

Unveiling the Gen Z Consumer Retention on the Shopee Platform: A Neuromarketing Perspective

Suryo Hadi Wira Prabowo¹, Cesia Rizkika Parahiyanti², Achmad Murdiono³,

Fatwah Inna Aulisaina⁴, Norzalita Abd Aziz⁵

{suryo.hadi.fe@um.ac.id¹, cesya.rizkika.fe@um.ac.id², achmad.murdiono.fe@um.ac.id³
fatwahinna1@gmail.com⁴, eita@ukm.edu.my⁵}

Universitas Negeri Malang Malang, East Java, Indonesia^{1,2,3,4}, Universiti Kebangsaan Malaysia
Selangor, Malaysia⁵

Abstract. Digital commerce, commonly known as e-commerce, facilitates sellers to market their products. Shopee, as one of Indonesia's e-commerce retail platforms, offers solutions to assist businesses through paid promotion. It categorizes sellers into organic and paid sellers, which enhances seller performance by making their products more discoverable to potential buyers. However, this situation can also have adverse effects. The increasing number of product choices and displays can become distractions for potential buyers. Such distractions result in low retention of customers and the advantages offered by the platform may be questioned. The purpose of this study is to understand the retention of potential buyers while viewing products on the Shopee e-commerce platform. The study adopts a quantitative experimental approach, utilizing the pupil projection technique, which is part of the neuroscience field, using an eye tracker device. The study involves 15 subjects from the Generation Z category, who have the ability to make purchase decisions and have made at least one product purchase on Shopee. The results demonstrate a statistically significant difference in retention between visitors to product pages of organic sellers and paid sellers. Hopefully, the results of this research will shed light on the subject of customer retention and have implications for sellers on e-commerce platforms to tailor their business strategies in line with the current consumer behavior.

Keywords: Consumer Retention, E-Commerce, Generation Z, Neuromarketing.

1 Introduction

The development of e-commerce in Indonesia has experienced a remarkable surge in recent years. With the increasing accessibility of the internet and widespread use of smartphones across the country, the e-commerce market in Indonesia has grown rapidly [1], [2]. Currently, major e-commerce platforms such as Tokopedia, Shopee, Bukalapak, and Lazada have become the top choices for consumers to shop online [3], [4]. Additionally, specialized platforms like Blibli, JD.ID, and various online stores focusing on specific products have enriched the e-commerce ecosystem in Indonesia.

Sellers have also greatly benefited from this e-commerce development. Selling online enables them to reach a broader market, not just within their city or island but throughout Indonesia [3], [5]. Logistics and payment systems that are increasingly integrated and advanced allow sellers to deliver products quickly and safely to various regions, even to remote areas. Features like customer reviews and product recommendations also help sellers build trust and customer loyalty.

However, the e-commerce development and sellers in Indonesia also face various challenges. Competition in the e-commerce market is becoming increasingly fierce, requiring sellers to constantly innovate and provide better services to consumers [6]. Logistics and infrastructure issues in some areas remain a challenge, making it difficult to reach certain regions and causing delivery delays. Furthermore, the high rate of product returns in e-commerce also affects seller profitability and requires effective strategies to address.

Nevertheless, the potential for e-commerce development in Indonesia is still significant, especially with the continuous growth of internet users. With the adoption of appropriate technology and a deep understanding of consumer behavior through neuromarketing approaches, e-commerce players can better comprehend and adjust their marketing strategies to achieve success in online businesses [4], [7]. Alongside technological advancements and support from the government and other stakeholders, e-commerce in Indonesia has the potential to become a powerful driver of economic growth.

Paid promotion and paid seller facilities are integral to boosting sales performance in the highly competitive e-commerce industry. Through paid promotion, sellers can enhance the visibility of their products by investing in prominent placements within search results and eye-catching labels [3]. These paid advertisements increase the chances of attracting potential customers and driving more sales. Similarly, participating in paid seller programs grants sellers valuable advantages, including priority customer support and access to in-depth data analytics [8]–[10]. By leveraging these facilities, sellers can gain valuable insights into customer behavior and preferences, enabling them to refine their marketing strategies for better targeting and improved conversions.

While paid promotion and paid seller programs offer immense potential for e-commerce success, a strategic and data-driven approach is essential for maximizing their benefits. Sellers must conduct thorough market research to identify their target audience and optimize their advertising efforts accordingly. Transparency in pricing and product information is paramount to building trust with customers and maintaining a positive reputation [1], [3]. Moreover, regular evaluation of the impact of these initiatives allows sellers to assess their return on investment and make informed decisions about future participation in these programs. With the right approach, paid promotion and paid seller facilities can be powerful tools for elevating sales performance and fostering growth in the competitive e-commerce landscape [11].

Due to the challenges posed by distractions and their potential negative impact on consumer experience, the efficacy of the advantages offered by paid promotion and paid seller facilities is now being questioned. The saturation of paid advertisements may lead to diminishing returns as consumers become less receptive to marketing efforts, while intense competition among sellers for limited attention on e-commerce platforms could dilute the effectiveness of paid promotion [3]. To address these concerns, a balanced approach, emphasizing data-driven insights and a customer-centric focus, is crucial in restoring the effectiveness of these facilities and achieving sustainable growth in the highly competitive e-commerce landscape [18].

Therefore, research is needed to measure or study the impact of distractions on the retention of potential buyers on a product page in e-commerce. Such research is crucial in understanding the effects of distractions caused by various factors, including paid promotion and other elements on the product page. Through a neuromarketing approach that combines neuroscience and marketing, this research can track the brain activity of potential buyers when exposed to various information and advertisements on the product page. The findings of this research will provide deeper insights into how distractions can influence the retention of potential buyers, whether it enhances interest or otherwise, and offer a clearer understanding of the optimal online shopping experience.

2 Literature Review

2.1. The Development of E-Commerce Industry

Extensive research and analysis have been conducted on the development of e-commerce industry in recent years. Scholars and researchers have delved into various aspects of its growth, exploring the evolution of e-commerce from its inception to its current state and the emerging trends that shape its future.

Several studies have highlighted the rapid expansion of the e-commerce sector, driven by advancements in digital technology, internet penetration, and changing consumer behavior. A study emphasized the transformative impact of mobile e-commerce, highlighting its role in bridging the gap between online and offline shopping experiences [19]. The proliferation of smartphones and the increasing adoption of mobile applications have facilitated seamless transactions, enabling consumers to shop anytime, anywhere.

Moreover, the rise of social commerce has significantly influenced the e-commerce landscape. Some studies explored the integration of social media platforms with e-commerce, showcasing how social commerce leverages user-generated content, social recommendations, and personalized interactions to enhance customer engagement and drive sales [2], [19].

From the perspective of marketplaces, various studies have analyzed the dominance of major e-commerce platforms and their impact on small and medium-sized enterprises (SMEs). Some studies investigated the role of platform ecosystems in supporting SMEs' digital transformation and market access, shedding light on how e-commerce platforms create opportunities for sellers to reach a broader customer base [3], [4].

The evolving consumer expectations and demands have led to a surge in omnichannel retailing. Previous study explored the convergence of online and offline channels, demonstrating how an integrated omnichannel approach enables seamless customer experiences, increased customer loyalty, and improved sales performance [20].

Despite its remarkable growth, the e-commerce industry faces challenges that researchers have extensively analyzed. Among these challenges, cybersecurity and privacy concerns have gained considerable attention. Several previous studies examined the impact of security breaches and data breaches on consumer trust and willingness to engage in online transactions, underscoring the critical role of safeguarding consumer information in maintaining the e-commerce industry's sustainability [12], [15].

In conclusion, the literature on the development of the e-commerce industry reflects its dynamic nature, shaped by technological advancements, changing consumer behavior, and evolving

market dynamics. Scholars and researchers continue to explore various aspects of e-commerce, from mobile commerce and social commerce to platform ecosystems and omnichannel strategies, contributing valuable insights that inform the industry's strategies and practices. Addressing challenges related to cybersecurity and consumer privacy will be essential in sustaining the industry's growth and ensuring a seamless and secure online shopping experience for consumers.

2.2. The Emergence of Paid and Organic Sellers Features in E-Commerce Platform

The development of the e-commerce industry from a competitive standpoint has been a subject of significant research, exploring the multifaceted factors that have contributed to the emergence of features such as paid seller and organic seller offerings by e-commerce platforms. The competitive landscape within the e-commerce industry has undergone dramatic transformations, driven by advancements in digital technology and changing consumer preferences [17]. As e-commerce platforms continue to witness exponential growth, the number of sellers vying for market share has significantly increased [7]. This intensified competition has prompted e-commerce platforms to adopt innovative strategies to attract and retain sellers, as well as to enhance the overall marketplace experience for consumers.

Paid seller programs have emerged as one of the prominent strategies in response to the competitive pressures. These programs offer sellers the opportunity to gain additional visibility and promotional benefits in exchange for a fee paid to the platform. Several previous studies have demonstrated that paid seller programs can significantly increase product exposure, improve seller visibility, and drive higher sales for participating sellers [20], [21]. By investing in paid seller offerings, sellers can showcase their products more prominently to potential customers, increase brand awareness, and gain a competitive edge in the crowded e-commerce marketplace.

To address these concerns and maintain a competitive yet equitable marketplace, some platforms have adopted a hybrid approach that combines paid and organic seller offerings. This approach allows sellers to choose from a range of promotional features and visibility options that align with their marketing goals and budget. Previous studies demonstrated that this hybrid model can foster a healthy competitive environment while providing sellers with flexibility and choices to suit their individual needs [25]. By offering diverse visibility options, e-commerce platforms can ensure that both paid and organic sellers have the opportunity to gain exposure, fostering a more level playing field for sellers of all sizes.

Thus, the competitive nature of the e-commerce industry has driven the emergence of features like paid seller and organic seller offerings. Paid seller programs have proven to be effective in enhancing seller visibility and driving sales, benefiting both platforms and participating sellers. However, e-commerce platforms must carefully manage the balance between promoting paid offerings and maintaining a fair marketplace for all sellers. By adopting hybrid approaches and offering various visibility options, platforms can foster a competitive environment that accommodates the diverse needs of sellers and ultimately enriches the overall e-commerce experience for consumers. The continuous research and adaptation in response to the evolving competitive landscape will be crucial for sustaining the growth and success of the e-commerce industry in the years to come.

2.3. Neuromarketing is a state-of-the-art method elucidates customer intention in e-commerce

Neuromarketing has emerged as a prominent and dynamic field, offering an innovative approach to studying customer intentions and behavior. By combining principles from neuroscience, psychology, and marketing, neuromarketing aims to uncover the subconscious drivers that influence consumer decision-making processes, providing businesses with invaluable insights into how customers perceive and respond to various marketing stimuli [8], [14].

In recent years, technological advancements in neuromarketing research have significantly expanded the capabilities of understanding customer intentions, and eye tracking has garnered considerable attention as a powerful tool in this domain [17]. Eye tracking technology enables researchers to precisely monitor and analyze eye movements, offering a unique and non-intrusive perspective into what customers visually focus on, how long they spend looking at specific elements, and their overall visual attention patterns.

Additionally, eye tracking has been instrumental in investigating the impact of website design on customer browsing behavior. Previous study employed Tobii Eye Tracking 5 to examine the arrangement of visual elements on websites and how they influenced customers' browsing patterns and time spent on specific pages [7]. By comprehending how customers navigate through webpages, businesses can identify opportunities for improving website usability and enhancing the overall online shopping experience.

Moreover, eye tracking technology has played a vital role in assessing the effectiveness of product page layouts and the visual hierarchy of product information in e-commerce. Researchers have utilized Tobii Eye Tracking 5 to understand which elements on product pages attract the most attention and how customers navigate through the information provided [14]. These insights enable sellers and e-commerce platforms to optimize their layouts, ensuring that crucial product information is readily accessible to customers and encouraging engagement that may lead to conversion.

While eye tracking provides valuable data on visual attention patterns, it is crucial to acknowledge its limitations. Eye tracking alone does not directly measure emotional responses or conscious decision-making processes; rather, it offers insights into initial visual attention patterns [26]. As a result, integrating eye tracking with other neuromarketing methods, such as electroencephalography (EEG) to measure brain activity or facial expression analysis to gauge emotional responses, can provide a more comprehensive understanding of customer intentions and emotions [27].

In conclusion, neuromarketing, particularly through eye tracking technology like Tobii Eye Tracking 5, has become an invaluable and promising method for studying customer intentions and behavior in the e-commerce context. By unlocking insights into visual attention patterns and customer responses to marketing stimuli, businesses can make data-driven decisions to optimize their marketing strategies, enhance website design, and deliver personalized and engaging experiences to customers. As technological advancements continue to enhance the capabilities of neuromarketing research, the field holds great promise in unveiling deeper insights into consumer behavior, allowing businesses to stay competitive and adaptive in the ever-evolving world of e-commerce. The integration of various neuromarketing methods will further enrich the understanding of customer intentions, paving the way for more sophisticated and effective strategies in the realm of e-commerce marketing.

2.4. Massive Promotion is A Distraction Leads to Declining Performance of Paid Seller

The emergence of distractions that negatively impact sales performance has raised questions about the effectiveness of the advantages offered by paid seller programs in e-commerce. As the digital landscape continues to evolve, the proliferation of distractions from various sources, including paid promotions, has become a significant concern for sellers and e-commerce platforms alike [11].

Distractions in the e-commerce environment can take various forms, such as excessive paid advertisements, pop-ups, and notifications, diverting customers' attention away from the intended purchase journey. These distractions can disrupt the customer's flow, leading to a decline in engagement and conversion rates. Researchers have investigated the impact of distractions on customer decision-making, highlighting how interruptions during the shopping process can result in increased cart abandonment and reduced overall sales [25].

Paid seller programs, which offer enhanced visibility and promotional benefits to sellers in exchange for fees paid to the platform, were initially considered advantageous in a competitive marketplace. Sellers could invest in these programs to gain a competitive edge and increase their product exposure [17]. However, as distractions escalate, the effectiveness of paid promotions may be diminished due to customers' decreased receptivity to marketing efforts. This raises doubts among sellers and e-commerce platforms about the actual return on investment for these programs.

While the impact of distractions on sales performance is a significant concern, researchers are also exploring methods to measure and mitigate distractions effectively. Studies involving eye tracking technology, including Tobii Eye Tracking 5, have been employed to understand how distractions influence customers' visual attention and engagement with online content [21]. By identifying the specific elements that attract attention and the ones that cause distractions, sellers can optimize their content and user interface to maintain customers' focus and reduce distractions during the shopping journey [29].

Based on the above explanation, the emergence of distractions in the e-commerce landscape has led to questions about the efficacy of paid seller programs and their advantages in enhancing sales performance. As distractions continue to challenge sellers' ability to engage customers effectively, businesses must adapt their marketing strategies to provide a more seamless and personalized shopping experience. Employing innovative technologies and research methods, such as eye tracking, can offer valuable insights into customer behavior and preferences, enabling sellers to better navigate the dynamic e-commerce environment and deliver a more compelling and distraction-free experience for customers.

2.5. Hypotheses of the Research

Considering the previously outlined conditions, the author posits that the proliferation of sellers utilizing paid promotions on e-commerce platforms can heighten distractions, consequently diminishing the retention of prospective buyers concerning product engagement on the e-commerce platform [11]. Retention, in this context, is measured by the extent of time potential buyers spend on product pages. Hence, the following hypothesis will be tested in this research:

H0: There is no significant difference in the time spent by potential buyers on product pages between organic sellers and paid sellers.

Ha: There is a significant difference in the time spent by potential buyers on product pages between organic sellers and paid sellers.

3 Method

This study employed a quantitative approach, primarily to investigate the time spent by potential buyers in searching for products within the e-commerce platform. In addition to this data, there are other variables that need to be analyzed to provide a comprehensive understanding of the observed phenomenon. By employing this approach, the author will gain a clearer insight into the actual conditions surrounding the study.

The data collection technique adopted in this research is the eye-tracking method. It is one of the data acquisition techniques in the field of neuromarketing that utilizes iris movement sensors to track the direction of the subjects' gaze based on their pupil projections. This technique operates by emitting infrared light towards the subject's eyes, which is then reflected back to the sensor and translated into readings on a computer screen. The eye-tracking device utilized in this study is the Tobii Eye-Tracker 5. This device has been widely employed in scientific research and business marketing applications. Previous researchers have asserted that the Tobii Eye-Tracker 5 aids in gaining a deeper understanding of the thought processes of research subjects based on their eye movements [26].

A specific population delineates customer behavior characteristics. In this study, the researchers engaged the Generation Z population. Generation Z, hereafter referred to as Gen-Z, encompasses individuals born between 1997 and 2012, making them aged between 11 and 26 years. This generation has matured amidst rapid technological advancement, leading to a higher level of technology acceptance compared to other generations. This alignment is pertinent to this study, as it enables the selection of a sample representing active buyers in the e-commerce platform [30].

The research involves subjects meeting the criteria of belonging to Generation Z (aged 11 to 26) and having made at least one product purchase on the Shopee e-commerce platform. Based on these criteria and the constraints present, a cohort of 15 research subjects was identified to represent the active Generation Z population engaged in product purchases within the e-commerce platform. This assertion is supported by preliminary surveys aimed at garnering historical purchasing information from the research subjects.

This study employed a variety of methods for data collection. Demographic and behavioral data were gathered through questionnaire submissions by the research subjects. On the other hand, retention data was acquired through OBS screen recording and Tobii Eye Tracking 5, which captured the subjects' gaze focus. All the collected data will be stored and interpreted within a spreadsheet, which will subsequently be analyzed as per the research requirements. Data processing involves both descriptive and inferential analyses, aligning with the specific objectives. Descriptive analysis is applied for the demographic and behavioral data, while inferential analysis is employed for the analysis of retention data of e-commerce platform visitors.

4 Result

This study involves several datasets to elucidate the phenomenon under investigation. Among these datasets are demographic and behavioral data, as well as user retention data from the Shopee e-commerce platform. Demographic and behavioral data are subjected to descriptive statistical analysis. The outcomes of the descriptive analysis on demographic and behavioral data will portray the distribution of demographic characteristics among the involved research subjects and shed light on user behavior patterns within the e-commerce platform. Conversely, user retention data from the Shopee e-commerce platform undergoes inferential statistical analysis. The findings derived from inferential analysis on user retention data will be instrumental in drawing conclusions to expound upon the research problem posed in this study.

4.1. Demographic and Behavioral Data Analysis

Based on the demographic and behavioral data of the research subjects involved in this study, it is revealed that 53.3% are female, while the remaining 46.67% are male. From this observation, it becomes evident that the research subjects who are female outnumber those who are male.

In addition to the demographic data, this study also gathered behavioral data to ascertain the behaviors of the research subjects as visitors to the Shopee e-commerce platform. Several datasets were obtained for analysis. First, the frequency data of purchase history was collected. From this data, it is evident that research subjects with high frequency levels (at levels 4 and 5) account for 40% and 33.3% respectively, combining to form a total of 73.3%, which constitutes the majority among the engaged research subjects. This analysis reveals that the research subjects participating in this study exhibit distinct frequency levels in their purchase history. It can be inferred that these research subjects potentially represent the Gen Z population segment, known for their penchant for online purchasing through e-commerce platforms.

Furthermore, within the behavioral data of the research subjects, data on product categories based on their purchase history was also acquired. Based on the gathered data, it is observed that the three most frequently purchased product categories among the research subjects are Clothes (20.97%), Fashion Accessories (12.90%), and Foods (12.90%). These findings indicate that the product category predominantly bought is fashion items, particularly clothing. This observation leads to the conclusion that the research subjects engaged in this study are likely representative of the Gen Z population segment, known for their substantial engagement in purchasing fashion products.

One of the indicators that can be employed to evaluate the performance of sellers on an e-commerce platform is by examining the visit-purchase ratio. Based on the acquired data, it is discerned that the seller category with the highest number of visits and purchases is the Shopee Mall category, amounting to 52 visits and 9 purchases. However, in terms of ratio, the largest visit-purchase ratio is observed in the Star+ Seller category with a ratio of 0.4. Thus, in terms of performance, the seller category demonstrating the most robust performance is the Star+ Seller. This underscores that Star+ Sellers, functioning as paid sellers, exhibit superior seller performance on the Shopee e-commerce platform.

4.2. Buyer Retention Data Analysis

The aim of this study is to determine whether there exists a difference in user retention on the Shopee e-commerce platform between organic sellers and paid sellers. To address this objective, an analysis of the differences between two collected data groups is essential. The conducted analysis involves an Independent-Sample T-Test. The outcomes of this analysis will elucidate whether the two data groups share statistically similar characteristics or not.

This study employs the Independent-Sample T-Test analysis method to assess differences within the obtained data groups. However, the utilization of this analysis method necessitates adherence to assumptions compatible with the chosen technique. Within the framework of the Independent-Sample T-Test, the collected data must conform to the assumption of normal distribution. Based on the results of the normality test, it is evident that the retention time data for both organic sellers and paid sellers have significance values exceeding 0.05 (at a 95 percent confidence level), specifically 0.200 and 0.200. This indicates that the two utilized data groups meet the normal distribution assumption, thereby allowing for the application of the Independent-Sample T-Test analysis method. The result of normality distribution test can be observed in Table 1.

Table 1. Normality Distribution Test using Kolmogorov-Smirnov

K-S Normality Distribution Test	Time_Retention (Paid Seller)	Time_Retention (Organic Seller)
Statistic	.108	.127
df	50	5
Sig.	.200	.200

The test of differences is employed to ascertain statistical distinctions between two data groups. Retention time is computed by evaluating the time subjects, acting as prospective buyers, spend on a single product sold by either an organic seller or a paid seller. Based on the conducted variance analysis, it is evident that the retention time data of research subjects exhibit a significant value for Equality of Variance, measuring 0.015, which falls below 0.05 (at a 95 percent confidence level). This suggests that the assumption of equal variance between the two data groups cannot be maintained.

Moreover, the results from the Independent-Sample T-Test reveal a significance value of 0.000, falling below the threshold of 0.05 (at a 95 percent confidence level). Consequently, the null hypothesis (H_0) is rejected in favor of the alternative hypothesis (H_a), signifying a statistically significant difference between the two data groups. The outcomes of the difference test can be observed in Table 2.

Table 2. Compare Mean using T-Test

Variable	Equality of Variances		T-Test (Equal variance not assumed)		
	F	Sig.	t	df	Sig. (2-Tailed)
Time_Retention	6.274	.015	-7.295	22.134	.000

5 Discussion

5.1. Demographics and Behaviors of Generation Z in Online Shopping

Within this study, the demographic and behavioral data of the research subjects are harnessed to glean profound insights into the preferences and behaviors of visitors to the Shopee e-commerce platform. This analysis aids in comprehending how demographic and behavioral factors influence user interactions with the platform and how neuromarketing interpretations can be applied to enhance user experiences and marketing strategies [17].

From the demographic data, it can be inferred that the majority of research subjects are female, constituting 53.3%, while males make up 46.67%. This finding potentially indicates a dominance of females in interacting with e-commerce platforms like Shopee. In the context of neuromarketing, this suggests the potential to craft marketing strategies that are more attuned to female preferences and purchasing tendencies.

Analysis of purchase frequency unveils that a substantial portion of the research subjects exhibit high frequency levels in their purchase history. In this instance, subjects with frequency levels of 4 and 5 account for 73.3%. A neuromarketing interpretation views this as an indication that this research group might represent the Generation Z population segment, inclined toward active online purchasing. Marketing strategies could be tailored to attract this segment by leveraging neuro-psychological elements that stimulate more frequent online purchases [3].

Analysis of product categories reveals that clothing, fashion accessories, and food are the most frequently purchased categories among the research subjects. This points to the conclusion that fashion products, particularly clothing, exert a strong appeal within this research group. In the context of neuromarketing, a deeper understanding of the psychological factors driving this preference can aid in optimizing product presentation, message conveyance, and promotional strategies.

Performance measurement of sellers in the form of the visit-purchase ratio highlights prominent seller categories in user interactions. Notably, Star+ sellers exhibit the highest visit-purchase ratio. From a neuromarketing perspective, this can be interpreted as indicating that psychological factors or promotional strategies employed by Star+ sellers contribute to this ratio. To optimize marketing strategies, a deeper comprehension of neuro-psychological elements influencing purchasing preferences can be integrated [18], [21].

The data and interpretations in this study provide crucial insights for neuromarketing and marketing practitioners in understanding user preferences and behaviors on e-commerce platforms. Marketing strategies rooted in neuromarketing interpretations of demographic, behavioral, and seller performance data can yield more effective outcomes in attracting, influencing, and satisfying users within the increasingly competitive e-commerce landscape.

5.2. The difference in Retention Level between Organic and Paid Seller

The findings of this research demonstrate that Generation Z exhibits varying levels of retention between organic sellers and paid sellers on the Shopee e-commerce platform. Based on these results, it is evident that there is a distinction in the duration individuals spend on seller pages within the website. The utilization of paid services for customer retention still proves effective in enhancing the quality performance of sales pages. This warrants further investigation to

depict the actual conditions surrounding the disparities between the two seller categories. Subsequently, an examination of the retention data of product page visitors on the Shopee e-commerce platform is undertaken.

The group data difference test has indicated a statistically significant difference in retention time between visitors to product pages of organic sellers and paid sellers. Subsequently, a deeper understanding of the actual variations is essential. This can be achieved through the measurement of data points including Minimum, Maximum, Average, and Percentile, aiming to depict the real-world distinctions between the two data groups. This set of data points can be observed in Table 3.

Table 3. Retention Data (Time)

Indicator	Seller Category	
	Paid Seller	Organic Seller
Minimum	00:00:02	00:00:23
Maximum	00:00:32	00:00:29
Average	00:00:14	00:00:26
Percentile		
5th	00:00:03	00:00:23
25th	00:00:06	00:00:25
50th	00:00:14	00:00:26
75th	00:00:22	00:00:27
95th	00:00:31	00:00:29

Firstly, examining the data at the minimum data point reveals that the paid seller category exhibits a retention time of 2 seconds, while the organic seller category has a minimum retention time of 32 seconds. This illustrates that the visitors of paid seller product pages have lower retention compared to those of organic seller product pages, suggesting a tendency to quickly navigate between pages.

Secondly, observing the data at the maximum data point shows that the paid seller category has a retention time of 32 seconds, whereas the organic seller category has a maximum retention time of 29 seconds. This indicates that the visitors of paid seller product pages have higher retention compared to those of organic seller product pages, implying that the visitors who find the relevant product tend to spend more time on paid seller product pages.

Thirdly, examining the data at the average data point indicates that the paid seller category boasts an average retention time of 14 seconds, while the organic seller category has an average retention time of 26 seconds. This demonstrates that the visitors of paid seller product pages have lower retention compared to those of organic seller product pages, suggesting that, on average, the visitors of paid seller product pages transition more swiftly from one page to another.

Lastly, analyzing the data at the percentile positions, it is apparent that the organic seller category has a narrower spread compared to the paid seller category. This suggests that the visitors of organic seller product pages exhibit more uniformity in terms of retention compared to those of paid seller product pages. This implies a more consistent loyalty pattern within the visitor data of the organic seller category.

6 Conclusion

Based on the various findings obtained from this research, the following conclusions are drawn. Firstly, concerning demographic and behavioral aspects, the Gen Z demographic, predominantly represented by females, exhibits a high frequency of purchases, especially in the realm of fashion items, notably clothing. Secondly, statistically, a significant difference in retention between visitors of organic seller and paid seller product pages has been established. Lastly, it has been observed that visitors of organic seller product pages display lower retention variability compared to visitors of paid seller product pages. With the outcomes of this research, it is anticipated that these insights can be utilized by e-commerce platform sellers to tailor their digital marketing strategies.

7 Limitation

The researchers recognize a number of constraints inherent in this research. The initial limitation revolves around the temporal boundaries imposed during the data acquisition phase. This temporal confinement could potentially have induced a simulation environment that inadequately replicates authentic real-world circumstances, given that patrons of e-commerce platforms customarily invest substantial time in scrutinizing product options prior to effecting a transaction. The subsequent constraint revolves around the utilization of a specific device, predominantly desktop computers. This confinement of device usage might have engendered a simulated environment that diverges from routine actualities, in light of the prevailing trend of purchases executed through mobile devices. Such a disparity could significantly influence users' familiarity with the positioning and functionalities of menu elements.

References

- [1] T. M. König, N. Hein, and V. Nimsgern, "A value perspective on online review platforms: Profiling preference structures of online shops and traditional companies," *J. Bus. Res.*, vol. 145, pp. 387–401, Jun. 2022, doi: 10.1016/j.jbusres.2022.02.080.
- [2] T. P. Böttcher, J. Weking, A. Hein, M. Böhm, and H. Krcmar, "Pathways to digital business models: The connection of sensing and seizing in business model innovation," *J. Strateg. Inf. Syst.*, vol. 31, no. 4, 2022, doi: 10.1016/j.jsis.2022.101742.
- [3] M. Skare, B. Gavurova, and M. Rigelsky, "Innovation activity and the outcomes of B2C, B2B, and B2G E-Commerce in EU countries," *J. Bus. Res.*, vol. 163, 2023, doi: 10.1016/j.jbusres.2023.113874.
- [4] Nofrizal, U. Juju, Sucherly, A. N, I. Waldelmi, and Aznuriyandi, "Changes and determinants of consumer shopping behavior in E-commerce and social media product Muslimah," *J. Retail. Consum. Serv.*, vol. 70, p. 103146, Jan. 2023, doi: 10.1016/j.jretconser.2022.103146.
- [5] H. Pratikto, S. H. W. Prabowo, A. Murdiono, and A. Basuki, "Developing Business Simulator Media Application-Based to Improve Analytical Capability and Independent Business Decision Making for Business Management Students," in *Proceedings of the 2nd International Conference on Learning Innovation*, 2018, pp. 285–293, doi: 10.5220/0008411202850293.
- [6] M. B. Gulfraz, M. Sufyan, M. Mustak, J. Salminen, and D. K. Srivastava, "Understanding the impact of online customers' shopping experience on online impulsive buying: A study on two leading E-commerce platforms," *J. Retail. Consum. Serv.*, vol. 68, p. 103000, Sep. 2022, doi: 10.1016/j.jretconser.2022.103000.

- [7] F. R. Mashrur *et al.*, “An intelligent neuromarketing system for predicting consumers’ future choice from electroencephalography signals,” *Physiol. Behav.*, vol. 253, 2022, doi: 10.1016/j.physbeh.2022.113847.
- [8] C. R. Parahiyanti, S. H. W. Prabowo, Y. R. Dewi, N. A. Aziz, and E. Yunitasari, “Creating Satisfaction, Loyalty, and Competitive Advantage for Banking Industry: The Roles of Customer Relationship Management (CRM) in the Digital Era,” in *Proceedings of the BISTIC Business Innovation Sustainability and Technology International Conference (BISTIC 2022)*, 2023, pp. 380–392, doi: 10.2991/978-94-6463-178-4_38.
- [9] S. H. W. Prabowo, A. Murdiono, R. Hidayat, W. Rahayu, and S. Sutrisno, “Digital Marketing Optimization in Artificial Intelligence Era by Applying Consumer Behavior Algorithm,” *Asian J. Entrep. Fam. Bus.*, vol. 3, no. 1 SE-Articles, Jul. 2019, [Online]. Available: <https://www.perwiraindonesia.com/ajefb/index.php/jurnalAJEFB/article/view/40>.
- [10] W. Guo and Q. Luo, “Investigating the impact of intelligent personal assistants on the purchase intentions of Generation Z consumers: The moderating role of brand credibility,” *J. Retail. Consum. Serv.*, vol. 73, p. 103353, Jul. 2023, doi: 10.1016/j.jretconser.2023.103353.
- [11] C. Hao and L. Yang, “Platform advertising and targeted promotion: Paid or free?,” *Electron. Commer. Res. Appl.*, vol. 55, p. 101178, Sep. 2022, doi: 10.1016/j.elerap.2022.101178.
- [12] A. Hakim, S. Klorfeld, T. Sela, D. Friedman, M. Shabat-Simon, and D. J. Levy, “Machines learn neuromarketing: Improving preference prediction from self-reports using multiple EEG measures and machine learning,” *Int. J. Res. Mark.*, vol. 38, no. 3, pp. 770–791, Sep. 2021, doi: 10.1016/j.ijresmar.2020.10.005.
- [13] M. Mulyani, S. Prabowo, V. Wicaksono, and H. Paksi, “Pengembangan Media Pembelajaran E-Materi untuk Meningkatkan Minat dan Motivasi Belajar Mahasiswa pada Matakuliah Konsep Dasar PPKn,” *Sekol. Dasar Kaji. Teor. dan Prakt. Pendidik.*, vol. 31, no. 2, pp. 151–161, 2022.
- [14] S. Bhardwaj, G. A. Rana, A. Behl, and S. J. Gallego de Caceres, “Exploring the boundaries of Neuromarketing through systematic investigation,” *J. Bus. Res.*, vol. 154, 2023, doi: 10.1016/j.jbusres.2022.113371.
- [15] M. C. Mason, G. Zamparo, A. Marini, and N. Ameen, “Glued to your phone? Generation Z’s smartphone addiction and online compulsive buying,” *Comput. Human Behav.*, vol. 136, p. 107404, Nov. 2022, doi: 10.1016/j.chb.2022.107404.
- [16] P. Hu, Y. Gong, Y. Lu, and A. W. Ding, “Speaking vs. listening? Balance conversation attributes of voice assistants for better voice marketing,” *Int. J. Res. Mark.*, 2022, doi: 10.1016/j.ijresmar.2022.04.006.
- [17] G. Viglia, G. Zaefarian, and A. Ulqinaku, “How to design good experiments in marketing: Types, examples, and methods,” *Ind. Mark. Manag.*, vol. 98, pp. 193–206, 2021, doi: 10.1016/j.indmarman.2021.08.007.
- [18] R. Pereira, F. M. Córdova, and H. A. Díaz, “Some experiences in Neuromarketing: Moving from White papers to Scientific inquiries,” *Procedia Comput. Sci.*, vol. 199, pp. 1409–1415, 2021, doi: 10.1016/j.procs.2022.01.178.
- [19] J. Ballerini, D. Herhausen, and A. Ferraris, “How commitment and platform adoption drive the e-commerce performance of SMEs: A mixed-method inquiry into e-commerce affordances,” *Int. J. Inf. Manage.*, p. 102649, Apr. 2023, doi: 10.1016/j.ijinfomgt.2023.102649.
- [20] Mudjahidin, N. L. Sholichah, A. P. Aristio, L. Junaedi, Y. A. Saputra, and S. E. Wiratno, “Purchase intention through search engine marketing: E-marketplace provider in Indonesia,” *Procedia Comput. Sci.*, vol. 197, pp. 445–452, 2021, doi: 10.1016/j.procs.2021.12.160.
- [21] L. E. Valdez-Juárez, D. Gallardo-Vázquez, and E. A. Ramos-Escobar, “Online buyers and open innovation: Security, experience, and satisfaction,” *J. Open Innov. Technol. Mark. Complex.*, vol. 7, no. 1, pp. 1–24, 2021, doi: 10.3390/joitmc7010037.
- [22] A. Behl, N. Jayawardena, A. Nigam, V. Pereira, A. Shankar, and C. Jebarajakirthy, “Investigating the revised international marketing strategies during COVID-19 based on resources and capabilities of the firms: A mixed method approach,” *J. Bus. Res.*, vol. 158, 2023, doi: 10.1016/j.jbusres.2023.113662.

- [23] S. Grabowska and S. Saniuk, "Development of Business Models in the Fourth Industrial Revolution: Conditions in the Context of Empirical Research on Worldwide Scope Companies Located in Poland," *J. Open Innov. Technol. Mark. Complex.*, vol. 8, no. 2, 2022, doi: 10.3390/joitmc8020086.
- [24] A. L. Kilay, B. H. Simamora, and D. P. Putra, "The Influence of E-Payment and E-Commerce Services on Supply Chain Performance: Implications of Open Innovation and Solutions for the Digitalization of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia," *J. Open Innov. Technol. Mark. Complex.*, vol. 8, no. 3, 2022, doi: 10.3390/joitmc8030119.
- [25] A. Nugroho and W. T. Wang, "Consumer switching behavior to an augmented reality (AR) beauty product application: Push-pull mooring theory framework," *Comput. Human Behav.*, vol. 142, 2023, doi: 10.1016/j.chb.2022.107646.
- [26] N. Hamelin *et al.*, "Storytelling, the scale of persuasion and retention: A neuromarketing approach," *J. Retail. Consum. Serv.*, vol. 55, 2020, doi: 10.1016/j.jretconser.2020.102099.
- [27] S. Singh, "Impact of Neuromarketing Applications on Consumers," *Singh / J. Bus. Manag.*, vol. 26, no. 2, pp. 33–52, 2020, doi: 10.6347/JBM.202009_26(2).0002.
- [28] N. Jaide, Siswantoyo, J. Liu, Z. Sholikhah, and M. M. Andhini, "Ambidexterity Behavior of Creative SMEs for Disruptive Flows of Innovation: A Comparative Study of Indonesia and Taiwan," *J. Open Innov. Technol. Mark. Complex.*, vol. 8, no. 3, 2022, doi: 10.3390/joitmc8030141.
- [29] J. Lee, J. Kim, and J. Y. Choi, "The adoption of virtual reality devices: The technology acceptance model integrating enjoyment, social interaction, and strength of the social ties," *Telemat. Informatics*, vol. 39, pp. 37–48, 2019, doi: 10.1016/j.tele.2018.12.006.
- [30] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *Eur. Bus. Rev.*, vol. 31, no. 1, pp. 2–24, Jan. 2019, doi: 10.1108/EBR-11-2018-0203.