The Determinants of E-Commerce Development in Indonesia: A Bibliometrical Analysis

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Abstract.
The development of e-commerce is an economic disruption that occurs in the digital era. The e-commerce system provides benefits to society in being able to reach a wider market, providing efficiency and flexibility, and being able to provide transaction pattern information that can be accessed at any time. The Indonesian Central Statistics Agency noted that there has been an increase in the use of e-commerce in business activities in Indonesia (25.25% in 2020 and increased to 32.23% in 2021). Seeing these facts, ideally, the development of e-commerce could be studied based on its determinants, but current research has not yet studied this comprehensively. Therefore, this research aims to (1) comprehensively cluster the determinants of e-commerce development in Indonesia using bibliometric studies, and (2) identify the density of determinants of e-commerce development in Indonesia comprehensively using bibliometric studies. The method used is quantitative-based bibliometrics. The research used publish or perish, and VOSviewer. The results show that four dominant keyword clusters often appear, with the most dominant keyword being e-commerce, while based on density analysis, 28 topics are often studied in studies of the determinants of e-commerce development in Indonesia.

Keywords: *bibliometrics, determinants, e-commerce development, Indonesia.*

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1. Introduction

The robust growth of e-commerce in Indonesia is indicative of the acceleration of the country's economy, leading to a range of favorable outcomes. E-commerce refers to a digital economic transaction activity that utilizes specific technological tools. According to Ariansyah (2021), digital technology plays a crucial role in driving national sustainability

and fostering global economic growth. The widespread availability and increasing complexity of digital technology have facilitated convenient access for individuals across all strata of society to engage in economic transactions. The ease of access offered by technology allows economic actors, such as providers of products and services, to broaden their market reach. Consequently, economic transactions are no longer constrained by spatial and temporal limitations, enabling sellers to potentially augment their business revenue. This contrasts with offline economic transaction activities that necessitate a tangible setting and must occur at a specific time. The optimization of efficiency and flexibility in both spatial and temporal dimensions has the potential to reduce fixed operational expenses, thereby enabling the reallocation of these resources towards the advancement of products or services and their subsequent marketing endeavors. The utilization of electronic commerce extends beyond the realm of large-scale entrepreneurs, as it is increasingly permeating Micro, Small, and Medium Enterprises (MSMEs). The capacity of micro, small, and medium enterprises (MSMEs) to embrace electronic commerce (e-commerce) has an impact on their accessibility, as noted by Jauhari et al. (2022). The measurement of repurchase intention in the context of e-commerce holds significant value for e-commerce entities as it aids in the sustenance of their business operations (Ali & Bhasin, 2019).

E-commerce enables business entities to conveniently discern patterns of purchasing intentions, as well as the determinants underlying these purchasing decisions. The reason for this is that e-commerce possesses the capability to retain transactional data, which can be readily accessed by users of e-commerce platforms. The proliferation of e-commerce in Indonesia has led to significant advancements and positive outcomes in this technological domain. According to research conducted by the Indonesian Central Statistics Agency in 2022, the findings indicate a significant reliance on e-commerce as a means of conducting business transactions. In the year 2021, Indonesia's e-commerce industry can be categorized into five distinct sectors. These sectors encompass large-scale and retail trade, car or motorbike repair and maintenance, accommodation and food and drink providers, processing industry, arts, entertainment, recreation, and service activities, as well as other miscellaneous categories. The distribution of these sectors in terms of their respective contributions to the overall e-commerce landscape is as follows: large-scale and retail trade, car or motorbike repair and maintenance account for 39.10%; accommodation and food and drink providers contribute 19.98%; the processing industry sector represents 17.18%; arts, entertainment, recreation, and service activities makeup 8.77%; and the remaining categories constitute 14.97%. The essential elements required to facilitate electronic commerce operations encompass a digital marketplace or online store, participants in the form of buyers and sellers, payment gateways, and delivery services.

The term "marketplace" denotes an electronic platform that facilitates the provision of products or services by entrepreneurs in an online environment. Marketplaces can manifest themselves in various formats, such as websites, applications, or social media platforms. Based on a study conducted by Hasan et al. (2021), the marketplaces in Indonesia comprise various platforms, with Instagram accounting for 19.52% of the market share, websites representing 10.89%, Shopee contributing 2.78%, Bukalapak comprising 1.95%, Tokopedia representing 1.85%, OLX accounting for 1.33%, Lazada contributing 0.62%, and other platforms making up the remaining 80.92% of the market. The quantity and quality of these

marketplaces are experiencing notable growth. The observed rise is consistent with the upward trend in the proportion of businesses engaged in e-commerce activities, as indicated by the data from BPS Indonesia (2022), which shows an increase from 25.25% in 2020 to 32.23% in 2021. In Indonesia, e-commerce transactions are facilitated by widely used payment gateways, including "duitku," "doku," "ipaymu," and "xendit." In addition, Windiarti et al. (2022) have demonstrated that the payment gateway known as "shopeepay" is undergoing a notable surge in popularity within Indonesia, particularly in the region of DKI Jakarta.

The augmented quantity of components in e-commerce signifies a substantial development and expansion of e-commerce adoption in Indonesia. The growth of e-commerce in Indonesia is significantly influenced by the regulations stipulated in Law No. 7 of 2014 pertaining to trade and Law No. 8 of 1999 pertaining to consumer protection (Pariadi, 2018). Furthermore, the substantial growth of e-commerce in Indonesia is bolstered by the advent of the fourth industrial revolution and technological advancements. The expansion of electronic commerce in Indonesia presents prospects for the younger cohort to cultivate their potential and entrepreneurial concepts, bolstered by high-speed internet infrastructure, thereby enabling accessibility across the entirety of Indonesia (Azzery, 2022). Additional factors that contribute to the advancement of e-commerce in Indonesia encompass digital innovation, proficiency in digital knowledge and skills, effective branding and marketing strategies, and the caliber of services or products (Achmad, 2023). In addition to facilitating factors, there exist inhibiting factors that impede the progress of e-commerce. Numerous scholarly investigations have examined this subject, including a study conducted by Wahyuni et al. (2023), which revealed that the implementation of taxation measures can impede the operations of electronic commerce. The development of e-commerce in Tulungagung, Indonesia is influenced by the factor of limited availability of facilities and infrastructure (Wahyudi et al., 2023). Nevertheless, certain studies do allocate partial attention to the factors that hinder or facilitate certain outcomes.

Hence, the primary objective of this study is to comprehensively cluster the determinants of e-commerce development in Indonesia through the utilization of bibliometric studies. Additionally, this research aims to thoroughly identify the density of determinants of e-commerce development in Indonesia using bibliometric studies. This study aims to analyze the comprehensive determinants of e-commerce development in Indonesia through the utilization of bibliometric studies. A bibliometrical analysis is considered a suitable methodology for research due to its ability to capture significant research trends that exert a substantial influence on the respective field of study (Mukherjee et al., 2022). The utilization of bibliometrics in this study is based on the premise that the use of keywords and visualization of research topics, which represent determinant factors, facilitates the identification of pertinent research topics. The research offers a theoretical contribution by presenting a comprehensive overview of the determinants that influence the development of e-commerce in Indonesia. Additionally, it provides practical value through bibliometric information, which can serve as a foundation for identifying patterns in e-commerce development in Indonesia. Consequently, this information can be utilized for evaluation purposes. Furthermore, this serves as the foundation for the development of more focused and all-encompassing strategies.

2. Research Methods

The present study adopts a quantitative approach and utilizes bibliometric methods, as it relies primarily on scientific articles as the primary data source. Bibliometrics, as a field within information science, possesses the capacity to unveil discernible patterns pertaining to the utilization of documents, the evolution of literature, and the sources of information (Cahyani et al., 2022). The dataset utilized in this study comprises scientific articles that specifically address the determinants of e-commerce development in Indonesia. The determinants under consideration pertain to factors that either support or hinder a particular phenomenon. In Indonesia, inhibiting factors refer to various elements that impede the progress of e-commerce, whereas supporting factors encompass the diverse elements that foster the advancement of e-commerce in the country. The scientific article references utilized are sourced from Crossref. The articles were chosen without taking into account specific temporal constraints. The tools utilized in this study are enumerated in Table 1.

Table 1. Research tools

No	Tool	Function
1	Publish or Perish 8 and Crossref	To explore and search for scientific articles that match the research topic
2	VosViewer	To select scientific articles, and cluster and visualize scientific articles according to scientific topics
3	Ms. Excel	To tabulate and select data
4	Ms. Word	Describe the research results and write them in the article

The mechanisms carried out in this bibliometric study process are as follows. (1) Determine the study topic and research data sources; (2) Search for scientific article metadata according to the required topic in Publish or Perish 8 using the Crossref database, for a quantity of 1000 scientific articles searched, taking into account that they are relevant to the research topic and current conditions. Topic searches are based on keywords contained in the titles and abstracts of scientific articles and the study year range is from 2000 to 2023; (3) After the database is found, proceed with exporting the database in RIS format. This format was chosen so that the database can be opened and processed in Vosvewer; (4) Input the database (RIS format) in Vosviewer and select the keywords that are most relevant to the selected topic; (5) Visualizing RIS metadata with clustering and density mapping models. This process is based on an algorithm that already operates on Vosviewer; and (6) Store and identify the strength of relationships between nodes (circles) and lines based on size, as well as identify publishing times based on color.
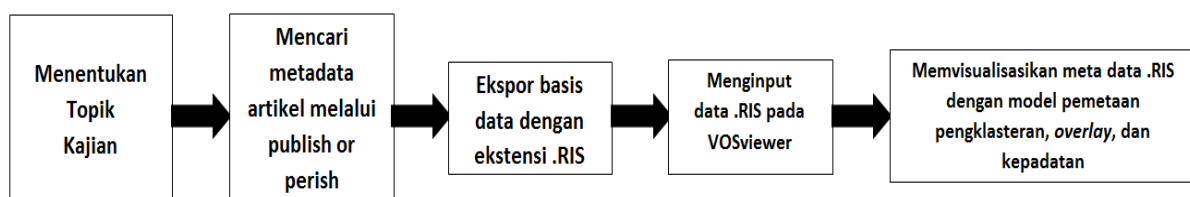
More clearly, this mechanism is listed in Figure 1.

Figure 1. Bibliometric study mechanism

3. Results and Discussion

3.1. Results

3.1.1 Clustering of Determinants of E-Commerce Development in Indonesia

The visualization of determinant clusters represents the degree of correlation between specific keywords that influence the development of e-commerce in Indonesia. The visualization comprises various elements, such as labels, colors, sizes, circles, and lines. The visualization generated by VOSviewer is commonly recognized as a keyword network. The provided label exhibits keywords pertaining to the subject matter of factors influencing the progression of electronic commerce. The chromatic properties of the lines and nodes, specifically their coloration, serve as visual indicators denoting the respective clusters to which each keyword belongs. The size component in this context pertains to the frequency of occurrence of keywords. It is categorized into sizes based on lines, nodes, and labels. Line size is determined by two factors: thickness and distance. Thinner lines indicate a higher frequency of keyword co-occurrence within a cluster, while thicker lines suggest the opposite. Additionally, a shorter distance between nodes signifies a stronger relationship between them. The visual representation of the circles and labels in the graph indicates a positive correlation between the size of the nodes and labels and the frequency of occurrence of the respective keywords in the research. The circle element serves a function in enhancing the clarity of keyword visualization. The purpose of the line is to illustrate the correlation between keywords, both within a single cluster and across different clusters. The aforementioned provisions pertain to research as discussed by Kurniawan and Kusumastuti (2023) and Niherola (2019).

Figure 2 depicts a network visualization representing the determinants influencing the development of e-commerce in Indonesia. Based on the visual representation, it is evident that the most prominent node and label correspond to the term "e-commerce." This observation suggests that e-commerce exhibits the highest occurrence frequency among other keywords within a given cluster, as well as beyond the confines of the cluster. Some additional nodes and labels exhibit a smaller scale compared to e-commerce, yet remain relatively larger than other nodes or labels. These include research, study, business, and company. This measure indicates that the frequency of occurrence of the keywords on the label is higher compared to other keywords. This is further supported by the label's color, which is darker and more prominent compared to other labels associated with keywords. The interconnection among nodes is visually represented through the dimensions and thickness of the lines. The study of e-commerce is closely associated with several key determinants, namely "user", "use", "covid", "business", "service", "development", "application", "product", and "customer". Moreover, research is intricately connected to the examination of the factors that influence "use," "user," "study," and "quality." The term "business" holds significant pertinence in the examination of the factors influencing "covid" and "benefit". The term "company" exhibits a significant correlation with pivotal research pertaining to the keyword "promotion". The measure of relevance is indicated by the length and width of the lines.
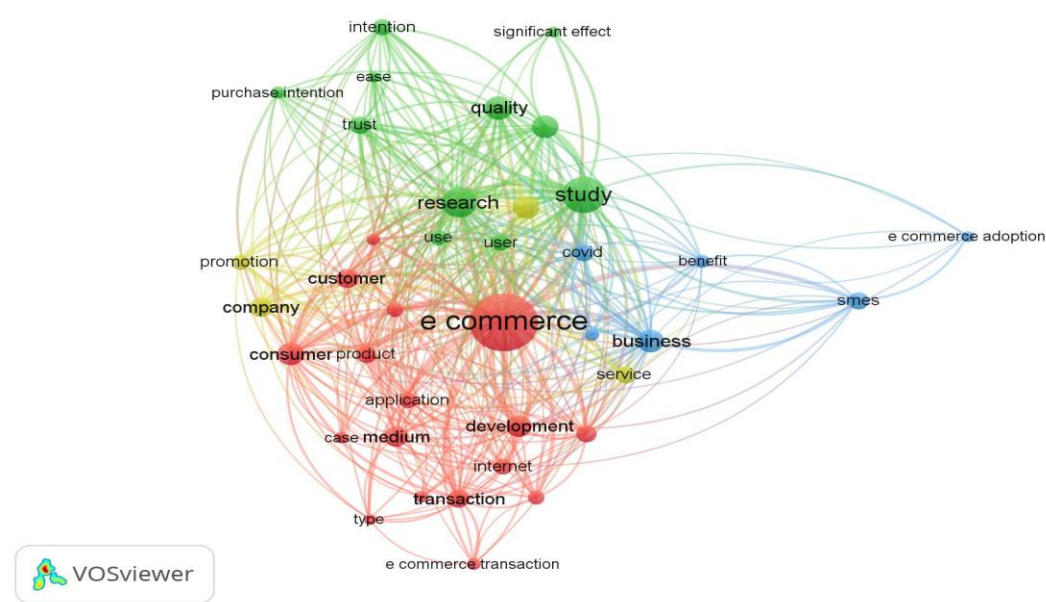
Figure 2. Network visualization of the determinants of e-commerce development in Indonesia
Source: Author's data processing results (2023)

In addition to analyzing the frequency of keywords and assessing the strength of relevance across different categories of keywords, Figure 2 provides a visual representation of the results obtained from clustering mapping. There exist four distinct clusterings, with each individual cluster being assigned a unique color. The visualization displays four clusters, each represented by a distinct color. Cluster 1 consists of 17 keywords and is depicted in red, while Cluster 2 comprises 11 keywords and is represented in green. Cluster 3, consisting of 6 keywords, is visualized in blue, and cluster 4, containing 4 keywords, is depicted in yellow. Each cluster comprises multiple keywords that exhibit mutual relevance, as illustrated in Table 2.

Table 2. Clustering of keywords determining the development of Indonesian e-commerce

Cluster	Color & quantity	Keywords
1	Red (17)	*"application", "case", "consumer", "customer", "development", "e commerce", "e commerce business", "e commerce transaction", "information", "internet", "medium", " person", "problem", "product", "technology", "transaction", and "type".*
2	Green (11)	*"ease", "effect", "intention", "purchase intention", "quality", "research", "significant effect", "study", "trust", "use", "user".*
3	Blue (6)	*"benefit", "business", "covid", "e commerce adoption", "pandemic", "smes".*
4	Yellow (4)	*"analysis", "company", "promotion", and "service".*

Source: Author's data processing results (2023)

3.1.2 Density Determinants of E-Commerce Development in Indonesia

Figure 3 illustrates the density of determinants pertaining to the development of e-commerce in Indonesia. Based on the presented visualization, it is evident that the dominant topic exhibits the highest degree of relevance to the subject matter under consideration. The robustness of the subject matter is indicated by the magnitude of the label's width, as well as the dimensions and degree of ambiguity of the circle.

Based on the analysis of Figure 3, it can be inferred that the prevailing subjects of investigation pertaining to the factors influencing the progress of e-commerce in Indonesia

encompass the following: (1) e-commerce, (2) utilization, (3) user behavior, (4) the impact of the COVID-19 pandemic, (5) advantages, and (6) scholarly inquiry. The present study aims to investigate the relationship between study (7), quality (8), trust (9), purchase intention (10), and ease (11). The concept of intention (12) and its subsequent significant effect (13) are important factors to consider in academic discourse.

In this study, we can examine the impact of small and medium-sized enterprises (SMEs) on the adoption of e-commerce. We can also focus on the role of SMEs in the development of e-commerce transactions, specifically in the context of business services. Our analysis can consider the various types of e-commerce transactions and their application in different mediums. Additionally, we can explore the influence of e-commerce adoption on consumer products and the strategies employed by companies to promote their products to customers.
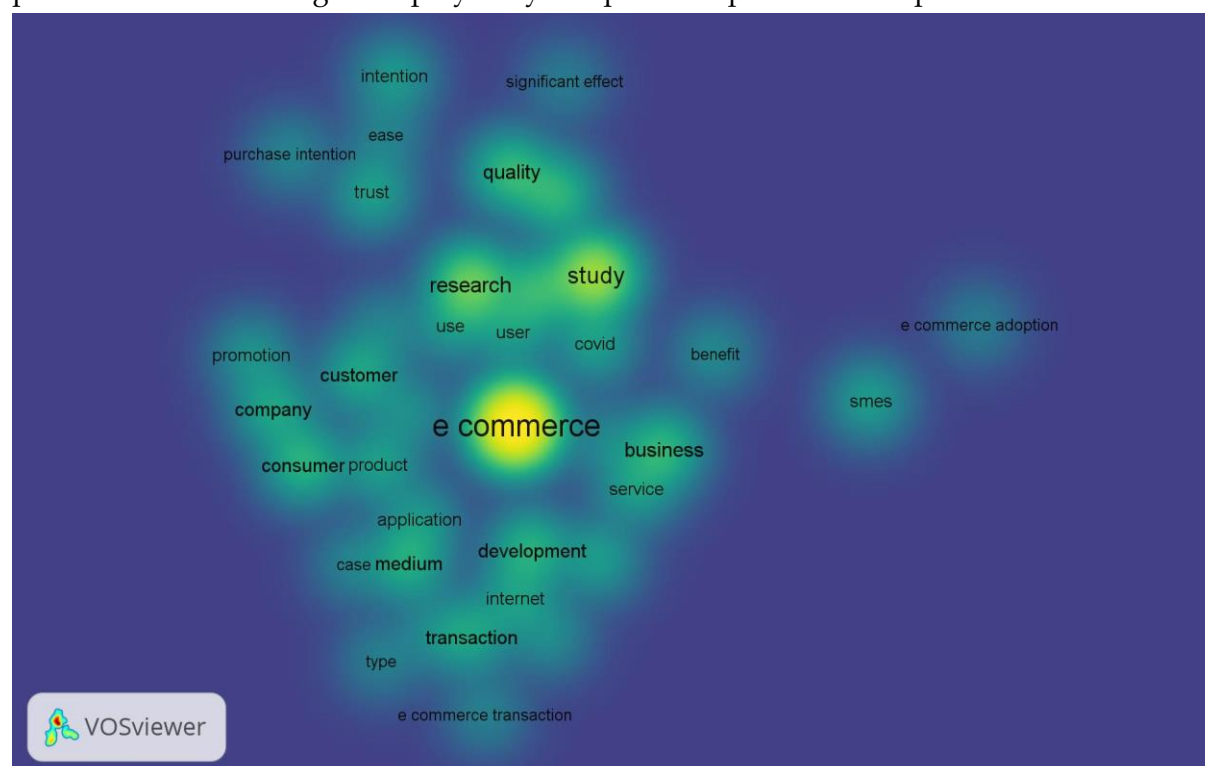

Figure 3. Density determinants of e-commerce development in Indonesia

Source: Author's data processing results (2023)

3.2. Discussion

The findings of this analysis encompass bibliometric data that reveal the prevailing subjects that shape the progression of e-commerce in Indonesia. The chosen publication years span from 2002 to 2023. A total of 1,000 scientific articles pertaining to the determinants of e-commerce development in Indonesia were initially identified. However, the author conducted a filtering process to select the most pertinent articles, resulting in a final set of 364 articles. These selected articles garnered a cumulative citation count of 611, with an average of 29.10 citations per year. Each article encompasses keywords pertaining to the factors influencing the progress of electronic commerce in Indonesia.

For instance, a study conducted by Irene (2023) focused on the keyword "application" within the context of determinants (cluster 1). Based on the findings of this study, it was determined that the implementation of personalized advertising on e-commerce platforms

in Indonesia has a discernible positive effect on the overall satisfaction levels of e-commerce customers. Consequently, this phenomenon holds significant potential as a determinant for the advancement and growth of the e-commerce industry within the Indonesian context. In a recent study conducted by Khairo (2022), the focus is on consumer keywords, specifically those falling within cluster 1. Consumer trust in e-commerce can be enhanced through the implementation of legal safeguards. As individuals develop a belief in e-commerce, the number of e-commerce users is expected to rise, thereby facilitating the ongoing development of e-commerce.

The subsequent keyword to be discussed is "customer," as documented in the research conducted by Sari et al. (2023). The research findings indicate that customer satisfaction is influenced by one of the variables in e-commerce. Customers play a significant role in various aspects of e-commerce, including the provision of social support, offering reviews on the quality of products and services, as well as establishing social trust within the e-commerce realm. The findings of previous studies, specifically those conducted by Pratiwi (2022), demonstrate that the presence of Internet and computer users plays a significant role in fostering e-commerce and driving economic growth in Indonesia.

The subsequent scholarly publication also presents an analysis of the factors influencing the growth and progress of electronic commerce in Indonesia. According to a recent study conducted by Alfanur and Kadono (2021), there is a correlation between consumer intentions and behavior and the advancement of e-commerce. This study builds upon the previous article's focus on technology and securities. The article by Sari (2021) provides a concise summary of additional research findings. In contrast to the preceding article, the present study reveals that the utilization of e-commerce, particularly the pay later functionality, is primarily determined by the convenience factor. This characteristic engenders impulsive consumer purchasing behavior, thereby resulting in a rise in e-commerce sales and the possibility for further expansion. The flash sale program in e-commerce also demonstrates the determinant associated with the keyword "promotion." According to Sundjaja (2020), empirical evidence supports the notion that flash sale initiatives effectively enhance consumers' intentions to make purchases on e-commerce platforms. Consequently, it can be inferred that flash sale promotions play a significant role in driving the progress of e-commerce in Indonesia.

4. Conclusion

Based on the research results, it can be concluded that there are four clusters of keywords that frequently appear. The keywords that frequently appear among these four clusters include e-commerce, research, study, business, and company. These keywords form a relationship which is shown through the line. Based on clustering, the topics often discussed in studies of determinants of e-commerce development consist of 1) e-commerce, (2) use, (3) user, (4) covid, (5) benefit, (6) research, (7) study, (8) quality, (9) trust, (10) purchase intention, (11) ease, (12) intention, (13) significant effect, (14) SMEs, (15) *e-commerce adaptation*, (16) business, (17) service, (18) development, (19) internet, (20) transaction, (21) e-commerce transaction, (22) type, (23) case medium, (24) application, (25) consumer product, (26) company, (27) customer, (28) promotion.

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