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A Computational Bibliometric Analysis of E-Groceries Analysis Using VOSviewer

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ABSTRACTS

The purpose of the research is to combine mapping analysis with VOSviewer as well as Publish or Perish software to do a computerized bibliometric analysis of the topic "E-Groceries Analysis." The method used descriptive-quantitative approach in conjunction with bibliometric analysis in which the data were retrieved from Google Scholar. Based on the results, E-Groceries Analysis research decreases every year, proven by the fact that 2018 have 25 articles and increased to 32 articles in 2019, 49 articles in 2020, and 98 articles in 2021. Based on further findings of this research, it can be concluded that there are several understudied sectors in E-Groceries Analysis that may be examined further to increase the efficacy of E-Groceries analysis. This research is also anticipated to serve as a reference for future research in defining and assessing the research subject, as well as a reference for field to be studied in E-Groceries analysis.

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1. INTRODUCTION

The customary sequences that were once employed when completing daily tasks, including shopping, have been disturbed and re-combined, both in time and place, as a result of the Internet today (Couclelis, H. 2000). Online shopping does certainly allow customers to buy goods or services from a seller over the Internet, fundamentally changing the procedures involved in information gathering, comparison, and use, as well as purchase and delivery. People who use e-commerce can purchase products using their mobile devices while, for instance, traveling to work or waiting at the train station without having to adhere to the store's precise opening and closing hours. Consumer behavior is significantly altered by the evolution of shopping, and this behavior is closely related to transportation (Suel, E., & Polak, J. W. 2017).

With grocery shopping being the most popular and regular form of retail therapy, it has a particularly negative impact on the environment and urban freight transportation. However, depending on customer behaviour and last mile delivery strategies, switching from in-store to online purchasing can have both good and bad effects on transportation. In greater detail, it is evident that when customers order groceries online and want home delivery, the burden of the freight travels is transferred from the customer to the store.

Instead, the final effect on urban freight transportation is unpredictable because it relies on the kind of product, how often people shop, why they purchase, whether trips are chained together, and how quickly efficiency must be achieved (Mokhtarian, P. L. 2004).

Therefore, this study aims to conduct a bibliometric analysis on the topic of purchasing decisions in using the E-Groceries service. This method uses a mixed method with a literature review, Publish or Perish to collect data and Vosviewer to visualize the relationship between terms as well as other things such as research trends throughout the year. It is hoped that this research will contribute to finding the fields proposed in the topic of E-Groceries Analysis. E-Groceries analysis is a business model that applies information technology to establish communication relationships and conduct transactions with customers regarding products, services and distribution systems through internet media (Muhammad, N. S., et al 2016).

Previous study regarding E-Groceries analysis have been conducted. Ayudhia et al. conducted a study regarding E-Groceries analysis of business model. Pico and Barcelo also conducted a study regarding E-Groceries study, which focuses on organic matter and microplastics. According to Pico and Barcelo, Py-GC-MS is a valuable technique for E-Groceries analysis specially to cover crucial E-Groceries aspects (Pico, Y., & Barcelo, D. 2020). Besides, plenty of bibliometric analysis research on various fields, such as Computer Science (Al Husaeni, D. F., & Nandiyanto, A. B. D. 2022), Educational Research (Al Husaeni, D. F., et al 2023), High school (Al Husaeni, D. N., & Nandiyanto, A. B. D. 2023), Techno-Economic Education (Ragadhita, R., & Nandiyanto, A. B. D. 2022), Materials Research (Nandiyanto, A. B. D., et al 2020), Vocational School (Al Husaeni, D.

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N., & Nandiyanto, A. B. D. 2023), Digital Learning (Al Husaeni, D. F., & Nandiyanto, A. B. D. 2022), Scientific Publications (Mulyawati, I. B., & Ramadhan, D. F. 2021), Bioenergy Management (Soegoto, H., et al., 2022), Chemical Engineering (Nandiyanto, A. B. et al 2021), Special Needs Education (Al Husaeni, D. F., et al., 2023), and Covid-19 (Hamidah, I., Sriyono, S., & Hudha, M. N. 2020). However, there have not been a bibliometric analysis regarding E-Groceries analysis.

Therefore, this research aims to conduct a bibliometric analysis on the topic of E-Groceries analysis. The method used mixed method with literature review, Publish or Perish 8 to gather the data and Vosviewer to visualize the connection between terms as well as other things such as research trend along the year. It is hoped that this research would contribute to discover the understudied fields in the topic of E-Groceries Analysis.

2. METHOD

Descriptive-quantitative approaches were applied in this study. In addition, Literature review were conducted to gain insights based on previous researches on Bibliometric analysis as well as the topic of E-Groceries analysis. We collected the articles from journals indexed by Google Scholar, due to its accessibility.

Publish or perish was chosen to gather the bibliometric data from Google Scholar (Al Husaeni, D. F., & Nandiyanto, A. B. D. 2022). Then, the bibliometric data were saved in *.ris, and *.csv format to be used in VOSviewer software and to be converted into *.xlsx to be analyzed further. The software version that is used in this research is Publish or Perish 8 and VOSviewer 1.6.17.

In this research, we sifted through facts and used relevant facts to make arguments under the topic E-Groceries Analysis. We retrieve the data from Google Scholar by entering the keyword "E-Groceries Analysis" for to the title, keyword, and abstract requirements in the Publish or Perish software. We obtained 993 articles on E-Groceries Analysis research published between 2017 and 2021. The collected articles are then saved in *.ris format to be visualized in VOSviewer software in the form of visualization map, and to analyze the research trend in the form of bibliometric maps. Before creating the map, irrelevant terms were filtered in the visualization map (Allan, R. N., et al., 1984). The visualization map is classified into three types: Network visualization, Overlay visualization, and Density visualization.

3. RESULTS AND DISCUSSION

3.1. Research developments in the field of E-Groceries Analysis

Research on climate development in the field of E-Groceries Analysis, Describes the development of research in the field of E-Groceries Analysis from 2018 to 2021 in Fig. 1.

Figure 1 shows that the research on E-Groceries Analysis decreases every year. This can be proven by the fact that there are 25 articles in 2018, 32 articles in 2019, 49 articles in 2020, and lastly 98 articles in 2021. Based on the search results in the Publish or Perish, there are 263 articles that match the research topic. 16 articles with the most citations from 16 different publishers were shown in Table 1.

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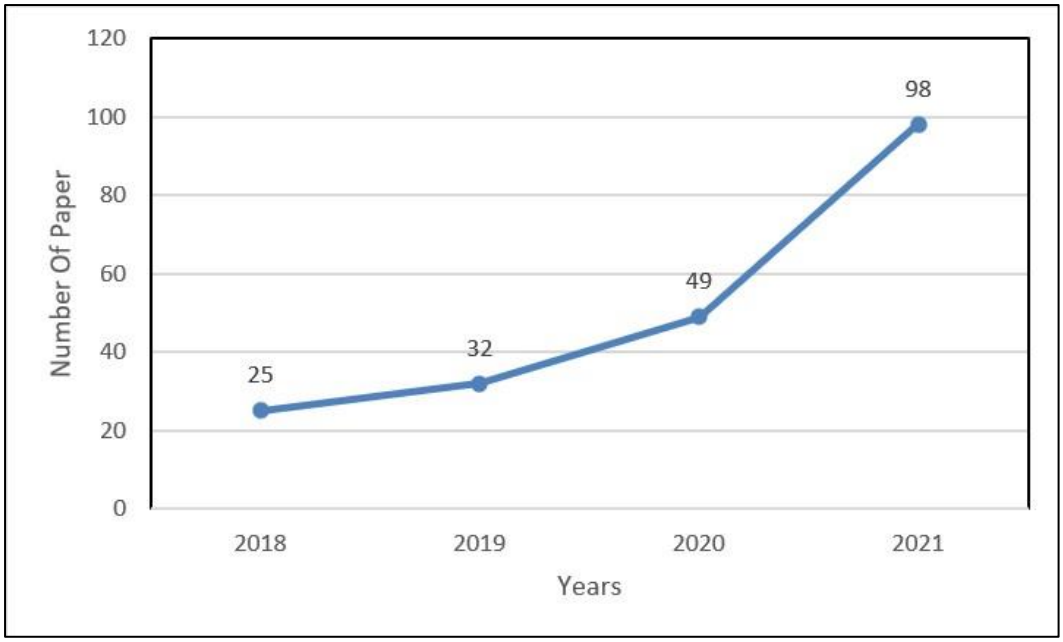

Fig. 1. Level of research development on E-Groceries Analysis

Table 1. Article Data in the Field of E-Groceries Analysis

No	Authors	Title	Publisher	Year	Cites	Refs
1.	OA Hjelkrem., et al.	E-groceries: Sustainable last mile distribution in city planning	Wiley Online Library	2021	255	(Bjørgen, A., et al., 2021)
2.	C Fikar	A decision support system to investigate food losses in e-grocery deliveries	westminsterresearch.westminster.ac	2018	63	(Fikar, C. 2018)
3.	BY Ekren., et al.	Lateral inventory share-based models for IoT-enabled E-commerce sustainable food supply networks	University of Jaffna	2021	57	(Ekren, B. Y., et al., 2021)

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Table 1 (Continue). Article Data in the Field of E-Groceries Analysis

No	Authors	Title	Publisher	Year	Cites	Refs
4.	C Thommis	Logistieke uitdagingen in e-groceries	uis.brage.unit.no	2021	52	(Thommis, C. 2021)
5.	M Fernandez Vazquez-Noguerol.	Modeling and optimization of the supply chain in e-groceries	uir.unisa.ac.za	2021	46	(Fernandez V, N, M. 2021)
6.	M Mees.	E-groceries: The Effects of Simulated Sensory Information and Freshness Guarantee Information on Consumer Uncertainty.	uijrt.com	2019	44	(Mees, M. 2019)
7.	C Berggren., & S Wikström	Barriers Online: Exploring Consumers' Resistance to E-groceries	ubiblioruum.ubi.pt	2018	43	(Berggren, C., & Wikström, S. 2018)
8.	AI Pujol	Digital nudging to enhance sustainable purchasing behaviours in e-groceries	turcomat.org	2020	42	(Pujol, A. I. 2020)
9.	MFV Noguerol	Modeling and optimization of the supply chain in e-groceries	thesis.cust.edu.pk	2021	40	(Noguerol, M. F. V. 2021)

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Table 1 (Continue). Article Data in the Field of E-Groceries Analysis

No	Authors	Title	Publisher	Year	Cites	Refs
10.	J Meijboom	Waste reduction in e-groceries fulfilment center: A case study at Picnic	theseus.fi	2019	38	(Meijboom, J. 2019)
11.	P Gunawardana., & PIN Fernando	Does Customer Trust Mediate the Impact of e-Service Quality Dimensions? Lessons during COVID-19 Pandemic	tesi.luiss.it	2021	30	(Gunawardana, P. K. A. T. D. R., & Fernando, I. 2021)
12.	P Gunawardana., & PIN Fernando	Does customer trust impact on e-service quality dimensions during covid-19 pandemic?	iopscience.iop.org	2021	29	(Gunawardana, P. K. A. T. D. R., & Fernando, I. 2021)
13.	P Gunawardana., & PIN Fernando	Assessing the Mediation Role of the Customer Trust On E-Service Quality: Lessons During Covid-19 Pandemic	Cambridge University Press	2021	28	(Gunawardana, P. K. A. T. D. R., & Fernando, I. 2021)
14.	Y KUSNADI., & G PAN	Developing online business strategy with millennials through partnership with university	sne-journal.org	2020	15	(Kusnadi, Y., & PAN, G. 2020)

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Table 1 (Continue). Article Data in the Field of E-Groceries Analysis

No	Authors	Title	Publisher	Year	Cites	Refs
15.	VC Echrler., et al.	Challenges and perspectives for the use of electric vehicles for last mile logistics of grocery e-commerce–Findings from case studies in Germany	sljmuok.sljol.info	2021	15	(Ehrler, V. C., et al., 2021)
16.	M Waitz., et al.	A decision support system for efficient last-mile distribution of fresh fruits and vegetables as part of e-grocery operations	search.proquest.com	2018	13	(Waitz, M., Mild, A., & Fikar, C. 2018)

In Table 1 there are 16 articles that match the criteria research. Of the 16 selected articles, showing that highest quote related to E-Groceries Analysis research is 255, while with the lowest citation is 13. That in Table 1, it shows that in 2018 and 2021, each has articles with quotes highest. In 2018-2021, the most articles quoted is 255 articles. Temporary that, in 2018, a lot of articles quoted are 63 articles. Year with quote the most is in 2021 as many as 255 articles.

3.2. Visualization E-Groceries Analysis topic area using VOSviewer

Visualization map of E-Groceries Analysis topic was created using VOSviewer software. According to Al Husaeni and Nandiyanto, two terms set are the minimum number of relationships when creating map using VOSviewer software (Peters, C. I. 1975). The generated map has 10 items (terms) with a total of 3 clusters, 18 links, and total link strength of 166 (See Fig. 2). Cluster 1 is indicated by red; Cluster 2 is shown in green; Cluster 3 is shown in dark blue.

Figure 2 is the Network Visualization map generated by VOSviewer based on the terms present in collected data. The collected articles have a total of 10 terms (in the form of items) and were categorized into 3 clusters. In addition, it has the total link strength of 166 and total links of 18. The item categorization is determined based on the connection

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strength of the terms with each other, further detail of each cluster is shown in Figs. 3 - 7. Items on each cluster are as follows:

(i) Cluster 1 (4 items)

Customer, E-Grocery, Home delivery, Supply chain

(ii) Cluster 2 (3 items)

Feature, Main Content Skip, Skip

(iii) Cluster 3 (3 items)

Covid, Pandemic, Role

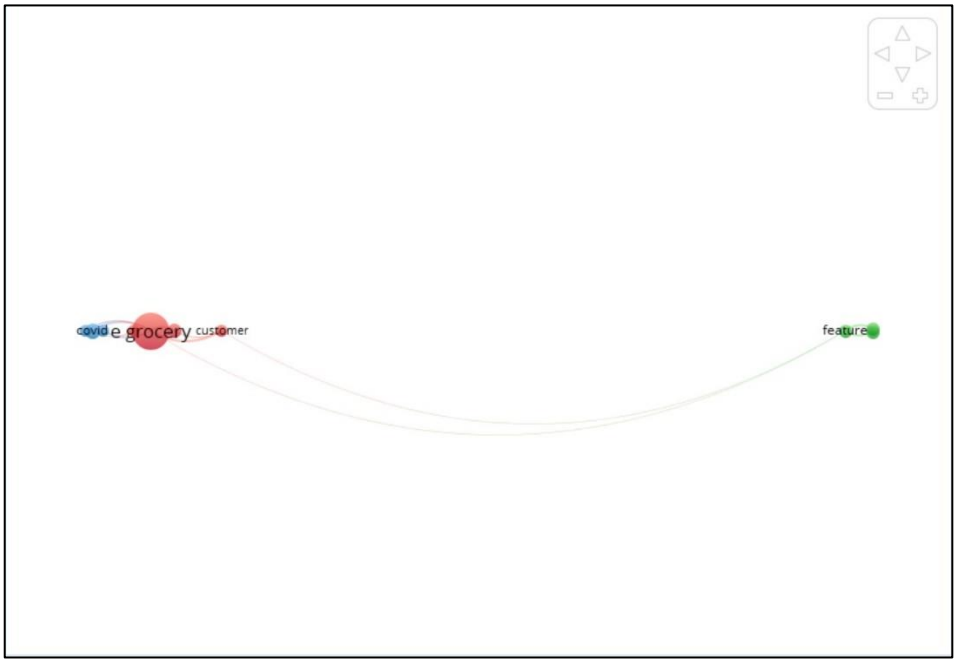

Fig. 2. Network Visualization map of E-Groceries Analysis

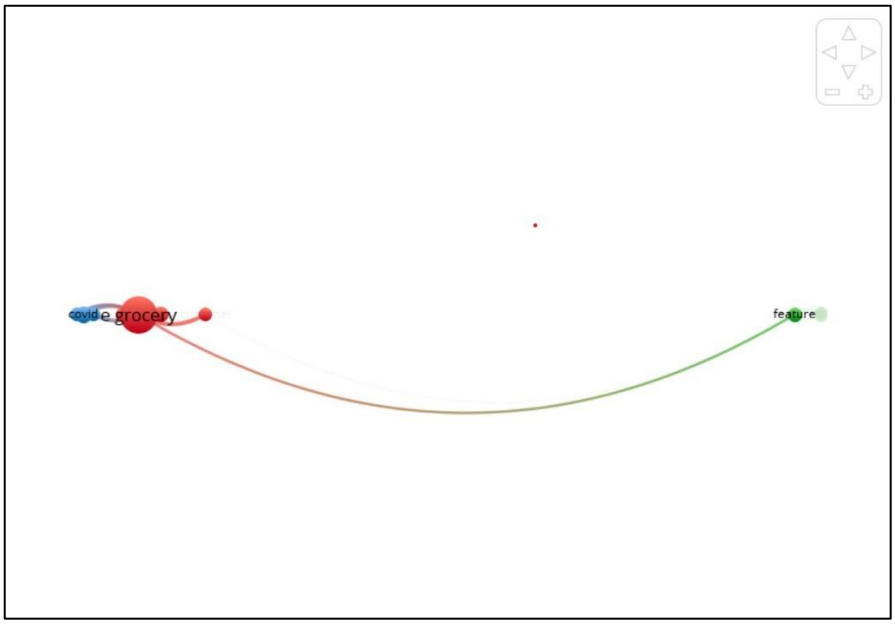

Fig. 3. Cluster 1 Visualization E-Groceries Analysis Network.

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The main node in Cluster 1 is the term 'E-Groceries', this node linked to several other nodes in cluster 1 namely, 'supply chain', 'costumer', and 'home delivery'. In addition, it also linked to the nodes in the other cluster, such as

- 'supply chain', 'costumer', and 'home delivery' in Cluster 1
- 'Feature', 'Main Content Skip', and 'Skip' in Cluster 2
- 'Covid', 'Pandemic', and 'Role' in Cluster 3

The main node in Cluster 2 is the term, E-Groceries Feature, this node linked to several other nodes in cluster 2 namely, 'skip', and 'Main content Skip'. In addition, it also linked to the nodes in the other cluster, such as

- 'supply chain', 'costumer', and 'home delivery' in Cluster 1
- 'Feature', 'Main Content Skip', and 'Skip' in Cluster 2
- ' Covid', 'Pandemic', and 'Role' in Cluster 3

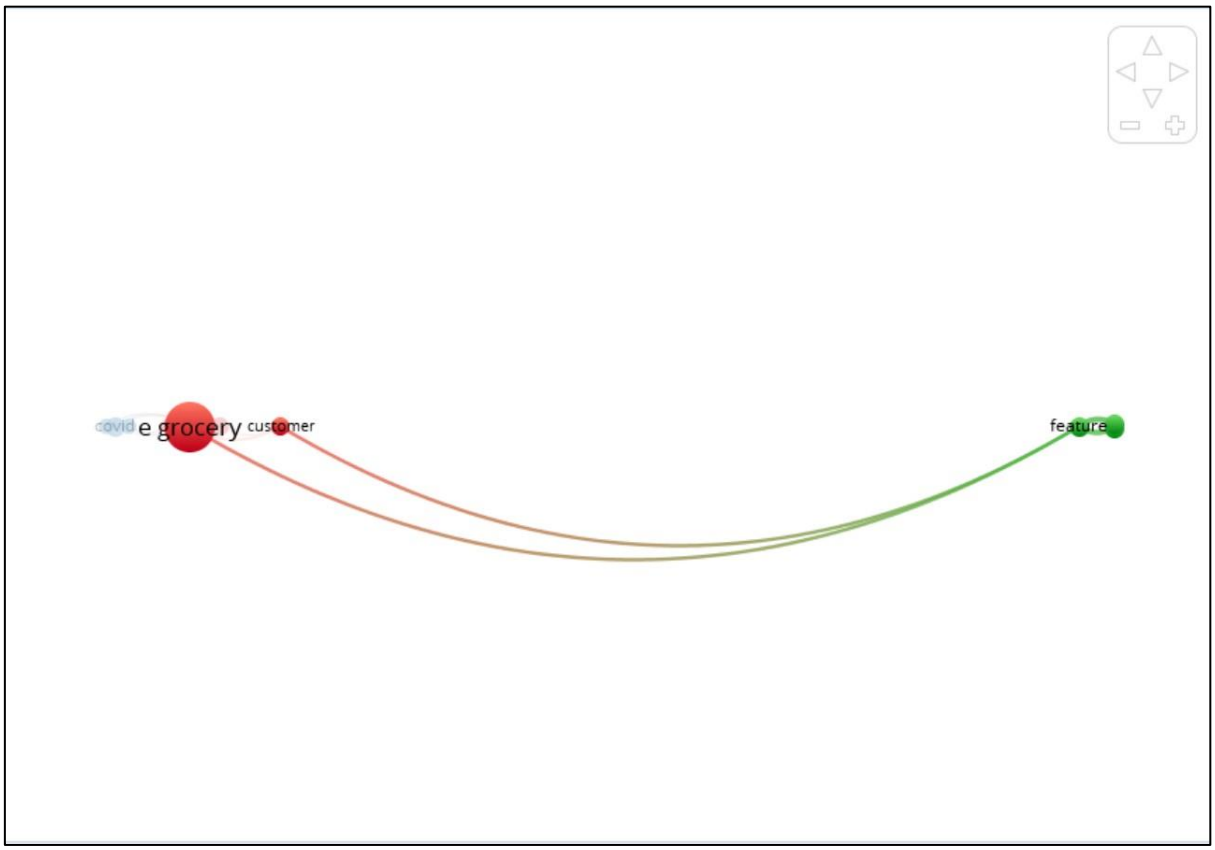

Fig. 4. Cluster 2 Visualization E-Groceries Analysis network.

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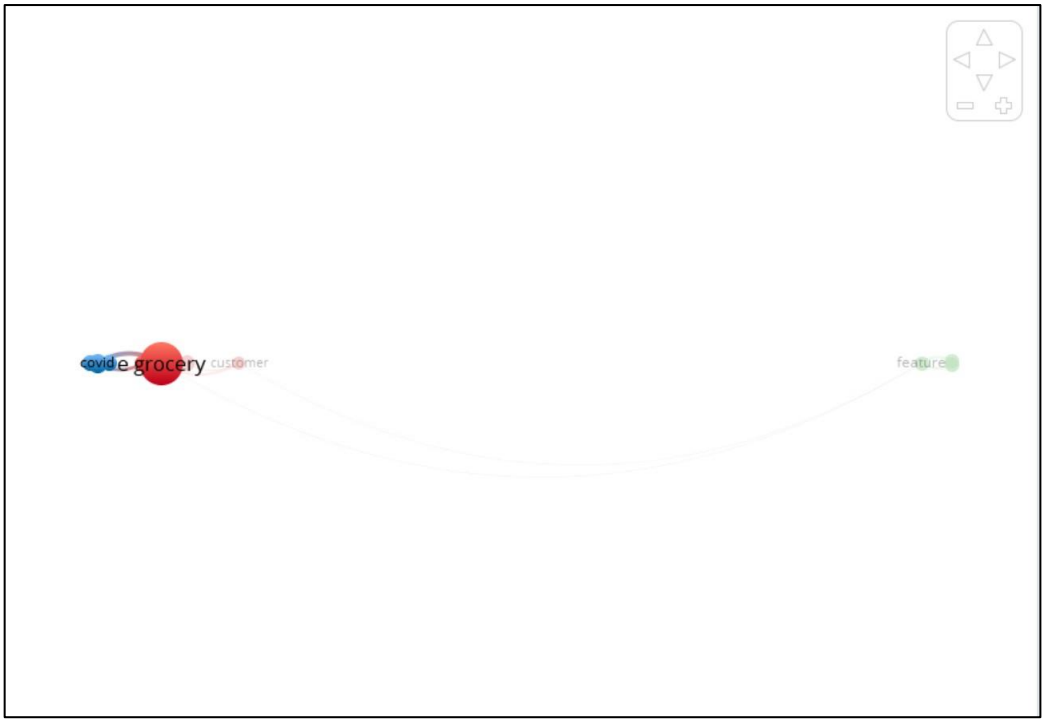

Fig 5. Cluster 3 Visualization E-Groceries Analysis network.

3.3. Overlay Visualization map of E-Groceries Analysis

Overlay Visualization map visualize the research trend of keywords in each year. Different coloration indicates the year in which terms are commonly used. Darker color indicates that the keyword is commonly appear on older years while bright color indicates that the keyword commonly appears on recent year.

In Fig. 6, the majority of keywords seems to be popular on older years. However, there are recently emerging keywords in the collected data such as 'covid', 'E-Grocery', 'customer', 'feature'. These keywords can be linked to recent situations such as the Covid-19 pandemic and the effort to minimize carbon footprint and green energy development in the name of saving the environment.

3.4. Density Visualization of E-Groceries Analysis

Density Visualization aims to show the frequency of occurrence of terms in the collected data. Color intensity and size is the primary indicator of density, so an item that have a large and bright coloration means that the keyword appears frequently in the collected data and vice versa. The density visualization is shown in Fig. 7.

Visualization density about climate E-Groceries Analysis research is in the picture above, which means that on the map density showing results analysis use all article regarding E-Groceries Analysis in 2018-2022. In Fig. 7, it is depicted that there are some color terms that is there is color yellow with a fairly large diameter. These terms called evidence, E-Grocery, covud, customer, and feature.

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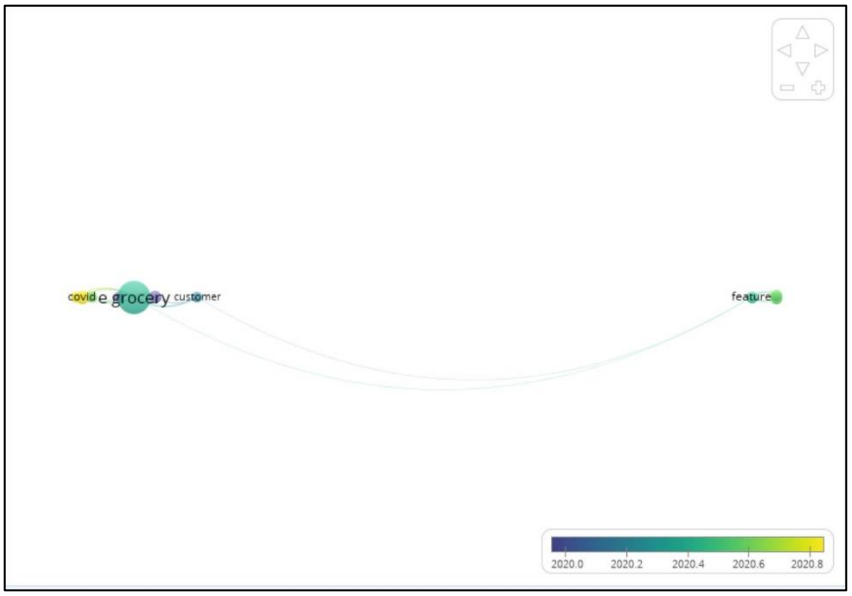

Fig. 6. Overlay E-Groceries Analysis visualization

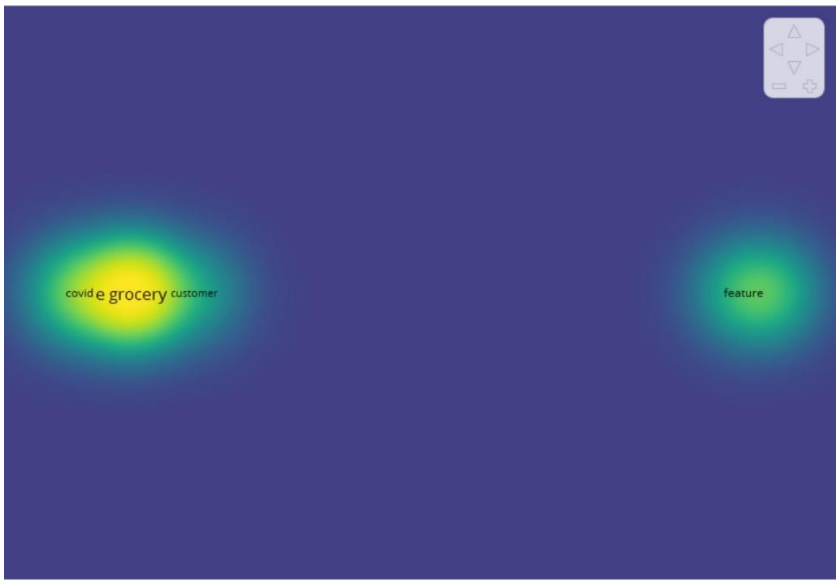

Fig. 7. Density Visualization map of E-Groceries Analysis

4. CONCLUSION

The conclusion in this study is that there are many topics that are poorly explored in the field of E-Groceries analysis for example, cluster 1 is "E-Groceriey", Cluster 2 "feature", Cluster 3 "covid". It is hoped that this research will contribute to finding the field studied in the topic of E-Groceries Analysis

REFERENCES

Al Husaeni, D. F., & Nandiyanto, A. B. D. (2022). Bibliometric using Vosviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre

DOI: https://doi.org/10.34010/injiiscom.v4i1.9586
p-ISSN 2810-0670 e-ISSN 2775-5584

and post Covid-19 pandemic. *ASEAN Journal of Science and Engineering, 2*(1), 19-46.

Al Husaeni, D. F., & Nandiyanto, A. B. D. (2022). Bibliometric using Vosviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post Covid-19 pandemic. *ASEAN Journal of Science and Engineering, 2*(1), 19-46.

Al Husaeni, D. F., & Nandiyanto, A. B. D. (2022). Mapping visualization analysis of computer science research data in 2017-2021 on the google scholar database with vosviewer. *International Journal of Informatics, Information System and Computer Engineering (INJIISCOM), 3*(1), 1-18.

Al Husaeni, D. F., Nandiyanto, A. B. D., & Maryanti, R. (2023). Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research. *Indonesian Journal of Teaching in Science, 3*(1), 1-8.

Al Husaeni, D. F., Nandiyanto, A. B. D., & Maryanti, R. (2023). Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research. *Indonesian Journal of Teaching in Science, 3*(1), 1-10.

Al Husaeni, D. N., & Nandiyanto, A. B. D. (2023). Bibliometric analysis of high school keyword using VOSviewer indexed by google scholar. *Indonesian Journal of Educational Research and Technology, 3*(1), 1-12.

Al Husaeni, D. N., & Nandiyanto, A. B. D. (2023). Bibliometric analysis of high school keyword using VOSviewer indexed by google scholar. *Indonesian Journal of Educational Research and Technology, 3*(1), 1-12.

Allan, R. N., Billinton, R., & Lee, S. H. (1984). Bibliography of the application of probability methods in power system reliability evaluation 1977-1982. *IEEE Power Engineering Review*, (2), 24-25.

Berggren, C., & Wikström, S. (2018). Barriers Online: Exploring Consumers' Resistance to E-groceries.

Bjørgen, A., Bjerkan, K. Y., & Hjelkrem, O. A. (2021). E-groceries: Sustainable last mile distribution in city planning. *Research in Transportation Economics, 87,* 100805.

Couclelis, H. (2000). From sustainable transportation to sustainable accessibility: Can we avoid a new tragedy of the commons?. *Information, place, and cyberspace: Issues in accessibility*, 341-356.

DOI: https://doi.org/10.34010/injiiscom.v4i1.9586
p-ISSN 2810-0670 e-ISSN 2775-5584

Ehrler, V. C., Schöder, D., & Seidel, S. (2021). Challenges and perspectives for the use of electric vehicles for last mile logistics of grocery e-commerce–Findings from case studies in Germany. *Research in Transportation Economics, 87*, 100757.

Ekren, B. Y., Mangla, S. K., Turhanlar, E. E., Kazancoglu, Y., & Li, G. (2021). Lateral inventory share-based models for IoT-enabled E-commerce sustainable food supply networks. *Computers & Operations Research, 130*, 105237.

Fernandez Vazquez-Noguerol, M. (2021). *Modeling and optimization of the supply chain in e-groceries* (Doctoral dissertation, Organización de empresas e márketing).

Fikar, C. (2018). A decision support system to investigate food losses in e-grocery deliveries. *Computers & Industrial Engineering, 117*, 282-290.

Gunawardana, P. K. A. T. D. R., & Fernando, I. (2021). Does Customer Trust Mediate the Impact of e-Service Quality Dimensions? Lessons during COVID-19 Pandemic (preprint).

Gunawardana, P. K. A. T. D. R., & Fernando, I. (2021). Does Customer Trust Mediate the Impact of e-Service Quality Dimensions? Lessons during COVID-19 Pandemic.

Gunawardana, P. K. A. T. D. R., & Fernando, P. I. N. (2021). Assessing the Mediation Role of the Customer Trust On E-Service Quality: Lessons During Covid-19 Pandemic. *Sri Lanka Journal of Marketing, 7*(3), 105.

Hamidah, I., Sriyono, S., & Hudha, M. N. (2020). A Bibliometric analysis of Covid-19 research using VOSviewer. *Indonesian Journal of Science and Technology*, 34-41.

KUSNADI, Y., & PAN, G. (2020). Developing online business strategy with millennials through partnership with university.

Mees, M. (2019). *E-groceries: The Effects of Simulated Sensory Information and Freshness Guarantee Information on Consumer Uncertainty.*

Meijboom, J. (2019). Waste reduction in e-groceries fulfilment center: A case study at Picnic.

Mokhtarian, P. L. (2004). A conceptual analysis of the transportation impacts of B2C e-commerce. *Transportation, 31*, 257-284.

Muhammad, N. S., Sujak, H., & Abd Rahman, S. (2016). Buying groceries online: the influences of electronic service quality (eServQual) and situational factors. *Procedia Economics and Finance, 37*, 379-385.

DOI: https://doi.org/10.34010/injiiscom.v4i1.9586
p-ISSN 2810-0670 e-ISSN 2775-5584

Mulyawati, I. B., & Ramadhan, D. F. (2021). Bibliometric and visualized analysis of scientific publications on geotechnics fields. *ASEAN Journal of Science and Engineering Education, 1*(1), 37-46.

Nandiyanto, A. B. D., Al Husaeni, D. N., & Al Husaeni, D. F. (2021). A bibliometric analysis of chemical engineering research using vosviewer and its correlation with covid-19 pandemic condition. *Journal of Engineering Science and Technology, 16*(6), 4414-4422.

Nandiyanto, A. B. D., Girsang, G. C. S., Maryanti, R., Ragadhita, R., Anggraeni, S., Fauzi, F. M., ... & Al-Obaidi, A. S. M. (2020). Isotherm adsorption characteristics of carbon microparticles prepared from pineapple peel waste. *Communications in Science and Technology, 5*(1), 31-39.

Noguerol, M. F. V. (2021). *Modeling and optimization of the supply chain in e-groceries* (Doctoral dissertation, Universidade de Vigo).

Peters, C. I. (1975). *Method of Antenna Tuning*. DEPARTMENT OF THE NAVY WASHINGTON DC.

Pico, Y., & Barcelo, D. (2020). Pyrolysis gas chromatography-mass spectrometry in environmental analysis: Focus on organic matter and microplastics. *TrAC Trends in Analytical Chemistry, 130*, 115964.

Pujol, A. I. (2020). Digital nudging to enhance sustainable purchasing behaviours in e-groceries.

Ragadhita, R., & Nandiyanto, A. B. D. (2022). Computational bibliometric analysis on publication of techno-economic education. *Indonesian Journal of Multidiciplinary Research, 2*(1), 213-220.

Soegoto, H., Soegoto, E. S., Luckyardi, S., & Rafdhi, A. A. (2022). A bibliometric analysis of management bioenergy research using vosviewer application. *Indonesian Journal of Science and Technology, 7*(1), 89-104.

Suel, E., & Polak, J. W. (2017). Development of joint models for channel, store, and travel mode choice: Grocery shopping in London. Transportation Research Part A: *Policy and Practice, 99*, 147-162.

Thommis, C. (2021). Logistieke uitdagingen in e-groceries.

Waitz, M., Mild, A., & Fikar, C. (2018). A decision support system for efficient last-mile distribution of fresh fruits and vegetables as part of e-grocery operations.

DOI: https://doi.org/10.34010/injiiscom.v4i1.9586
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