

MEASURING AI'S IMPACT ON EUROPEAN CONSUMER SATISFACTION: A BIBLIOMETRIC ANALYSIS OF INTEGRATED SOLUTIONS

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Abstract: *The integration of artificial intelligence (AI) solutions in various sectors has been shown to enhance customer satisfaction and operational efficiency. Understanding customer satisfaction levels post-AI integration is increasingly critical for assessing the effectiveness and overall value of these technological advancements. Investigating the collaborative dynamics in artificial intelligence solutions and consumer applications from 2020 to 2025, this study analyzes the knowledge dissemination by examining the relationships between authors, journals, countries, and institutions. The dataset comprises 7609 publications from Web of Science and employs bibliometric analysis and network visualization via VOSviewer. Analysis of the data demonstrates that highly productive authors also display a significant tendency to engage in collaborations. Moreover, key thematic clusters identified include user-centric perspectives, business adoption strategies, performance measurement, and the economic considerations of AI implementation. The findings underscore the dynamic nature of this field and its increasing relevance across various industries.*

Keywords: artificial intelligence, consumer satisfaction, bibliometric analysis

1. Introduction

The integration of artificial intelligence (AI) into various products and services has rapidly transformed the landscape of consumer interaction, necessitating a thorough understanding of its impact on customer satisfaction. As businesses increasingly adopt AI-powered solutions, ranging from personalized recommendations and chatbots to AI-driven interfaces, the way consumers perceive and experience these technologies becomes paramount. Understanding and measuring consumer satisfaction in this evolving context is critical for businesses to optimize their AI deployments and ensure positive user experiences [1, 2, 3, 4]. This emphasis is further underscored by the vast amount of

data generated by consumer interactions with AI, presenting a rich field for scholarly inquiry.

The strategic importance of consumer satisfaction in driving business success and fostering long-term relationships is well-established [5, 6, 7]. In the specific realm of AI integration, however, the factors influencing satisfaction may differ significantly from traditional service encounters. Aspects such as trust in AI, perceived usefulness, transparency of algorithms, and the quality of human-AI interaction become critical determinants of user acceptance and overall satisfaction [8, 9]. Consequently, a comprehensive understanding of how these AI-specific attributes shape consumer satisfaction is

important for both academic advancement and practical application.

Given the burgeoning body of literature exploring the intersection of AI and consumer satisfaction, a systematic and macroscopic overview of this research field is warranted. This study addresses this need by employing bibliometrics, a quantitative methodology for analyzing patterns in scientific publications. By examining publication trends, influential authors, key journals, and the intellectual structure of this research domain, bibliometric analysis offers a valuable lens through which to understand the current state of knowledge and identify emerging areas of focus.

Consequently, this study endeavors to present an extensive bibliometric examination of the academic publications focused on assessing consumer satisfaction after the deployment of artificial intelligence-driven solutions. The main purpose is to develop a visual understanding of the research environment by illustrating its collaborative networks, published works, and shifting tendencies. Additional goals encompass: (I) map the chronological development of research in this field alongside the spread of publications across various count (II) determine impactful journals, authors, and landmark publications within the subject; and (III) reveal the thematic interdependencies between central notions, notable researchers, and relevant academic platforms.

The subsequent sections of this manuscript are organized as follows: section two presents a targeted examination of the pertinent scholarly works; section three details the bibliometric methodologies employed herein; section four illustrates the outcomes of the bibliometric analyses conducted; and section five provides a summary of the key findings and proposes potential directions for future academic inquiry.

2. Contextualizing the research: a literature review

The measurement of consumer satisfaction

has long been a pivotal area of research across various disciplines, recognized for its crucial role in business success and customer loyalty [10, 11, 12]. As artificial intelligence (AI) increasingly permeates consumer-facing applications, understanding how this technological integration influences user satisfaction has become a burgeoning field of inquiry. While the broader literature on consumer satisfaction is extensive, the specific examination of satisfaction in the context of AI-powered solutions is a more recent, yet rapidly expanding, domain.

Prior bibliometric analyses have illuminated research trends in related fields, such as the adoption and impact of technology on consumer behaviour [13, 14, 15]. However, a comprehensive bibliometric overview specifically focused on the measurement of consumer satisfaction following the integration of AI-based solutions remains relatively underexplored even if industry 4.0 is an important focus for managerial performance [16]. Existing studies often examine either consumer adoption of AI [17], or general factors influencing satisfaction with technology [18, 19], without a dedicated focus on the measurement aspect within the AI integration context.

To illustrate, studies have investigated consumer perceptions of chatbots in customer service [20, 21] or the impact of personalized recommendations on purchase behaviour [22, 23, 24]. While these contribute valuable insights, a macro-level analysis mapping the intellectual structure, key contributors, and evolving themes specifically concerning the measurement of satisfaction in this AI-driven landscape is lacking. This gap in the literature motivates the current bibliometric study, which aims to provide a systematic and visual overview of the research dedicated to understanding how consumer satisfaction is conceptualized and assessed in the era of integrated AI solutions. By analyzing publication trends, influential scholars, and prevalent research themes, this study seeks

to establish a foundational understanding of the existing knowledge base and identify potential avenues for future research in this increasingly important area.

Unlike prior bibliometric works that may have focused on broader aspects of AI adoption or general technology satisfaction, this study distinguishes itself by its specific focus on the measurement of consumer satisfaction within the context of AI integration. Furthermore, it aims to provide a comprehensive overview of the field by employing a distinct and potentially broader range of data sources and advanced visualization techniques to map the intellectual landscape of this emerging research domain.

3. Research methodology

To quantitatively and visually explore the academic literature concerning the assessment of consumer satisfaction after the incorporation of artificial intelligence (AI)-driven solutions, this research utilizes a two-pronged methodological strategy encompassing bibliometric analysis and science mapping. Bibliometric analysis serves to track the scientific evolution and visualize information pertaining to key concepts, intellectual contributions, and collaborative networks within this emerging field [25]. By leveraging bibliographic data, bibliometric techniques enable the assessment of author and institutional performance, facilitating the identification of the underlying knowledge structure [26]. By employing this method, a reliable and seemingly unbiased analysis of a significant body of references becomes possible, allowing for the extraction of quantifiable information regarding the progression of understanding using statistical and quantitative tools, and generating meaningful findings through the scrutiny of citation patterns, co-citation relationships, geographical spread, and the prevalence of keywords.

Complementarily, science mapping techniques enable the visualization of relationships between publications, offering

a graphical representation of the research landscape [27]. Knowledge mapping has proven a practical approach across disciplines to uncover trends within specific domains [28]. The visual mapping of scientific networks in this study is achieved through the application of several techniques, namely citation analysis, co-citation analysis, bibliographic coupling, and co-word analysis. For the purpose of discerning noteworthy essential factors within the research domain, this analysis predominantly employs a series of measures, including frequency, co-occurrence and co-citation. Leveraging increasingly powerful data visualization tools, known as knowledge maps, this approach allows for a comprehensive analysis and evaluation of the trends and research frontiers in the domain of consumer satisfaction measurement within the context of AI integration [29].

3.1. Data sources and data collection

To conduct a comprehensive analysis of the research landscape concerning consumer satisfaction and AI solutions, this study utilized the Web of Science (WoS) Core Collection, a prominent and temporally extensive database frequently employed in bibliometric investigations. Employing the advanced search functionality, a targeted query was constructed to retrieve relevant literature.

Specifically, the titles of articles were searched for the terms "customer* satisfaction", "artificial intelligence", "integration". The Boolean operator 'OR' was strategically applied to identify publications containing two or more of these keywords, while the asterisk symbol ("*") served as a wildcard to encompass plural forms and variations of the search terms. A meticulous approach was taken to ensure the precision of the search, exploring various pertinent terms related to the phenomena. The exact query search was: TS=("customer* satisfaction" OR "consumer* satisfaction" OR "user* satisfaction" OR "satisfaction measurement" OR "satisfaction assessment"

OR "perceived satisfaction") AND
 TS=("artificial intelligence" OR "AI" OR
 "machine learning" OR "ML" OR "natural
 language processing" OR "NLP" OR
 "chatbot*" OR "virtual assistant*" OR
 "intelligent system*") AND
 TS=("integration" OR "implementation"
 OR "adoption" OR "deployment" OR "use"
 OR "application").

Significantly, the initial document retrieval process was conducted without limitations on subject matter or publication date, with the aim of achieving a comprehensive understanding of the research field and its temporal progression. However, subsequent restrictions were applied to refine the dataset. Specifically, the search was constrained to publications from European countries, encompassing only English-language articles published within the last five years.

The initial search yielded a substantial dataset of 1977345 documents. To enhance the rigor and interpretability of the subsequent analysis, the dataset was refined by filtering for journal articles. Furthermore, considering the European context of the study, a "Business Economics" filter would likely capture research focusing on the specific economic and business challenges and opportunities related to AI adoption and consumer behavior within the European business sector. This refinement resulted in a final sample size of 7609 English-language publications. The complete records of these documents were then extracted and served as the primary data source for the subsequent science mapping and bibliometric analysis. This final dataset comprises 7609 publications and their 34381 citing articles, with self-citations explicitly excluded. These publications have collectively garnered a total of 43063 citations, also excluding self-citations, and exhibit a combined H-index of 65, providing a quantitative foundation for understanding the impact and characteristics of research in this field.

3.2. Visual representation of data tool

VOSviewer presents a complementary yet distinct lens for navigating the bibliometric landscape. Developed with a specific emphasis on the visualization of similarity, VOSviewer excels at constructing and rendering intuitive maps based on relationships such as co-citation, bibliographic coupling, co-authorship, and the co-occurrence of keywords. VOSviewer shines in its ability to generate distance-based maps where the proximity of nodes directly reflects the strength of their interconnectedness. This Java-based tool, freely accessible to researchers, empowers the creation of visually compelling networks that can encompass a wide array of entities, from individual publications and researchers to journals and institutions. Its strength lies in transforming complex bibliometric data into easily interpretable visual representations, facilitating the identification of key clusters, influential actors, and dominant themes within a research domain. Furthermore, VOS viewer incorporates text mining capabilities, enabling the construction and visualization of co-occurrence networks of significant terms extracted directly from the body of scientific literature. This feature provides a unique avenue for uncovering the underlying semantic structure and evolving lexicon of a field, offering insights that complement traditional citation-based analyses.

4. Results

4.1. Descriptive analysis

As shown in figure 1, the distribution of the articles illustrates a significant and accelerating overall growth in academic publications indexed by Web of Science. The year 2021 has gained the significant lift in publication number. The last five years have seen an increase in the number of publications (23248) focusing on this topic, accounting for half of all that has been written (46331) in this field since 2000. This surge in scholarly attention indicates that the integration of AI-powered

solutions across various industries, particularly those with direct consumer interaction, is no longer a nascent trend but

a well-established and actively evolving reality demanding rigorous investigation.

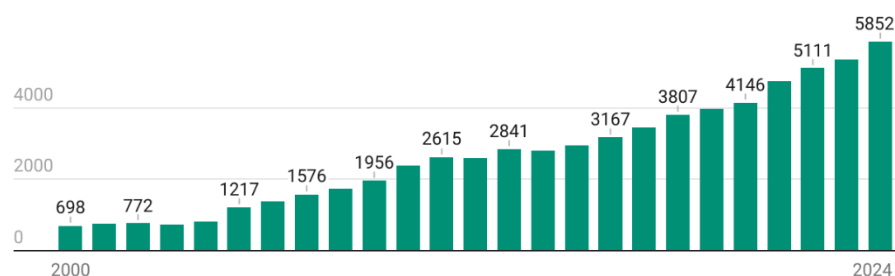


Figure 1: Evolution of literature outputs on AI' customer satisfaction
Source: authors' work

In terms of the origin of European authors concerned with this topic, it can be noted that most papers come from the United Kingdom (2339 articles), followed by Germany (1305 articles) and France (1083 articles).

In this investigation, a total of 500 distinct authors contributed to the field. The scholarly output of these individuals varied considerably, ranging from a single publication to a substantial body of work comprising 30 papers. The most prolific authors were: Ajay Kumar (h index 33), a scholar affiliated to Business Analytics at EMLYON Business School France, Demetris Vrontis (h index 54) affiliated to University of Nicosia and and Antony, Jiju (h index 35) affiliated to Newcastle University. Each of this three author have more than 20 papers on this subject, enhancing the literature with their expertise in the field. It is noteworthy that the ten most prolific authors, based on their publication volume within this subject area, collectively account for a substantial 42 percent of the total documented research. This concentration of output among a relatively small group of researchers strongly suggests a significant degree of scholarly interaction and potential collaborative activity shaping the development of knowledge in this domain. Considering the academic or professional institutions represented by the researchers the figures show that University of London

(269 articles), Ministry of Education Science of Ukraine (132 articles), Centre National de la Recherche Scientifique CNRS (110 articles) and University College London (96 articles) contributed with 8% of the total amount of articles.

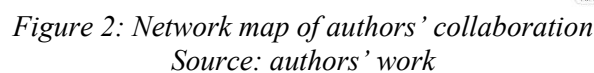
Analyzing the journals, out of the 7609 articles were published in 1211 journals, the first ten journals publishing 13% of research. The greatest number of articles were published in Technological Forecasting And Social Change (217), followed by Journal of Business Research (123 articles) and IEEE Transactions on Engineering Management (113 articles).

4.2. Collaboration analysis

The analysis of the authorial collaboration network provides a valuable framework for discerning scholars who have exerted a substantial influence on the research domain, as evidenced by their publication record and network centrality. Moreover, this structural examination unveils the complex interdependencies and collaborative linkages that characterize the intellectual landscape of this field of inquiry.

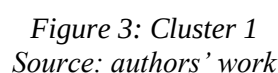
After accessing the VOSviewer software and inputting the data retrieved from the Web of Science, the subsequent analysis of author collaborations, constrained by a minimum threshold of five publications per author, yielded a network structure comprising 13 distinct clusters of author groups. This network visualization, derived

consequences of implementing AI-based solutions. Kumar A. (29 cooperative publications), Chatterjee S. (24) and Chaudhuri (17) were the top three authors in terms of collaboration.



the identification of key themes and their interrelationships, providing a structural overview of the intellectual content within this domain.

The analysis of the terms resulted in four main clusters centered around the main words *cost* (figure 4) , *adoption* (figure 5), *user* (figure 3) and *performance* (figure 6).



The cluster formed around the word user (388 occurrences and 0.676 relevance score) has the following keywords most encountered: behaviour, satisfaction, intention, attitude, acceptance, trust, engagement, social influence, e-satisfaction. These terms indicate a strong interest in understanding consumer behavior and the factors that influence consumer satisfaction

and loyalty, especially in the context of services and e-commerce.

These terms suggest that research is focusing on the consumer experience, the reasons why customers choose to switch providers and how technology influences satisfaction in the online environment.

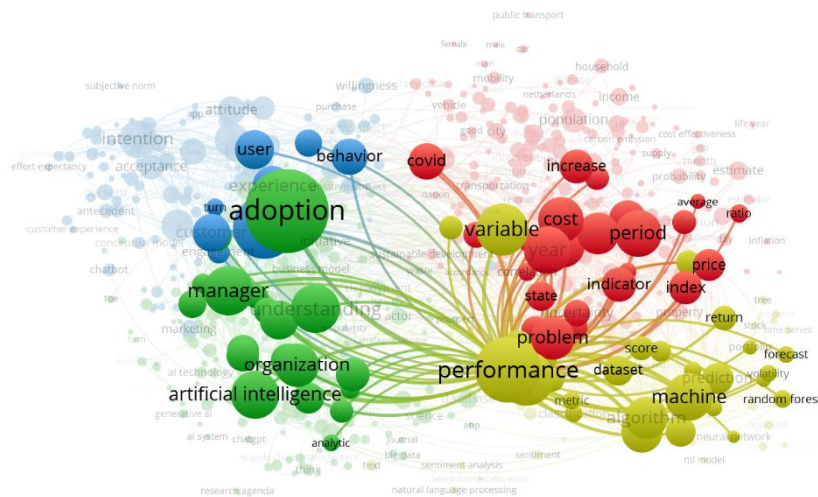


Figure 4: Cluster 2
Source: authors' work

The conceptual nexus anchored by the term cost (626 occurrences and 5873 total link strength) has the following keywords most

commonly encountered: price, indicator, problem, ratio, period, uncertainty, population, estimation.

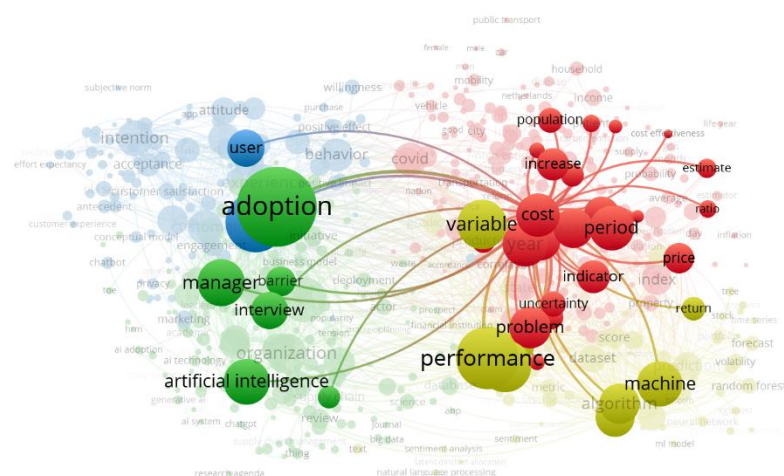


Figure 5: Cluster 3
Source: authors' work

Evidencing a strong degree of semantic cohesion, the lexical item adoption 646 links, 13730 total link strength, 1212 occurrences) anchors a cluster of keywords characterized by high rates of co-occurrence, including: manager, organization, business model, understanding, initiative, artificial intelligence.

The terms highlight the researchers' aim to provide actionable insights for managers and companies. The keywords within this cluster reveal a desire to advance knowledge concerning the improvement of business practices and the accommodation of changes in the economic and technological environment.

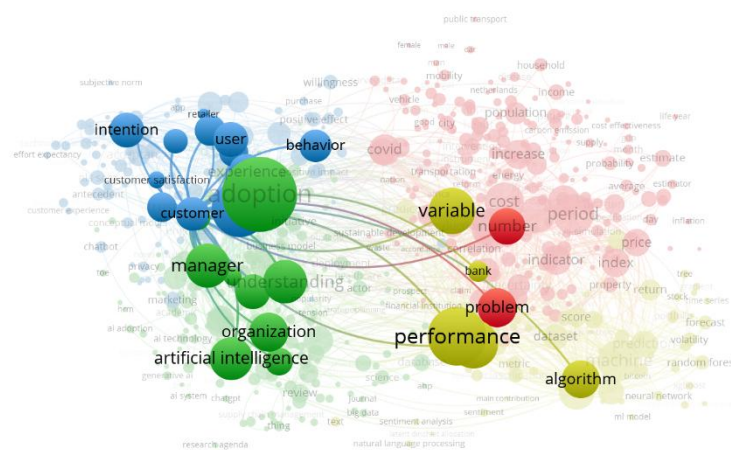


Figure 6: Cluster 4
Source: authors' work

The keyword performance, exhibiting a notable frequency (840) and relevance score (9804), functions as a focal point for a discernible semantic cluster within the analyzed text, with the most prominent co-occurring terms being variable, date, machine, forecast, metric, algorithm and score.

The representative keywords for this cluster evince a salient trend in the exploration of the impact of digital technologies and artificial intelligence on business operations, marketing strategies, and customer interaction paradigms. Scholarly inquiry is directed towards investigating the potential of AI to enhance service provision, personalize consumer experiences, and optimize operational efficiency.

Several frequently occurring keywords highlight the main topics of the research. For instance, adoption (1212 occurrences), performance (840 occurrences), theory (832

occurrences), machine (542 occurrences), manager (551 occurrences), understanding (564 occurrences), period (566 occurrences), problem (535 occurrences), measure (483 occurrences), algorithm (455 occurrences), number (458 occurrences), interview (444 occurrences), machine learning (439 occurrences), variable (583 occurrences), year (554 occurrences), and technique (637 occurrences) suggest the research focuses on theories and techniques used in machine learning but also on how managers adopt new technologies over time in order to understand and measure the performance of this action. This shows a strong focus on using quantitative methods and considering managerial viewpoints in the field.

The comparative analysis of keyword occurrence and relevance scores reveals potential trends, such as the increasing scholarly attention towards generative artificial intelligence, evidenced by the high

relevance of terms like chatgpt (1.5874), genai (2.3837), and generative ai (2.045), and a growing body of research exploring the intersection of AI and blockchain, as indicated by the presence of keywords like blockchain technology (1.0124), bitcoin (2.1572), and cryptocurrency (0.9001). Collectively, these keyword analyses underscore the field's dual emphasis on both the established theoretical and methodological foundations, particularly in machine learning and adoption studies, and the burgeoning interest in emerging areas such as generative AI and the convergence of AI with blockchain technologies, ultimately reflecting a dynamic evolution in scholarly inquiry towards both practical applications and innovative frontiers.

5. Conclusions

This bibliometric examination of the evolving research landscape surrounding consumer satisfaction in the context of artificial intelligence integration reveals a dynamic and rapidly expanding field characterized by significant European contributions and a strong emphasis on collaborative scholarship. The exponential growth in publications, particularly within the last five years, underscores the increasing academic and practical relevance of this domain as AI permeates various aspects of consumer interaction. The identified concentration of influential authors and core journals signals an emerging maturation of the field, with established expertise actively shaping the ongoing discourse.

Furthermore, the analysis of co-authorship networks highlights the collaborative nature

of knowledge generation within this domain, indicating a robust exchange of ideas and methodologies. The identified thematic clusters, centered on user-centric perspectives, business adoption strategies, performance measurement, and the economic considerations of AI implementation, underscore the multi-faceted nature of this research area. This suggests a holistic approach that considers not only the technological advancements but also the human, organizational, and economic implications of AI in shaping consumer experiences.

The concentration of research within European contexts, as evidenced by this bibliometric analysis, offers a valuable lens through which to understand the dynamics of AI integration and consumer satisfaction in this specific geographical and cultural sphere. Future research should build upon these findings by prioritizing longitudinal studies to track the long-term impact of AI on consumer satisfaction within Europe, explore the nuances of cultural and contextual variations across the continent, and further develop robust methodologies for measuring and predicting consumer responses to increasingly sophisticated AI-powered solutions. While the findings are rooted in the European landscape, the insights gained underscore the broader necessity for a continued interdisciplinary approach, bridging technological innovation with insights from social sciences and business strategy, to foster positive and sustainable consumer-AI relationships globally.

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