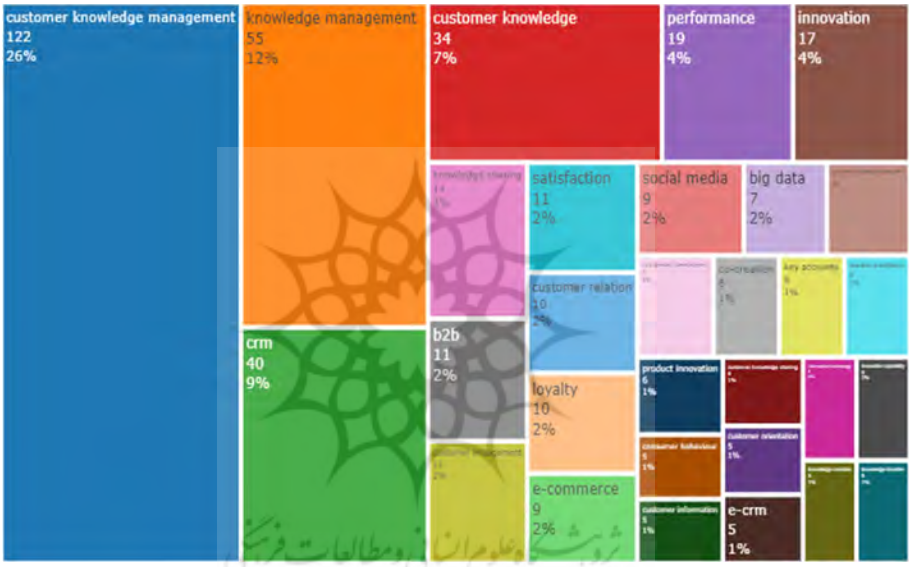

Figure 7. Words tree map (1992-2022)

Table 8 provides insights into the frequency and evolution of keywords used by researchers in two-time spans: 1992–2015 and 2016–2022. The findings reveal that the keywords “customer knowledge management”, “knowledge management”, “CRM”, and “customer knowledge” have been consistently used by researchers in both periods. Although the frequency of the keyword “knowledge management” has decreased from 2015 to 2022, it remains the second most commonly used keyword among researchers. Notably, the word “performance” has replaced “innovation” as one of the top five keywords between 2016 and 2022. Further, the keyword ‘knowledge sharing’ has seen significant growth in publications during this period.

Table 8. Frequency and Evolution of Keywords

Timespan	1992-2015 Documents=125 Sources=92 Authors=259		2016-2022 Documents=130 Sources=97 Authors=321	
Rank	**"Author's Keywords"**	**F***	**"Author's Keywords"**	**F**
1	customer knowledge management	59	customer knowledge management	63
2	knowledge management	34	knowledge management	21
3	CRM	20	CRM	20
4	customer knowledge	16	customer knowledge	18
5	Innovation	12	performance	12
6	customer relation	8	knowledge sharing	11
7	e-commerce	8	customer engagement	8
8	Performance	7	loyalty	8
9	key accounts	6	big data	7
10	b2b	5	b2b	6
11	customer information	5	satisfaction	6
12	knowledge transfer	5	social media	6
13	market orientation	5	customer knowledge sharing	5
14	Satisfaction	5	innovation	5
15	consumer behavior	4	new product development	5
16	customer knowledge development	4	product innovation	5
17	information technology	4	co-creation	4
18	knowledge creation	4	innovation capability	4
19	process management	4	software quality	4
20	knowledge sharing	3	sustainability	4

Timespan	1992-2015		2016-2022	
	Documents=125 Sources=92 Authors=259		Documents=130 Sources=97 Authors=321	
Rank	**"Author's Keywords"**	**F***	**"Author's Keywords"**	**F**
Keywords Cloud				

F*: Frequency

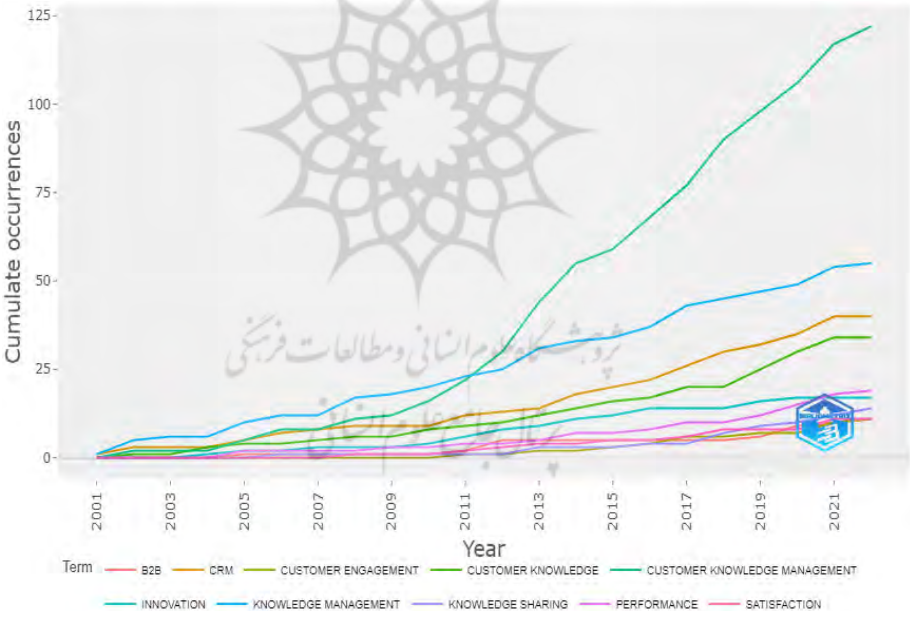

Figure 8. Word Growth (year-wise)

Thematic Evolution Map of the Topic: It is possible to examine and map the evolution of a topic's trajectory over time by dividing it into several time slices. Figure 7 represents an emergent topic moving towards mainstream themes. To

analyze this evolution, we have divided the entire period into two time slices: the first spanning 23 years (1992–2015), and the second spanning 7 years (2016–2022).

The evolution of keywords depicted in Figure 7 reveals significant thematic changes and the progression of CKM research from 1992 to 2022.

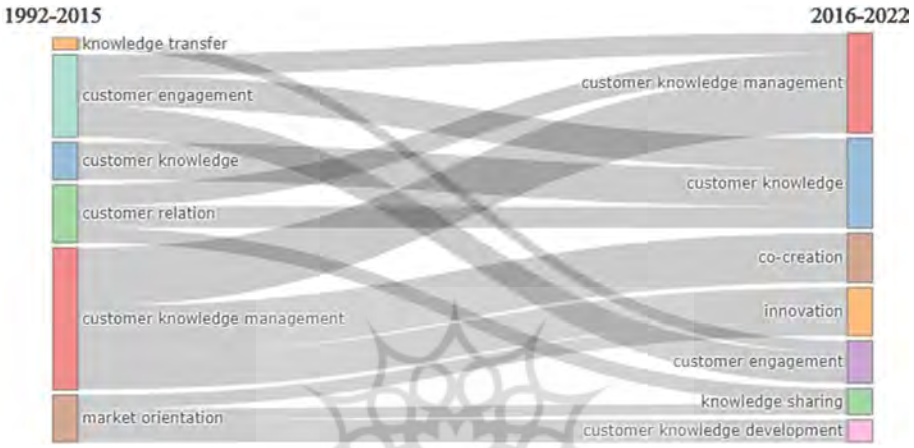

Figure 9. Alluvial diagram of thematic evolution

The keywords 'customer engagement', 'customer knowledge', and 'customer knowledge management' are critical as they appear in both stages of CKM research. Meanwhile, the term 'Co-creation' has emerged in recent years, and there has been a shift from 'customer relation' and 'market orientation' to 'knowledge sharing' and 'customer knowledge development' over the last seven years.

RQ4. What are the conceptual structures and knowledge clusters in CKM research?

Co-Words or Co-Occurrence Word Analysis: Co-word analysis is a bibliographic analysis technique used to count the frequency of particular words that occur together in literature. It provides researchers with additional information to investigate the conceptual structure of the keywords they use (Lin et al., 2022). According to co-word analysis, author-defined keywords are crucial components of research material in academic publications (Huang et al., 2020). Consequently, the level and distribution of keyword sharing accurately reflect the primary study

goal of the literature (Lin et al., 2022). A network of co-word occurrences consists of nodes, lines, and links that indicate the connections between words, as shown in Figure 8. The size of the nodes and the relative thickness of the lines on this map represent the frequency and degree of association of each keyword, respectively.

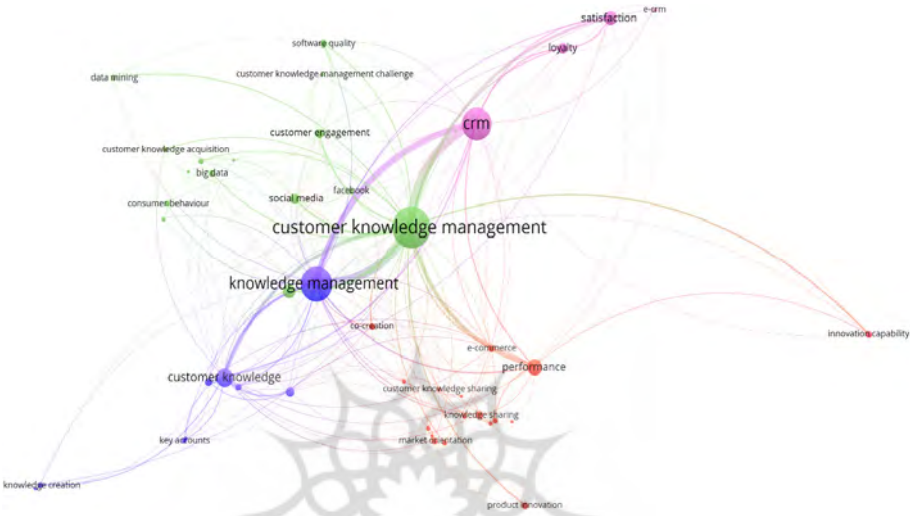

Figure 10. The network of co-word occurrence (threshold 4 occurrences, display 45 keywords)

Researchers, in the field of CKM, have studied various topics, using a minimum of 4 co-occurrences per keyword and a total of 45 keywords. The findings have been categorized into 4 main themes, which are presented in Table 9.

The study reveals the existence of 4 clusters, out of which the first and second clusters can be further divided into two sub-clusters based on the respective themes. Let's explore each cluster in detail:

Table 9. Clusters, Node, Betweenness, and Closeness

N. of Themes	Cluster	Node (Themes)	Betweenness	Closeness
Cluster 1: (17 Themes)	Sub-Cluster 1-1: CKM and Market Orientation	market orientation	28.489	0.0123
		performance	11.492	0.0132
		information technology	1.200	0.0116
		e-commerce	1.109	0.0122
		customer	0.713	0.0112

N. of Themes	Cluster	Node (Themes)	Betweenness	Closeness
		customer orientation	0.416	0.0118
		project performance	0.000	0.0111
		consumer	0.000	0.0085
	Sub-Cluster 1-2: Knowledge Sharing and Co-Creation	knowledge sharing	47.320	0.0133
		new product development	16.794	0.0123
		knowledge	7.849	0.0119
		co-creation	4.613	0.0130
		customer knowledge sharing	3.335	0.0118
		open innovation	1.069	0.0119
		product innovation	0.170	0.0112
		innovation capability	0.000	0.0115
		customer knowledge development	0.000	0.0085
Cluster 2: (15 Themes)	Sub-Cluster 2-1: CKM and Customer Engagement	customer knowledge management	395.750	0.0192
		customer engagement	7.241	0.0127
		innovation	5.769	0.0133
		consumer behavior	1.917	0.0118
		sustainability	0.591	0.0115
		customer knowledge acquisition	0.539	0.0118
		netnography	0.258	0.0118
		knowledge transfer	0.232	0.0109
		incentive	0.048	0.0114
		CKM challenge	0.000	0.0116
	Sub-Cluster 2-2: CKM and Tools and Technique	social media	4.189	0.0127
		big data	2.386	0.0122
		Facebook	0.036	0.0111
		data mining	0.009	0.0115

N. of Themes	Cluster	Node (Themes)	Betweenness	Closeness
		software quality	0.000	0.0116
Cluster 3: (9 Themes)	Cluster 3: Knowledge Management and CRM	knowledge management	186.969	0.0179
		customer knowledge	82.059	0.0154
		knowledge creation	43.000	0.0119
		B2B	10.729	0.0135
		customer relation	3.298	0.0127
		customer information	0.105	0.0110
		process management	0.090	0.0119
		key accounts	0.000	0.0109
		customer retention	0.000	0.0079
Cluster 4: (4 Themes)	Cluster 4: CRM and Customer Loyalty	CRM	37.336	0.0149
		loyalty	1.237	0.0122
		satisfaction	0.630	0.0122
		e-CRM	0.011	0.0110

Sub-Cluster 1-1: CKM and Market Orientation

In this sub-cluster, the market orientation has a higher betweenness, indicating that this keyword has a significant impact on the network. Therefore, this sub-cluster focuses on CKM and Market Orientation due to the emergence of terms such as customer, customer orientation, and performance. The relationship between market orientation, innovation performance, and learning orientation is mediated by knowledge management. To achieve innovative results, managers and decision-makers need to have a better understanding of the concepts related to market orientation, learning orientation, and knowledge management (Putra et al., 2020). Based on Putra et al.'s (2022) findings, knowledge management acts as a mediator in the interaction between market orientation, innovation, and learning orientation (Putra et al., 2020). Similarly, Hollebeek et al. (2019) suggest that implementing managerial strategies that incorporate strategic direction and knowledge management can improve innovation performance (Hollebeek et al., 2019).

Sub-Cluster 1-2: Knowledge Sharing and Co-Creation

The sub-cluster 1-2, is characterized by keywords such as 'knowledge sharing' which has the highest centrality and betweenness. This cluster focuses on the concept of co-creation, emphasizing other words like "new product development", "co-creation", "open innovation", "product innovation", and "innovation capability".

Sharing customer knowledge is essential for co-creating value (Leticia Santos-Vijande et al., 2013). Knowledge exchange involves communication with both internal stakeholders (the company employees) and external stakeholders (such as consumers, suppliers, competitors, and universities). Research shows that firms that encourage internal stakeholder knowledge-sharing can better understand and utilize external resources (e.g., external information, ideas, and insights) throughout the co-creation process, resulting in increased production. Co-creation and innovation skills are related, and when customers collaborate to create something, sharing information among them fosters innovation, ultimately increasing the potential for innovation (Markovic & Bagherzadeh, 2018).

Sub-Cluster 2-1: CKM and Customer Engagement

The second cluster focuses on CKM as its core. Similar to the first cluster, it can be further divided into two sub-clusters with technology tools being highlighted alongside the main concepts. Sub-cluster 2-1 centers on "customer knowledge management," and related ideas such as consumer behavior, sustainability, acquiring customer knowledge, knowledge transfer, and the CKM challenge. The topic of "Innovation" is also significant in this cluster, according to (Feng et al., 2022). They state that knowledge management has become a crucial strategy for enhancing an organization's capacity for innovation, with all facets of dynamic knowledge management having a favorable impact on efficacy.

Furthermore, CE (a psychological state that arises as a result of interactive customer experiences with a central object service relationship) is considered a method for increasing sales, gaining a competitive edge, and maximizing profitability. According to Hollebeek et al (2019), Engaged customers are more likely to support attempts to innovate new products, services, and viral marketing strategies, show brand loyalty and happiness, and make specific recommendations to others (Hollebeek et al., 2019).

Sub-Cluster 2-2: CKM and Tools and Technique

The high betweenness centrality of the keyword “social media” indicates its strong position in the network structure. It leads the focus of this sub-cluster towards technological tools of customer knowledge management such as big data, Facebook, and data mining. Social media have become an essential medium for people to share information and voice their opinions. As a result, they have evolved into a source of consumer education. Given the widespread use of business social media, companies can benefit greatly from using social media analytics to develop customer knowledge. By gaining this knowledge quickly, businesses can outperform their rivals in decision-making processes related to quality assurance, sales and marketing, and corporate information (He et al., 2019).

Moreover, Social media is expected to play a major role in the advancement of CKM in the future (Boateng, 2016). As the volume of conversations among users rises, it is becoming a tool for consumer education. To successfully maximize the advantages of social media for CKM, companies need to apply analytics to find consumer insights in social media data (Hutauruk & Lusa, 2022).

Cluster 3: Knowledge Management and CRM

In this cluster, the focus is on the customer. The degree of betweenness in knowledge management, customer knowledge, and customer interaction is high in this cluster.

A business strategy based on managing relationships with customers is known as customer relationship management (Rais et al., 2022). CRM success has a greater positive impact on the ability to innovate than KM and CRM combined. Therefore, if CRM success is used as a parameter between KM and innovation capability, better results can be obtained. The success of CRM has made KM an essential tool for enhancing innovation capabilities. CRM success plays a unique function between KM and innovative skills. In particular, KM is essential but insufficient for enhancing innovation skills, whereas CRM success allows KM to fulfill some of its potential benefits (Migdadi, 2021).

Cluster 4: CRM and Customer Loyalty

The final cluster focuses on “CRM and Customer Loyalty.” The terms “customer

relationship management," "loyalty," and "satisfaction" all have an impact on CKM. Loyal clients are considered the secret to success by many service-based businesses (Alam & Noor, 2020). Increasing customer loyalty is a primary objective of CRM, which confirms improved customer relationships and encourages consumer loyalty (Alam et al., 2021). Customer relationship management directly or indirectly affects customer satisfaction and loyalty. Building customer loyalty can be aided by increasing customer satisfaction. Customer happiness has a positive correlation with customers (Rais et al., 2022).

4. Discussion

Smart organizations have begun to discover that the proverb "if we only knew what we knew" equally applies to "if we only knew what our customers knew" due to the information economy (Gibbert et al., 2002). Companies that previously relied on internal knowledge have changed their business strategies to prioritize their consumers, who are now regarded as crucial resources. As a result, both the corporate and academic realms widely employ CKM. By integrating, exchanging, and applying customer knowledge as the key elements of knowledge management, CKM will not only improve the standard of customer service but also help in attracting and retaining customers. Additionally, it will foster service innovation focused on sustainability and ultimately enhance performance (Chen et al., 2023). Despite extensive research, the knowledge structure of CKM is still unclear. This article aims to investigate the intellectual foundation of research results in the area of CKM.

An analysis of 255 scientific documents revealed the annual growth trend in scientific publications related to CKM from 1981 to 2022. Lotka and Bradford's law identified the core researchers and journals in this field, which can serve as valuable sources of information for future policies. By analyzing these influential individuals and their references, policymakers can gain insights into the main sources driving advancements in the field.

Scientific works have used 'Customer knowledge management', 'knowledge management', 'CRM', and 'customer knowledge' to the same extent, as indicated by the frequency and evolution of these keywords. However, the use of the keyword "knowledge management" has declined from 2015 to 2022. Published

works between 2016 and 2020 show significant growth in terms of 'innovation', 'performance' and 'knowledge sharing'. Khosravi and Hossein's (2017) study reveals a marked increase in the number of articles about CKM since 2011, with recent articles focusing on CKM results (Khosravi & Hussin, 2018). New CKM trends support studies on the relationships between CKM and organizational learning and innovation, CKM and product and service quality, and CKM and organizational performance. Based on current research, 'co-creation' has become more prevalent recently, and 'market orientation' and 'customer relations' have evolved to 'knowledge sharing' and 'customer knowledge development' over the past seven years. The evolution of words shows that researchers' interest in this field has changed from creation, storage and transfer of knowledge to developing innovation through customer engagement and co-creation of value. Therefore, it is suggested that decision-makers should use customer knowledge management systems not only as a database to store customer opinions but also as a tool for co-creating brand value.

To identify important subjects within the CKM knowledge base and gain an overview of the main research areas, we use keyword co-occurrence analysis, which has been shown as a potent tool for knowledge discovery in databases and new research areas. The co-word analysis of the author's keyword identifies four major clusters and two sub-clusters: 'CKM and Market Orientation', 'Knowledge Sharing and Co-Creation', 'CKM and Customer Engagement', 'CKM, Tools and Technique', 'Knowledge Management and CRM', and 'CRM and Customer Loyalty'.

5. Conclusion

As academic interest in CKM is on the rise, there is an urgent requirement for a thorough bibliometric analysis of this area. Consequently, this study offers both descriptive and performance bibliometric analyses, along with research field mapping based on network analyses. This analysis presents an informative snapshot of the current research status in this field that can guide future research and development endeavors. This study makes a significant contribution to the literature on CKM by identifying and deriving key themes. By scientifically analyzing various fields, including customer knowledge management, researchers can

better understand scientific limits and general knowledge structures for beginners. Additionally, this study can help policymakers identify research priorities in different scientific fields and adapt them to meet society's future needs. Additional research can be conducted utilizing various databases such as Dimensions and Google Scholar with diverse search approaches, potentially yielding disparate outcomes.

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Zahra Sadeqi-Arani

Zahra Sadeqi-Arani is an Assistant Professor in financial science, management, and entrepreneurship faculty at the University of Kashan. She graduated with a PhD in operation research (OR) from Tehran University and has keen research interests. She has published more than 60 papers in the ISC/ WOS/ Scopus Indexed Journals. She has 16 Years of Experience in academic teaching. Her research areas include marketing, consumer behavior, and text mining.

Elmira Janavi

Dr. Elmira Janavi is an assistant professor in the Department of Policy Evaluation and Science, Technology, and Innovation Monitoring at the National Research Institute for Science Policy (NRISP). Among his research interests are the evaluation of science and technology, scientific communication, scientific mapping, scientific complexity, scientific competitiveness, policy research in the field of science and technology, and innovation.

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