



Analysing the Bibliometric of Circular Economy and Customer Behavior: A Study from 2018 to 2023

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Abstract. This study performed an extensive bibliometric analysis of 1520 articles catalogued in Scopus from 2018 to 2023, specifically focusing on the immediate findings of examining the connection between the Circular Economy and consumer behaviour. Its primary objective was to map this research domain's scientific network and contributions. The noteworthy outcomes of the analysis revealed that the years 2022 and 2023 registered the highest number of articles, totaling 124, signifying a growing interest in this subject. The researcher, R. Mugge, made the most substantial contributions, and the Delft University of Technology was the primary affiliation for these studies. Geographically, the United Kingdom led with 62 indexed articles, followed closely by Italy with 61 articles, highlighting global interest in this topic. Most of the articles were categorized under the subject area of Environmental Science, indicating the interdisciplinary character of this research. Notably, the Horizon 2020 Framework Programme emerged as the primary sponsor, underscoring the research's importance in academia. The study's key finding is that the significant relationship between the Circular Economy and consumer behaviour will likely positively impact customer loyalty. This research offers valuable insights for academics, practitioners, and policymakers in the field of economics

Keywords: Bibliometric analysis, Circular Economy, Consumer behavior, Economics.

1 Introduction

In recent years, there has been a growing interest in the circular economy (CE) from various sectors, including society, businesses, and governmental bodies [1]. The most well-known economic model was the linear model, which focused on constant growth and the extensive use of resources. The circular economy (CE) has come forward as a

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different approach to this model because it plays a crucial positive role in the environment. Its functions and interactions with the economic system set it apart as an alternative [2]. The transition to a circular economy requires a transformation in companies, industries, and the overall economy. This transformation is driven by changes in societal values, norms, behaviors, and attitudes, as highlighted by [3].

1.1 Consumer Behavior and Circular economy

Consumer participation in advancing the circular economy has been examined from different perspectives, including the study of green consumer behavior and the adoption of circular packaging [4]. In a broader context, a significant body of recent research has concentrated on behavioral theories [5] their practical application to encourage consumers to adopt more circular consumption [6] alternatives like investigating the impact of marketing campaigns promoting products with longer lifespans or highlighting the environmental benefits of choosing reusable items over single-use alternatives [7] Businesses to engage with customers across various touch points more effectively.

2 Methodology

Bibliometric, as described by [8], entails the application of statistical techniques to data gleaned from publications, including books and articles. This method is commonly utilized to evaluate the scholarly impact of authors, author collectives, or publications within specific subject areas, as emphasized by [9]. The quantitative analysis encompasses various methods such as citation analysis, co-authorship analysis, keyword analysis, and journal analysis. Citation analysis provides insights into the influence of specific works, authors, or journals by examining their frequency in citations. Co-authorship analysis unveils collaborative networks and interdisciplinary research, while keyword analysis identifies prevailing topics and research trends. Typically, the data for this methodology is sourced from publications indexed in SCOPUS, with the present study analyzing 1520 Scopus-indexed records between the years 2018 and 2023. [10] have conducted studies on author productivity and citation impact, providing valuable insights into scholarly publishing patterns.

2.1 Data Source & Retrieval Strategy

TITLE-ABS-KEY (circular AND economy AND consumer) AND PUBYEAR > 2017 AND PUBYEAR < 2024 AND (LIMIT-TO (EXACTKEYWORD , "Circular Economy") OR LIMIT-TO (EXACTKEYWORD , "Sustainable Development") OR LIMIT-TO (EXACTKEYWORD , "Sustainability") OR LIMIT-TO (EXACTKEYWORD , "Waste Management") OR LIMIT-TO (EXACTKEYWORD , "Consumption Behavior")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (DOCTYPE , "ar"))

2.2 Interpretation: Number of Publications by year

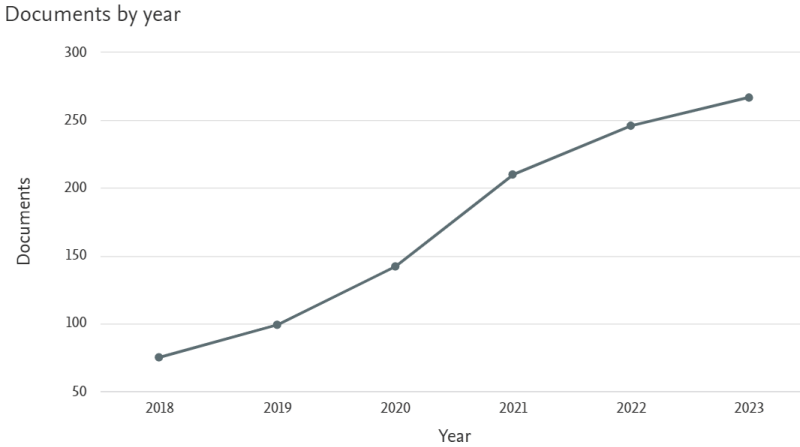


Fig. 1. Number of Publications by year

Fig. 1. presents a detailed overview of annual publication trends from 2018 to 2023, showcasing a consistent growth in research output. The data indicates a remarkable surge in 2023, with 267 publications, marking a noticeable increase from the previous years: 246 in 2022, 210 in 2021, 142 in 2020, 99 in 2019, and 75 in 2018. This upward trajectory suggests a substantial uptick in research activity during 2023, possibly driven by emerging trends, increased funding opportunities, or shifting academic priorities. The subsequent years, from 2018 to 2023, exhibit sustained high levels of research output, emphasizing the enduring momentum in scientific inquiry. Despite minor fluctuations, an overall upward trend underscores the growing significance of research in the academic and scientific community [11]. Noteworthy is the comparatively lower publication count in the early 2000s, revealing a substantial increase in recent years, likely indicative of the expanding and diversifying landscape of research fields and the global growth of academic research. Interpretation: Publications by subject area. [12] emphasizes the significance of publishing in SCOPUS-indexed journals for increased visibility and academic impact.

2.3 Interpretation: Publications by subject area

Table 1. Top 10 publications by subject area

Top 10	Subject Area	Publications
1.	Environmental Science	649

2.	Energy	380
3.	Engineering	330
4.	Business, Management and Accounting	309
5.	Social Sciences	298
6.	Computer Science	142
7.	Decision Sciences	41
8.	Medical	22
9.	Mathematics	16
10.	Arts and humanity	14

Table 1. The distribution of research documents across various subject areas highlights the diverse and multifaceted nature of academic inquiry. Environmental Science leads with 649 documents, emphasizing its substantial importance in practical and technological aspects. Energy follows closely with 380 documents, demonstrating a significant focus on this field in academic research. Engineering ranks third with 330 documents, indicating a strong emphasis on problem-solving and technical exploration. Business, Management, and Accounting take the fourth position with 309 documents, underscoring their significance in academic research. The subsequent subject areas contribute to the academic landscape with varying degrees of representation. Social Sciences, with 298 documents, play a crucial role in understanding human behavior, followed by Economics with 94 documents, Mathematics with 69 documents, and Decision Sciences with 41 documents, each contributing to diverse research endeavors. [13] explores the impact of SCOPUS indexing on citation metrics and academic recognition. They found a positive correlation between SCOPUS-indexed publications and increased citation rates, suggesting that publishing in such journals contributes to a researcher's academic reputation.

2.4 Interpretation: Publications by Type

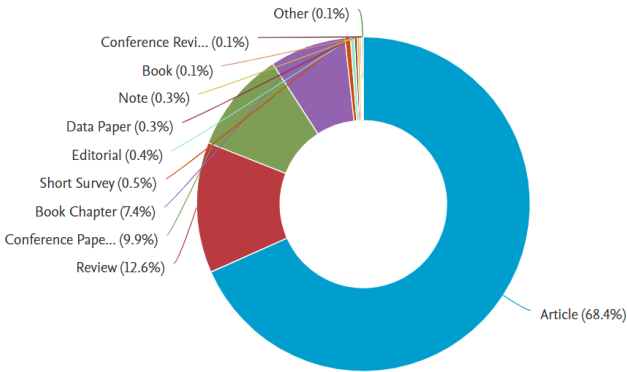


Fig. 2. Publications by Type

Provided data reveals insights into the types of publications within a specific dataset. Among the document types, articles constitute the majority with 625 publications, reflecting the prevalent nature of articles in academic research. Articles are typically comprehensive research papers that delve into various topics. The substantial number of articles in this dataset suggests that it primarily consists of in-depth research contributions. Conference papers follow with 333 publications, demonstrating the significance of disseminating research findings through conference presentations. This suggests that the dataset may contain a considerable amount of research originating from academic conferences or meetings. Additionally, there are 138 book chapters, indicating that the dataset encompasses contributions to edited volumes and books, often focusing on specific subjects or chapters within larger publications. There are 43 reviews, suggesting that the dataset contains research that summarizes and critically examines existing literature on particular topics. Furthermore, there are only a few notes (3), short surveys (2), and single instances of books and letters. Overall, the data provides a snapshot of the document types present in the dataset, with articles and conference papers being the most prominent. [14] investigates the distribution of publication types in SCOPUS-indexed journals, highlighting the prevalence of research articles, reviews, and conference papers. They emphasize the significance of understanding the composition of publication types to navigate the scholarly landscape effectively.

Table 2. Publications by Type

Top 10	Publication Type	Publications
1.	Article	1039
2.	Review	192
3.	Conference Paper	150
4.	Book Chapter	112
5.	Short Survey	8
6.	Editorials	6
7.	Data Paper	4
8.	Note	4

It also implies that the dataset encompasses a diverse array of publication formats, with a predominant emphasis on articles. Articles serve as a primary means for researchers and scholars to present comprehensive research findings. The dataset further features a notable quantity of conference papers, underscoring the significance of academic conferences as forums for sharing research insights and ideas. Additionally, the inclusion of book chapters suggests potential affiliations with larger book projects,

where contributors focus on specific chapters or sections within a comprehensive publication. Although reviews are fewer in number, they indicate a presence of research that critically examines and summarizes existing literature. Conversely, notes, short surveys, books, and letters are relatively infrequent, suggesting that these may represent shorter or less extensive types of publications. This distribution of document types within the dataset offers valuable insights into the varied nature of research contributions within the academic or scholarly context.

2.5 Interpretation: Publications by Countries



Fig. 3. Publications by Countries

Table 3. Top 10 Country’s Publication

Sr. No.	Country	Publications
1.	United Kingdom	203
2.	Italy	180
3.	united states	127
4.	India	118

5.	Spain	117
6.	Germany	114
7.	china	90
8.	Netherland	88
9.	Portugal	69
10.	France	66

2.6 Interpretation: Publications by Author

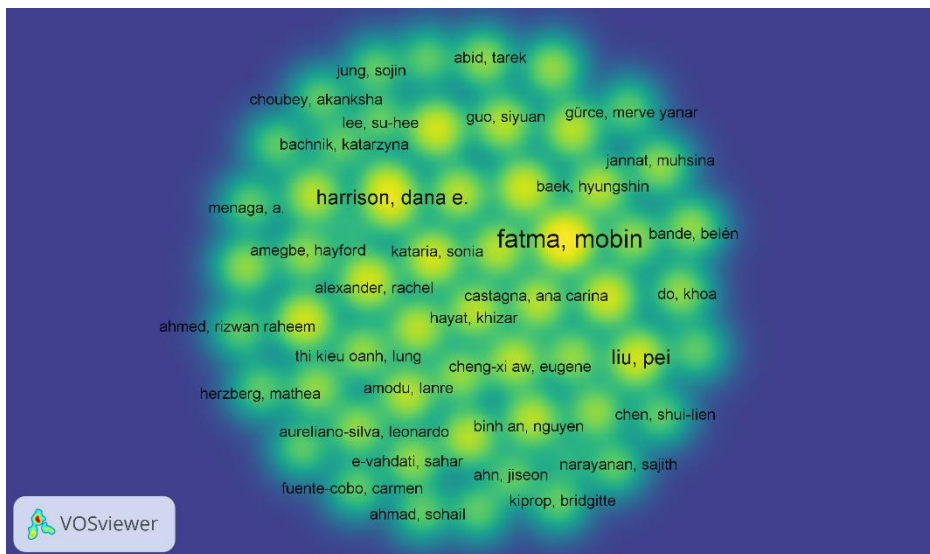


Fig. 4. Publications by Author

Table 4 and Table 5 present data on the number of documents and citations associated with different authors. These tables provide an insight into the productivity and impact of various researchers in a comparative study.

Table 4. The ranking of countries/territories based on the number of documents indicates a diverse and globally dispersed landscape of academic research. The United Kingdom leads with 203 documents, highlighting its significant influence in scholarly contributions. Italy closely follows with 180 documents, underscoring its noteworthy role in academic endeavors. The United States, despite being a major academic player, ranks third with 127 documents. India, Spain, and Germany secure positions four through six, showcasing a varied international representation. China follows in the seventh position, reflecting its growing impact on global academic research. The Netherlands, Portugal, and France complete the top ten, emphasizing a rich and dynamic global collaboration in research activities [15]. These rankings provide insights into the distribution of research output across nations, suggesting diverse academic focuses, priorities, and contributions on an international scale. [16] analyzes the global distribution of scholarly articles in SCOPUS, revealing a dominance of publications from countries like the United States, China, and several European nations. They discuss the implications of these trends for global research collaboration and knowledge dissemination. [17] explore the contributions of different countries, emphasizing the growing influence of emerging economies in this domain.

Table 4. Top 10 Publications by Author

Top 10	Author	Publications
1.	Mugge, R.	7
2.	Bocken, N.M.P.	6
3.	Dalhammar, C.	6
4.	De Meester, S.	6
5.	Murakami, S.	6
6.	Aldaco, R.	5
7.	Babbitt, C.W.	5
8.	Fogarassy, C.	5
9.	Hobson, K.	5
10.	Hussain, A.	5

In Table 4, ranking of authors based on the number of documents they have contributed, Bocken, N.M.P. (6 documents): Bocken closely follows with a significant number of publications, indicating a strong presence in the academic output related to

the topic. Mugge, R. (7 documents): Mugge is the leading author in terms of document count, suggesting a substantial contribution to the field. Dalhammar, C. (6 documents): Dalhammar shares the second position, also with six documents, indicating a noteworthy contribution to the subject matter. De Meester, S. (6 documents): Similar to Dalhammar, De Meester has made a substantial impact with six documents. Murakami, S. (6 documents): Murakami ties for the second position, signifying a significant role in the body of literature. Aldaco, R. (5 documents): Aldaco has contributed five documents, reflecting a notable presence in the field. Babbitt, C.W. (5 documents): Babbitt is also ranked based on five documents, indicating a considerable contribution. Fogarassy, C. (5 documents): Fogarassy shares the seventh position with five documents, showcasing a noteworthy impact.

Hobson, K. (5 documents): Hobson is another author with five documents, demonstrating a substantial involvement in the subject. Hussain, A. (5 documents): Hussain concludes the top ten with five documents, highlighting a significant role in the academic output related to the topic. Iacovidou, E. (5 documents) and Kazancoglu, Y. (5 documents): Iacovidou and Kazancoglu complete the list, each with five documents, underlining their notable contributions. Analysis suggests that these authors have played a substantial role in the scholarly discourse on the topic, as evidenced by the number of documents they have contributed.

2.7 Interpretation: Occurrence of Keywords

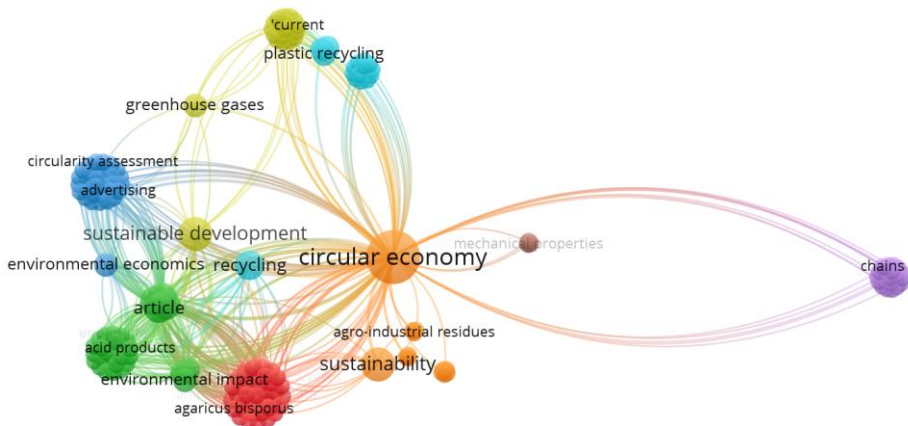


Fig. 5. Keyword Occurrence

The keyword analysis in Figure 6 provides valuable insights into the literature's focal points. "Circular economy" (CE) is the most frequently mentioned keyword, appearing 206 times highlighting its significant importance in the field. CE, "Sustainable development" and "life cycle" are the next most frequent keywords, with 144 and 122 mentions, respectively. These terms are closely linked to CE, representing the sought-after outcomes through effective implementation of circular economy principles.

Keywords such as "Consumer behavior," "Consumer attitude," and "Circular economy" appear 48 times, emphasizing the importance of effective data management in the context of customer relationship management (CRM) and customer satisfaction. "Recycling process" and "recycling consumer waste" signify the integration of marketing strategies with CRM to achieve customer-centric goals. Furthermore, "Customer experience" and "customer engagement" are each mentioned 17 times, indicating a growing interest in these topics within the context of the circular economy and consumer behavior. Keywords like "Consumer behavior," "Consumer attitude," and "Circular economy" appear 48 times, emphasizing the role of effective data handling in the context of CRM and customer satisfaction. "Recycling process" and "recycling consumer waste" indicate the integration of marketing strategies with CRM to achieve customer-centric goals. Furthermore, "Customer experience" and "customer engagement" are mentioned 17 times each, showcasing the growing interest in these topics within the context of the circular economy and consumer behavior

2.8 Interpretation: Publications by Sponsors

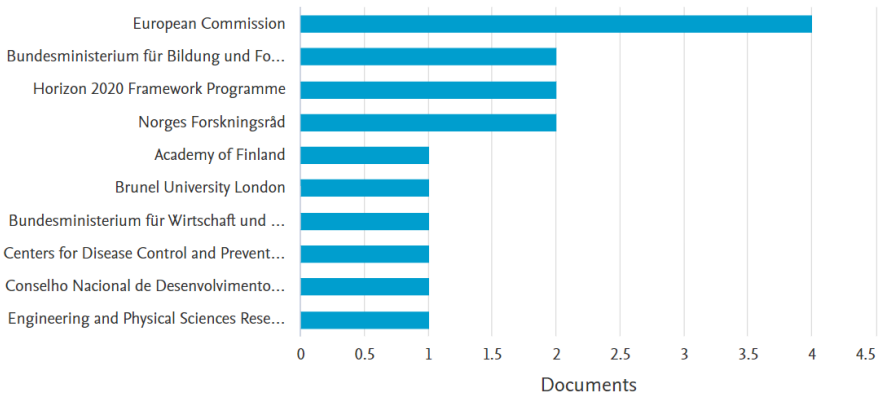


Fig. 6. Top 10 Publication Sponsors

The analysis of Figure 6, which evaluates publications based on their funding sponsors, offers valuable insights into the diverse organizations and institutions championing research in the field. The commitment of the top 10 funding sponsors underscores their dedication to advancing knowledge across various domains. Notably, the "European Commission" emerges as a prominent sponsor, contributing to four publications and exemplifying Europe's steadfast commitment to fostering research in Circular

Economy and related areas. The active involvement of the "Bundesministerium für Bildung und Forschung," the "Horizon 2020 Framework Programme," and "Norges Forskningsråd," each supporting two publications, highlights a collaborative interest and substantial investments in Circular Economy research. [18] explores the influence of sponsorships and funding sources on research outputs. The authors analyze the impact of industry-sponsored research on academic publications, discussing potential biases and conflicts of interest. [19] Investigated the relationship between funding sources and publication outcomes, this research assesses the extent to which different types of sponsors influence the content and dissemination of scholarly articles.

Furthermore, contributions from organizations like the "Academy of Finland," "Brunel University London," and the "Bundesministerium für Wirtschaft und Energie," each sponsoring one publication, underscore their crucial role in nurturing the landscape of Circular Economy research. This growing interest in Circular Economy research signals a promising future, with anticipated increased funding projects and expanded integration into business practices. As alarming threats to the environment persist, the heightened focus on Circular Economy is expected to play a pivotal role in addressing and mitigating these challenges.

3 Discussion and Conclusion

The examination of the dataset yields a thorough comprehension of the current state of research within the circular economy and its related domains. The data portrays a dynamic and continually developing academic landscape, providing valuable insights into crucial facets of circular economy and consumer behavior. discusses the impact of sponsorship on the publication process and the quality of research. The authors critically evaluate the role of industry funding in shaping the research agenda and publication outcomes.

The progression in the volume of publications over the years underscores the escalating significance and sustained momentum within the field. The conspicuous peak observed from 2018 to 2023 the consistent maintenance of a high level of research output further attests to the field's resilience and ongoing relevance.

The association of the relatively low number of publications in the early 2000s with the significant increase in recent years suggests a transformation in research dynamics. This shift likely mirrors the diversification of research areas and the globalization of academic investigations. Overall, this trend paints a picture of Circular Economy as a vibrant and continuously evolving field that remains central to both academic discourse and practical considerations. [20] discussed the impact of sponsorship on the publication process and the quality of research. The authors critically evaluate the role of industry funding in shaping the research agenda and publication outcomes.

The way articles are arranged according to subject areas emphasizes how diverse CE research. Although the most published subjects in CE include Environmental Science, Energy, Engineering, Business, Management, and Accounting, the inclusion of other topic areas like highlights the multidisciplinary aspect of CE. These subjects contribute to a holistic understanding of CE, reflecting the importance of Computer Science, Decision Sciences, Medical frameworks in the field. At the same time, specialist fields like mathematics, the arts, and humanities exist that, despite being less common, contribute significantly to CE.

Analyzing the distribution of publications by type provides valuable insights into the nature and emphasis of research contributions within the field of Circular Economy. Among the various document types, "Article" stands out as the most prevalent category, with a substantial count of 1039. This prevalence suggests a strong emphasis on comprehensive and in-depth research endeavors, reflecting a commitment to advancing the understanding of Circular Economy through scholarly articles. Additionally, the presence of 192 "Reviews" signifies a focus on synthesizing existing knowledge and providing critical assessments of the current state of research in Circular Economy. "Conference Papers" (150) and "Book Chapters" (112) suggest active engagement in disseminating research findings through conference proceedings and collaborative book contributions, respectively. The inclusion of "Short Surveys" (8) indicates efforts to provide concise overviews or summaries of specific aspects within the field. The presence of "Editorials" (6), "Data Papers" (4), and "Notes" (4) suggests a diversity of scholarly contributions, including editorial perspectives, datasets, and brief research notes. The inclusion of "Books" (2) underscores the production of comprehensive works that contribute significantly to the literature in Circular Economy. Lastly, the singular counts for "Letters" and "Exams Papers" highlight the presence of more concise or specialized forms of communication within the academic discourse.

Conclusion

The analysis of the data provides valuable insights into the dynamics of Circular economy research. This sector is experiencing a consistent growth in research activity, signifying its increasing importance. Research in insurance CE covers a wide spectrum of subject areas, publication types, and contributions from researchers and institutions globally. Notably, keywords such as „Sustainable development life cycle”, Consumer behavior, Consumer attitude, Circular economy, Recycling process, Consumer behavior, Consumer attitude. This dynamic and diverse landscape offers abundant opportunities for researchers, scholars, and practitioners to make valuable contributions and gain insights from the ever-evolving field of Circular economics and consumer behavior.

Future recommendation

In light of the dynamic evolution within the circular economy (CE) landscape, it is advisable for future research endeavors to concentrate on exploring the specific implications of CE strategies. One crucial aspect deserving attention is the analysis of "Customer Behavior," with potential keywords including consumer preferences, sustainable consumption, and green purchasing habits. Understanding how consumers engage with and respond to circular economy practices is vital for tailoring strategies to meet unique environmental needs and global challenges. Moreover, there is a pressing need for investigations into the integration of advanced technologies, with a particular focus on "Blockchain Technology." Research in this area can shed light on how blockchain, known for its transparency and traceability features, positively impacts the environment within the context of circular economy practices.

By delving deeper into these dimensions, researchers and practitioners can contribute to the refinement and enhancement of CE business practices. The ultimate goal is to improve environmental sustainability, foster responsible consumption, and positively influence firm performance. This forward-looking approach aligns with the ever-changing landscape of circular economy practices, ensuring that strategies are not only effective but also responsive to emerging challenges and opportunities.

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