

Augmented Reality in Marketing: A Bibliometric Analysis and Thematic Evolution (2015–2024)

ABEIDALLAH Fatima^{1*}, MEGHRAOUI Mehieddine Abdelkader²

¹ University of Mascara, fatima.abdallah@univ-mascara.dz

² University of Mascara, mehieddineak.meghraoui@univ-mascara.dz

Date of receipt: 06/09/2025

Date of acceptance: 14/11/2025

Abstract:

This study aims to examine augmented reality research published between 2015-2024. The research combines performance metrics with scientific mapping. The data include 380 peer-reviewed articles identified from the Scopus database and analysed using Biblioshiny and VOSviewer. After the analysis, we found that the literature shows an overall increase in the number of articles published since 2015, most studies on AR in marketing have been published since 2019, and this show a recent uptrend in research interest in this area. The USA and the UK emerge as the most prolific and influential countries. A small number of authors and organizations monopolize the field, underscoring a concentrated scientific influence. Network analysis provides insights into the evolution of collaboration networks among countries, showing a tendency for AR marketing researchers from Europe and the Asia-Pacific region to cooperate more closely over time. Thematic analysis shows a progression from early technology-focused studies to interdisciplinary themes, including artificial intelligence, customer experience, and the metaverse.

Keywords: Augmented Reality, Marketing, Bibliometric Analysis, Science Mapping, Thematic Evolution

Jel Classification Codes : M31, O33, O32

1. Introduction

Digital technologies have transformed most areas, including marketing. AR is defining the consumer experience with a brand. It combines its virtual elements with the real world and offers interactive and augmented experiences to users. The technology change will influence consumer perception, assessment, and interaction with commodities and services and hence, transform marketing practices (Peštek & Osmanović, 2022, p. 399; Zulfiqar et al., 2023). Although AR has been used in many different fields during the last ten years, including as the military, healthcare, tourism, architecture, and education, marketing and commerce have been some of the most active and economically significant industries (Walentek & Ziora, 2023, p. 862). AR faced skepticism and underinvestment because of perceived technological immaturity and uncertainty about its commercial potential. However, recent years have witnessed growing confidence and investment as industries increasingly recognize AR's capacity to attract consumers and deliver novel brand experiences (Parekh et al., 2020). Global investment trends indicate a strong upward trajectory for the AR industry, with forecasts anticipating a 105% increase in revenue between 2023 and 2037 (Walentek & Ziora, 2023, p. 862). The rapid growth shows the importance of summarising the state of academic knowledge on how to use AR in marketing in order to guide future developments. In particular, the retail sector has seen a fast increase in the adoption of AR technologies, supported by the ubiquity of mobile applications. It also reinforced by the global transition toward "smart consumer lifestyles" (Nikhashemi et al., 2021).

Researchers are increasingly exploring AR marketing but the field continues to suffer from the lack of cohesion. Studies have focuses on how AR influences thoughts, feeling and perceptions. They focused on aspects such as spatial presence, media enjoyment, and perceived usefulness. However, only a few studies provide a complete view of the field's intellectual development over time (Yang & Lin, 2024, p. 38). Much of the existing research looks at specific applications, including AR in retail or mobile applications. The integration of AI-driven personalization is reshaping millennial interactions (Souheila, 2025, p. 535), yet broader patterns of academic collaboration, shared concepts, and the spread of knowledge are often not addressed. To address these gaps, this study conducts a bibliometric

analysis of AR marketing studies from 2015 to 2024.

2.1. Theoretical Background and Main Concepts

2.1.1. Definition of augmented reality

The concept of "augmented reality" (AR) is thought to have originated in 1992. T. Caudell suggested using screens to help workers on aeronautical assembly lines. The goal was to improve the clarity of assembly and installation instructions. Although this was the origin, the clearest example of the use of AR was the video game "Pokemon Go" in 2016, which inserted cartoon characters into real daily personal environments. This event significantly contributed to the mainstream adoption of AR technology (Aguilar, 2024, p. 34). Augmented reality (AR) is a fast advancing technology. It adds computer generated content to the real world. This content may consist of text, graphics, videos, sounds, and geolocation information. AR improves our ability to see, hear, touch, and even smell things in our surroundings (Du et al., 2022, p. 01). Compared to virtual reality, AR keeps users from being completely absorbed in an artificial world. AR allows users to remain in their real physical surroundings. The virtual elements are aligned with the user's physical surroundings in a way that reflects the real-world context. With ongoing progress in AR technologies, the applications of it are expanding and have applications across various sectors from education, design, manufacturing, to construction and entertainment. AR holds considerable promise to enrich human experiences and advance technological capabilities (AlFadlat & Al-Azhari, 2022, pp. 3–4). Businesses began implementing AR in marketing during the late 2000s as means to alter the way consumers interact with and shop for brands. It is evident in categories ranging from furniture, beauty products, to glasses and luxury watches, where customers can use gadgets like the "magic mirror" on their personal devices to virtually try on things directly to their bodies and faces (Scholz & Duffy, 2018, pp. 12–13).

2.1.2. Applications of Augmented Reality in Marketing

Augmented Reality (AR) combines online content with real-life items to provide consumers with a richer experience when shopping, allowing consumers to engage in more productive ways with the brands they are considering. AR creates unique, engaging physical experiences that enhance the way we interact with the web (Du et al., 2022, p. 1) and offers users the

ability to see if an object works in their home environment. As an example, the Ikea app, Place, allows consumers to visualize furniture in their home.

Augmented reality has allowed businesses to enhance their e-commerce offerings, providing consumers with a deeper and more customized shopping experience. Augmented reality is a new way for consumers to find and purchase products. With augmented reality, consumers can engage with the products in a variety of ways, and this creates an emotional connection between the consumer and the products he/she is purchasing. In addition, consumers will have the ability to see a product through augmented reality and will have access to extensive and detailed information regarding the products (Monaro, 2025, p. 01). Augmented reality also enables the consumer to virtually "try on" clothing, accessories, and provides the consumer with the ability to visualize how the items would appear in their home. Overall, this technology has helped consumers to make more informed/productive purchasing decisions and has helped to improve overall consumer satisfaction (Ghouse & Shekhar, 2024, p. 07).

2.2. Previous studies and research gap

There is a huge body of literature concerning AR; this section focuses on contextualizing the bibliometric analysis by presenting a critical examination of the main contributions from previous studies that have investigated the scholarly literature on Augmented Reality (AR) in the field of marketing. The methodologies adopted, research scopes addressed, key findings reported, and limitations acknowledged in these works will be reviewed, thereby justifying the relevance and originality of the present approach.

Peštek et al. (2022) conducted a study titled "Systematic Mapping Study: Application of Augmented Reality in Marketing". Utilizing a systematic mapping strategy based on citation analysis and co-citation analysis, the authors collected data from two databases, Scopus and Web of Science, and displayed them using VOSviewer. The conclusion reached by the authors indicates that by using AR technologies as a motivator, brands can not only get customers to participate in their products/brands but also create loyalty among their customers, create revenue for themselves, and ultimately affect how their customers experience their products. However, the treatment of data was largely thematic and conceptual in nature. The study lacks a comprehensive bibliometric performance evaluation and omits a longitudinal

science mapping of social and conceptual research networks.

In a systematic literature review published in *Frontiers in Psychology* by Du et al. (2022), 99 journal articles were analysed from the Web of Science database to create a complete picture of the role of augmented reality (AR) in the marketing sector. The review's focus was to classify the literature based on empirical studies of the S-O-R and TAM theoretical frameworks and their respective application areas in the retail, tourism and advertising sectors. Additionally, the researchers investigated how the different types of AR (i.e., mobile, webpage based, and on-site) influenced consumers' perceptions of each type of AR and how these perceptions contributed to consumer experiential outcomes across different contexts.

In their 2023 article titled "Past, present and future of augmented reality marketing research: a bibliometric and thematic analysis approach", published in the *European Journal of Marketing*, Jayaswal and Parida undertook an extensive mixed-methods investigation. They used bibliometric techniques, thematic mapping, and qualitative content analysis. The authors examine how research on AR in the marketing area has progressed over time and how it is at the present date. 192 articles from Scopus that were published between 2005 and 2022 were included in the dataset. The study included information on important performance metrics, including journals, authors, and nations. It also explored co-authorship networks. Using a co-word analysis technique, the authors created a graphic overview of the development of each thematic area in e-commerce and retailing. The main benefit of this review over others is that it identifies the various themes, which have developed over time within the field. The authors point out that while many articles have been published on the e-commerce and retailing sectors, there are still a number of themes (such as pricing and promotion) that have received very little attention in the published literature. Finally, the authors also identified limitations of earlier reviews, including limited number of sources or databases, and a lack of bibliometric evaluation.

Tasci et al. (2024), in their bibliometric study published in paper ASIA, explored the intersection of virtual reality (VR) and augmented reality (AR) in marketing using 418 Scopus-indexed articles from 2013 to 2023, analysed through Biblioshiny in R. Their analysis mapped emerging themes such as human-centered design, artificial intelligence (AI) integration, and the

metaverse, while highlighting the growing prominence of tourism-related applications within immersive marketing. Various graphical representation methods (i.e., dendrograms, thematic evolutionary maps; word clouds; and, three-field plots) were developed by the authors of the project in order to depict the conceptual framework and research developments.

Shahab (2024) carried out a bibliometric study on augmented reality (AR) in business. 327 articles from the Web of Science (WoS) database served as the basis for the analysis. The analysis determined which authors, journals and countries had the highest impact. It also examined collaboration patterns among scholars. In addition, the study identified the key thematic areas and potential areas of research. Both performance analysis and science mapping methods were used, with VOSviewer as a visualization tool. Data collection occurred in June 2023. A significant increase in publications was observed between 2018 and 2023, with major contributions noted in tourism, advertising, e-commerce, customer experience, and technology acceptance. Leading journals such as the Journal of Retailing and Consumer Services and the Journal of Business Research were identified. The two authors, Ko de Ruyter and Philipp A. Rauschnabel, are also credited with having high citation rates and extensive contributions to research in the field. European researchers mainly led collaboration networks. The keyword analysis showed "augmented reality", "virtual reality", and "purchase intention" to be the three most frequently used keywords. Research gaps identified at the conclusion of this study were a need to investigate how AR influences herding behaviour and brand hate; and a need for longitudinal studies to investigate the business outcomes related to AR.

Earlier studies listed above have explored researched augmented reality (AR) in marketing; however, in each of them there is substantial limitations. For example, Peštek et al. (2022) focused on thematic mapping, but they ignored bibliometric performance and longitudinal science mapping. Sharma (2023) focused only on retail. Broader marketing domains, such as advertising and branding, were not included. Du et al. (2022) conducted a systematic review that primary used Web of Science. They missed important sources of data like Scopus and bibliometric indicators such as co-authorship and co-citation networks. The research of Jayaswal and Parida (2023) used a mixed-methods approach, but neglected to cover topics related to pricing,

promotional offers, and consumer behaviour after purchase. The findings of the study published by Tasci et al. (2024) provided general information about various types of immersive technologies; however, these results do not provide an insight into what makes Augmented Reality effective in Marketing. Shahab (2024) mentioned that longitudinal studies in the future would be beneficial, but did not provide any new information or discuss the combination of tools that could be used in these studies.

In our research, we fill the gaps related to both Methodology and content, offering a greater and more comprehensive view of the current trends within AR marketing research. This will strengthen theoretical contributions as well as support managers in the area of immersive marketing. Table 01 summarises some of the earliest studies on AR in marketing and identifies many methodological issues relating to these studies, along with important methodological considerations and constraints. We can mention that many of these studies focused on particular areas, like business or retail, which reduces the generalizability of their findings. Concerning methodology, some are systematic reviews without bibliometric tools, and others lacked science mapping or thematic evolution analysis. It should be mentioned that some studies are outdated or do not cover new topics. Our study is more complete and up-to-date. It covers all areas of marketing and uses data from 2015 to 2024.

3. Research Objectives and Hypotheses

The objective of this research is to give a full bibliometric reflective view of Augmented Reality (AR) within marketing between 2015 and 2024, by combining performance analysis and science mapping techniques, for achieving the following objectives:

- To evaluate the evolution of publication volume, citations, and h-index to assess the growth and impact of AR marketing research;
- Identification of Each Country/Institution/Author that has contributed the most to the field;
- To map the conceptual structure of AR marketing through keyword co-occurrence and bibliographic coupling;
- To trace the thematic evolution of AR marketing research over time;
- Look for patterns of global partnerships, as well as determine the way in which co-authorship networks are built.

With the above-mentioned objectives, the following hypotheses are proposed:

H1: The volume and academic influence (citations, h-index) of publications on AR in marketing have significantly increased over the period 2015–2024.

H2: AR marketing research output and impact are concentrated among few countries, institutions, and authors, reflecting a centralized academic structure.

H3: The intellectual structure of AR marketing research has changed from an early technological focus to broader interdisciplinary themes.

H4: The global AR marketing co-authorship network shows regional clustering, with a few countries serving as main hubs of collaboration.

4. Methodology

4.1. Bibliometric analysis as a research method

Research methods for bibliometric analysis serve to conduct the statistical, quantitative, and visual examination of academic literature within a defined scope. Its primary aim is to uncover insights into academic output, the way(s) in which knowledge networks are interconnected, historical development, and evolving research trends in a particular field or topic. With bibliometric analyses, researchers will gain a greater understanding of the context and direction(s) of scholarly activity (Huang, 2024, p. 02). Bibliometric Analysis is based upon several key indicators that are briefly described below:

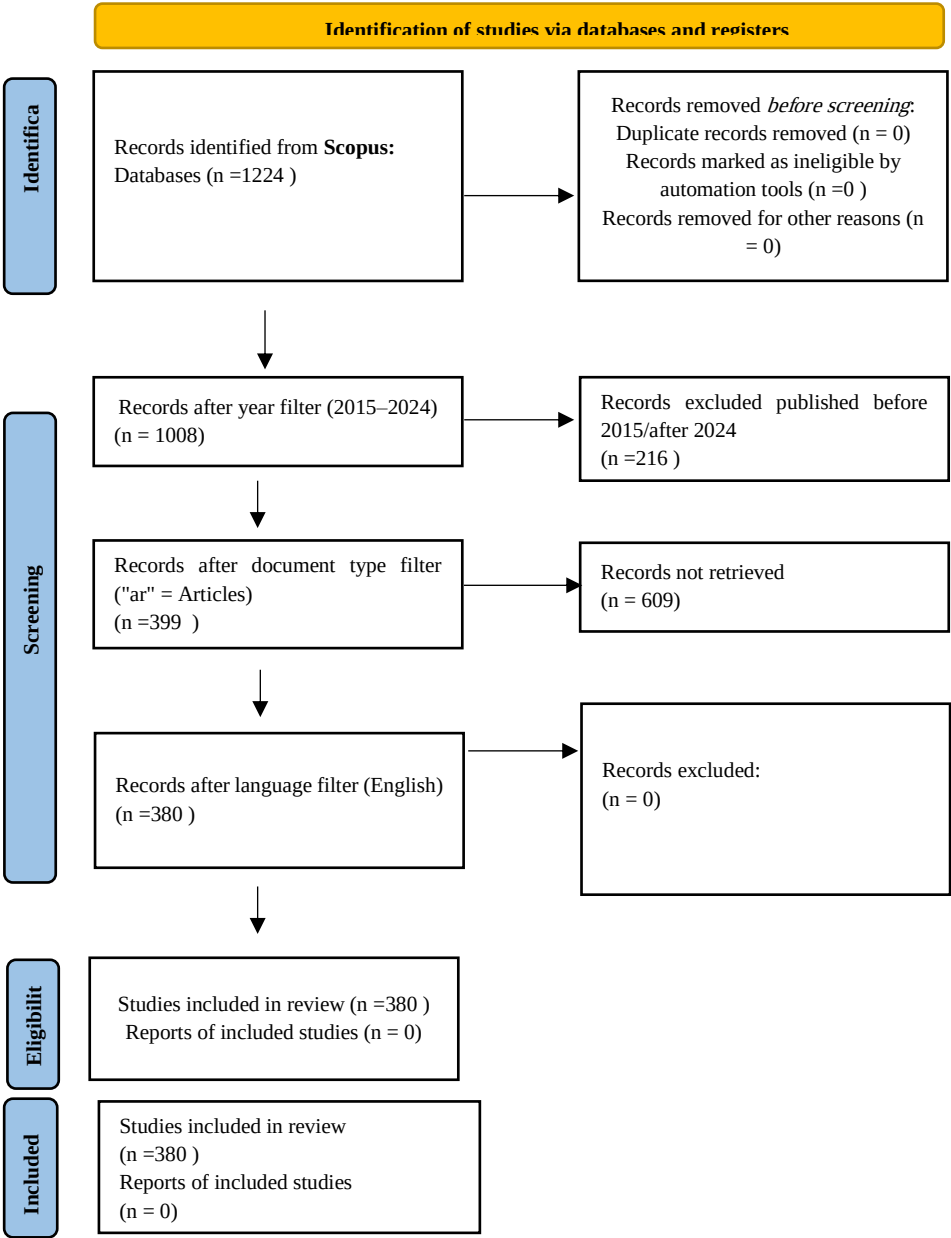
- Quantity Indicators: Measure the productivity of researchers or institutions.
- Quality Indicators: Assess the performance and impact of research.
- Structural Indicators: Analyze the connections between publications, authors, and research areas (Guerola-Navarro et al., 2023, p. 03)

4.2. Data collection

PRISMA flow diagram (Fig.01) provides a clear and systematic view of the data selections that will be considered in this study. The initial search in Scopus was done to locate 1,224 records. With the 20152024 filter, it was reduced to 1,008. The number of records deleted because of being out of the selected period was 216. The restriction to peer-reviewed articles led to a final dataset of 399 records, with 609 records in total being non-article documents (conference papers and book chapters). When the English language filter was applied, it produced 380 records where all were included at the screening level. During the eligibility assessment, no further exclusions were made,

leading to a final dataset of 380 articles used for the bibliometric and science mapping analysis.

Fig.1.PRISMA model



Source: created by the authors

4.3. Techniques and tools

The dataset was studied by applying a mixture of quantitative bibliometric methods with the help of Excel, VOSviewer, and Biblioshiny. A brief overview of the tools and methodologies, as well as indicators that were used in this study, is listed in Table.

Table 1. Summary of analytical methods and indicators

Type of analysis	Techniques/tools used	Indicators/variables measured
Performance Analysis	Descriptive statistics via Excel & Biblioshiny	- Number of publications by year- Citation count- h-index- Most cited authors- Most productive journals- Country-wise contributions- Institutional productivity
Science Mapping	Co-authorship network analysis (VOSviewer)	-Co-authorship links- Collaboration clusters between countries
	Keyword co-occurrence analysis (VOSviewer)	-Frequency of keywords- Thematic clusters
	Bibliographic coupling (VOSviewer)	-Shared references among documents- Thematic clusters- Total link strength
	Co-citation analysis (VOSviewer)	- highly cited sources- Co-citation clusters- Intellectual structure
	Thematic Evolution Mapping (Biblioshiny / VOSviewer)	

Source: created by the authors

5. Results

The results are presented in two major sections: performance analysis, which assesses research productivity and influence, and science mapping, which visualizes intellectual and collaborative structures within the field of augmented reality in marketing.

5.1. Performance analysis

5.1.1. Documents by year

As shown in Table 2, the number of publications is continuously growing, with the peak in 2024 (108 publications). Its most influential year was the year 2022, when the citation impact is 5442 and h index is 30. The 2021-2023 citation numbers and h-index values also indicate a strong academic activity and indicate that the research still has interest. The majority of documents were cited, especially from 2018 onward, highlighting growing visibility although the amount of publications in 2015-2017 is lower, the number of citations per paper was relatively high. The table shows that there is a huge growth in the research output and the impact in the topic in the past 10 years.

Table 2. Annual production

Year	Number of documents	Citations	H-index	Documents with citation
2024	108	966	17	90
2023	66	2372	24	62
2022	56	5442	30	55
2021	41	4061	25	41
2020	28	2578	26	19
2019	25	1380	15	22
2018	22	1985	15	20
2017	18	1405	13	18
2016	12	1469	6	10
2015	4	94	3	4

Source: created by the authors

6.1.2. Documents by source

The Table 3 highlights the most influential journals from 2015–2024. The Journal of Retailing and Consumer Services has the highest number of publications at 20, 3451 citations and CiteScore of 22.7, which is quite influential and visible. Computers in Human Behavior and Psychology and Marketing also show notable influence, with over 1000 citations each and perfect citation rates (all documents cited). Sustainability Switzerland and Journal of Business Research contribute solidly, balancing publication volume and citation performance.

Table 3. Source rankings

Source Title	Number of Documents	Total Citations	Documents with Citation	CiteScore Rank	2024 H-Index
Journal of Retailing and Consumer Services	20	3,451	18	22.7	18
Computers in Human Behavior	10	1,097	10	20.7	10
Sustainability (Switzerland)	10	261	10	7.7	9
Psychology and Marketing	9	1,037	9	15.9	8
Journal of Business Research	8	742	8	25.3	7
Journal of Research in Interactive Marketing	7	211	7	21.6	7

Asia Pacific Journal of Marketing and Logistics	4	284	4	8.7	4
Business Horizons	4	722	4	15.4	4
Journal of Distribution Science	4	93	4	1.7	3
Journal of Services Marketing	4	162	4	7.4	4

Source: created by the authors

5.1.3. Key Authors

The "Top-Contributing Authors" table shows that Rauschnabel, P.A. leads with 16 publications, 4750 citations, and an h-index of 36. Other notable authors include C. Hinsch and K. de Ruyter. Hinsch, despite having only six papers, has 3016 citations. Several authors (Chylinski, Hilken, Keeling, Kumar) have co-authored the same 6 papers with identical citation counts (907), indicating collaboration. Javornik, A. and Huang, T.L. have 5 publications each, maintaining solid citation performance. Most authors have an h-index of 5 to 6 within this topic, but higher personal h-indices suggest broader academic impact. In general, a small number of very active and significant academics shape the field and frequently work together on significant studies.

Table 4. Top-contributing authors

Author name	Number of document	Total citation	H-index of the papers	H-index of the author
Rauschnabel, P.A.	16	4750	14	36
Chylinski, M.	6	907	6	20
Heller, J.	6	488	6	19
Hilken, T.	6	907	6	16
Hinsch, C.	6	3016	6	16
Keeling, D.I.	6	907	6	29
Kumar, H.	6	326	6	9
de Ruyter, K.	6	907	6	74
Huang, T.L.	5	308	5	15
Javornik, A.	5	934	5	16

Source: created by the authors

6.1.4. Documents by country

Table 5 outlines the scholarly productivity and influence of the ten leading countries in this domain. The United States holds the foremost

position with 72 documents, 9236 citations, and the highest h-index (36), an index that reflects both wide production and significant impact. The United Kingdom follows with 45 publications, 8426 citations, and a remarkably high h-index (32), which reflects a high impact. The volumes of publications in India and China are relatively high (37 and 32 documents, respectively), though the h-indexes of both countries are lower (16 and 14), implying a smaller impact of their research. Germany and Australia may have produced less total output than India and China but have received a considerable number of scholarly citations, indicating that the caliber of their work has been of exceptional quality. The lowest h-index in Table 5 is that of Malaysia (h-index = 9), demonstrating that Malaysia has made very little intellectual impact on the field.

Table 5. Country rankings

Country/Territory	Documents	Citations	H-Index
United States	72	9236	36
United Kingdom	45	8426	32
India	37	4355	16
China	32	3056	14
Germany	31	6380	21
South Korea	29	4099	15
Australia	25	5251	19
Spain	25	3118	17
Taiwan	22	2114	14
Malaysia	20	2345	9

Source: created by the authors

5.1.5. Key institutions

Table 6 indicates which institutions contributed the most to this body of literature. The University of the Bundeswehr Munich leads with 16 documents, the highest citations (4764), and an h-index of 14, indicating strong productivity and impact. Symbiosis International Deemed University and The University of Texas Rio Grande Valley follow with nine documents each, showing high citation counts (3658 and 3171), though with relatively lower h-indices. While less productive than these three top-affiliated institutions, both Manchester Metropolitan University and UNSW Sydney, also contributed significant volumes of research that have demonstrated a high level of citation influence. Universiti Sains Malaysia has the lowest

number of citations (27) and h-index (4) indicating a low influence. There are notable variations in the research impact and volume among the universities/affiliations listed above, with the possibility that some are of the same or greater quality as others, but may have lesser amounts of published research.

Table 6. Top affiliations

Affiliation	Documents	Total citations	H-index
University of the Bundeswehr Munich	16	4764	14
Symbiosis International Deemed University	9	3658	6
The University of Texas Rio Grande Valley	9	3171	8
Manchester Metropolitan University	8	1883	7
Universität Bamberg	7	197	6
Universiteit Maastricht	7	938	7
UNSW Sydney	7	1049	7
Grand Valley State University	6	3029	6
UNSW Business School	6	983	6
Universiti Sains Malaysia	5	27	4

Source: created by the authors

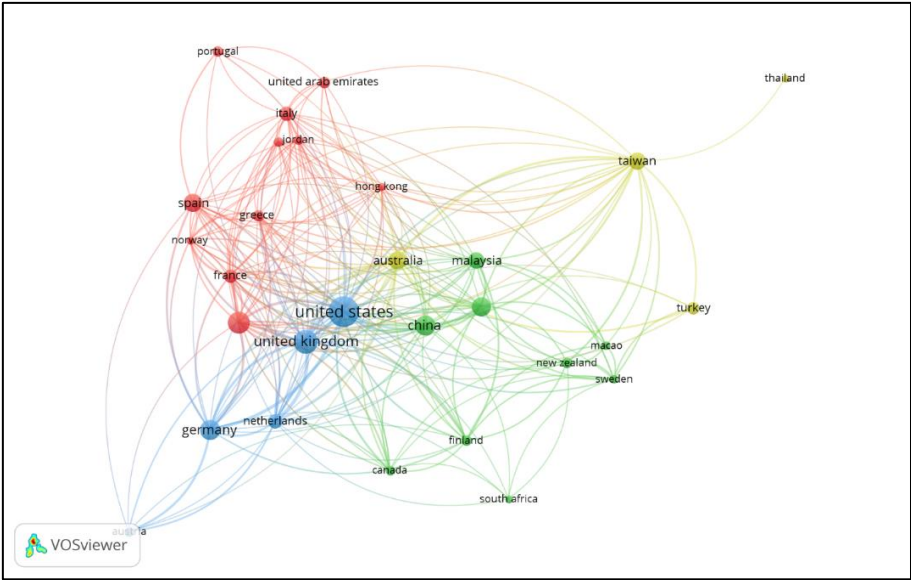
5.2. Science mapping

5.2.1. Mapping global co-authorship

The Fig.2 illustrates the co-authorship network between countries. The nodes are countries and the size of the node is the number of publications or co-authorships in that country. The connections between nodes show the relationship of co-authorship, and various colors are used to show groups of countries that often have partner relationships with each other. The United States stands out as the central and most influential country in the network. It has the highest number of connections with other countries, acting as a major global hub of research collaboration in AR marketing. The U.S. is closely associated with the United Kingdom, Germany, Canada, and Netherlands, which make a blue cluster as a symbol of robust transatlantic and Western research associations. The red group comprises a few countries of the Southern and Western Europe, including France, Italy, Spain, Portugal, Greece, and Norway, and also countries of the Middle East, including Jordan and the United Arab Emirates. The level of regional cooperation in these countries is high and may be due to EU research projects and study exchange

programs. France and Italy serve as important nodes within this group. The green cluster includes mainly Asia-Pacific countries and some emerging economies. The countries of China and Malaysia are at the center of this green node through their strong ties with South Africa, Sweden, New Zealand, and Finland. This means that both countries are playing an increasing role in the global community in the field of AR Marketing Research. In addition to the Asian countries, the yellow node includes: Taiwan, Turkey, Australia, the Hong Kong, and Thailand. In this yellow node, Taiwan is emerging as one of the key countries due to its ability to collaborate internationally on numerous occasions, as opposed to Thailand, who appears to have fewer international connections and publications related to AR Marketing Research. The map shows a wide and connected web of international collaborations. Clear regional clusters appear, and some countries act as hubs linking these networks.

Fig.2. Mapping global co-authorship



Source: created by the authors

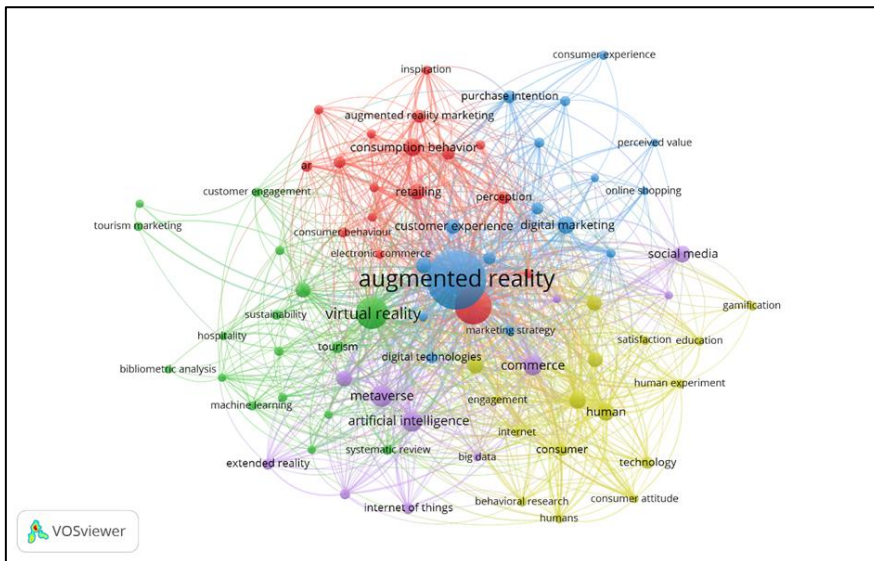
5.2.2. Co-occurrence keywords

Fig.3 provides a comprehensive overview of the research landscape. The word “augmented reality” is connected with most other words in the middle of the map, which means “augmented reality” is at the core of this research area. Related terms such as “virtual reality”, “commerce” and

“customer experience” further underline the fusion of immersive technologies and marketing towards consumer applications.

A variety of thematic clusters can be distinguished in the visualization. The red cluster predominantly focuses on consumer behavior and retailing. It indicates there is a great attention of the scholarly community regarding factors influencing consumers’ decision making and shopping experiences while shopping in a retail context by means of augmented reality based technologies (keywords: augmented reality marketing, retailing, consumption behavior, purchase intention). The blue cluster communicates how AR works with Digital Marketing. The words Digital Marketing, Online Shopping, Perceived Value and Consumer Experience show that there is an increased desire to learn more about how AR enhances communication between brands and consumers via their websites or apps. The green cluster is focused on conducting research primarily in relation to tourism and hospitality industries. Keywords such as “tourism”, “hospitality”, “sustainability”, and “customer engagement” reflect the application of AR in creating immersive and sustainable tourism experiences that engage visitors and promote responsible consumption. The yellow cluster examines the development of AR through a human lens as well as through psychological elements in advertising and advertising effectiveness. The conceptual cluster contains consumer; technology; behavioral research; gamification; educational experience; and emotional attachment (all of these elements relate to AR also influencing consumer attitude). The purple cluster shows the relation between AR and new technologies and research methods. The cluster includes: artificial intelligence, machine learning, internet of things, extended reality, and systematic review point to rising interest in cross-disciplinary work, which suggests that AR is being linked with larger digital systems, including the metaverse. The Map indicates huge and in-depth usage of Augmented Reality in Marketing, and includes several areas, such as consumer behaviour, digital engagement, hospitality and innovation. The multiple connections between the keywords indicate that immersive technologies are being used more frequently, and clearly illustrate the trend toward experience- and data-driven Marketing.

Fig.3. Keyword co-occurrence network



Source: created by the authors

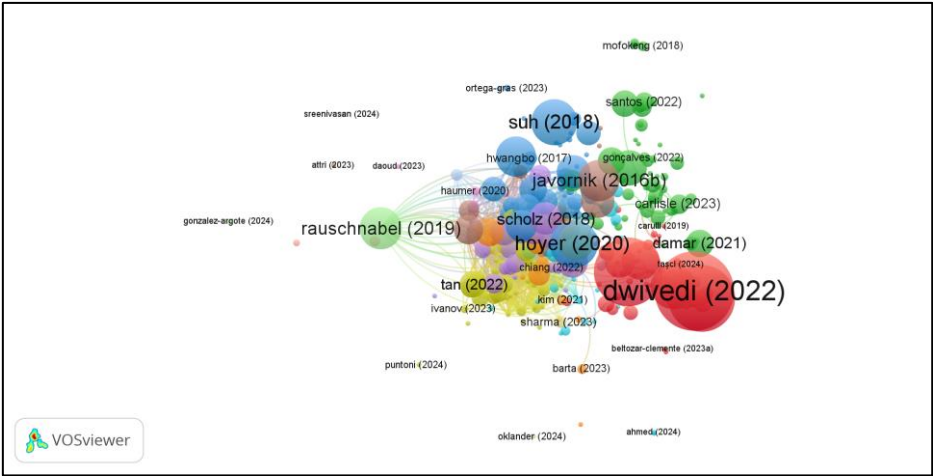
5.2.3. Bibliographic coupling document

The bibliographic coupling analysis conducted through VOSviewer offers a clear visualization of the intellectual landscape of augmented reality (AR) in marketing. Fig.04 uncovers thematic clusters and influential publications. The connections between individual documents displayed as nodes. The size of each node indicates how strong of a bibliographic connection it has with other documents. For example, Dwivedi's (2022) paper has been cited more frequently than any other paper in the field, therefore its node is quite large. Dwivedi's article serves as a key anchor point for much of the subsequent literature, and likely represents either a conceptual or comprehensive review of the field. It anchors much of the subsequent literature. Other key documents that help establish the foundation of current knowledge include Hoyer (2020), Rauschnabel (2019), Suh (2018), and Javornik (2016b). the last articles ,mentioned have a similar methodological and theoretical structure, representing the broadest intellectual framework of the field.

The analysis identifies four main thematic clusters: the red cluster, led by Dwivedi, emphasizes strategic overviews and digital transformation; the green cluster, centered around Javornik and Gonçalves, explores consumer engagement and experiential dimensions of AR; the blue cluster focuses on

technological design and interface interactivity; while the purple/yellow cluster involves empirical assessments of AR in real-world retail and service environments. In addition to these major areas, we discovered some emerging or less-emphasized areas as pointed out by researchers with peripheral nodes (e.g., Gonzalez-Argote, Ocklander, and Ahmed). The chronological order of our analysis illustrates that while many of the more recent studies (2022–2024) may have emerged from earlier conceptual-type studies (i.e., 2016–2019), the emphasis of more recent studies is looking primarily at application, personalization, and integration of AI. In general, this map provides valuable information about thematic trends, so it helps guide future research directions in AR marketing.

Fig.04. bibliographic coupling document



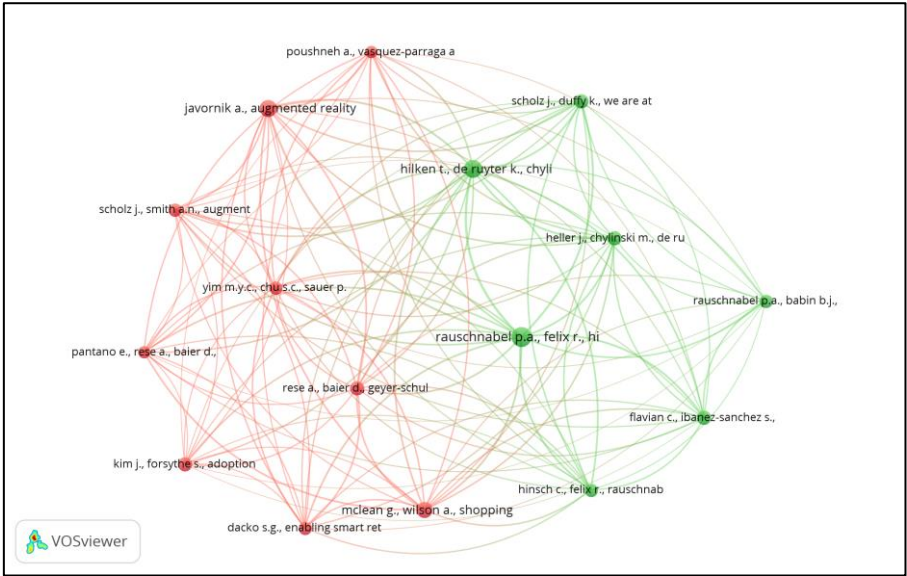
Source: created by the authors

5.2.4. Co-citation cited references

Fig.05 illustrates the co-citation network for the most co-cited references in augmented reality (AR) in marketing, generated based on data from Scopus and via VOSviewer. Two clusters are identifiable illustrating two main theme areas. The red cluster is largely comprised of publications centered around AR adoption, user experience, and AR technologies in marketing. Representative and influential authors in the red cluster are Poushneh A., Javornik A., Pantano E., Kim J., and Smith A.N., and these articles explored consumer behavior, smart retail, and shopping experiences. On the other hand, the green cluster is focused on value creation, customer engagement, and service innovation, through AR. Representative and

influential authors in the green cluster are Rauschnabel P.A., Hilken T., Felix R., and Heller J., and these articles featured more conceptual and strategic arguments for using AR in marketing. Authors such as Rese A., Baier D., and Sauer P. function as connecting authors across the two major clusters, suggesting their articles were representative of both areas as interdisciplinary articles. The size of the nodes is representative of the number of co-citations, and it is clear that certain authors were central to "the conversation" and helped lay the foundations of the field, particularly Rauschnabel P.A. and Javornik A.

Fig.05. Co-citation network



Source: created by the authors

5.2.5. Thematic evolution

Fig.06 shows the way the research on the subject of augmented reality (AR) in marketing has developed over three consecutive periods of time, which are: 2015-2018, 2019-2021, and 2022-2024. It draws related keywords to underline the key themes at every stage and their development.

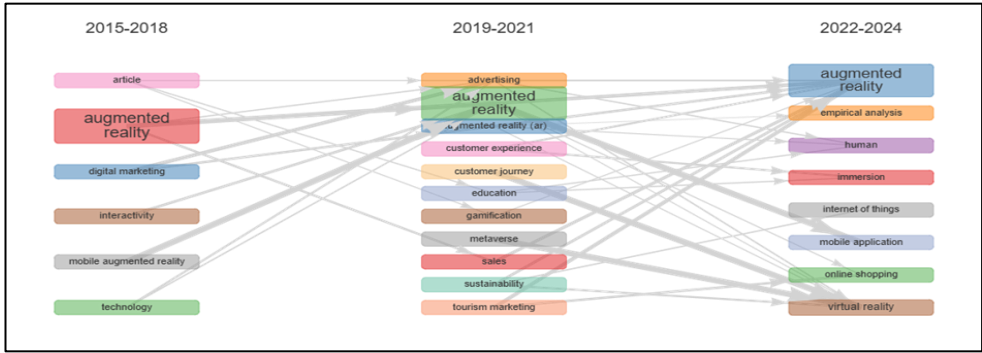
The initial stage (2015-2018) was the foundation stage. Research was primarily technical and exploratory. The major themes were augmented reality, technology, mobile augmented reality, digital marketing and interactivity. The studies carried out in this stage were aimed at the potential of AR as a tool. It discussed the use of AR in marketing, mostly with mobile devices. In this middle phase (2019–2021), the field started expanding into

applied and experience-driven areas. “Advertising”, “customer experience”, “customer experience”, “gamification”, “tourism marketing”, “sustainability”, “sales and “education” are keywords referenced. This means that Augmented Reality (AR) has now transitioned from being viewed as just technology, to being a part of a larger Integrated Marketing Communication Plan, and the Primary themes of focus related to augmented reality (AR) and experience were to link together technical & human experience elements.

We observe that research from the newest phase (2022-2024) indicates increased methodological rigor and strategic application of research methods. The major themes are: "empirical analysis," "immersion," "human, online shopping, virtual reality and internet of things. Based on this body of work, it is anticipated that the importance of psychological and sensory effects of AR will continue to grow as AR continues to be adopted for use in e-commerce. In addition, the increasing association of AR with both IoT and VR will indicate to business and the clientele that they are moving more and more towards a data driven business and economic model.

The diagram shows a definite change: (2015-2018) a technology-driven perspective, (2019-2021) an application and experience perspective. Lastly, into a strategic and empirical phase (2022-2024) of AR engaging with other emergent technologies. This development is a manifestation of how scholarly studies have shifted towards the question of what AR is and how AR works to how AR can be used to improve consumer experience and ultimately how AR can be measured, scaled, and combined with other technologies in marketing practice.

Fig.06. Shifts in AR Marketing Themes (2015–2024)



Source: created by the authors

5.3. Hypotheses testing

To assess whether the proposed hypotheses (H1–H4) are supported by the bibliometric and thematic analyses, Table (09) summarizes the empirical findings. Each hypothesis is aligned with descriptive evidence from the results and the overall conclusion regarding its validity.

Table 7. Hypotheses and Empirical Findings

H	Description	Findings from Results	Conclusion
H1	<i>The volume and academic influence (citations, h-index) of publications on AR in marketing have significantly increased over the period 2015–2024.</i>	The number of publications has increased tremendously since 2019, reaching its highest in 2024 (108 docs). The number of citations has grown exponentially (e.g., 5442 in 2022). h-index has been improving by year.	Supported
H2	AR marketing research output and impact are concentrated among few countries, institutions, and authors, reflecting a centralized academic structure.	U.S. and U.K. dominate in publication volume and citation count. A small set of authors (e.g., Rauschnabel) and institutions contribute disproportionately.	Supported
H3	The intellectual structure of AR marketing research has changed from an early technological focus to broader interdisciplinary themes.	Thematic evolution shows shift from "mobile AR" and "interactivity" (2015–2018) to "immersion", "AI", and "customer experience" (2022–2024).	Supported
H4	The global AR marketing co-authorship network shows regional clustering, with a few countries serving as main hubs of collaboration.	Co-authorship map highlights U.S., U.K., and China as central hubs with strong transatlantic and Asia-Pacific clusters.	Supported

Source: created by the authors

6. Discussion

The impact of Marketing Augmented Reality is rising since 2019 because of increased availability of AR technology, the simplification of access to AR applications, and the active digitalization of marketing campaigns. The findings of hypothesis testing presented in this section verify the objectives of this research study. The empirical evidence collected to substantiate each of the hypotheses has proven the accelerating growth of AR research and the concentration of AR-Related academic influence, and the transitions from the historic focus on the technology's basis to its growing use in immersion and interdisciplinary applications provide rationale to better understanding how

the field has evolved over the years. These findings present the basis more complete understanding of the field's evolution and help frame the theoretical and practical implications discussed below.

The findings of this study not only confirm but also extend the insights reported in earlier works on augmented reality (AR) in marketing. Specifically, Peštek et al. (2022) argue that AR has the capacity to improve consumer experiences and improve brand engagement with consumers. Our findings further demonstrate how the benefits provided by AR to improve consumer interaction and engagement have continued to grow over time, which indeed supports their conclusion. In comparison with Peštek and colleagues, who have created a conceptual framework for mapping their research about AR in marketing in a longitudinal manner based upon bibliometrics, we also show that the growth of this area is real; the quantitative and qualitative growth have accelerated significantly since 2019. According to our study, there was a rising in production and impact with a peak in 2024 for publication number and record citations in 2022, which offers a more comprehensive picture of the surge in scholarly and practical interest, thereby substantiating Sharma's (2023) observation of pandemic-induced momentum in AR retail research. However, we have expanded Sharma's observation to include other areas of marketing research as well. Compared to Du et al. (2022), who focused on a smaller Web of Science dataset and empirical perspectives on AR in retail, tourism, and advertising, this study employs a more extensive Scopus dataset (2015–2024) and integrates bibliometric performance indicators with science mapping. The results reveal a clear thematic evolution from early technological exploration of "mobile AR" and interactivity (2015–2018) toward strategic, interdisciplinary themes such as artificial intelligence, the Internet of Things, and the metaverse in the maturity phase (2022–2024). The trends that Jayaswal and Parida (2023) identified regarding thematic development for AR in marketing are mirrored by the findings of the current research, but our more recent data set reflects new streams of research that did not exist in their 2023 coverage. AR's (Augmented Reality) adoption is a new business opportunity utilizing the latest technology advances. In addition to traditional uses of AR as demonstration models or advertising tools in the digital space, AR technology is now regarded as a vital aspect of many business sectors'

survival and growth in the years ahead.

The geographical and institutional patterns observed also refine earlier conclusions. In accordance with Shahab (2024), our results support those who suggest that the US and UK were dominant in terms of research output and impact; however, India, China and Malaysia are beginning to show evidence of increased contribution in the future, even though they are still ranked lower than the aforementioned countries in terms of citation impact. Our study offers a more institutional perspective that earlier reviews neglected by including top institutions like the University of the Bundeswehr Munich and Symbiosis International Deemed University. The outputs of the science mapping support previous observations regarding strong European collaboration networks, as noted by Shahab (2024) and Jayaswal & Parida (2023), but also provide insight into the continuing presence of clustering within regions and, therefore, the ability to create larger global collaborative scientific partnerships.

This study identifies methodological and substantive deficiencies in previous studies on AR Marketing Research. Previous studies, including Sharma (2023), had limited scope (focused on retail) and Tasci et al. (2024) diluted AR-specific insights by combining AR with VR and metaverse applications, our analysis encompasses all marketing domains, thus making our analysis significantly more generalizable compared to other studies. Through performance analyses, science mapping, and thematic evolution combined into a single framework, we can develop a broader view of AR Marketing Research including both intellectual and social dynamics and present an updated view of the current state of knowledge. The discovery of unexplored domains including pricing, promotion, after sales behavior and ethical aspects of AR further develops the research agenda that is beyond the thematic limitation of the previous work. Overall, by placing all these findings in the context of the ongoing development in the field, this paper, besides confirming the exponential growth and strategic importance of the field, presents a more current, holistic, and methodologically integrated evaluation. It validates the role of AR in driving a new consumer-brand relationship and indicates new directions to explore to define the future of immersive and technology-focused marketing.

7. Conclusion

This research delivers a comprehensive and current bibliometric assessment of Augmented Reality (AR) in marketing, based on 380 peer-reviewed articles published between 2015 and 2024. By integrating performance indicators with science mapping and thematic evolution analysis, the study identified major publication trends, leading contributors, core journals, and emerging research themes. The hypotheses developed were tested systematically and they were all supported. Findings validate the increase in research output and academic impact, and the volume of publications, citations, and h-index have significantly increased since 2019. The impact and research productivity was observed to be clustered among a few countries, institutions and authors, which emphasize the dominant role of long-established centers and the most prominent scholars. Thematic analysis showed that there has been a trend towards investigating technology-oriented topics at the beginning and more and more interdisciplinary applications, especially those that integrate artificial intelligence, the Internet of Things, and the metaverse. Co-authorship networks displayed both localisation and the formation of international cooperation centers, especially in the United States, the United Kingdom and China. The results are relevant to the scholarly literature as they record the process of digital consumer behavior and immersive brand experience transformation of AR marketing as a technological novelty into a multidisciplinary field. For practitioners, the results underscore the strategic value of AR in enhancing consumer engagement, strengthening brand identity, and driving innovation in digital commerce. The concentration of the research output points as observed would indicate that the world needs to collaborate and diffuse more knowledge internationally in order to realize a balanced growth in the world. The intersection of AR and AI, and the IoT and metaverse will likely determine the following generation of data-driven and hyper-personalized marketing. Even though significant progress has been made, there are loopholes that should be filled by looking into them. Issues like pricing policies, after-sale behavior, and the psychological impacts of AR on consumer-brand relationships in the long-term are under-developed. To explain the regional differences in adoption and perception, cross-cultural studies are required, and the ethical, privacy and accessibility issues should be considered as AR technologies become more ubiquitous. On the whole, AR has become a

paradigm shift in the field of marketing research and practice, and the development of the discipline proves its scholarly maturity and its ability to reinvent digital consumer experiences and strategic marketing during the age of immersive technologies.

8. List of bibliography

- Aguilar, J. F. N. (2024). Digital imaging, virtual and augmented reality. *Cirugi'a Españ̃ Ola*, 102(1), 30–35.
- AlFadalat, M., & Al-Azhari, W. (2022). An integrating contextual approach using architectural procedural modeling and augmented reality in residential buildings: The case of Amman city. *Heliyon*, 8(8), e10040. <https://doi.org/10.1016/j.heliyon.2022.e10040>
- Du, Z., Liu, J., & Wang, T. (2022). Augmented Reality Marketing: A Systematic Literature Review and an Agenda for Future Inquiry. *Frontiers in Psychology*, 13, 925963. <https://doi.org/10.3389/fpsyg.2022.925963>
- Ghouse, S. M., & Shekhar, R. (2024). Navigating the Metaverse: Opportunities, Challenges, and Future Perspectives in Marketing. In *Reference Module in Social Sciences* (p. B9780443137013004783). Elsevier. <https://doi.org/10.1016/B978-0-443-13701-3.00478-3>
- Guerola-Navarro, V., Stratu-Strelet, D., Botella-Carrubi, D., & Gil-Gomez, H. (2023). Media or information literacy as variables for citizen participation in public decision-making? A bibliometric overview. *Sustainable Technology and Entrepreneurship*, 2(1), 100030. <https://doi.org/10.1016/j.stae.2022.100030>
- Huang, N. (2024). Quantitative and visual analysis of tsunami warning research: A bibliometric study using web of science and VOSviewer. *International Journal of Disaster Risk Reduction*, 103, 104307. <https://doi.org/10.1016/j.ijdr.2024.104307>
- Monaro, M. (2025). Enhancing shopping experience in augmented reality by customizing product manipulation modalities: A customer experience study. *Computer Studies*.
- Nikhashemi, S. R., Knight, H. H., Nusair, K., & Liat, C. B. (2021). Augmented reality in smart retailing: A (n) (A) Symmetric Approach to continuous intention to use retail brands' mobile AR apps. *Journal of Retailing and Consumer Services*, 60, 102464. <https://doi.org/10.1016/j.jretconser.2021.102464>
- Parekh, P., Patel, S., Patel, N., & Shah, M. (2020). Systematic review and meta-analysis of augmented reality in medicine, retail, and games.

- Visual Computing for Industry, Biomedicine, and Art*, 3(1), 21.
<https://doi.org/10.1186/s42492-020-00057-7>
- Peštek, A., & Osmanović, A. (2022). Systematic mapping study: Application of augmented reality in marketing. *Ekonomski Vjesnik*, 35(2), 399–416. <https://doi.org/10.51680/ev.35.2.12>
- Scholz, J., & Duffy, K. (2018). We ARe at home: How augmented reality reshapes mobile marketing and consumer-brand relationships. *Journal of Retailing and Consumer Services*, 44, 11–23. <https://doi.org/10.1016/j.jretconser.2018.05.004>
- Souheila, B. (2025). Artificial intelligence and the revolution of online commerce: Personalization and loyalty strategies for millennial consumers. *Journal of Studies in Economics and Management*, 8(1), 535–551.
- Walentek, D., & Ziora, L. (2023). A systematic review on the use of augmented reality in management and business. *Procedia Computer Science*, 225, 861–871. <https://doi.org/10.1016/j.procs.2023.10.073>
- Zulfiqar, F., Raza, R., Khan, M. O., Arif, M., Alvi, A., & Alam, T. (2023). Augmented Reality and its Applications in Education: A Systematic Survey. *IEEE Access*, 11, 143250–143271. <https://doi.org/10.1109/ACCESS.2023.3331218>