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Big Data and Ethical Consumption: A Bibliometric Analysis

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Abstract - **The objective of this study is to perform a bibliometric analysis of big data and ethical consumption to discern crucial trends, topics, and prospective research avenues. The study employed the PRISMA framework. The results demonstrate that big data substantially impacts ethical consumption by offering enhanced understanding of consumers' ethical preferences and behaviors. This study also reveals significant trends, like the increasing incorporation of advanced analytics and artificial intelligence in comprehending and fostering ethical consumer behavior across multiple sectors. Furthermore, it underscores the significance of digital platforms in promoting ethical consumption behaviors and the necessity of resolving privacy issues related to big data utilization. This research enhances our comprehension of utilizing big data to further sustainable development goals and provides a basis for future investigations into ethical consumer behavior.**

Keywords - **Bibliometric analysis, big data, consumer behavior, ethical consumption, sustainable development goals.**

I. INTRODUCTION

Big data (BD) refers to large volumes of data generated at high velocity and in various formats, requiring advanced business management processing techniques for decision-making [24; 25; 22]. It equips with industry-specific analytics tools to uncover patterns and correlations among stakeholders, including consumers, regulators, suppliers, and so on, for business decision-making aspects [17; 23].

Big data influences consumer behavior analysis to predict consumer preferences and decision-making processes [21]. Academicians and practitioners integrate BD analytics into consumer behavior studies to tailor business marketing strategies, enhance consumer satisfaction and engagement, and predict future purchasing trends [20]. It impacts consumers' ethical dimensions, such as fair trade, eco-friendly products, and animal welfare, and how these are perceived by consumer purchasing intention and action [18; 19].

BD applications play a crucial role in promoting ethical consumption (EC) by enhancing consumer privacy and integrating artificial intelligence in marketing analytics for ethical consumption decision-making [14]. The role of consumers' digital contributions, especially in apps like Buycott, underscores the significance of user generated data in shaping ethical consumption behaviors and corporate actions [16]. While BD can contribute to achieving the Sustainable Development Goals (SDGs), we must address ethical considerations like privacy and data ownership to ensure its positive impact on ethical consumption and sustainability [27; 15].

For addressing the BD influence in shaping EC behavior, it is significant to know the key trends, gaps, and challenges in the field, guiding future research and practical applications in assuring a better sustainable future [31]. There are systematic literature review papers on addressing big data in several aspects, e.g., ethical consideration in data science [13], BD value realization [12], BD analytics [22], digital marketing consumer behavior [11], sustainable tourism [10], sustainable consumption [26], and so on. These reviews denote that BD is a multidisciplinary domain that has myriads of applications in different domains, including consumer behavior. However, there is no systematic literature review on how big data shapes ethical aspects in consumer decision-making. To address this gap, this study aims to conduct a systematic literature review to facilitate quantitative and qualitative portrayals of relevant literature to compare and contrast the findings of prior studies in the intersection of big data and ethical consumption domains [33]. The research questions are as follows.

RQ1. What is the primary emphasis of big data and ethical consumption studies?

RQ2. What are the major themes and topic areas within big data and ethical consumption, and how have these themes developed over time?

RQ3. What are the opportunities for future research for both scholars and industry professionals?

In order to answer these research questions, the essay adopts bibliometric analysis, including performance analysis and science mapping of the chosen scholarly documents, followed by a thematic analysis to determine future research directions [30].

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The study's novelty lies in its portrayal of the scholarly contributions and thematic evolution of BD and ethical consumption from a multidisciplinary perspective. This study also identifies emerging trends for projecting future research directions in terms of theoretical and practical implications.

The subsequent chapters shall be outlined as follows: Chapter two presents the methodology. Chapter three showcases the bibliometric and thematic analysis along with the findings. Following this, chapter four discusses the findings, and chapter five concludes the work with theoretical and managerial contributions.

II. METHODOLOGY

The study uses the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to conduct the systematic literature review [29]. The study opts for Web of Science (WoS) that was used in the prior literature on BD (13; 11]. The study considers documents that were published and were written in English. Also, 6 more articles were added through the cross-check mechanism of another database and reference section [31]. The study incorporates ethical consumption synonyms from the paper [27] into its analysis. The appendix contains the search query. The SLR process is given below.

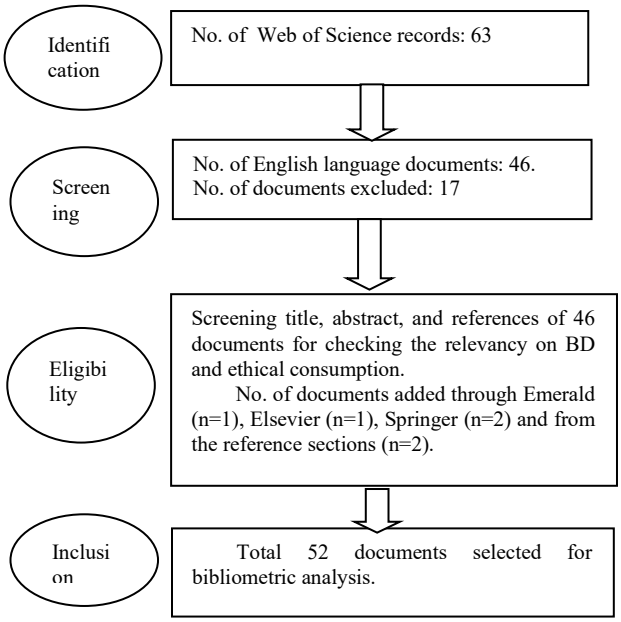


Fig. 1. PRISMA protocol for systematic literature review.

Bibliometric analysis combines performance analysis and science mapping. Performance analysis assesses the productivity using different matrixes whereas science mapping examines the intellectual relationships within a field [30]. In the performance analysis, the study used Bradford's Law (1934) [35], where the number of journals in these zones follows a geometric progression, typically expressed as 1:n:n2, where n is the Bradford multiplier. The study also assesses Lotka's Law [36] for measuring author productivity, which states that the number of authors publishing n works is proportional to 1/n2, meaning that productivity decreases rapidly for higher publication counts [36]. In the keyword co-occurrence analysis, the study used the following formula for assessing average publication year (APY).

$$APY = \frac{\sum(ti_i * n_i)}{\sum t_i} \quad (1)$$

According to the formula, if a topic t appears in two articles (n = 2) in 2022, three articles in 2023, and five articles in 2024, then its APY value is 2023.3.

[(2X2022)+(3X2023)+(5X2024)/10].

The study avails BiblioShiny package of R language in performance analysis [28] and VOSviewer for science mapping.

III. RESULTS

A. Performance analysis

The study evaluates the Bradford law [35] concerning the distribution of articles in core journals of BD and EC, as illustrated in figure 2.

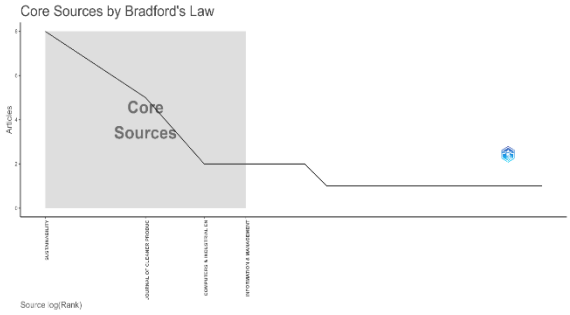


Fig. 2. Bradford's Law.

The shaded gray area delineates the journals that significantly contribute in terms of article volume. Publications such as Sustainability and Journal of Cleaner Production are likely integral to the core zone, given their extensive coverage of subjects like big data and ethical

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consumption. The x-axis employs a logarithmic scale to categorize journals according to their productivity levels. Journals of greater prestige, such as Sustainability, are positioned on the left, whereas those with lower productivity, like Information & Management, are situated further to the right.

To determine the author impact and resource allocation in BD on shaping EC, the study analyze the Lotka's Law [36] for determining the scientific productivity distribution which shows in figure 3.

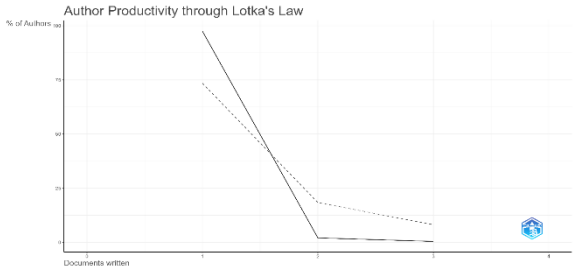


Fig. 3. Lotka's Law.

11% of authors write 3 articles and the Lotka's law noted about the inverse square law, where author productivity decreases exponentially as the number of publications increases.

B. Science mapping

For science mapping, the study conducted bibliographic coupling to determine thematic clusters of BD research in EC [30]. The study selected documents which have at least 5 citations. The figure 4 represents 4 thematic clusters of BD research in shaping EC in consumer perspectives.

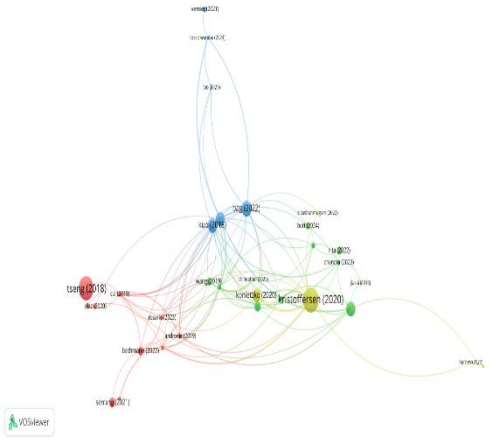


Fig 4. Clusters of BD research in EC from bibliographic coupling.

The study conducts keyword co-occurrence analysis for determining the research trends. The study put minimum occurrence as 3 as threshold. The overlay diagram presents in figure 5.

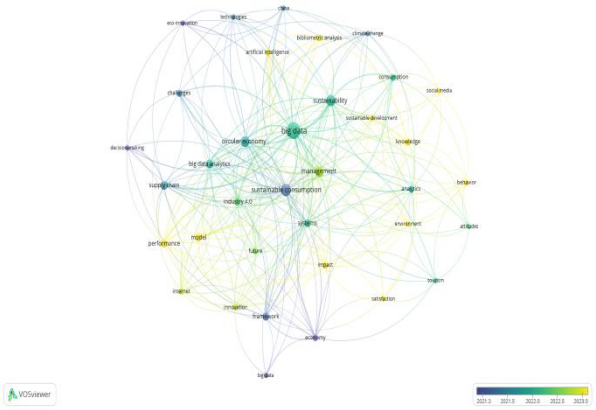


Fig 5. Keyword co-occurrence

IV. DISCUSSION

Based on the four clusters presented in figure 4, the study presents four thematic clusters in Table 1.

TABLE 1.
Thematic clusters of big data in ethical consumption

Cluster name	Authors	Main findings
Red (Data-Driven Solutions)	[2;5;8]	Data-driven technologies improve SDG performance by improving decision-making and resource allocation, despite constraints such as data gaps. Green consumers value sustainability in their product reviews, demonstrating a positive predisposition toward environmentally friendly behaviors. The circular economy has challenges such as high expenses, but it also provides enormous economic rewards and creative potential for organizations that follow its principles.
Blue (Sustainable Innovation)	[4;5;14]	Organizational social structures significantly boost SMEs' contributions to the Circular Economy. Environmental innovation increases green supply chain management (GSCM) and CE capabilities as a result of institutional pressure. It also demonstrates that firms excel at green product development but require sustainability improvements elsewhere. Big data and predictive analytics (BDPA) encourage sustainable development partner collaboration, and organizational fit enhances it even further.

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Yellow (Digitalization)	[1;23;34]	Digital technologies (DTs) like IoT and big data are crucial for advancing the circular economy (CE), but there is a lack of organized guidance on how to apply them and the necessary business analytics (BA) capabilities. The Smart CE framework developed in this study helps to link circular initiatives with BA demands, resulting in increased resource efficiency and productivity in manufacturing. Furthermore, there is a need for fundamental changes in product and business models, as well as practical tools to support ecosystem innovation in the BD and EC domains.
Green (Big data analytics)	[1;2;3;6;8;21;34]	Big data analytics (BDA) has the potential to improve manufacturing decision-making, but data and technology barriers prevent its deployment which creates EC intention-behavior gap. Lack of infrastructure and high investment costs in manufacturing supply chains may influence BDA policy. E-commerce consumers demand sustainable practices, which has linked consumer behavior, sustainability, city logistics, and circular economies. Big data helps address environmental issues and promote low-carbon behaviors to promote ethical consumption

In keyword co-occurrence analysis, the study evaluates the thematic trends of BD applications in shaping EC research, as depicted in Figure 8. The shift from blue to yellow nodes in the picture indicates a movement from basic sustainability practices to complex, interrelated evaluations that incorporate artificial intelligence and sophisticated data analysis for predicting and promoting ethical consumer behavior. This trend signifies the data-driven methodologies in ethical consumption practices across many sectors [8;14]. Artificial intelligence employs analytics for predicting customer behavior [9;37]. Social media, like Facebook, X, and LinkedIn, promote knowledge dissemination regarding sustainable practices, resulting in improved knowledge generation that fosters consumer awareness and education, which is important to reduce the EC intention-behavior gap [20;7]. By employing advanced behavior analysis, researchers can uncover patterns in sustainable decision-making, thereby guiding the creation of models to forecast consumer decisions [21; 3]. The yellow nodes in the figure specifically highlight the growing emphasis of future research initiatives on the integration of technology and sustainability. This technological integration fosters innovation in sustainable consumption methods while facilitating improved effect assessment of efforts and monitoring of customer satisfaction with sustainable alternatives (Rita & Ramos, 2022). This trend illustrates a distinct transition from fundamental sustainability indicators to more intricate, interconnected big data studies that utilize modern technologies to comprehend ethical consumer behavior.

V. CONCLUSION

This study highlights the critical role of data-driven technologies, particularly big data, in advancing EC and achieving Sustainable Development Goals (SDGs). Researchers can utilize these findings to explore how BD enhances decision-making and resource allocation for sustainability initiatives. Furthermore, the emphasis on advanced data analytics and artificial intelligence offers insights into predicting consumer behavior related to ethical consumption by reducing the EC intention-behavior gap at the consumer level.

Managers should leverage big data and analytics to enhance decision-making processes related to sustainability initiatives within their organizations. Understanding the barriers to big data adoption can inform strategic investments in infrastructure and tools that support ethical consumption practices and help customers to reduce the EC intention-behavior gap. Additionally, integrating advanced behavior analysis can help managers predict consumer preferences for ethical consumption, enabling more effective marketing strategies for sustainable products.

The study considers the Web of Science database only. Future research could consider more databases to get a much broader result. BD plays a transformative role in shaping EC behaviors. Its integration with advanced analytics enhances decision-making for sustainability initiatives, thereby reducing the gap between EC intention and behavior. Organizations should prioritize investments in big data technologies to better understand consumer preferences. Future research should focus on addressing ethical concerns related to privacy and data ownership while promoting sustainable practices.

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