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Malaysia and ASEAN-5 e-commerce research: Bibliometric analysis and sustainable development

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Abstract

E-commerce has proven its contribution to the global growth both pre- and post-pandemic, particular in Malaysia and ASEAN-5 countries. E-commerce extends beyond the online shopping, and forms new transactions model. The understanding of e-commerce trends within ASEAN-5 countries is essential to characterize digital economy development that impact global trade, digital divide bridging, and contribute to sustainable development. Hence, the objective of this study is to conduct bibliometric analysis on the Scopus indexed documents between ASEAN-5 countries. This study analysis utilized VOSviewer software to examine the distribution of bibliometric maps. The data was acquired from the Scopus database, whereby data filtering pertaining with the e-commerce terms contained in the title, keyword, and abstract areas. The documents published between 2013 and 2022 were chosen to capture the latest circumstances. During the studied period, Indonesia has the highest documents and items. Within the period, ASEAN-5 showed an increase trend of publication. ASEAN-5 showed various of the top five keywords occurrences, however similarity in sales term. The dataset items are further categorized into clusters. ASEAN-5 demonstrated association of theories in the documents except Philippines. The majority of the countries utilized consumer behavior theories, except Singapore focus mathematics concept. Besides, the sustainable development term frequently occurred within ASEAN-5, particularly Malaysia and Thailand, but not in Philippines. In addition, e-government term plays key research for Thailand and Philippines. The study finding provides a valuable insight for future study in the ASEAN-5 countries e-commerce by identifying key terms, significant publications, and collaborative networks. Researchers can build on this finding to explore specific study areas, consists of theories adopted, sustainable development, and e-government.

Keywords: ASEAN-5, bibliometric, e-commerce, Scopus, sustainable development, VOSviewer

Introduction

E-commerce extends beyond online shopping and involves innovative transaction business models, within business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C). For example, Lazada and Alibaba B2B platforms have transformed how micro, small and medium-sized enterprises (MSME) penetrate global markets. Besides, Shopee and Tokopedia B2C platforms have increased consumer convenience by reshaping the consumer experience through live-streaming and digital payments integration. Facebook Marketplace C2C platforms has encouraged and empowered individual in the digital economy participation. This is due to the internet technology which provided a pivotal innovation of the modern age, thus dramatic impact on business practices. The widespread adoption of information and communication technologies (ICT) have resulted in an expansion of e-commerce within the global B2B activities (Hadasik & Kubiczek, 2022). With the internet growth, individual now engage in the global economy such as price comparison among different geographical regions such as how demand affects pricing, and identify potential substitute options (Acharya et al., 2023). Subsequently, the customers gain a distinct advantage. This is because the extensive level of market openness enables individual to conveniently compare offerings across multiple websites. When customers discover discrepancies in particular in pricing content or services, they are inclined to swiftly transition back to traditional options (Elhan-Kayalar et al., 2022). Therefore, from a business perspective, the presence of a physical store is not seen significant (Hadasik & Kubiczek, 2022).

Moreover, the post COVID-19 pandemic has demonstrated e-commerce to be a significant driver of global economic growth. The pandemic catalyst for the rapid e-commerce expansion due to movement restrictions, and social distancing measures factors. During the pandemic, the ASEAN-5 region experienced unprecedented growth trends in online transactions, particularly retail, healthcare, and education industry shifting to digital operation modes. In 2022, the Southeast Asian countries e-commerce revenue reached $99.5 billion. Within ASEAN-5, Indonesia taking the lead make up 52% of the total, followed by Thailand (14.4%), the Philippines (11.5%), Malaysia (8.7%), and Singapore (4%).

However, the bibliometric analysis in e-commerce research, particularly in Scopus Scholar-indexed journals, is understudied. The use of VOSviewer for mapping analysis enable to assess term the quantity and present condition. Hence, this study utilized bibliometric analysis to analyses Scopus indexed e-commerce study. This study is expected to assist researchers discover e-commerce research subject matter. It is valuable to understand the correlation of e-commerce study to other fields. In addition, it provides a recent e-commerce development in the post-pandemic environment.

Literature review

The discipline of e-commerce denotes the conduct of business transactions through electronic platforms. It utilizes electronic media and the internet as a means of conducting economic exchange of goods and services transactions. At the organizational level, e-commerce adopts internet-based technological solutions (Acharya et al., 2023), such as electronic data interchange. The exploitation of website platform as a trading platform has facilitates direct exchanges between the seller and buyer. The platform employs a wireless purchase cart or a buy basket as a mechanism

for allowing payment via debit card, credit card, or electronic fund transfer. As such, e-commerce is commonly associated with internet, payment processing services, analytics, and social media aspects (Kim & Kim, 2022; Fu & Saad, 2023; Khoa & Huynh, 2023; Marjuti et al., 2023).

During COVID-19, multiple studies have been undertaken (Beckers et al., 2021; Giotopoulos et al., 2022; Elhan-Kayalar et al., 2022; Hasbi et al., 2022; Hadasik & Kubiczek, 2022). While conventional research concentrated on large-scale organizations (Han et al., 2022), the COVID-19 period emphasis on global digital applications aspect by retail enterprise (Beckers et al., 2021; Giotopoulos et al., 2022; Shang et al., 2023), and household behavior (Al Amin et al., 2022; Gruntkowski & Martinez, 2022; Jasinska-Bilizczak, 2022; Chen et al., 2023; Khoong et al., 2023). Besides, studies also associate it with strategic planning (Hadasik & Kubiczek, 2022). As comparison, the current e-commerce sector has undergone significant advancements. E-commerce has experienced notable shift towards decentralized operations, incorporation of artificial intelligence (AI) technology, and services offering such as the application of the goods and services tax and short-term financing (Luisa, 2020; Lin et al., 2021; Kang et al., 2022; Zhang, 2023; Jha et al., 2023; Goti et al., 2023).

In view of the important of e-commerce, there was some review of literature study of e-commerce being done. However, the studies limit industries to supply chain (Mashalah et al., 2022), sustainability (Cordes & Marinova, 2023), consumer behavior (Chen et al., 2023), and AI (Goti et al., 2023). In term of geographical distribution, few studies focus within the Association of Southeast Asian Nations (ASEAN) countries (Elhan-Kayalar et al., 2022; Ridhwan et al., 2023). However, several key gaps literature remain within ASEAN-5 e-commerce. Majority of the studies concentrated on the economics, technological, and market aspects, but limit study that integrates sustainable development aspects. Besides, few provide countries comparative analysis, and focuses on individual countries. In addition, only a few existing e-commerce bibliometric studies have addressed the sustainability developing role especially in ASEAN context.

VOSViewer is a software tool developed with the objective of creating, building, and visualizing bibliometric maps (Vlase & Landesmaki, 2023). VOSViewer includes a range of functions, including a text-mining capability that allows for the development and visualization of relationships between citations in scholarly articles. The integration of mapping systems, search features, and browsing functionality enables the visual depiction of published maps (Bukar et al., 2023; Zyoud et al., 2023; Khoong et al., 2024). VOSviewer supports the extraction analysis, an approach utilized to simplify large datasets by studying the bibliometric information linked to a particular paper. Bibliometrics provides a thorough analysis of the conceptual framework and evolving trends within a specific area of study (Vlase & Landesmaki, 2023).

Method and study area

Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) procedure was utilised for data collection, whereby includes the identification, screening, eligibility, and included stages. The Scopus database was selected due to the significance target of academics for quality publications and international acknowledgment. Besides, the Scopus database is international citation level revealed the largest researched indexed abstract and citation database. All Scopus databases articles are high quality audited yearly based on the four quality measurements, consisting of CiteScore, h-index, SCImago Journal Rank, and Source Normalised Impact per

Paper. All Scopus database articles indexed and fulfilled the criteria for article type and relevance research themes for this research were kept in a file for VOSviewer analysis utilization.

In this research, the themes “e commerce” OR “electronic commerce” articles were exclusively selected. The data retrieval process engaging the title, keyword, and abstract criteria to search for information pertaining to the e-commerce. The papers employed in this study consist of publications between the year 2013 to 2022. A duration of 10 years is sufficient to capture the latest trends, and reflects COVID-19 environment. This timeframe also highlights the influence of pandemic and related policy shift on influenced research directions and output quantity. Data were retrieved on 4 April 2023. There is no language filter applied. The data were filter by country to retrieve each ASEAN-5 country. From the database filtering process, Indonesia (1,422 records) has the highest record documents, followed by Malaysia (931 records), Singapore (529 records), Thailand (341 records), and Philippines (157 records).

All retrieved articles were stored in the *.csv file format. After, VOSviewer tools utilised to represent visually, and examine bibliometric maps trends. The data mapping process began by extracting articles from database sources that had been previously selected. The data mapping included three categories, namely network mapping, density mapping, and visualisation overlay. VOSviewer is designed to create and display bibliometric networks, in which the networks may involve article journals, researchers, or personal articles. This often constructed based on citations, bibliographic data, or co-authorship. VOSviewer is suitable for huge literature research quantities analysis, and for visually representing data trends (Perianes-Rodriguez et al., 2016). This analysis done by co-citation and keyword-based approaches. Subsequently, network visualised that demonstrates the associations between numerous terms. VOSviewer adopts a multi-stage visualise bibliometric networks procedure, consists of data collection, data import input and preparation, network creation development, and visualisation. To create the bibliometric map, the keyword frequency determines a minimum frequency of five occurrences from the prepared database. Furthermore, the study adopted a filtering process to determine the terms that would be integrated into the VOSviewer network mapping visualisation.

Results and discussion

Based on the data shown, the number of researches on e-commerce demonstrate increase trend for ASEAN-5 countries (Figure 1). In term of the highest publication, Malaysia had the most publication from year 2013 until 2016. However, Indonesia overtook the highest publication since 2017 until 2022. Indonesia and Philippines demonstrated more than 10-times fold increase within the period. Besides, more than 90 percent of the documents were related to articles and conference paper (Table 1), and mostly related to computer science, engineering, business, and management and accounting subjects.

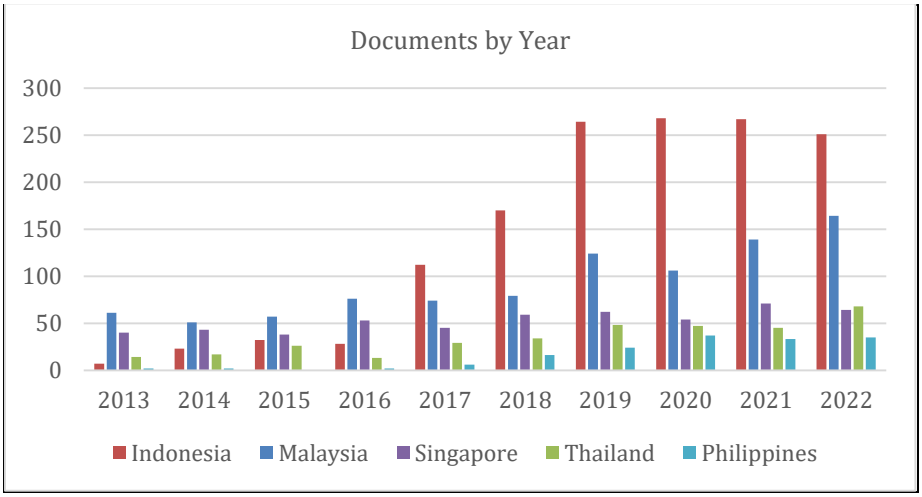


Figure 1. Types of e-commerce documents between ASEAN-5

Table 1. Comparison document types between ASEAN-5

Type of documents	Indonesia	Malaysia	Singapore	Thailand	Philippines
Article	460 (32.3%)	509 (54.7%)	251 (47.4%)	135 (39.6%)	35 (22.3%)
Conference paper	925 (65.0%)	346 (37.2%)	236 (44.6%)	186 (54.5%)	118 (75.2%)
Book chapter	22 (1.5%)	41 (4.4%)	33 (6.2%)	16 (4.7%)	2 (1.3%)
Review	12 (0.8%)	30 (3.2%)	4 (0.8%)	3 (0.9%)	1 (0.6%)
Book	1 (0.1%)	2 (0.02%)	3 (0.6%)	1 (0.3%)	0 (0.0%)
Data Paper	0 (0.0%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Editorial	0 (0.0%)	1 (0.1%)	1 (0.2%)	0 (0.0%)	0 (0.0%)
Retracted	1 (0.1%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Erratum	1 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Note	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	1 (0.6%)

Source: Scopus database

Based on the minimum number of occurrences of five keywords setting, Indonesia had the highest total of items of 437, follow by Malaysia (227 items), Singapore (157 items), Thailand (90 items), and Philippines (36 items) relating to the e-commerce area. Even though the top five keywords by occurrences among ASEAN-5 showed various dimensions, however similarity of the sales keywords emerged in all ASEAN-5 (Table 2). For Indonesia, the top five keywords associated with the sales surveys, meanwhile Malaysia associated with websites survey, Singapore associated to cost information systems, Thailand associated with sales websites, and Philippines associate to student eLearning. ASEAN-5 showed various of the top five keywords occurrences, however similarity in sales term (Figure 2). The dataset items further categorized into distinct clusters, based on the color for visualization (Table 3 to Table 11).

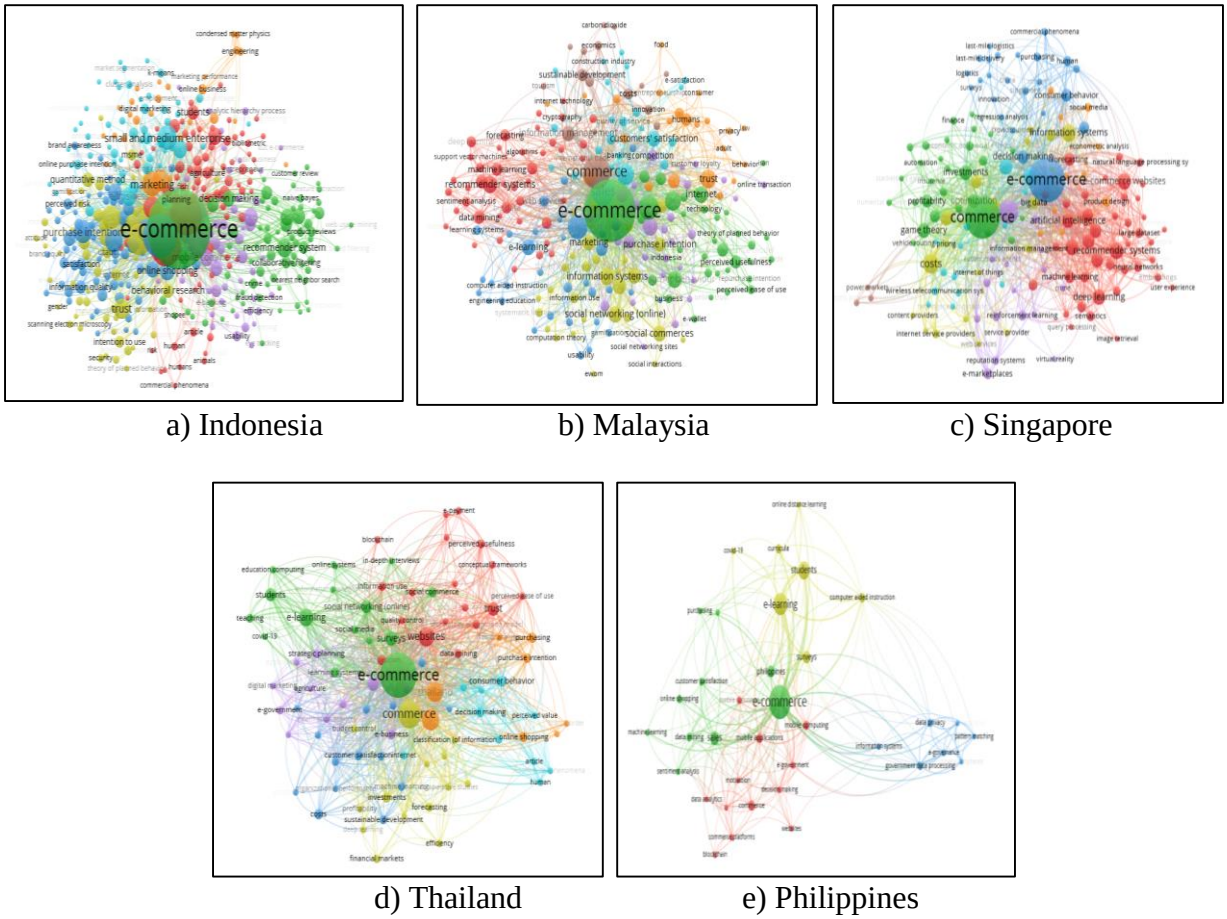
Table 2. Top five keywords between ASEAN-5

Country	Indonesia	Malaysia	Singapore	Thailand	Philippines
First keyword (TO/TLS)	E-commerce (885/4,509)	E-commerce (478/1,721)	E-commerce (226/768)	E-commerce (200/595)	E-commerce (126/321)
Second keyword (TO/TLS)	Sales (267/2,013)	Commerce (135/621)	Commerce (210/784)	Commerce (76/239)	E-learning (56/167)
Third keyword (TO/TLS)	Commerce (231/1,394)	Sales (94/589)	Sales (67/293)	Sales (48/224)	Students (37/113)
Fourth keyword (TO/TLS)	Indonesia (205/1,286)	Websites (75/391)	Costs (44/211)	Thailand (42/122)	Sales (22/68)
Fifth keyword (TO/TLS)	Surveys (137/1,169)	Surveys (54/339)	Information systems (35/142)	Websites (37/162)	Surveys (17/60)
Total cluster groups	**7**	**8**	**8**	**7**	**4**

Source: Scopus database

The finding shows Indonesia has overtaken Malaysia in research output since 2017. This is driven by several factors. The rapid digital transformation initiatives involve the 100 Smart Cities Program and the rise of major e-commerce Tokopedia and Bukalapak platform, has contributed to increased research interest. In addition, authorities research and development support and global collaboration, has encouraged a dynamic research community. On another hand, Malaysia shows a steady output trend may indicate a shift in priorities study toward emerging areas such as Fintech and blockchain.

Besides, the types of documents published highlight research dissemination strategies. Philippines and Indonesia and the rely heavily on conference papers. This reliance suggests a preference for faster findings dissemination, and common in emerging research groups. Nevertheless, while conference papers provide immediate visibility, however it typically absence of journal articles academic long-term impact. On another hand, Malaysia and Singapore produce a higher proportion of journal articles reflecting the focus on peer-reviewed study that contributes more significantly global e-commerce academic discourse. Then, the limited contributions to book chapters and review articles across ASEAN-5 countries underscore a gap in synthesizing consolidating study findings. The lack of reviews obstructs comprehensive analysis, and trend-gap identification. These finding expose different academic strategies within ASEAN-5, where Philippines and Indonesia emphasize quantity rapid dissemination, meanwhile Malaysia and Singapore prioritize quality scholarly impact.



a) Indonesia b) Malaysia c) Singapore

d) Thailand e) Philippines

Figure 2. Network visualization of e-commerce for ASEAN-5

Table 3. Cluster e-commerce terms group for Indonesia (437 items)

Cluster	Terms	Total items	Colour	Links	Total links strength	Occurrences
1	Commerce	93	Red	349	1,394	231
2	E-commerce	74	Green	433	4,509	885
3	Sales	67	Dark blue	366	2,013	267
4	Surveys	61	Yellow	286	1,169	137
5	Websites	58	Purple	207	619	90
6	Small and Medium Entreprise (SME)	55	Light blue	180	458	84
7	Marketing	29	Orange	239	607	85

Table 4. Cluster group associated terms for Indonesia

Cluster	Terms	Within cluster associated terms	Non-within cluster associated terms
1	Commerce	Information management, e-learning, agriculture, qualitative method, costs, e-government, etc	Marketing, SME, SEM, website, purchase intention, etc
2	E-commerce	Recommender system, decision making, collaborative filtering, mobile banking, eye tracking, etc	Website, marketing, online shopping, SME, behavioral research, trust etc
3	Sales	Purchase intention, e-service quality, perceived risk, brand awareness, information quality, etc	Behavioral research, mobile commerce, website, quality control, competition, SME, etc
4	Surveys	SEM, trust, behavioral research, quantitative method, economic and social effects, etc	Online shopping, purchase intention, marketing, developing countries, e-learning, competition, etc
5	Websites	Mobile commerce, product design, web design, user interfaces, information use, etc	SME, competition, purchasing, website quality, behavioral research, information management, etc
6	Small and Medium Entreprise (SME)	Competition, developing countries, e-business, e-commerce adoption, etc	SEM, TAM, website, decision making, e-marketplace, qualitative method, etc
7	Marketing	Social networking (online), social media	SME, social media, qualitative method, information management, website, etc

Table 5. Cluster e-commerce terms group for Malaysia (227 items)

Cluster	Terms	Total items	Colour	Links	Total links strength	Occurrences
1	Recommender systems	42	Red	53	138	37
2	E-commerce	34	Green	224	1,721	478
3	Websites	33	Dark blue	139	391	75
4	Social networking (online)	29	Yellow	95	218	34
5	Small and Medium Enterprises	28	Purple	56	145	40
6	Sales	23	Light blue	166	589	94
7	Trust	22	Orange	76	197	45
8	Commerce	16	Brown	173	621	135

Table 6. Cluster group associated terms for Malaysia

Cluster	Terms	Within cluster associated terms	Non-within cluster associated terms
1	Recommender systems	Data mining, deep learning, forecasting, collaborative filtering, ontology, etc	Commerce, sales, websites, purchase intention, consumer behaviour, article, etc
2	E-commerce	Online shopping, consumer behaviour, internet, Technology Acceptance Model (TAM), Covid-19, etc	Sales, surveys, websites, Unified Theory of Acceptance and Use of Technology (UTAUT), trust, information management, etc
3	Websites	E-learning, website design, engineering education, web services, user interfaces, gamification, etc	Behavioral research, data mining, decision making, trust, B2C, etc
4	Social networking (online)	Mobile commerce, information systems, social media, social commerce, economic and social effects, etc	Behavioral research, Facebook, trust, digital marketing, consumer behaviour, etc
5	Small and Medium Enterprises	e-business, research, literature review, competition, cloud computing, etc	Sales, surveys, Covid-19, business performance, structural equation modelling (SEM), etc
6	Sales	Surveys, customers' satisfaction, neural networks, quality of service, e-banking, product design, etc	Recommender systems, websites, sustainable development, trust, information management, etc
7	Trust	Privacy, behaviour, risks, SEM, security, human, etc	Online transaction, TAM, social media, computer crime, online shopping, etc
8	Commerce	Information management, sustainable development, e-procurement, innovation, costs, investment, etc	Machine learning, artificial intelligence (AI), forecasting, trust, SEM, TAM, e-learning, etc

Table 7. Cluster e-commerce terms group for Singapore (157 items)

Cluster	Terms	Total items	Colour	Links	Total links strength	Occurrences
1	Recommender systems	42	Red	64	162	34
2	Commerce	29	Green	139	784	210
3	E-commerce	24	Dark blue	139	768	226
4	Costs	19	Yellow	72	211	44
5	Sales	16	Purple	95	293	67

6	Social networking (online)	14	Light blue	69	151	30
7	Product design	10	Orange	27	49	12
8	Electric power transmission networks	3	Brown	12	26	6

Table 8. Cluster group associated terms for Singapore

Cluster	Terms	Within cluster associated terms	Non-within cluster associated terms
1	Recommender systems	E-commerce websites, state-of-art, deep learning, AI, data-mining, etc	E-commerce, big data, decision making, multi agent systems, information management, etc
2	Commerce	Investments, profitability, game theory, stackelberg games, numerical experiments, economic and social effects, stochastic models, optimization, etc	Virtual reality, reinforcement learning, deep learning, consumer behavior, costs, etc
3	E-commerce	Online shopping, consumer behavior, crowdsourcing, sustainability, innovation, etc	Product design, AI, deep learning, sales, VR, investments, game theory, etc
4	Costs		Competition, economics, internet, big data, IoT, incentive mechanism, etc
5	Sales	Crime, e-marketplaces, reputation systems, distributed computer systems, autonomous agents, etc	Recommender systems, AI, social media, forecasting, optimization, costs, game theory, etc
6	Social networking (online)	Marketing, clustering algorithms, influence maximizations, algorithms, approximation algorithms, etc	Costs, sales, investments, risk assessments, social media, forecasting, recommender systems, data mining, etc
7	Product design	Economic analysis, empirical analysis	Online shopping, data mining, state of the art, AI, digital storage, etc
8	Electric power transmission networks	Power markets, energy resources	Commerce, costs, sales

Table 9. Cluster e-commerce terms group for Thailand (90 items)

Cluster	Terms	Total items	Colour	Links	Total links strength	Occurrences
1	Websites	18	Red	59	162	37

2	E-commerce	15	Green	87	595	200
3	Planning	14	Dark blue	29	46	9
4	Commerce	14	Yellow	77	239	76
5	Marketing	11	Purple	44	97	19
6	Consumer behavior	8	Light blue	34	70	13
7	Sales	8	Orange	65	224	48

Table 10. Cluster group associated terms for Thailand

Cluster	Terms	Within cluster associated terms	Non-within cluster associated terms
1	Websites	Trust, TAM, data mining, mobile commerce, competition, information systems, etc	Sales, e-learning, social networking (online), strategic planning, customer satisfaction, machine learning, industrial research, online shopping, consumer behavior, etc
2	E-commerce	E-learning, social networking (online), surveys, social media, developing countries, etc	Budget control, agriculture, customer satisfaction, decision tress, service quality, online shopping, trust, TAM, etc
3	Planning	Machine learning, costs, sustainable development, customer satisfactions, supply chain management, etc	E-learning, social networking (online), e-business, decision trees, forecasting, investments, budget control, competition, etc
4	Commerce	Budget control, decision trees, behavioral research, investments, deep learning, etc	Data mining, trust, blockchain, e-learning, agriculture, business performance, investments, machine learning, consumer behavior, etc
5	Marketing	Strategic planning, digital marketing, e-government, information services, e-business, etc	Trust, quality control, e-learning, business performance, investments, consumer behavior, recommender systems, etc
6	Consumer behavior	Service quality, tourism, decision making, consumption behavior, perceived value, etc	Trust, purchasing, perceived usefulness, e-learning, e-business, forecasting, sustainable development, etc
7			
8	Sales	Thailand, online shopping, cross-border e-commerce, purchase intention, purchasing, factor analysis, etc	Trust, data mining, e-learning, agriculture, e-government, sustainable development, forecasting, etc

Table 11. Cluster e-commerce terms group for Philippines (36 items)

Cluster	Terms	Total items	Colour	Links	Total links strength	Occurrences
1	Mobile computing	12	Red	16	42	10
2	E-commerce	10	Green	35	321	126
3	Government data processing	7	Dark blue	12	42	8
4	E-learning	7	Yellow	20	167	56

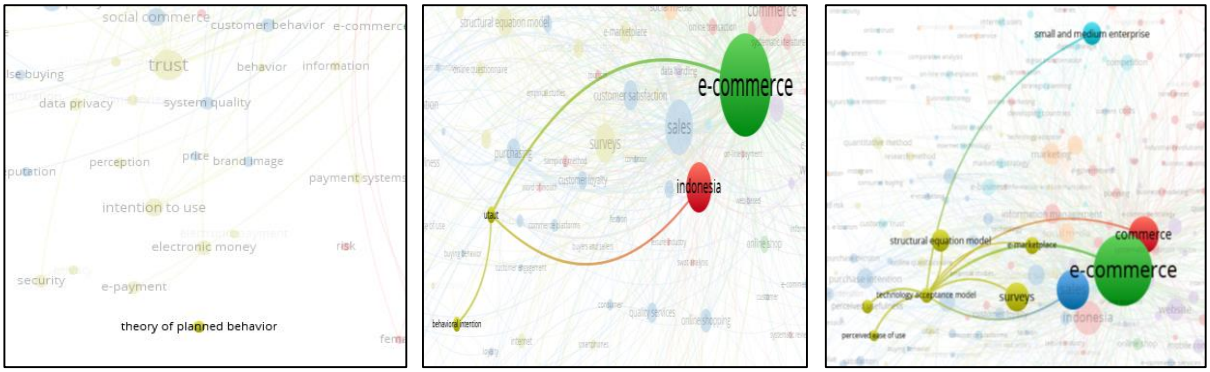
Table 12. Cluster group associated terms for Singapore

Cluster	Terms	Within cluster associated terms	Non-within cluster associated terms
1	Mobile computing	Mobile application, e-government, decision making, profitability, commerce etc	Information systems, data privacy, e-learning, students, sales, customer satisfaction, etc
2	E-commerce	Sentiment analysis, machine learning, online shopping, customer satisfaction, purchasing, etc	E-learning, online distance learning, information systems, data privacy, etc
3	Government data processing	Data privacy, information systems, e-governance, pattern matching, etc	Computer aided instruction, surveys, e-government, decision making, websites, etc
4	E-learninig	Online distance learning, computer aided instruction, curricula, covid-19, etc	Mobile computing, e-government, data mining, purchasing, machine learning, sentiment analysis, etc

ASEAN-5: E-commerce and theories adopted

Post pandemic seen the ASEAN-5 countries have experience businesses and governments operation transformative shifts. Besides economic growth, e-commerce plays an essential role in addressing social and environmental aspects, which crucial in sustainable development achievement. This study concentrates on three key aspects, consisting of the theories adopted in existing studies, integration sustainable development practices, and e-government role.

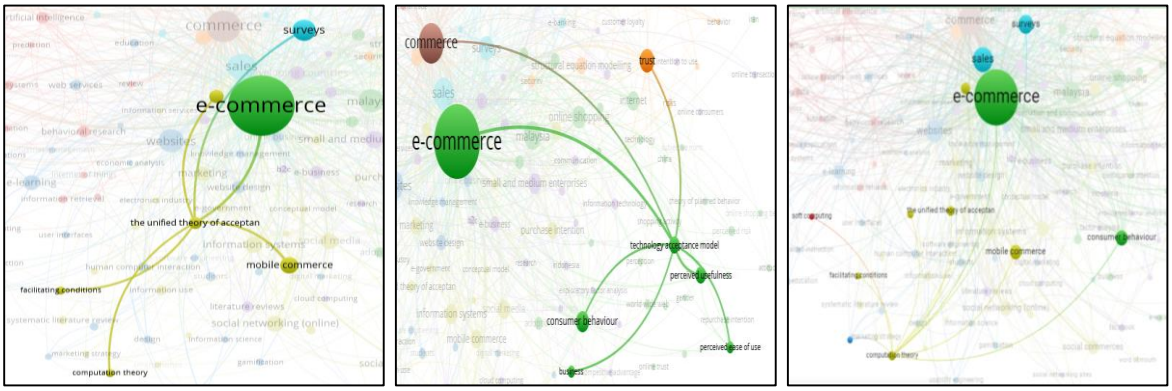
One of the interesting finding was the associated theory and model adopted for research, except Philippines. Majority countries utilized consumer behavior theories, while Singapore emphasized on mathematics concept. Indonesia adopted Theory Planned Behavior (TPB), Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology Acceptance Model (TAM) (Figure 3), with TPB was the least adopted but inside the trust cluster (Figure 7), meanwhile UTAUT related to behavioral intention (Figure 8). The most study was TAM, whereby associated with SEM, SME, e-marketplace, perceived usefulness, perceived ease of use, and among others. This association enables development strategic framework. Within the SME, the utilization of SEM analytical technique enhances SME performance within e-marketplaces.



a) TPB b) UTAUT c) TAM

Figure 3. Theories related to e-commerce for Indonesia

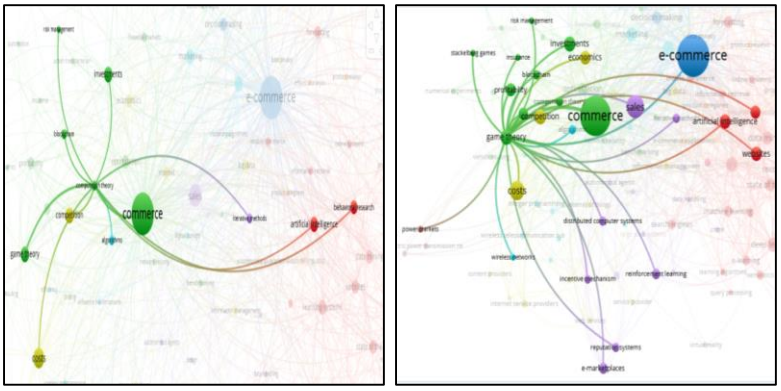
Malaysia utilized both consumer behavior and mathematics concept. The past research embedded theories included UTAUT, TAM, and Computation Theory (CT) (Figure 4). UTAUT and CT occurred within the same cluster, and share the same mobile commerce, surveys, e-commerce, facilitating conditions, economics and social effects terms (Figure 4a and Figure 4c). Besides, TAM adopted in consumer behavior, perceived usefulness, perceived ease of use, and trust related articles (Figure 4b). The integration terms promote organization movement in the digital environment, promoting innovation, enhancing consumer satisfaction, and supporting sustainable growth in mobile commerce. The integration leverages the potential of mobile commerce, thus ensuring organization competitiveness in the digital marketplace.



a) UTAUT b) TAM c) CT

Figure 4. Theories related to e-commerce for Malaysia

Singapore adopted CT and Game Theory (GT) (Figure 5), which occurred within the same cluster. Besides, it shares some similar terms such as algorithms, AI, iterative methods, competition, risk management, and among others. The technology adoption enables organisation enhance operational efficiency, and decision-making within a competitive landscape. The integration discussed serves as the fundamental basis for a business strategic and data-oriented approach.



a) CT b) GT

Figure 5. Theories related to e-commerce for Singapore

For Thailand, TAM was the widely use theory in articles (Figure 6), whereby related to trust, mobile commerce, websites, service quality, AI, quality of service, and among others.

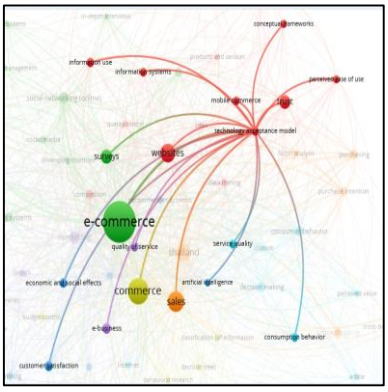
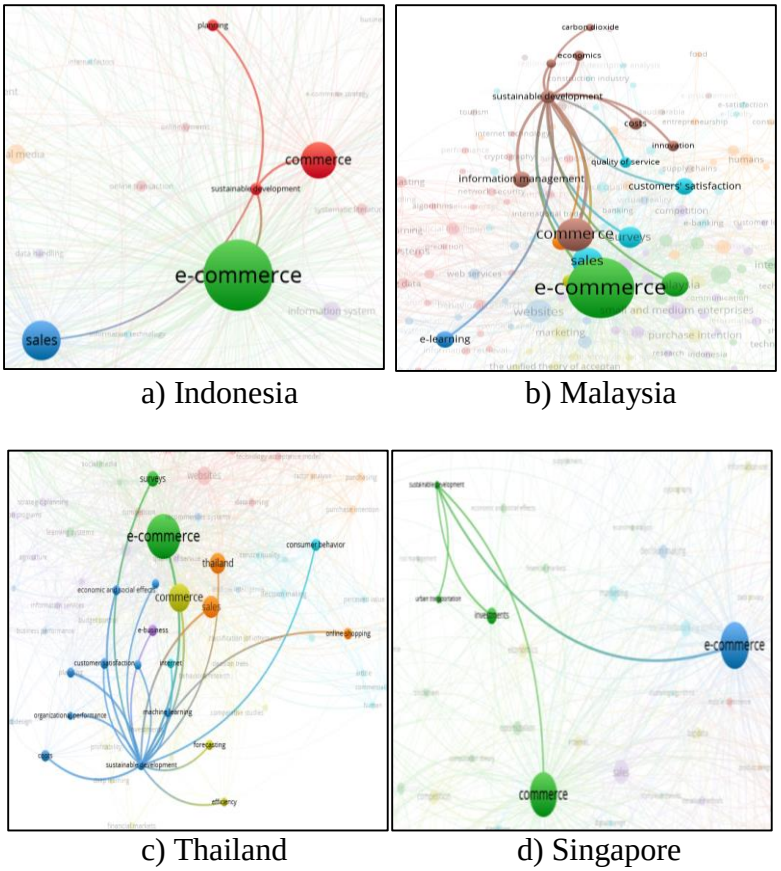


Figure 6. Theories related to e-commerce for Thailand

ASEAN-5: E-commerce and sustainable development

ASEAN-5 countries except Philippines, supported United Nation Sustainable Development Goals 2030 (SDG2030) initiative, although in the different pathway. Malaysia and Thailand were the most concern of the sustainable development. For Indonesia, sustainable development is general highlighted, whereby related to common terms such as sales, commerce, e-commerce, as well as planning (Figure 7a). For Malaysia, sustainable development associated with carbon dioxide, economics, regional planning, costs, innovation, information management, and commerce (Figure 7b). Malaysia adopted multifaceted character such as innovation, economics and environment aspects. The non-within cluster terms includes e-learning, quality of service, customer satisfaction, surveys, sales, decision making, as well as economics and social effects, and among others. This association possible form a framework for optimizing educational experiences to driving positive outcomes.



a) Indonesia b) Malaysia

c) Thailand d) Singapore

Figure 7. Sustainable development related to e-commerce for ASEAN-5

For Thailand related to costs, organizational performance, machine learning, customer satisfaction, planning, economics and social effect, as well as supply chains management (Figure 4c). Besides, the non-within cluster terms associated with sales, online shopping, consumer behavior, forecasting, e-business, commerce, efficiency, and among others. This integration has provided eco-conscious among consumers, and fosters environmentally responsible business practices. For Singapore, sustainable development is briefly discussed and only related to urban transportation, investment, e-commerce, and commerce (Figure 7d).

ASEAN-5: E-commerce and e-government

E-government initiatives shape ASEAN-5 e-commerce and sustainable development landscape efforts. These create digital transformation by encouraging policy frameworks, infrastructure, and trust. For example, the Indonesia National Digital Transformation Framework provided a seamless integration of public services with digital platforms. This has streamlined administrative processes and enhanced online marketplaces accessibility and reliability. Besides, the Malaysia Digital Economy Blueprint concentrate in e-government as a driver for expanding digital trade and economic growth inclusion, in which align on high-quality academic contributions. Besides, the intercepts between e-government and e-commerce are evident in efforts to promote sustainability. The digital platforms developed enable data collection and analysis to optimize logistics, reduce waste, and promote environmentally friendly practices. The Thailand Smart Cities initiative has

involved digital commerce as part of its broader goals. In addition, e-government initiatives improve trust and security in e-commerce platforms. Data privacy, cybersecurity, and digital payments policies provide a conducive transactions environment. This interaction ensuring equitable access to underserved groups.

ASEAN-5 government play important roles in e-commerce development, except Singapore (Table 13). The e-government for Indonesia and Malaysia were highlighted with e-commerce. However, e-government is essential for Thailand and Philippines. For Thailand, governments utilizing digital industry to improve their service offerings. Digital marketing tactics play a crucial role in the promotion of e-government services, and urban regions agriculture. The online platforms serve as intermediaries, in which connected farmers with markets through information and agricultural products. The process includes the formulation of strategic plans, and implementation of user-friendly application programs to meet the specific needs. Through customer feedback satisfaction, these enable provision of high-quality services. The integration concepts establish synergy between technology, government, commerce, and agriculture, highlighting the interconnection of various disciplines in the digital age.

For Philippines, e-government initiatives comprising e-governance and government data processing. It demonstrates authority holds a prominent position in the country. The decision-making is guided by a substantial amount of data. With the rise of mobile computing and the proliferation of mobile applications, the provision facilitates citizen engagement with government services and data. Data analysis techniques, such as data mining and sentiment analysis, are utilized to analyze the data gathered. Data mining enable to identify patterns, hence facilitating the decision-making. Sentiment analysis used to evaluate current public sentiment and assist governments in understanding public reaction on policies and services. Furthermore, the incorporates e-learning portals to ensure public access accurate information.

Table 13. E-commerce and e-government

Country	Associate keywords with e-government
Indonesia	E-commerce
Malaysia	E-commerce
Thailand	Electronics industry, digital marketing, agriculture, information services, design, strategic planning, application programs, customer satisfaction, quality of services, etc
Philippines	Decision making, mobile computing, mobile applications, mobile commerce, websites, data analysis, e-governance, government data processing, data mining, sentiment analysis, customer satisfaction, surveys, e-learning, etc

Conclusion

The objective of this study is to conduct a bibliometric analysis on the e-commerce research articles comprised in the Scopus journal. This analysis will involve the utilization of VOSviewer software to examine the distribution of bibliometric maps. The data obtained is the result of filtering based on the keyword e-commerce for ASEAN-5 countries, published between the year 2013 to 2022. The findings the ASEAN-5 countries show variability patterns, but reveal an increasing trend over the 10 years. Indonesia emerged as the leading contributor. Indonesia shift attributed towards digital transformation investment, rapid e-commerce sector expansion, and

government initiatives. In contrast, Malaysia focus on high-quality peer-reviewed research. The findings also highlight dissemination strategies within ASEAN-5. Philippines and Indonesia relying heavily on conference papers for quicker dissemination, meanwhile Malaysia and Singapore focus on journal articles reflecting a focus on academic global visibility.

Based on the minimum number of occurrences of five keywords setting, had the highest frequency. The dataset items then categorized into clusters. ASEAN-5 documents employed theories, except Philippines. Majority of associated theories are based on customer behavior, except Singapore emphasis on mathematical concepts. Furthermore, ASEAN-5 nations, except Philippines, demonstrated support for the SDG2030 initiative, although in different manners. Malaysia and Thailand were the most concerned on sustainable development. The governments play significant roles in the development of e-commerce excepts Singapore. Indonesia and Malaysia briefly emphasized e-government initiatives. However, e-government greatest significance for both Thailand and Philippines.

This study serves as a significant resource and a subject of reflection for scholars who are interested in exploring deeper into areas of e-commerce study within ASEAN region. It is crucial to acknowledge that this bibliometric research is limited to scholarly publications exclusively found within the Scopus database. Furthermore, it is recommended to conduct assessments from multiple database such as the Web of Science, Dimensions, and Lens databases. By broadening the range of data sources employed, a more in-depth understanding of the subject matter can be attained.

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