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Electronic-Market Efficiency: Dominant themes in Literature

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E-Market is a relatively new concept and idea that is revolutionizing the Indian market, playing a significant role in its development. The thought of developing the small and medium market sector is becoming a reality through digital platforms, which are critical drivers in the long run. The concept of online shops and markets was unimaginable before India, as long as one could think. However, some things could be improved about this whole new concept of selling. People worldwide are still in some dilemma with the question of the primary things required to make this platform more accessible and approachable for developing its core business model. Therefore, it is essential to explore the issues and opportunities of e-commerce in India and comprehend its effectiveness. After conducting thorough research, it was discovered that e-commerce is a part of a broader social transformation. This transformation is a shift towards an economy based on information and knowledge, an increasing reliance on technology, and the globalization of markets.

Keywords: *E-market, Problems, Prospects, Challenges, efficiency, bibliometrics, etc.*

0 INTRODUCTION

Electronic markets, or "e-markets," have revolutionized how businesses operate by leveraging information technology to facilitate market transitions via an electronic network. In the past, a dominant corporation in the value chain would establish a network and install a proprietary application over this private network. However, with the advent of e-markets, businesses of all

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sizes can participate in an open marketplace, increasing competition and driving innovation.

E-market is concerned with integrating information systems and business processes to assist in developing information sources and transferring information throughout the globe via the internet—effective and efficient integration of producers, customers, intermediaries, and sellers. The term "e-market" describes an innovative platform that allows buyers and sellers to complete transactions online efficiently. It is a dynamic and continuously evolving space transforming businesses' operations. Online marketplaces have helped companies expand their reach, enabling them to connect with customers and partners worldwide. They have become an indispensable tool for businesses aiming to keep pace with the rapidly changing digital landscape. It is tough to define e-market correctly due to several inconsistent methods. Still, because it is the primary topic of this research, it is vital to define e-market properly.

The European Commission (1997) states that e-marketing is *"doing business electronically."* Gartner Group (1999) states that e-marketing is *"a powerful set of technologies, applications, and business processes that link corporations, consumers, and communities."*

Timers (1998) defined an *"e-market as any type of economic transaction in which the participants communicate electronically rather than via physical exchange or interaction."*

0.1. INTERNET

"The internet is a worldwide interconnected system of computer networks.". It is a worldwide information superhighway. It also refers to the vast amount of information stored on several network servers. Through this millions of computers are connected together on global networks that equip us with a robust information and technology to be interconnected in a society. Its genesis can be traced back to an experimental network developed with support from the US Department of Defense's Advanced Research Project Agency (ARPA) that allowed scientists to work on different projects and interact with each other. In the early 1960s, with four locations in the United States, it quickly spread throughout Europe. Electronic mail via the ARPA network was a huge success. The National Science Foundation (NSF) took over the academic community network project in the mid-1980s, as defence traffic was switched from ARPAnet to MILNET. In 1987, the National Science Foundation established NSFNet. The NSF upgraded the connections to 56 kilobytes per second (Kbps) to connect the five supercomputer centres. Regional and business networks were allowed to link to the NSF network. Connecting networks with their nearest neighbours resulted in spatially contiguous chains. Each chain was linked to a supercomputer centre, and every network could interact

with all other network computers using store and forward procedures. The NSF network was eventually known as the Internet (Zhang et al., 2002). The ITS Federal Government, which controls the NSF net, prohibits commercial use. On the other hand, the commercial Internet comprises several private backbones managed by different Internet service providers (ISPs). The dependability of the Internet provided by lSPs is based on the availability of phone lines, bandwidth, and computers used by end users.

0.2. E-MARKET

E-market is a vast realm of conducting business via digital platforms, and e-retail is a part of it. E-business refers to online discussions and digital commercial transactions between organizations and individuals utilizing the newest technical infrastructure by an organization's regulations.

Electronic commerce encompasses various operations, including business-to-business transactions and internal procedures organizations use to support purchasing, selling, recruiting, planning, and other activities. There are several e-industry websites, but most of the industry is dominated by business-to-customer (B2C) e-market websites. B2C electronic commerce means a corporation can sell its final product to customers online.

E-MARKET IN INDIA

The Internet has become essential for modern social and business communication in industrialized countries. The Internet's widely recognized applications make it essential to modern life. Its uses and applications continue to evolve in previously unimaginable ways. The widespread deployment of higher internet connection speeds has increased popular usage, benefiting E-Market enterprises. The E-Market has expanded to the point where it is both an economic speciality and a source of economic development. It is an intriguing subject in and of itself (*Meier & Rauch, 2005*). As stated in 1999 and rightly pointed out back then, the Internet would influence and improve the lives and living situations of the impoverished and less urbanized people of Africa, Asia, and Latin America from all quarters. (*Todaro, 1999*). These developing countries understand the significance of technology and the need to act fast (*James, 1999; Todaro, 1999*). *"Information and Communication Technologies (ICT) and the E-Market are the economic development engines currently reshaping all countries (Ahmad, 2001; Hammond, 2001; Pilat, 2003)."*

The Third World is the world's largest untapped market with immense E-Market potential. Certain parts of the Third World have already achieved a demographic profile of income and education equivalent to the industrialized world (*Mann, 2000*). E-Market is an indispensable tool for emerging nations, as it overcomes significant barriers to commercial expansion, including poor

literacy, low wealth, distant location, rudimentary payment methods, and cultural reluctance to change. This technology is crucial for emerging nations to grow their economies and take advantage of the immense opportunities presented by the global market (*UNCTAD, 2003*). These constraints are reflected in how companies struggled to expand their markets: limited ability to disseminate information, customers without disposable income, lack of transportation and banking infrastructure, remoteness from potential markets, and high market-entry costs (*April & Craddock, 2000; Cohen et al., 2000; Maitland, 2001*). Building a telecommunications infrastructure is costly. Outside capital inflows (foreign direct investment) will be necessary to create the infrastructure (*Jenkins & Thomas, 2002; UNCTAD, 2003*). Organizations and governments anticipate a transformation in the E-Market. This will assist in dealing with macro and micro issues (*Aljifri et al., 2003*). Adopting an e-market will necessitate a thorough overhaul and reimagining of how a company's model should operate. The modifications will result in new management practices, a transformed corporate culture that fosters positive customer relationships, altered staff expectations, and encrypted and secure payment methods (Well, 2004). The e-commerce industry in India is growing significantly due to the penetration of the Internet and its use across the Indian population at an ever-increasing pace owing to the reduced cost of Internet packages, which are today significantly low in comparison to the time when the Internet was introduced across India. Therefore, these favourable demographics push the overall growth of the Indian e-commerce industry, which is now one of the largest growing sectors within India, with exceptional growth recorded within the said industry from 2014 until 2030. (with forecasts) (as shown in the figure below).

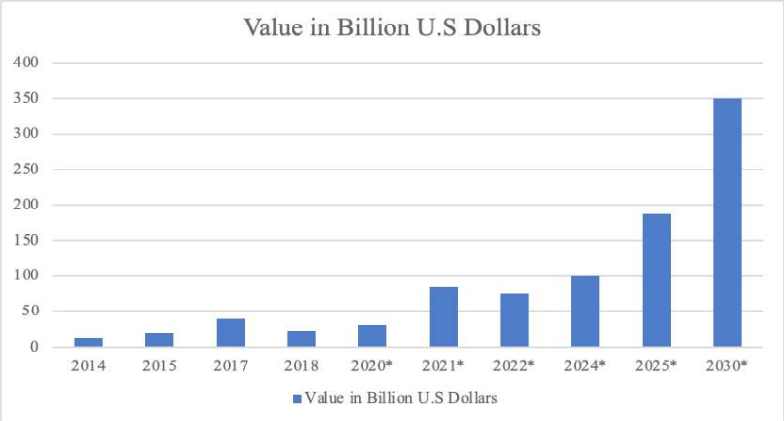

Figure 1: highlights the constant growth of sales across the Indian e-commerce industry from 2014-2030 (with forecasts until 2030).

Therefore, this constant growth in e-commerce from 14 billion in 2014

to 20 billion in just one year, with a forecast of 350 billion in 2030, shows how India is steadily progressing within the industry. Some of the key e-giants are Amazon, Paytm, Myntra, Flipkart, and Meesho.

Figure 1: "Market size of e-commerce industry across India"

Also, India is one of the largest e-commerce markets in the world, with a yearly growth of 51%, and the USA is the most significant worldwide e-commerce market. Even if e-commerce was practised in India prior to the 1990s, its influence was minimal. Top-tier pe firms have recently made a number of significant investments in investing money in India's e-commerce since there is ample opportunity and success potential. Also, b2b e-commerce is allowed to accept 100 per cent FDI in India, which illustrates the contribution of e-commerce to the country's overall internet retail market.

Furthermore, the Indian e-commerce market is predicted to surpass the United States by 2034 and grab the top spot globally. The digital age is about to revolutionize India.

1 STATEMENT OF PROBLEM

E-commerce is a relatively young business in Indian marketplaces, but it is becoming increasingly crucial to the country's rapid growth. It is a significant driving factor behind the expansion of small as well as large-scale businesses. The notion of online stores was inconceivable after the establishment of e-market. However, this industry took off following the launch of India's first e-market firm (fabmart.com) in 1999. However, there still needs to be more clarity concerning the growth of the e-market industry. There needs to be a clear picture of the fundamental needs for the development of e-market firms. As a result, it is necessary to comprehend the issues and potential of the e-market, as well as the themes and practices that drive its efficiency.

2 LITERATURE REVIEW

The emergence of electronic markets (e-markets) has transformed the commerce landscape, offering businesses and consumers unprecedented opportunities for trade and interaction. Electronic markets (e-markets) have seen a remarkable metamorphosis since their birth, from simple platforms to complex ecosystems that drive worldwide business. Initially conceived as digital platforms facilitating online transactions, e-markets, as noted by *Thuraisingham et al*. (2011), quickly rose to prominence for their ability to provide rapid and efficient means of exchanging products and services, transcending geographical boundaries, and fostering regional and global trade. However, despite their ease, as noted by *Li And Zang (2012*), e-markets are still in their early stages, with rising ethical problems demanding rapid attention.

Building trust is a critical aspect of e-market adoption, as explained by *Mcknight et al. (2012),* who advocate for sophisticated trust metrics to traverse the intricacies of online transactions. Scholarly research has delved deeper into various dimensions of e-market efficiency over time, examining factors ranging from legal implications, as discussed by *Tandon (2016*), to the transformative potential of e-commerce, as emphasized by *Padhiyar et al. (2016*), who highlighted the disruptive impact on traditional business models. *Lavuri (2016)* presented insights into the history of the Indian e-market, tracking its path from scepticism to exponential growth propelled by mobile technology and targeted advertising methods. The ramifications of e-market development are far-reaching, ranging from encouraging entrepreneurship, as described by Prabir and Kumar (2017), to revolutionizing industry sectors such as textiles, as investigated *by Panigrahi and Joshi (2018*). *Yadav and Sharma (2019*) underline the necessity of adaptation and innovation in navigating the dynamic e-market landscape and the challenges and possibilities in the tourist industry. Recent research by *Sharma and Khattri (2019), Devi et al. (2020), Billewar and babu (2020), Khandelwal (2021), and Aileni et al. (2021)* has expanded our understanding of e-market efficiency by delving into nuances such as technology adoption, quality management, security engineering, and website optimization. This body of literature, taken together, paints a comprehensive picture of the evolution of e-markets, from simple platforms to multifaceted ecosystems, while emphasizing the ongoing quest to understand the factors that drive their efficiency and ensure their ethical and sustainable growth. Scholarly studies in industrialized countries have gone further into numerous aspects of e-market efficiency throughout time. For example, *Robertson & Vignali (2011*) and *Smith & Rupp (2003*) from the united states investigated the influence of e-markets on consumer behaviour and supply chain management, respectively, emphasizing the importance of targeted solutions to improve efficiency. Additionally, *Schoder and Fischbach (2013)* from Germany investigated the impact of information technology in determining e-market efficiency, emphasizing the relevance of technical innovation and acceptance. In the united kingdom, *Brynjolfsson and Mcafee (2014*) investigated the more significant consequences of digital transformation on economic productivity and competitiveness, emphasizing e-markets' transformational power. Similarly, *Verhoef et al. (2015)* from the Netherlands studied the integration of e-markets with traditional retail channels, looking for synergies and barriers for efficiency optimization. These studies add to a sophisticated understanding of e-market efficiency, focusing on the various forces at work in industrialized nations' digital economies.

Several elements, including price discovery processes, market liquidity, transaction costs, information efficiency, and the regulatory environment, impact e-market efficiency. While e-markets have significant advantages in

terms of efficiency and accessibility, issues such as algorithmic trading, platform costs, and regulatory concerns must be appropriately handled to realize their full potential.

3 RESEARCH METHODOLOGY

For an efficiency study in e-markets, we deemed it necessary to explore studies already conducted regarding the topic due to its novel nature. Although the internet dates back to 1995, e-markets are still picking up pace for acceptance in India. Exploring the sector is best to predict the outcome. The focus has been on gaining insights and familiarity with the topic as it is in the preliminary investigation stage. The study has been conducted using an exploratory research approach. The primary goal of exploratory research is to study or probe phenomena further. The research subject is a novel concept that is still evolving. This technique will aid in understanding the idea of "efficiency in e-markets" via a review of prior studies. Secondary data from numerous marketing and consumer behaviour-related publications, papers, and websites were used to achieve the current study's aims.

3.1. BIBLIOMETRIC ANALYSIS

"Bibliometrics is a quantitative analysis technique that uses mathematical and statistical methods to evaluate the relationships and influence of publications within a particular research field" (*(Donthu et al., 2021a*). This method can provide an overall view of academic literature while identifying critical studies, authors, journals, organizations, and countries over time. Through co-word, co-authorship, and co-citation analyses, a network analysis using bibliometric tools recently revealed established and emerging research areas more intuitively by mapping social networks.

This bibliometric analysis assesses the significance and influence of articles published in "Efficiency in E-Markets" in Scopus. The study has shown that efficiency in e-markets has attracted considerable attention and interest from researchers, research funding institutions, and practitioners. However, measuring the efficiency of e-markets is still a new and innovative concept.

This study aims to collect and review data on the effectiveness of e-markets. It utilizes systematic and scientific procedures and rationales for the review and implements the "*Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR*)" protocol, which consists of three major stages, namely *assembling*, *arranging*, and *assessing* articles *(Paul et al., 2021) (Kumar et al., 2022)."* The summary of the review procedure is illustrated in "Figure 1: Systematic review procedure using the SPAR-4-SLR protocol.

"***Assembling***
- ***Search Keywords:*** *"efficiency in e-markets" OR "efficiency in e-commerce" or "efficiency in e-business"*
- ***Search Database:*** *Scopus*
- ***Search Result:*** *4,141"*

"Arranging
- ***Organizing Filters****: Year, Subject Area, Document Type, Publication Stage, Source Type, and Language*
- ***Filtered Year for Inclusion****: Up to "2023"*
- ***Filtered Subject Area for Inclusion****: "Business, management, and accounting".*
- ***Filtered document types for inclusion****: "Article".*
- ***Filtered Publication Stage for Inclusion****: "Final".*
- ***Filtered Source Type for Inclusion:*** *"Journal".*
- ***Filtered Language for Inclusion:*** *"English".*
- ***Filtered Search Result:*** *522*

Assessing
- ***Analysis method:*** *Bibliometric analysis methods, particularly*
  - *"**Performance Analysis**" publication trend, most influential article, and top contributing journal, author, institution, and country.*
  - *"**Science Mapping**" via " network analysis using keyword co-occurrence" on 522 articles*
- ***Reporting convention:*** *figures, tables and words*
- ***Limitation:*** *The precision and comprehensiveness of bibliometric data from Scopus."*

Figure 1: Systematic review procedure using the SPAR-4-SLR protocol

- **Assembling:** To *assemble* the corpus of publications on e-market efficiency, this study first analysed the relevant literature in the preceding part to select e-market-related search terms. This method produced a combination of three keywords, which may be used in the following search string:

"Efficiency in e-markets" OR "efficiency in e-commerce" or "efficiency in e-business".

Following identifying keyword searches, this study searched Scopus for publications that included the search above string in the "article title, abstract, and keywords" field. In all, 4,141 documents were found throughout the search.

- **Arranging:** In order to *arrange* the 4,141 articles gathered during the initial research stage, this study implemented Scopus' filter function to sort the search results by *year, subject area, document type, publication stage, source type, and language*. The search results were filtered and restricted to "2023", "business, management, and accounting", "article", "final", "journal", and "English" in their respective categories. These

filters were chosen in accordance with the recommendations of *Paul et al. (2021) (Kumar et al., 2022)* for the following reasons:

"2023 represented the most current full-year run; e-markets are categorised under business, management, and accounting; Non-article kinds, such as editorials, may not be peer-reviewed, and the inclusion of such can lead to mixed insights: In-press articles were eliminated since they had not yet been finalised.; non-journal sources were eliminated because they may not have received rigorous peer review.; and we did not include non-English articles owing to our inadequate competence in languages other than English. As a result, the number was reduced to a total of 522 articles."

- **Assessing:** This study adopts a bibliometric analysis approach to assess the final corpus of 522 articles on the efficiency of e-markets, which is an extensive corpus. Bibliometric analysis employs quantitative methods to analyze scientific content from academic journals *(Donthu et al., 2021a*). By applying quantitative tools, Bibliometric analysis can assist in removing any biases that may present in manual (e.g., error-prone) and qualitative (i.e., subjective) evaluations. This is because quantitative analysis is more objective compared to qualitative analysis, which is more subjective *(Broadus, 1987; Burton et al., 2020)* and can be challenging, specifically when reviewing a large number of articles (i.e., 522 articles) *(Donthu et al., 2021*). This study aims to perform a bibliometric analysis of the field of efficiency in e-market research. Building on previous reviews conducted by *Cobo et al. (2011), Donthu et al. (2020, 2021d), and Khan et al. (2021)*, the analysis will utilize performance analysis to identify publication trends, top articles, contributing authors, institutions, and countries. Additionally, a science mapping approach will be used through a network analysis using keyword co-occurrence in VOSviewer (*van Eck & Waltman, 2017*) to uncover the major themes and topics driving the intellectual structure of efficiency in e-markets research. The following sections will present the findings, supported by figures and tables.

4 FINDINGS

4.1. PERFORMANCE ANALYSIS

Performance analysis is a technique used to measure the performance of a particular research area (Donthu et al., 2021a). In this case, we are focusing on the efficiency of e-markets. This form of assessment is akin to the profiling of participants in empirical investigations, but it is done more in detail utilizing bibliometric metrics. *(Donthu et al., 2021a)*. The study incorporates publication ethos, most impactful research paper in relevant journals by authors and

institutions across the globe.

- **Publication Trend for Efficiency of E-Markets**

Figure 2: below denotes the year-wise inclination in the efficiency of the E-market research. According to the figure, the first article on the efficiency of e-markets was published in a Scopus-indexed journal in 2000 by *Fernie J, Pfab F, and Marchant C,* as well as *Vlosky Richard and Punches John*. Over the past 24 years (2000-2023), the number of publications in this field has significantly increased. In 2000, there were only seven publications, but this number has grown considerably, reaching a record high of 64 publications in 2023. Notably, there has been an exponential increase in publications since 2014.

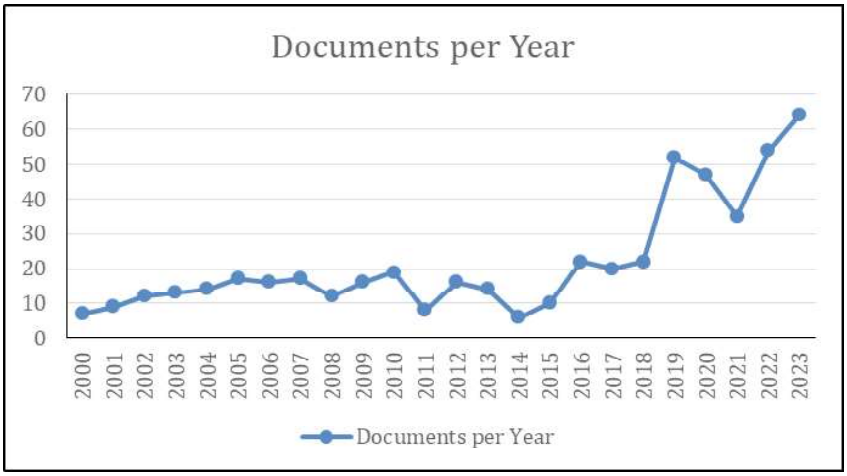

Figure 2: Annual no. of documents published in Scopus

- **Most Influential Articles for Efficiency of E-Markets**

Table 1: presents the most influential articles on the effectiveness of e-market research in terms of the number of citations they have received. According to the table, the article by *Amit, Raphael, & Zott, Christoph (2001)* is the most cited article in this field. Since its publication in 2001, it has received a total of 3307 citations, with a mean of 137.7917 citations/ year. This is followed by *Chiang, Wei-yu, Chhajed, Dilip, & Hess, James (2003*) and Santos, Jessica. (2003) articles in *Management Science and Managing Service Quality*, which have been cited 1436 and 897 times, respectively. It is worth noting that the most frequently referenced articles in the subject matter focus on creating models, addressing obstacles, and establishing trust, indicating their importance and impact. It is noteworthy that the top 20 most-cited articles in this field have received a total of 9054 citations, reflecting the significant attention given to e-markets in the rapidly growing digital landscape.

Table 1: Most Influential Articles on Efficiency in E-Markets

S. No.	Authors	Year	Total Citation	Tc/ Year	Title	Source
1	Amit, Raphael, & Zott, Christoph."	2001	3307	137.7917	Value Creation in E-Business	Strategic Management Journal
2	Chiang, Wei-yu; Chhajed, Dilip; & Hess, James.	2003	1436	65.2727	Direct Marketing, Indirect Profits: A Strategic Analysis of Dual-Channel Supply-Chain Design.	Management Science
3	Santos, Jessica .	2003	897	40.7727	E-service quality: A model of virtual service quality dimensions	Managing Service Quality
4	Hsu, Meng-Hsiang & Chiu, Chao-Min	2004	536	25.5238	Internet Self-Efficacy and Electronic Service Acceptance .	Decision Support Systems
5	Kim, Hong, & Kim, Taegoo Terry, & Shin, Sung	2009	291	18.1875	Modeling roles of subjective norms and eTrust in customers' acceptance of airline B2C eCommerce websites	Tourism Management
6	Gulati, Rajay, & Garino, Jonathan	2000	285	11.4000	Get the Right Mix of Bricks & Clicks	Harvard business review
7	Son, Jai-Yeol & Benbasat, Izak	2007	270	15.0000	Organizational Buyers' Adoption and Use of B2B Electronic Marketplaces: Efficiency- and Legitimacy-Oriented Perspectives	Journal of Management Information Systems
8	Zott, Christoph; Amit, Raphael; & Donlevy, Jon	2000	193	7.7200	Strategies for Value Creation in E-Commerce: Best Practice in Europe	European Management Journal
9	Otsuki, Tsunehiro; Wilson, John; & Mann, Catherine	2003	190	8.6364	Trade Facilitation And Economic Development: A New Approach To Quantifying The Impact	World Bank Economic Review
10	Auramo, Jaana; Kauremaa, Jouni; & Tanskanen, Kari	2005	189	9.4500	Benefits of IT in supply chain management–an explorative study of progressive Companies	International Journal of Physical Distribution & Logistics Management
11	Wu, Yuanyuan & Ngai, Eric, Pengkun, Wu, & Wu, Chong	2020	185	37.0000	Fake online reviews: Literature review, synthesis, and directions for future research	Decision Support Systems
12	Kärkkäinen, Mikko, & Holmström, Jan	2002	168	7.3043	Wireless product identification: enabler for handling efficiency, customisation and information sharing	Supply Chain Management: An International Journal
13	Garicano, Luis, & Kaplan, Steven	2000	162	6.7500	The Effects of Business-to-Business E-Commerce on Transaction Costs	The Journal of Industrial Economics.
14	Walczuch, Rita; Braven, Gert; & Lundgren, Henriette	2000	155	6.2000	Internet Adoption Barriers for Small Firms in the Netherlands	European Management Journal
15	Xue, Mei, & Harker, Patrick.	2001	136	5.9130	Customer Efficiency Concept and Its Impact on E-Business Management	Journal of Service Research
16	Mason, Scott; Ribera, P.; Cross, Jennifer; & Kirk, Randall	2003	134	6.0909	Integrating the warehousing and transportation functions of the supply chain	Transportation Research Part E: Logistics and Transportation Review
17	Ramakrishnan, Ramanathan	2010	133	8.8667	The moderating roles of risk and efficiency on the relationship between logistics performance and customer loyalty in e-commerce	Transportation Research Part E: Logistics and Transportation Revie .

TC per Year = Average Citations per Year

- **Top Contributing Journals for Efficiency of E-Markets**

  A total of 522 articles discussing the efficiency of e-markets have been published in 248 journals. Table 2 reveals that the top 24 journals that have published at least five articles on this topic are responsible for 35% (184) of the articles. Among them, the two most prolific journals are Electronic Commerce Research and Applications, and Transportation Research Part E: Logistics and Transportation Review, which have published 29 and 16 articles, respectively. However, concerning influence, Strategic Management Journal is the most cited with 3307 citations, followed by Management Science and Decision Support Systems with 1462 and 1069 citations, respectively.

Table 2: Top Contributing Journals on Efficiency in E-Markets

Sources	Articles	TC	Impact Factor
Electronic Commerce Research And Applications	29	715	6
Transportation Research Part E: Logistics And Transportation Review	16	651	10.6
Journal Of Theoretical And Applied Electronic Commerce Research	13	94	5.6
International Journal Of Production Research	12	483	9.2
International Journal Of Production Economics	11	389	12
Journal Of Industrial Engineering And Engineering Management	9	12	3
Journal Of Cleaner Production	8	289	11.1
Decision Support Systems	7	1069	7.5
Industrial Management And Data Systems	7	307	5.5
Information Technology And Management	7	95	2.4
Business Process Management Journal	6	214	4.3
Electronic Markets	6	115	8.5
International Journal Of Recent Technology And Engineering	6	3	NF
International Journal Of Services Technology And Management	6	43	0.5
Technology In Society	6	161	9.2
Information And Management	5	375	9.9
International Journal Of Electronic Commerce	5	285	5
International Journal Of System Assurance Engineering And Management	5	18	2
Journal Of Internet Banking And Commerce	5	92	NF
Journal Of Internet Commerce	5	16	4.3
Journal Of Retailing And Consumer Services	5	233	10.4
Knowledge-Based Systems	5	50	8.8

(**TC**= Total Citation, Impact factor from Journal Citation Report (JCR) 2023 by Web of Science (WOS), **NF**= Not Found)

- **Top Contributing Authors for Efficiency in E-Markets**

Table 3: Presents the leading authors who have contributed to the efficiency of e-market research. The table shows that *Yuyan Wan*g from the School of Management Science and Engineering, Shandong University of Finance and Economics, China, has authored the most articles in the field with nine publications, followed by *Yi Liu* and *Xiaoxiao Li* from the National Engineering Laboratory for E-Commerce Technologies, Tsinghua University, Beijing, China, and the School of Management, The State Key Lab for Manufacturing Systems Engineering, Xi'an Jiaotong University, China, respectively, with 8 and 7 articles. However, the most influential authors based on citations are *Yuyan Wang, Liang Shen, and Runjie Fan*, with 192 citations each. The top 20 authors have contributed 96 (18.3%) articles, which have received 2191 citations in e-markets' efficiency.

Table 3: Top Contributing Authors on Efficiency in E-Markets

S. No.	Authors	Articles	h-index	Total Citation	Affiliation and Country
1	Wang, Yuyan	9	6	336	School of Management Science And Engineering, Shandong University Of Finance And Economics, Jinan, 250014, China;
2	Liu , Yi	8	6	174	National Engineering Laboratory for E-Commerce Technologies, Tsinghua University, Beijing, China
3	Xiaoxiao Li	7	3	203	School of Management, The State Key Lab for Manufacturing Systems Engineering, Xi'an Jiaotong University, Xi'an, 710049, China
4	Zichen Zhang	5	2	44	School of Economics and Management, Shenyang Aerospace University, Shenyang 110136, China
5	Haolin Li	4	1	3	School of Management, Shanghai University, Shang Da Road 99, Shanghai, China
6	Liang Shen	4	3	269	Economics and Management School, Wuhan University, Wuhan, Hubei, China)
7	Lin Wang	4	2	26	School of Management, Northeastern University at Qinhuangdao, 8Qinhuangdao, China
8	Mei Zhang	4	2	67	Technology and Equipment of Rail Transit Operation and, Maintenance Key Laboratory of Sichuan Province, Chengdu 610031, China
9	Xiangfeng Chen	3	3	82	School of Management, Fudan University, 670 Guoshun Road, Shanghai 200433, China
10.	Runjie Fan	3	2	193	School of Management Science and Engineering, Shandong University of Finance and Economics, Jinan, Shandong, 250014, PR China
11	Junhong Gao	3	3	22	School of Management Science and Engineering, Shandong University of Finance and Economics, Jinan 250014, China
12	George Q. Huang	3	3	99	HKU-ZIRI Lab for Physical Internet, Department of Industrial and Manufacturing Systems Engineering, The University of Hong Kong, Hong Kong
13	Shuliang Li	3	2	57	Westminster Business School, University of Westminster, London, UK
14	Yifu Li	3	2	46	International Institute of Finance, School of Management, University of 15Science and Technology of China, Hefei 230026, China
15	Yong Pan	3	1	25	School of E-Commerce and Logistics Management, Henan University of Economics and Law, No. 1 East Jinshui Road, Zhengzhou 450046, China
16	Alan D. Smith	3	2	38	Department of Management and Marketing, Robert Morris University, Pittsburgh, Pennsylvania, USA

17	Cong Wang	3	1	18	China Retail Research Center, School of Economics and Management, Tsinghua University, Beijing 100084, China
18	Junhai Wang	3	1	4	School of Shangmao, Zhejiang Technical Institute of Economics, Hangzhou, 310018, China
19	Xiaoying Wang	3	3	55	School of Business Administration, Northeastern University, Shenyang, China
20	Qiang Wei	3	3	41	School of Statistics, Southwestern University of Finance and Economics, Chengdu, China
21	Yaming Yang	3	2	29	School of Computer Science and Technology, Xidian University, Xi'an, China
22	Jingran Zhang	3	2	56	Lewis College of Business, Marshall University, Huntington, West Virginia, USA
23	Xuemei Zhang	3	1	10	School of Business, Fuyang Normal University, Anhui Provincial Key Laboratory, Regional Logistics Planning and Modern Logistics Engineering, Fuyang Normal University, Fuyang, Anhui 236037, China
24	Yingfeng Zhang	3	3	117	Key Laboratory of Contemporary Design and Integrated Manufacturing Technology, School of Mechanical Engineering, Northwestern Polytechnical University, Shaanxi, China
25	Zhao X	3	3	177	

- **Top Contributing Countries for Efficiency of E-Markets**

Table 4: presents the top countries contributing to the efficiency of e-market research. The table shows that the United States is the most prolific country with 131 articles, followed by China and the United Kingdom with 130 and 44 articles, respectively. The United States and China are the top two most influential countries, with 3,755 and 3,222 citations, respectively. The United Kingdom ranks third amongst countries with 580 citations.

Table 4: Top Contributing Countries on Efficiency in E-Markets

Country/Territory	Documents	Citations
United States	131	3755
China	130	3222
United Kingdom	44	580
India	31	193
Spain	23	514
Australia	22	441
Taiwan	21	-
Canada	16	283
France	14	396
Germany	13	136
Hong Kong	13	77
Italy	12	205
Russian Federation	11	-
Malaysia	10	151 1
Greece	9	190
Indonesia	9	35
Singapore	9	19
Sweden	9	179
Finland	8	74
Netherlands	8	35
South Korea	8	350

- **Top Contributing Institutions for Efficiency of E-Markets**

Table 5: Presents the institutions that have contributed the most to e-market research efficiency. According to the table, the United States and China are the most prolific countries in this field, with each country contributing two articles. However, the most influential institution is the Wharton School at the University of Pennsylvania in Philadelphia, United States, with 3500 citations. The School of Management Science and Engineering at Shandong University of Finance and Economics and the School of Public Finance and Taxation in Shandong, China, have 163 citations each, making them the second most influential institutions. The top 26 contributing institutions have published 54 articles, representing 10.34% of all articles in this field. These articles have accumulated 4683 citations.

Table 5: Top Contributing Institutions to Efficiency of E-Markets

Organizations	Documents	Citations
Wharton School, University Of Pennsylvania, Philadelphia, , United States	2	3500
School Of Management Science And Engineering, Shandong University Of Finance And Economics, Jinan, 250014, Shandong, China	2	163
School Of Public Finance And Taxation, Shandong University Of Finance And Economics, Jinan, 250014, Shandong, China	2	163
College Of Management And Economics, Tianjin University, Tianjin, China	2	107
School Of Management Science And Engineering, Shandong University Of Finance And Economics, Jinan, 250014, Shandong, China	2	106
School Of Public Finance And Taxation, Shandong University Of Finance And Economics, Jinan, 250014, Shandong, China	2	106
Hku-Ziri Lab For Physical Internet, Department Of Industrial And Manufacturing Systems Engineering, The University Of Hong Kong, Hong Kong	2	94
National Economics University, Viet Nam	2	59
Department Of Technology Management And Economics, Chalmers University Of Technology, Gothenburg, Sweden	2	55
Rosen College Of Hospitality Management, University Of Central Florida, Orlando, Fl, United States	2	51
University Of St. Gallen, Institute Of Information Management, Switzerland	2	46
College Of Management And Economics, Tianjin University, Tianjin, China	2	37
Division Of Industrial Marketing And E-Commerce, Lulea University Of Technology, Lulea, Sweden	2	37
Rowe School Of Business, Dalhousie University, Halifax, B3h 4r2, Ns, Canada	2	27

School Of Business Administration, Guizhou University Of Finance And Economics, Guiyang, 550025, China	2	25
School Of Economics And Management, Chongqing Jiaotong University, Chongqing, 400074, China	2	25
Department Of Management And Marketing, Robert Morris University, Pittsburgh, Pa 15219-3099, United States	2	19
Department Of Management, Economics And Industrial Engineering, Politecnico Di Milano, Milan, Italy	2	19
University Of Bradford, University Of Bradford, United Kingdom;	2	18
School Of Economics And Business Administration, Chongqing University, Chongqing, 400044, China	2	9
National Engineering Laboratory For E-Commerce Technologies, Tsinghua University, Beijing, China	2	8
School Of Management And Economics, University Of Electronic Science And Technology Of China, Chengdu, 611731, China	2	4
School Of Shangmao, Zhejiang Technical Institute Of Economics, Hangzhou, 310018, China	2	3
School Of Management, Shanghai University, Shang Da Road 99, Shanghai, China	2	2
Chongqing Key Laboratory Of Logistics, Chongqing University, Chongqing, 400030, China	2	0
Eastern Kentucky University, United States	2	0

4.2. SCIENCE MAPPING

Science mapping is a method that helps visually represent existing knowledge and its connections in a particular domain, such as the efficiency of e-market research. To analyze the efficiency of e-markets research, using two of the techniques of bibliometric analysis: (i) temporal analysis to identify the major topics related to this domain over time, and (ii) network analysis to reveal the significant themes that contribute to the intellectual structure of the efficiency of e-markets research from 2000 to 2023. Science mapping is a method that visually represents the existing knowledge and its connections in a particular field. In this case, it is used to analyze the efficiency of e-markets

research. The analysis employs two bibliometric techniques: a temporal analysis that identifies the significant topics related to the efficiency of e-market research in each period and a network analysis that depicts the major themes that have contributed to the conceptual framework of the efficiency of e-market research in the last 24 years (2000-2023).

- **Temporal Analysis Using Thematic Evolution for Efficiency of E-Markets**

The corpus of articles on the efficiency of e-market research has discovered an evolution of themes supporting the research field. The major themes in each period identified using a temporal analysis are illustrated. Through thematic evolution in Figure 3. To start with period I: the theme concentration is electronic commerce, evolving to multi-agent systems and value creation along with electronic commerce (period II), and further to themes like information technology, behavioural research, management, competitive advantage (period III), and expanding to trust and sustainability (period IV), with the latest phase being inclusive of logistics, decision making, innovation, game theory, and covid -19 (period V). Figure 4 represents the evolution of themes classified into four categories: basic, motor, niche, and emerging or declining themes. Where basic and niche themes include e-business, procurement, innovation, pricing, and logistics, which are necessary for any form of business, whether online or offline. Motor themes are value-creation, trust, and relationship management, which drive the adoption of online companies with emerging themes such as fairness concerns, cloud computing, and customer satisfaction. The most relevant words related to the research field have been developed as a word cloud (Figure 5), along with Table 6, with the top 10 most relevant words.

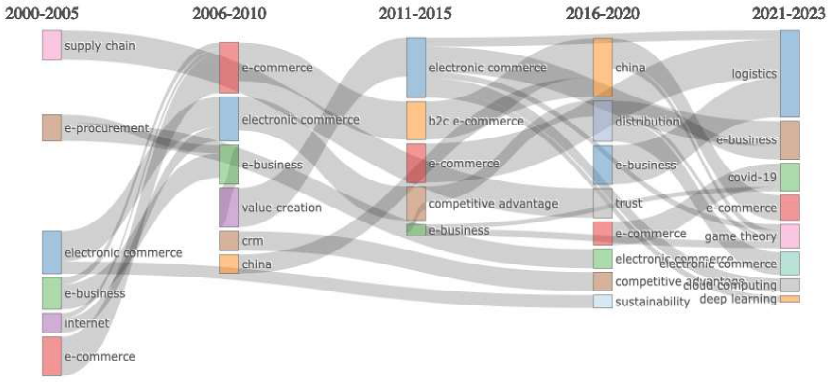

Figure 3: Thematic Evolution of Efficiency in E-Markets

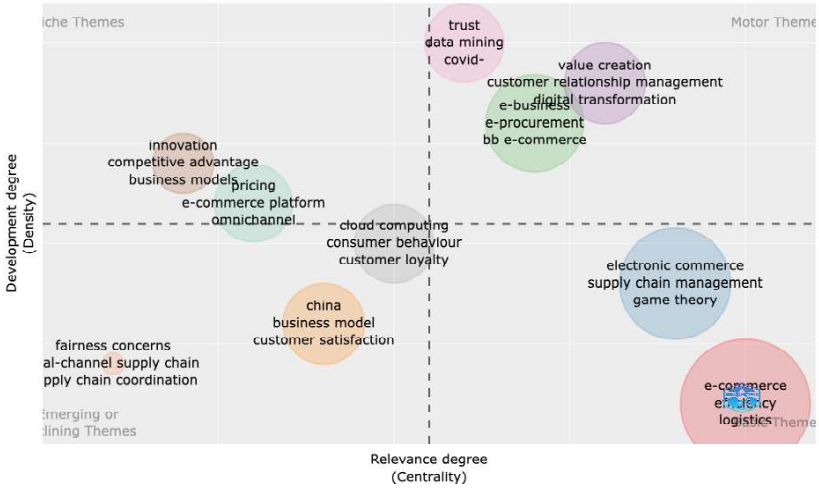

Figure 4: Evolution of Themes from 2000 -2021(Staring from Top Left)

Table 6: Most Relevant words

Terms	Frequency
Electronic Commerce	34
Commerce	22
Information Technology	17
Decision Making	15
Marketing	14
Sales	14
Competition	13
Internet	13
Supply Chains	12
Innovation	11

Figure 5: Word Cloud for Efficiency of E-Markets

4.3. NETWORK ANALYSIS

The network analysis examines the frequency with which keywords appear together throughout e-market research from 2000 to 2023. By doing so, It recognizes the essential themes that characterize this discipline's intellectual structure and efficacy—the network analysis groups topics according to their thematic similarities. Figure 6 illustrates The significant issues that emerged from keyword co-occurrences in the network analysis of the complete corpus generated through the VOS viewer. The study results reveal four central themes that represent primary fields such as business, costs, competition, and profitability, as well as emerging fields like data mining, information technology, optimization in online sales, and other related themes.

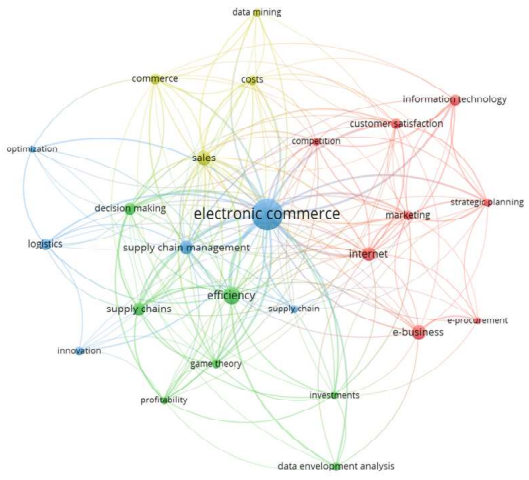

Figure 6: **Co-Occurrence Network**

5 GROWTH AND EFFICIENCY OF E-MARKET IN INDIA

The expansion and efficiency of e-markets in India constitute a revolutionary force with enormous potential for future development and possibilities. The most significant aspect of E-Markets is using technology to reduce operational expenses while increasing revenue. The Electronic Marketplace can increase income by creating new opportunities for traditional products, developing innovative information-based products, and establishing new service delivery channels to better serve and connect with customers. With the ongoing development of internet connection and widespread usage of smartphones, e-markets have become more accessible to a more significant part of the Indian populace. The accessibility of e-commerce encourages more people to participate in online commerce and opens up opportunities for innovation and entrepreneurship. *"The transaction management aspect of electronic commerce can further help businesses reduce operational expenses by improving coordination in sales, production, and distribution processes, combining operations, and lowering overhead costs. This results in more effective performance, including higher quality, increased customer happiness, and enhanced corporate decision-making (Panagariya and Joshi, 2016)."*

Electronic commerce is a way to make business transactions more efficient across various networks. It also has an impact on business-to-business contacts and encourages network-based organizations. Small and flexible enterprises rely on third-party partners for component suppliers and product delivery to better fulfil changing client expectations. Connecting customers, workers, suppliers, distributors, and even competitors requires an end-to-end relationship management solution. The management of online transactions throughout the supply chain is critical. *"Electronic commerce contributes to increased economic efficiency (lower costs) and speedier interchange (high-speed, accelerated, or real-time contact). It also includes transaction management, which organizes routes, processes, and tracks transactions. Consumers can make electronic payments and fund transfers as well. The main focus of electronic commerce is to generate and explore new business prospects and to "generate business value" or "do more with less." (Panagariya, 2000; Turban et al., 2002; Sheth, 2013)."* As digital infrastructure evolves, e-markets have enormous potential to fuel economic growth, generate job opportunities, and inspire innovation across various industries.

Furthermore, the efficiency improvements provided by e-markets, such as faster procedures, lower transaction costs, and increased market transparency; hold the potential to raise productivity and competitiveness in Indian enterprises. Improvements in technologies such as artificial intelligence, machine learning, and blockchain will likely improve the efficiency and capacities of e-markets, creating new opportunities for value creation and

differentiation. Furthermore, efforts such as Digital India and regulatory reforms targeted at boosting e-commerce are anticipated to foster the long-term expansion of India's e-markets. As businesses and consumers continue to embrace the digital economy, e-markets are poised to play a critical role in driving India's socioeconomic development, providing numerous opportunities for stakeholders to capitalize on the sector's potential and contribute to India's journey to becoming a digitally empowered nation.

5.1. FUTURE RESEARCH

The state or quality of being efficient is known as efficiency, which means accomplishing something with the least possible waste of time and effort; in short, it could be competency in performance. Digital marketplaces facilitate the advancement of information and communication technologies, which bring participants together to exchange goods, services, or information. Their popularity has been on an upward trajectory due to the benefits associated with them, like lower search costs, transaction ease, and increased choices for more products and services.

Although the data and opportunities provided by online marketplaces have shown an upward trend, e-market success is not assured by this factor alone. Digital markets have seen ups and downs over the past ten years, with many going out of business. The performance of digital markets needs to be assessed immediately due to their rapid development. The system, financial, and user perspectives could all be used to evaluate performance. One important sector contributing to the nation's socioeconomic development is the micro, small, and medium-sized enterprise (MSMEs) sector. The sector's importance has grown significantly in India due to its exports and GDP (gross domestic product) contribution. Entrepreneurship has seen significant growth in India's semi-urban and rural areas, largely due to the industry's contributions.

Efficiency is a concept that is commonly applied to financial markets, but it is also essential in e-commerce platforms. These platforms are designed to simplify how companies manage their sales, production of goods and overall work management. They provide helpful analysis, assessment, and data collection tools that enable fast decision-making and enhance operational efficiency, safety, work methods, services, and maintenance. The platforms are designed to centralize all business activities in one place, making it easier for businesses to manage their operations. E-commerce platforms also help businesses to customize how they present their products to customer's online, improving product management and marketing.

The concept of informational efficiency implies that all the available information should be accurately reflected in the prices of assets or securities. This means that the market should quickly and accurately absorb all the relevant

information and adjust the prices accordingly. In other words, the prices should reflect the actual value of the asset based on all the available information. Under rationality and perfect information assumptions, prices should adjust automatically with minimal trading.

Allocation efficiency is the optimal allocation and distribution of goods, services, and financial capital within an economy. The aim is to ensure that all resources are utilized to their fullest potential and allocated to their most efficient use. This results in the best possible distribution of resources among consumers and investors, promoting overall economic growth and productivity.

Whereas when we define these efficiencies in terms of e-commerce, operational efficiency of a market implies transaction cost and transaction ease; informational efficiency implies price discovery, adequate disclosures, and disclaimers; and allocational efficiency implies whether the market based allocation of resources is optimal.

Every problem and grievance, prima facie, signals inefficiency. Looking at the complaints registered on the National Consumer Helpline for the e-commerce sector, which have shown an increasing percentage over the last 5–6 years (Figure 8), is one of the reasons to assess the competency of the sector.

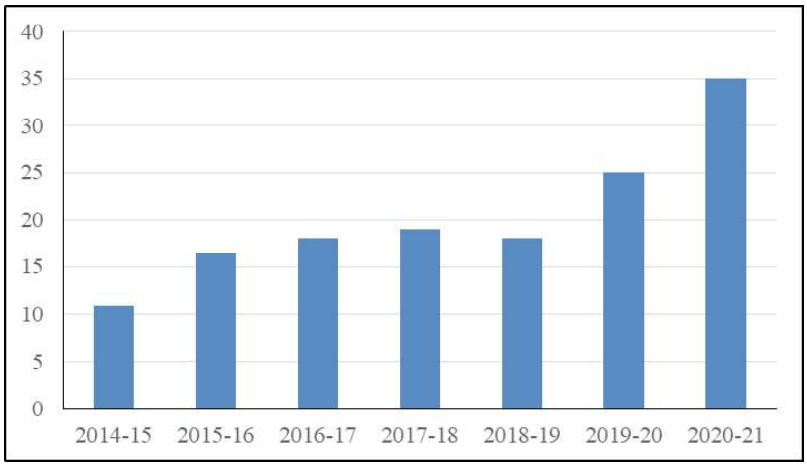

Figure 8: Percentage of Complaints in E-Commerce

Much of the present work on the performance of digital markets pertains to their informational efficiency, with a significant focus on price dispersion or price asymmetries compared to traditional markets. The focus is on the efficacy of data analytics and artificial intelligence in target marketing in consumer markets.

The proposed work is posited as an initial effort in the comprehensive indexation of digital market efficiency concerning all its facets. In the process, it seeks to address a host of macro- and micro-issues impinging on the efficiency

of digital markets.

For each of the three attributes of market efficiency, it is possible to develop sub-indices and metrics implying the degree of efficiency. For example, the market's informational and pricing efficiency is often stated in three increasingly comprehensive levels or degrees of efficiency.

6 CONCLUSION

E-markets are a part of a more extensive process of social change, marked by the shift towards an information and knowledge-based economy, along with the growing dominance of technology and the globalization of markets. Developing countries need to invest in social infrastructure and skills to enable the use of technology that considers users' local conditions, cultures, and abilities. If the ideal conditions are met, individuals and organizations can smoothly transition to the e-market, giving producers in developing countries opportunities to access new international markets with minimal capital investment and low costs. The e-market can improve competitiveness and customer service and reduce transaction costs and overhead. It also allows businesses to overcome conventional barriers such as limited access to information, prohibitive market entry fees, and isolation from prospective markets.

The paper concludes that the investigation of the efficiency of digital marketplaces is a study in its initial phases. Few studies have been conducted to support this. Still, the published literature helps us with a stepping stone to climb the next step by providing certain critical factors to which we owe the adaptability and acceptability of digital marketplaces. The data extracted from Scopus shows that studies on efficiency related to e-markets have yet to be conducted in India. To understand the factors on which efficiency is measured and to move an upward trajectory for its betterment, we could adopt the studies already conducted in developed nations. Specific aspects related to consumer behaviour like trust, satisfaction, and contentment have been some of the factors, with agents playing an important role, and to some extent, the regulations adopted by different nations for the mechanisms in which digital marketplaces could play a relevant role.

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