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Bibliometric Analysis on Stimulus-Organism-Response Framework in the Area of E-Commerce and Social Commerce

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Abstract: This study aims to identify the trends of the publications and research topics. The areas covered are in the field of e-commerce and social commerce that use stimulus-organism-response as the framework. The study was conducted using bibliometric analysis and VOSviewer to visually represent the findings. Scopus was the database for the research and related keywords were constructed based on the study area. 267 publications from 2008 until 2024 were examined. The results revealed that the number of publications is increasing from year to year and the research topics were varied but still within the study area. The research gap between the topics was also identified in this study.

Keywords: *Stimulus-organism-response, E-commerce, Social commerce, Bibliometric analysis, VOSviewer.*

1. Introduction

The current trend of e-commerce allows sellers to perform live streaming on any e-commerce platform to promote and market their products to customers. Live streaming permits the sellers to describe the products more effectively by delivering the information together with the product demonstration. During the live streaming, customers could also ask the sellers questions directly. The interaction between these two parties would encourage engagement and gain trust, thus influencing the customers to buy the products. Research that had been done by (Ling *et al.*, 2024) Interpersonal interaction is comprised of consumer-anchor interaction and consumer-consumer interaction, which positively affects the purchase intention. The anchor or seller can provide information about the products straightaway and give feedback towards questions and comments by customers. Communication between customers could also enhance the product experience. According to Qi & Xiaoli (2024), the anchor's characteristics could impact customers' sustainability following the live e-commerce broadcast room. The characteristics highlighted in the study were credibility, professionalism, interactivity, and attractiveness. The professionalism and credibility of the anchors could gain customers' trust; therefore, when the anchors deliver information about the products, the customers would feel that the products are of good quality and would be attracted to them. The live broadcast of the e-commerce platform enables two-way communication between the anchors and the customers. Thus, all the doubt regarding the products could be reduced and eliminated. The attractiveness of the anchors also plays a vital role in attracting customers to purchase the product.

Another study that is related to the live-streaming was conducted by Shiu et al. (2023), mentioned that dynamic characteristics where customers can conveniently perform shopping attitudes without any limitations and restrictions, as well as atmosphere clues focused on the platform environment, like the interface design of the website and the content displayed, can lead to consumers' purchase intention. Meanwhile, atmosphere clues and perceived interactivity could support immersive experience and social interaction, thus predicting customers' desire to conduct e-commerce transactions. One of the features contributing to the popularity of e-commerce nowadays is a feature known as "Buy Now Pay Later" which enables customers to make payments later, and the payments can be made several times. This feature uses a FinTech solution, and typically, financial providers need to work together with the e-commerce platforms to allow this feature to be effective (Juita *et al.*, 2024).

Social commerce is similar to e-commerce except that the medium focuses more on social media platforms. The usage of social media is increasing because by having social media accounts, users not only manage to connect and interact with other users, share stories about daily life, distribute information, and for entertainment purposes but are also able to purchase products and get feedback or views regarding products not only from the seller but also from the other customers (Guo and Li, 2022). As we know, social media enables users to

establish a community, thus by having social commerce, sellers could develop and strengthen their community, enhance loyalty, interactivity, and collaboration among users of social commerce which are sellers or firms, customers, and normal users who are just simply looking for information (Molinillo *et al.*, 2021).

Stimulus-organism-response (SOR) is a framework that was modelled by Mehrabian and Russel in 1974, as cited in (Ma, Liu and Li, 2023). The framework has three factors. The stimulus is all the external environment factors that could influence the behavior of the individual. Organism denotes the emotional and cognitive mediated states when interacting with the stimulus. Finally, the response means the individual's reaction or behavior based on the stimulus and organism. The framework is widely used by researchers to explore the behavior of the individual when certain conditions are met. The study of behavior is really important in understanding the behavior of the customers, especially in what conditions the customers would purchase products.

Previous studies have discussed the interrelationship between SOR with e-commerce and social commerce.
A study conducted by Ling et al. (2024), to identify the customers' behavior, the researchers used the SOR framework where interpersonal interaction acted as a stimulus, psychological distance as an organism, and purchase intention as a response. Moreover, the study also included situational factors like brand identification and time pressure in the framework. Shiu et al. (2023) Also performed research to study customers' behavior using the SOR framework, but they used two theories, human information processing theory and flow theory, in the SOR framework. The theories emphasize how customers' information processing capability and the flow state of live-streaming platforms affect their sense of control or trust, which determines their purchasing behavior. Furthermore, the researchers identified streaming attributes that consist of two main attributes, which are situational influence (dynamic characteristics and atmosphere clues) and individual influence (perceived interactivity) as the stimuli, cognitive or affective states (immersive experience and social interaction) as the organism, and behavior (purchase intention) as the response. The SOR framework is not only used to study the customers' behavior but also to study the anchors' characteristics. An anchor that has good characteristics was believed could enhance the customers' experience while viewing the live broadcast (Qi and Xiaoli, 2024).

Because the popularity of online shopping through social media has increased, Guo & Li, (2022) Had done research on social commerce focusing on the features (interactivity, recommendations, and feedback) and these features acted as the stimuli in the SOR theory, the customer's perceived value (utilitarian value and hedonic value) as the organism, and the repurchase intention of the customer as the response. They wanted to know whether the platform's features could influence the customers to repurchase the products. Another study into the design of the platform was by Molinillo et al. (2021) Where the researchers focused on the design of the social commerce websites. They have identified environmental stimuli, namely information quality, service quality, rewards, and recognition; customer perceived value as the organism, and the three responses, namely repurchase intention, positive electronic word-of-mouth (eWOM) intention, and customer engagement behavior intention.

Based on the explanation of the Stimulus-Organism-Response (SOR) framework above, where the purpose is to study the behavior of customers in the area of e-commerce and social commerce, this research presents a bibliometric analysis. The aims of this research are

- to identify the number of publications and citations
- to investigate the trend of the SOR topics in conjunction with e-commerce and social commerce
- to analyze the research gap in the SOR framework.

2. Methodology

Bibliometric analysis is an analytical technique to summarize a large volume of data to identify trends within a certain research area. (Monoarfa *et al.*, 2024). It also can be used to uncover the leading trends of research topics and to analyze journals, institutions, and countries. (Merigo *et al.*, 2017). The research used a bibliometric analysis procedure that comprised four steps to conduct the analysis. (Donthu *et al.*, 2021). The following are the explanations for all the steps involved when performing the analysis.

Step 1: Define the aims and scope of the bibliometric study
The researcher identified the aim and scope of the research. As mentioned above, this research aims to identify the number of publications and citations, investigate the trend of the SOR topics in conjunction with e-commerce and social commerce, and analyze the research gap in the SOR framework. The scope of the study was to focus on the area of e-commerce and Social Commerce in the SOR framework. The area was large enough to conduct the bibliometric analysis.

Step 2: Choose the techniques for bibliometric analysis
The research emphasized discovering the themes in general and during specific periods of time. Meanwhile, for the performance analysis, the focus was on the authors, articles, total publications, total citations, and research topic.

Step 3: Collect the data for bibliometric analysis
Based on the first step, several keywords were identified according to the aim and scope of the study. The combination of the keywords is based on the previous literature and discussion among the researchers. The keywords are "stimulus-organism-response" OR "stimulus organism response" OR "SOR" OR "S-O-R", and "electronic commerce" OR "e-commerce" OR "e-commerce" OR "social commerce". The research used Scopus as the database. To find the relevant documents (articles), the researchers used Scopus searching format to search the articles. The researchers used a search format based on the title, abstract keywords (TITLE-ABS-KEY), and Boolean Operators. A total of 10,061 documents were generated from the keywords related to stimulus-organism-response. The advanced search was performed to focus on the research topics of e-commerce and social commerce. From the initial number of documents generated, the result became 375. The research was only limited to "English" and "journals" as the language and type of publication, and the final result was 267 documents generated. The documents generated resulted from the year 2008 until 2024.

Step 4: Run the bibliometric analysis and report the findings
The analysis was done by using an analysis tool in the Scopus Database and VOSviewer. VOSviewer is a software tool that can be used to create, visualize, and explore maps. There are three types of visualizations namely network visualization, overlay visualization, and density visualization. (van Eck and Waltman, 2013). After the analysis was completed, the findings were reported.

3. Results and Discussion

Figure 1 presents the total publications and total citations of the articles from 2008 to 2024 in the field of stimulus organism response that focused on e-commerce and social commerce topics. The number of total publications showed a steady growth except for 2009, when there was no article published on the topics, and in 2015 and 2017, the number of publications decreased. Even though in 2024 the result showed a decline, it can be explained that the data was collected in the middle of the year, with a few months remaining. Table 1 denotes the total number of publications from 2008 to 2024.

Figure 1: Total Publications (TP) and Total Citations (TC)

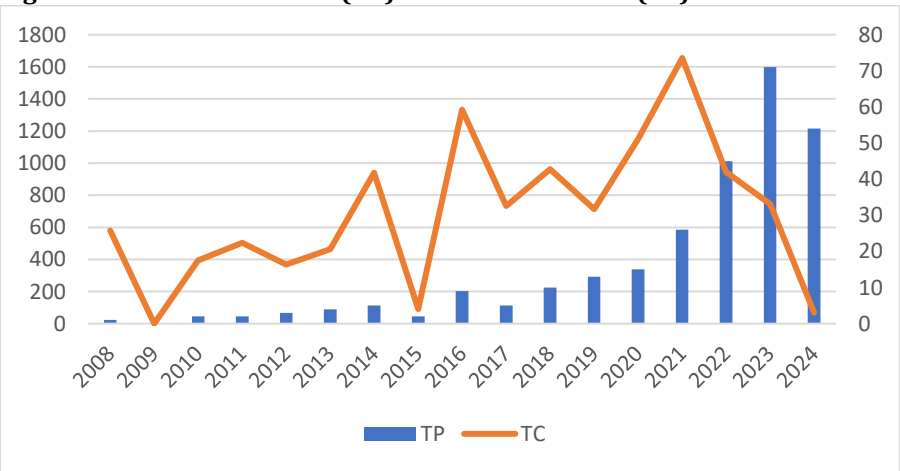


Table 1: Total Publications in 2008 – 2024

YEAR	TOTAL PUBLICATION	YEAR	TOTAL PUBLICATION
2008	1	2017	5
2009	0	2018	10
2010	2	2019	13
2011	2	2020	15
2012	3	2021	26
2013	4	2022	45
2014	5	2023	71
2015	2	2024	54
2016	9		

Table 2 depicts the total number of citations from 2008 to 2024. The highest number of citations were 1655 (2021) followed by 1333 (2016) and 1149 (2020). Table 3 presents twenty articles that have the highest number of citations. Popular articles discussed the area of social commerce, purchase intention, customer behavior, live streaming, and impulse buying. The article "What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences" had the most citations. This is because nowadays, customers tend to use social media to socialize and at the same time, it is very convenient to do online shopping using social media. Therefore, the areas related to the customers' behavior while using social media and the features of the media itself become a trending research area to be explored.

Table 2: Total Citations in 2008 – 2024

YEAR	TOTAL CITATION	YEAR	TOTAL CITATION
2008	580	2017	732
2009	0	2018	963
2010	395	2019	713
2011	504	2020	1149
2012	368	2021	1655
2013	463	2022	945
2014	940	2023	745
2015	92	2024	70
2016	1333		

Table 3: Mostly Cited Publications (TC = Total Citations)

AUTHORS	YEAR	TITLE	SOURCE	TC
Zhang, H., Lu, Y., Gupta, S., Zhao, L.	2014	What motivates customers to participate in social commerce? the impact of technological environments and virtual customer experiences	Information and Management, 51(8), pp.1017-1030	601
Chang, H.H., Chen, S.W.	2016	The impact of online store environment cues on purchase intention: Trust and perceived risk as a mediator	Online Information Review, 32(6), pp. 818-841	580
Zhang, K.Z.K., Benyoucef, M.	2016	Consumer behavior in social commerce: A literature review	Decision Support Systems, 86, pp. 95-108	431
Chan, T.K.H., Cheung, C.M.K., Lee, Z.W.Y	2017	The state of online impulse-buying research: A literature analysis	Information and Management, 54(2), pp. 204-217	397
Kang, K., Lu, J., Guo, L., Li, W.	2021	The dynamic effect of interactivity on customer engagement behavior through tie strength: Evidence from live streaming commerce platforms	International Journal of Information Management, 56, 102251	357
Koo, D.-M., Ju, S.-H.	2010	The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention	Computers in Human Behavior, 26(3), pp. 377-388	303
Floh, A., Madlberger, M.	2013	The role of atmospheric cues in online impulse-buying behavior	Electronic Commerce Research and Applications, 12(6), pp. 425-439	298
Li. H., Sarathy, R., Xu, H.	2011	The role of affect and cognition on online consumers' decision to disclose personal information to unfamiliar online vendors	Decision Support Systems, 51(3), pp. 434-445	298
Hu, M., Chaudhry, S.S.	2020	Enhancing consumer engagement in e-commerce live streaming via relational bonds	Internet Research, 30(3), pp. 1019-1041	284
Zhang, M., Ren, C., Wang, G.A., He, Z.	2018	The impact of channel integration on consumer responses in omni-channel retailing: The mediating effect of consumer empowerment	Electronic Commerce Research and Applications, 28, pp. 181-193	258
Liu, H., Chu, H., Huang, Q., Chen, X.	2016	Enhancing the flow experience of consumers in China through interpersonal interaction in social commerce	Computers in Human Behavior, 58, pp. 306-314	252
Xue, J., Liang, X., Xie, T., Wang, H.	2020	See now, act now: How to interact with customers to enhance social commerce engagement?	Information and Management, 57(6), 103324	221

Figure 2: Authors and Number of Publications

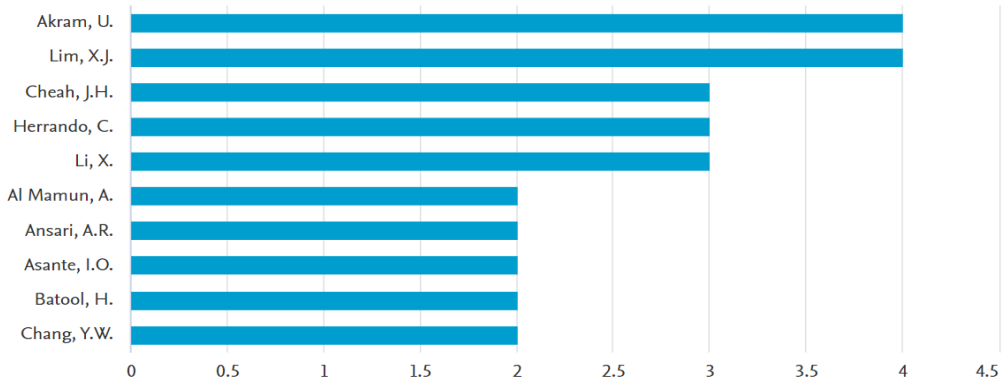


Figure 2 presents authors that frequently published articles that are related to the Stimulus Organism Response with e-commerce and social commerce. Two authors published 4 articles, three published 3 articles, and five published 2 articles. The authors were not necessarily the main contributors to the articles. Meanwhile, Table 4 highlights two authors that have 4 articles published. These two authors were derived from Figure 2 above.

Table 4: Name of Articles based on Authors

AUTHOR	NO OF PAPERS	TITLE	AUTHORS	JOURNAL	YEAR
Akram, U.	4	Feeling hungry? Let's order through mobile! Examining the fast food mobile commerce in China	Akram, U., Ansari, A.R., Fu, G., Junaid, M.	Journal of Retailing and Consumer Services, 56, 102142	2020
		An empirical study on the impact of e-commerce live features on consumers' purchase intention: From the perspective of flow experience and social presence	Wang, H., Ding, J., Akram, U., Yue, X., Chen, Y.	Information (Switzerland) 2021, 12(8), 324	2021
		Cosmetics makers have always sold 'hope in a jar'! Understanding the cosmetics purchase intention in the Chinese mobile commerce environment	Akram, U., Ansari, A.R., ulhaq, I;, Yan, C.	Journal of Retailing and Consumer Services, 73, 103337	2023
		Does social media usage contribute to cross-border social commerce? An empirical evidence from SEM and fsQCA analysis	Hu, S., Akram, U., Ji, F., Zhao, Y., Song, J.	Acta Psychologica, 241, 104083	2023
Lim, X.J.	4	Are men from Mars, women from Venus? Examining gender differences towards continuous use intention of branded apps	Lim, X.-J., Cheah, J.-H., Ng, S.I., Kamal Basha, N., Liu, Y.	Journal of Retailing and Consumer Services, 60, 102422	2021
		Thanks COVID-19, I'll reconsider my purchase: Can fear appeal reduce online shopping cart abandonment?	Wang, S., Cheah, J.-H., Lim, X.-J., Leong, Y.C., Choo, W.C.	Journal of Retailing and Consumer Services, 64, 102843	2022
		Why Do Some Consumers Still Prefer In-Store Shopping? An Exploration of Online Shopping Cart Abandonment Behavior	Wang, S., Ye, Y., Ning, B., Cheah, J.-H., Lim, X.-J.	Frontiers in Psychology, 12, 829696	2022
		How do I deal with complex social commerce landscape? Understanding continuance intention using approach and avoidance motivations model	Chong, S.-E., Ng, S.-I., Kamal Basha, N.B., Lim, X.-J.	Aslib Journal of Information Management	2024

A bibliometric analysis using VOSviewer created term co-occurrence visual representations based on text data. The results discovered 61 items in the 6 clusters with 1558 links, and the total link strength was 26706. The following are the items in the clusters.

Cluster 1 (17 items): Attention, behavior, enjoyment, impulse, impulse buying, information, online impulse buying, online survey, organism, social interaction, stimuli, stimulus, stimulus organism response framework, urge, usefulness, website, willingness.

Cluster 2 (15 items): Consumer purchase intention, customer satisfaction, e-commerce, feature, flow, flow experience, interactivity, mediating effect, mediating role, moderating effect, purchase intention, satisfaction, social presence, or model, trust

Cluster 3 (14 items): Author, commerce, covid, customer engagement, customer loyalty, design methodology approach, dimension, framework, online shopping, originality value, PLS-SEM, social commerce, use, value

Cluster 4 (9 items): Business, consumer behavior, emotion, perception, pleasure, response, review, risk, type

Cluster 5 (4 items): Product, respondent, sor, streamer

Cluster 6 (2 items): Social medium, turn

Figure 3: Network Visualization of Clusters on Keyword Co-Occurrence Analysis

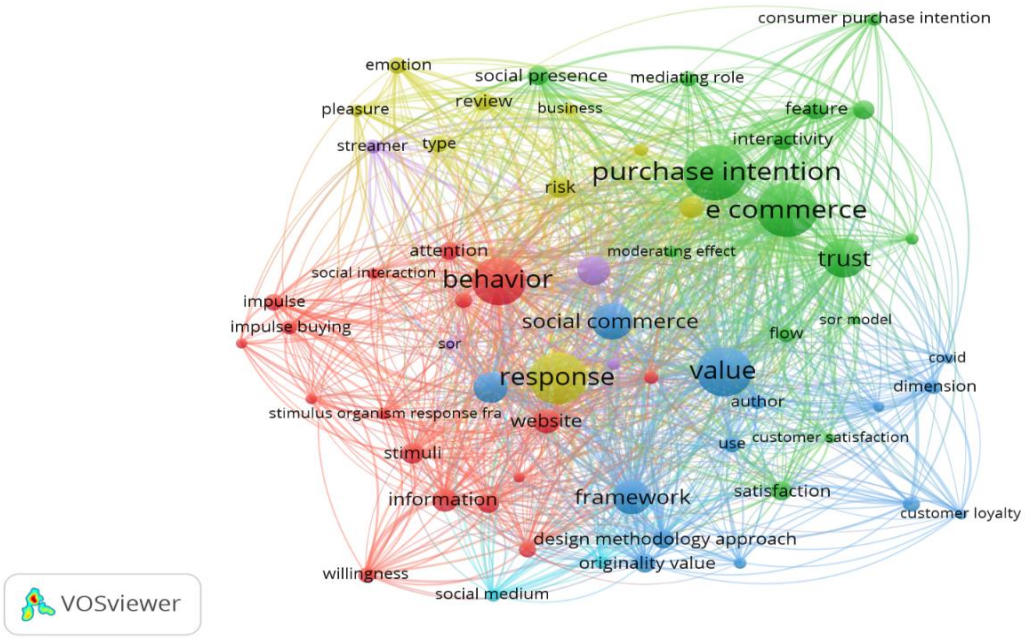
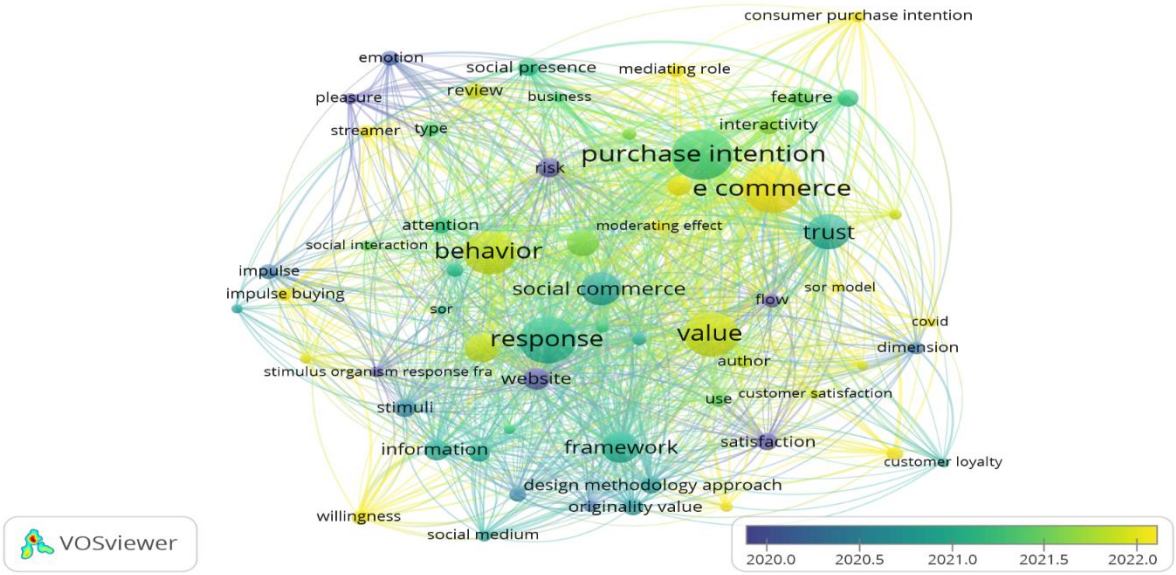


Figure 3 above shows network visualization that highlights terms or keywords that were most used by the researchers in the publications. The threshold was based on the minimum number of occurrences of a term. The researcher chose 20 terms as the minimum number and the results revealed that out of 5536 terms, 102 terms meet the threshold. The relevance score was calculated for each of the 102 terms identified and the most relevant terms would be selected based on the score. The default choice was to select 60% of the most relevant terms, and the result was 61 terms identified.

The size of the labels and nodes (circles) represented the items. The larger the size of the labels and nodes the higher the weight of the item. The colors shown represented the cluster of each of the items. Some of the terms that were widely used in the journals based on the clusters are behavior, website, and information (Cluster 1), purchase intention, e-commerce and trust (Cluster 2), value, social commerce, and framework (Cluster 3),

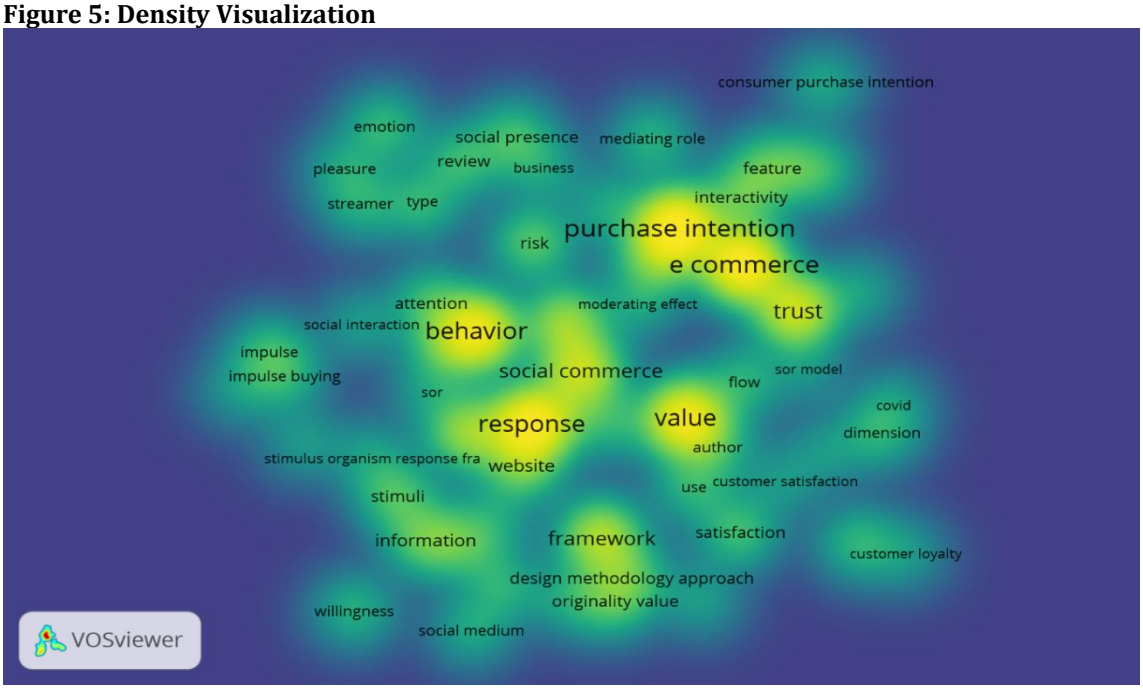
response, risk, and perception (Cluster 4), product and streamer (Cluster 5) and finally social medium (Cluster 6).

Figure 4: Overlay Visualization



As stated by (Monoarfa *et al.*, 2024), overlay visualization enables the researchers to examine the progression of trends within the field of study and also to investigate the interconnections among the topics being studied. Figure 4 shows the evolution of topics, and the trend can be seen from the topics of website, satisfaction, risk, emotion, and pleasure, then moving forward to topics like e-commerce, behavior, value, consumer purchase intention, willingness, impulse buying, and streamer.

Figure 5: Density Visualization



Density visualization is best used to identify a research gap in the field of study that has little attention or has not been thoroughly examined (Monoarfa *et al.*, 2024). Figure 5 denotes the item density visualization that

shows the level of density of items (topics) from 2008 until 2024. In VOSviewer, the colors varied from blue to green to yellow, where yellow color indicates the items that carry the higher weightage and have the larger number in the neighborhood of a point. At the same time, the blue color indicates the items that have a lower weight and have a smaller number of items (van Eck and Waltman, 2013). The results showed that purchase intention has the largest density among the items that have a yellow color. Apart from that, items that have darker colors represent items or topics that can be further explored to generate new findings.

4. Conclusion

The research aims to analyze trends in Electronic Commerce and Social Commerce that use stimulus-organism response (SOR) as the framework in their research. The SOR framework is vital in finding the behavior of the customers whether the customers would have the purchase intention and could establish motivation and engagement while using social media. Moreover, environmental factors are also important to know as these factors could trigger the individual's inner self, which could lead to the positive behavior of the customers. It can be concluded that the trend is moving forward positively and increasing from year to year. The research topics also vary, and based on the findings, a total of six clusters were identified with a total of 61 items. Overlay visualization demonstrated several research topics that could be discussed. Meanwhile, density visualization projected the research gap, which has the potential to be further explored.

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