

Determinants Of Traffic Effectiveness From E-Commerce In Indonesia Before And During The Pandemic

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Abstract: This study studies the determining factor for the effectiveness of e-commerce traffic in Indonesia. Four factors influence the level of effectiveness of e-commerce traffic. The first two factors are App Store and Play Store rankings. The next factor is the number of interactions with social media users, such as Twitter, Facebook, and Instagram. The last factor determining the effectiveness of e-commerce traffic is the number of employees from each e-commerce company. Using panel data regression, this study has obtained that the Play Store rank has a more significant effect on the effectiveness of e-commerce traffic than the App Store rank. The other findings are that social media visitors do not affect significantly, while the number of employees has a positive relationship and significantly influences the effectiveness of traffic e-commerce.

Keywords: E-Commerce; Ranking App Store; Ranking Play Store; Social Media Visitor; Number Of Employees.

Abstrak: Studi ini mempelajari faktor penentu efektivitas *traffic e-commerce* di Indonesia. Ada empat faktor yang mempengaruhi tingkat efektifitas *traffic e-commerce* di Indonesia. Dua faktor pertama adalah peringkat App Store dan Play Store. Faktor selanjutnya adalah jumlah interaksi dengan pengguna media sosial, seperti Twitter, Facebook, dan Instagram. Faktor terakhir yang menentukan efektivitas *traffic e-commerce* adalah jumlah karyawan dari masing-masing perusahaan *e-commerce*. Dengan menggunakan regresi data panel, penelitian ini mendapatkan bahwa peringkat Play Store berpengaruh lebih signifikan terhadap efektivitas *traffic e-commerce* dibandingkan dengan peringkat App Store. Temuan lainnya adalah pengunjung media sosial tidak berpengaruh secara signifikan, sedangkan jumlah karyawan memiliki hubungan positif dan signifikan berpengaruh terhadap efektifitas *traffic e-commerce*.

Kata Kunci: *E-Commerce; Ranking App Store; Ranking Play Store; Kunjungan Media Sosial; Jumlah Karyawan.*

INTRODUCTION

The presence of the internet encourages the birth of various types of digital technology to form new business models. Digital technology can unite the desires and needs of human life in carrying out daily activities connected through digital technology. Today, the number of internet users is continuously increasing and that growth brought an opportunity for both global e-commerce and regional e-commerce.

E-commerce helps businesses improve and advance their market position by providing more efficient and competitive transaction options (Abbas et al., 2021). E-commerce allows businesses to expand to a wider range of consumers (Rai et al., 2019). With the presence of various types of e-commerce, customers are given various conveniences for shopping online or looking for the services they need.



The global and prolonged COVID-19 pandemic has greatly affected the behaviour of business people and buyers due to the limited movement implemented by the government in tackling it. This increases e-commerce transactions because of the convenience and flexibility provided. During the COVID-19 pandemic, consumers were more likely to seek safety and comfort, so the e-commerce market tended to increase (Taher, 2021).

With limitations to interacting directly, people have diverted the way they communicate and interact with each other by using social media. The use of social media has developed from media to communicate to become more diverse, including in communicating and marketing products. Social media usage makes it interactive between producers and consumers and consumers and consumers (Tamilmani et al., 2018).

The research results by (Priansa and Suryawardani, 2020) show that the use of e-commerce and social media in marketing positively and significantly affects consumer decisions to shop on e-commerce sites. Within an e-commerce platform, employees possessing digital skills can contribute significant value to companies and customers (Verhoef et al., 2021). Digital skills encompass proficiency in digital applications and communication. On this e-commerce platform, employees assume responsibilities for delivering customer service, upholding security measures, and introducing innovative concepts that have the potential to captivate the interest of visitors.

In traditional or physical markets, the presence of a substantial number of visitors can impact how it captures other individuals' attention. These dynamics stem from social proof, which operates as a descriptive social norm, shedding light on human behavioural patterns. Social proof has a psychological influence on emotions such as FOMO (Fear of Missing Out), curiosity, trust, and product safety (Trudel, 2018), thereby drawing the attention of other visitors.

In digital marketing literature, it is known that the key to the success of an online shop or e-commerce business is the ability of the owner and manager to access the availability of branded goods from well-known merchants. The research results of (Sarin et al., 2021) show an increase in the number of users and organizations using mobile applications to increase their business volume and market value. In e-commerce, the volume of visitors becomes apparent through metrics like the count of downloaded e-commerce applications, the quantity of products transacted on these platforms, and the accumulation of product reviews. Social proof possesses the potential to convert visitors into prospective buyers.

Figure 1 shows the evolution of the six major e-commerce sites seen from the amount of traffic from 2017 to 2021 to increase sales; it can be seen that there are tremendous traffic increases on several e-commerce sites. During the pre-pandemic period and at the beginning of the pandemic in 2019, an increase in the amount of traffic occurred at a steady rate, while in 2021, when the pandemic entered a new era, which is marked by a looser pattern of restrictions on human movement that enables the wheels of the economy to move, the increase that occurred was very significant, especially for the two large e-commerce namely Lazada and Tokopedia.

Lazada and Tokopedia are examples of e-commerce that provide various types of goods and services customers need by downloading digital applications from these e-commerce sites or logging into their websites to make transactions. Uniquely, the two e-commerce promote various products belonging to other businessmen, where there is a link between e-commerce as a manager and marketer of goods with producers and suppliers.



The novelty of this research is the change in the use of Facebook and Instagram, which were initially only used as social media to become media for doing business (e-commerce). The research topic is the effectiveness of digital marketing strategies: the number of visits to an e-commerce site. This study is based on (Sarin et al.,2021) and (Priansa and Suryawardani, 2020). What distinguishes this research from previous research is the addition of the number of variables and the differences in the data used. The data used by previous researchers resulted from samples from questionnaires distributed but limited to certain areas in Indonesia. In this study, the data was collected from <https://iprice.co.id/insights/mapofecommerce>, which consists of panel data. This panel data serves as a sample representing respondents from various locations throughout Indonesia who had experience with e-commerce before and during the COVID-19 pandemic.

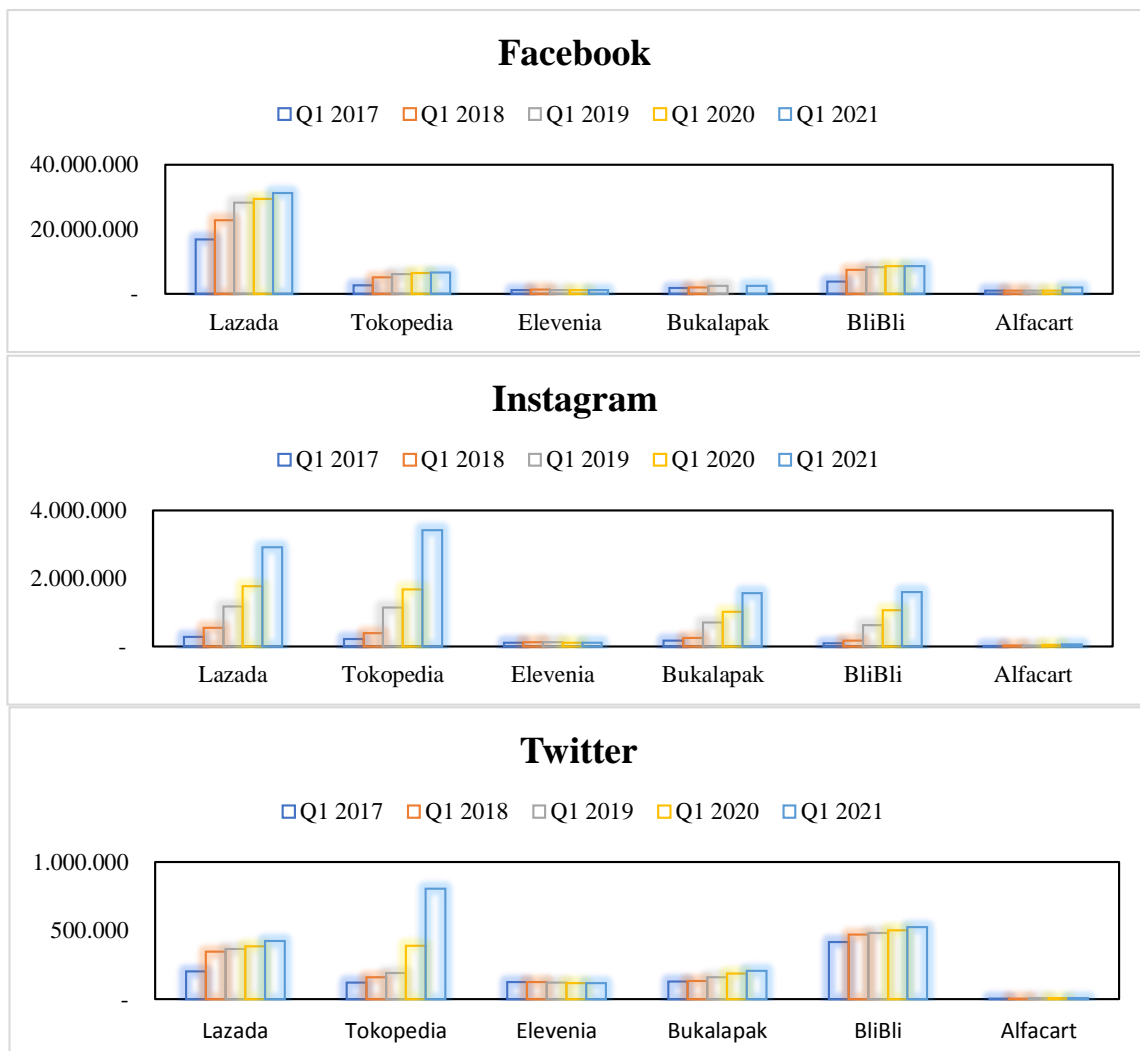


Figure 1. The Evolution of the Big Six of E-commerce
 Source: <https://iprice.co.id/insights/mapofecommerce>

The ranking functions of both the app store and the Play Store play a crucial role in capturing mobile phone users' attention towards utilizing the available applications. The



application's ranking is determined based on user reviews, ranging from 1 to 5 stars. This ranking system is exclusively administered by application users, reflecting their opinions.

The system aids in enhancing the discoverability of applications within popular categories and trusts in these applications. Consequently, these applications are more likely recommended when users access the app store or Play Store (Fang et al., 2018), leading to a surge in application downloads. This download increase is particularly notable for e-commerce platform applications, consequently driving up the number of visitors engaging with e-commerce applications.

This research studied the effect of app store rankings, play store rankings, and the effectiveness of using social media as a platform for e-commerce before and during the pandemic conditions. Based on the description above, the problems in this study can be formulated as follows: (1) Is app store ranking a determining factor for the effectiveness of e-commerce traffic? (2) Is Play Store ranking a determining factor for the effectiveness of traffic from e-commerce? (3) Is the type of social media (Facebook, Twitter, and Instagram) a determining factor for the effectiveness of e-commerce traffic? (4) Is the number of employees a determining factor for the effectiveness of traffic from e-commerce?

THEORETICAL REVIEW

Spatial diffusion Theory. This research provides a different perspective to understand the expansion of e-commerce **at the** national level. In addition to infrastructure, the spread of online business is affected by income and savings rates, which are the main reasons for the differences in the spatial distribution of online business and online shopping. The theory used in this study refers to research (Wang et al., 2021) using spatial diffusion theory, which equates directly to e-commerce with online business or online shopping to learn the spread of e-commerce in urban and rural areas. The results of the study Wang (2021) show that online business trends are only in line with the innovation diffusion hypothesis in regions with low levels of online business.

E-commerce. The history of e-commerce comes hand in hand with the history of the internet itself. E-commerce has become a big part of business today. E-commerce is a set of procedures and technologies that automate financial transaction tasks using electronic means (Barroso et al., 2019). Electronic commerce is phenomenal because its powerful concepts and processes have significantly changed today's life (Aymen et al., 2019). For many people, business e-commerce has become a priority e-commerce.

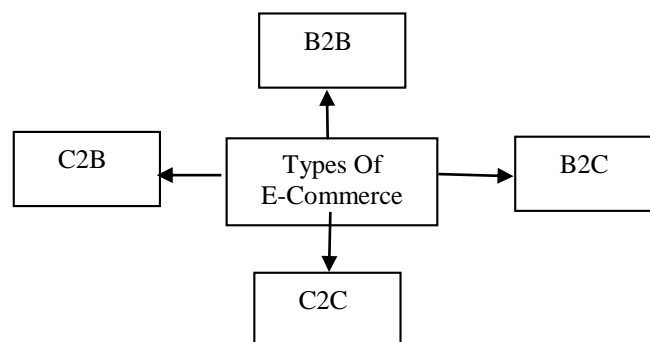


Figure 2. E-commerce Types
Source: (Chaffey and Hemphill, 2019)

Based on **Figure 2**, The types of e-commerce consist of (1) 'Business to Business (B2B)', which is electronic communication between businesses, to differentiate it from communication between businesses and customers. (2) 'Business to Consumer (B2C)' is an electronic business relationship between businesses and end consumers. (3) 'Consumer to Consumer (C2C)' is a type of e-commerce of all electronic transactions of goods or services made between consumers. (4) 'Consumer to Business (C2B)' is a consumer approaching a business with offers (Chaffey and Hemphill, 2019).

Examples of prominent general e-commerce websites in Indonesia include Shopee, Lazada, Bukalapak, and Tokopedia. Various factors, such as ease of use, willingness of manager, customer need, and cost, influence the decision of a company to adopt e-commerce.

Mobile Apps. Mobile Apps are smartphone applications that enable users to search and select the products they need by categories or brands, compare products and make an order.

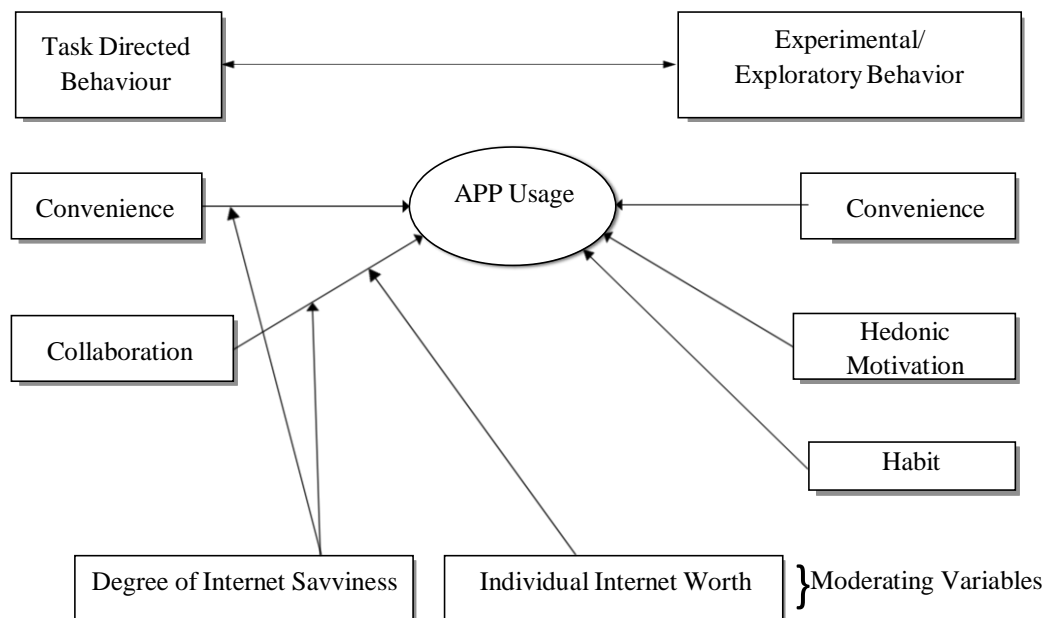


Figure 3. Model for Adoption of Mobile Apps for Shopping from E-commerce Sites
 Source: Ahuja and Khazanchi (2016)

Figure 3 shows the influencing factors for the usage of mobile apps, including (1) Convenience, (2) Collaboration, (3) Degree of Savviness of the Internet, (4) individual internet worth, (5) Habits, and (6) hedonic motivation (motivation to shop).

The main key player in the mobile apps market is the mobile Operating System (OS market). The OS is a smartphone platform software that will affect applications that generally do not work together. The key players are: (1) Android: Google's mobile OS. It is a mobile OS that is open source, meaning that theoretically, it can be used and adopted by anyone; it has also been adopted by the Open Handset Alliance (OHA), which is used by manufacturers Samsung, Sony, and HTC; (2) IOS: Apple's OS is used on iPhone, iPod, Apple TV, and iPad. This application is associated with OS X used in Apple Mac; (3) Windows mobile, which is Microsoft's OS used by several manufacturers, is incompatible with Windows on PCs.

The Play Store and the App Store are platforms where users can download and install applications. The Play Store, also called the Google Play Store, is an official application distribution platform developed by Google for the Android operating system. On the other hand, the App Store, known as the Apple App Store, serves as the official application distribution platform for IOS and is developed by Apple Inc. The applications available on both the Play Store and the App Store offer a range of functions, including entertainment and productivity tools.

Social Media. According to (Sholihin, 2019), social media is a tool used for connectivity and interactivity between individuals and groups in expressing themselves (for example, YouTube, Blog, Twitter, Facebook, and Instagram) and collaborating with others (for example, Rotten Tomatoes and Wikipedia). Social media has the following characteristics): (1) Network; (2) Information; (3) Archives; (4) Interaction; (5) Social simulation; (6) Content for users (Nasrullah, 2017).

According to Wibowo et al. (2021), social media is a social network site used by individuals to create direct communication and good relationships with their customers, build both their public or semi-public profiles in a system, publish, exchange and socialize informations between people and groups based on their interest.

Social media makes it easier to convey information faster and more personal time. There are three types of social media platforms, namely: (1) Online and Zoom communities, for example, Tripadvisor, Zomato, Kaskus, and Quora; (2) Blogs, for example, Blogspot and WordPress; (3) Social networks, for example, Facebook, Twitter, and Instagram.

As the use of social media develops, the social media sites currently popular in Indonesia are Facebook, WhatsApp, Twitter, Instagram, TikTok, YouTube, and Google. Facebook is a social media that highlights relationships beyond identity, conversation, reputation, and presence. Twitter contains user connection, interaction, and user profile views, while Instagram focuses on media content and is one of the fastest-growing platforms available today (Balakrishnan and Boorstin, 2017).

Research on the effectiveness of the use of e-commerce and social media by (Muqoddas et al., 2020) with the title "Usability User Interface Design in E-commerce Applications (Comparative Study of User Experience of Shopee, Lazada and Tokopedia)" used usability user interface design as the dependent variable and e-commerce as the independent variable. (Muqoddas et al., 2020) found the three highest e-commerce companies, Shopee, Lazada, and Tokopedia, have usability ranges on the 'Ok' and 'Good' scales.

(Respatiningsih, 2021), in "The Impact of E-Commerce on the Marketing Performance of MSMEs During the Covid19 Pandemic Mediated by Competitive Advantage", found there is a significant influence between social media and Tokopedia's brand image with marketing Performance as the dependent variable and e-commerce as the independent variable.

(Brennan, 2020), with the research title "A Convergence of Mobile Device Application Use and Smart Tourism: A Comparison of Korean and Non-Korean Smart Tourists". The dependent variable is e-commerce, and the Independent Variable is social media marketing. Research results show a significant influence between social media and the increase in e-commerce in Korea.

The effectiveness of social media-based e-commerce is a company's productive, sustainable strategy that makes the business environment conducive. The emergence of



the Covid pandemic has made many customers take advantage of social media and e-commerce in response to social restrictions and restrictions on human mobility.

Hypothesis Development. In this study, there is one dependent variable and three independent variables. The four independent variables include app store ranking, play store ranking, type of social media (Facebook, Twitter, and Instagram), and number of employees, while the dependent variable used is the effectiveness of e-commerce traffic.

Figure 4 shows that the three independent variables are related to the dependent variable.

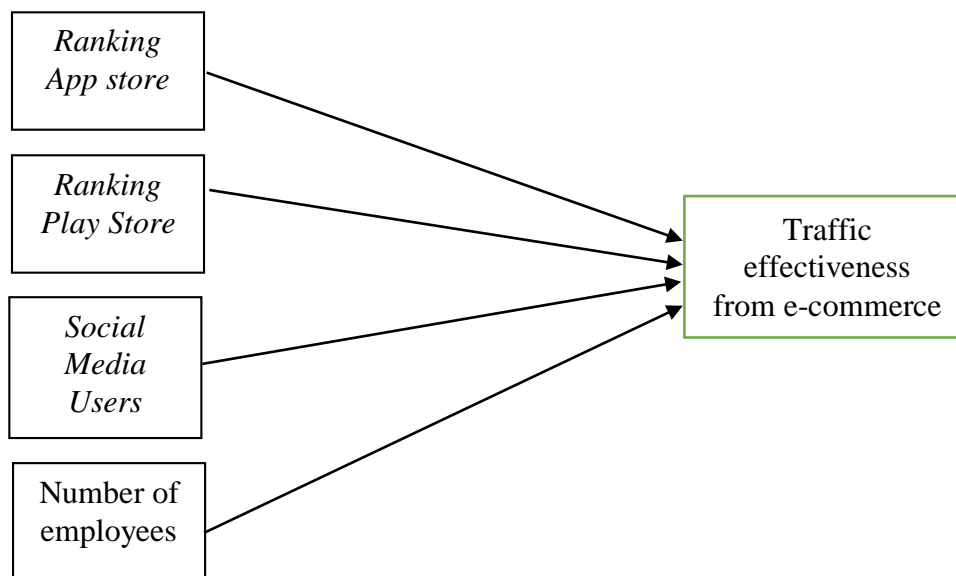


Figure 4. Research Model
 Source: Own Elaboration (2023)

Figure 4 The methodology for calculating the effectiveness of e-commerce visits from IPPriceGroup: it is known that at least four factors influence the level of effectiveness of e-commerce visits. The first two factors are related to the unique application operating systems from each well-known international vendor, namely: (1) App stores provided by the Apple company and mostly operated in the form of IOS software; (2) Play Store provided by companies other than Apple and mostly operated in the form of Android software.

The next factor is the number of interactions from well-known social media users, such as Twitter, Facebook, and Instagram. The last factor determining the effectiveness of e-commerce visits is the number of employees admins of each e-commerce.

So, based on the description above, to increase the effectiveness of an e-commerce visit, each owner and manager of an e-commerce business must be able to choose the type of application operating system that best suits the situation and conditions of the e-commerce business that is running. Compatibility between the types of IOS and Android application systems with the e-commerce business situation will also be determined to what extent the competency advantages possessed by the admins of each e-commerce business are the employees concerned. In addition, the compatibility between the IOS and Android system types is also determined by the effectiveness of the interaction between the admins of the e-commerce business and social media users such as Twitter, Facebook, and Instagram, which will be the target consumers in the future.

The increase in internet use indirectly increases the use of e-commerce, mobile applications, and digital marketing (Sarin et al., 2021). Social media data obtained from mobile devices such as Android reveals all user platform activities, such as disclosing the user's email address and identifying all videos watched, uploaded, shared, and deleted by the user (BenRhouma et al., 2022). Based on the above, the first and second hypotheses in the study:

H1: App store ranking is a determining factor for the effectiveness of e-commerce traffic.

H2: Play store ranking is a determining factor for the effectiveness of traffic from e-commerce.

The research results of (Attar et al., 2021) show that the trust and credibility of social media activities significantly affect e-commerce satisfaction, which in turn attracts customers to buy. With social media, a more comprehensive range of e-commerce actors can be reached (Saarijärvi et al., 2018). Based on the above, the third hypothesis in the study:

H3: The type of social media (Facebook, Twitter, and Instagram) determines the effectiveness of traffic from e-commerce.

The corporate strategy model McKinsey and Co. created has three hard elements and four soft elements. The three hard elements include strategy, structure, and system. Strategy includes business scope and competitiveness, marketing, and functional strategy. Structure refers to the basic configuration of the organization, and the system is the organization's mechanism.

The four soft elements include shared values, style, skills and staff. Style is the climate and culture of the company; skills refer to core competencies, which are a combination of unique skills and technology owned by the company. At the same time, the staff is the human resources of the entire organization. The existence of the COVID-19 pandemic causes companies to be able to explore survival measures and choose to establish or consolidate websites or e-commerce (Gavrila Gavrila and De Lucas Ancillo, 2022). This can be achieved if the company has several employees managing the company's e-commerce.



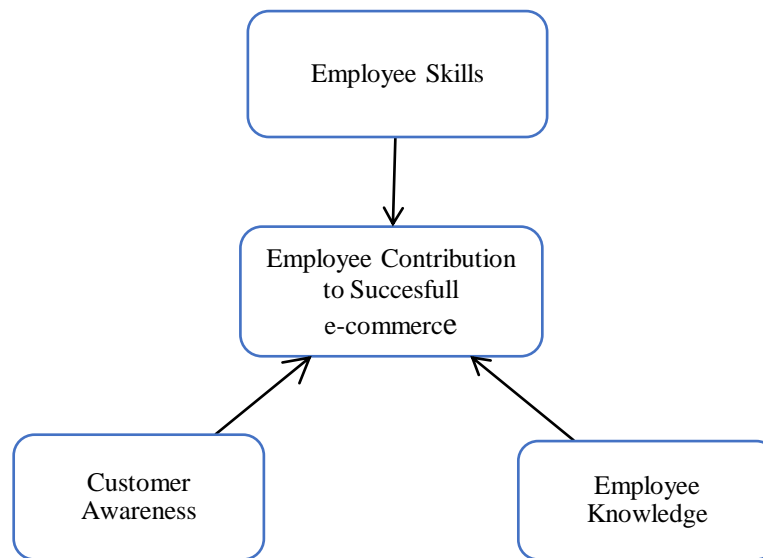


Figure 5. Diagram Employee Contribution to Successful E-commerce
 Source: Own Elaboration (2023)

Figure 5 shows employee contributions to successful e-commerce: employee skills, customer awareness, and employee knowledge. Companies must be able to adopt technological advances to attract and retain customers so that they can survive. Employees significantly contribute to e-commerce utilization activities in terms of marketing and integrating services online to identify, find, and provide services to customers.

According to (Choshin and Ghaffari, 2017), based on the processing results of respondents using Smart PLS, the results show that the infrastructure, knowledge, and information provided significantly impact the success of e-commerce. Based on the statement above, the fourth hypothesis in the study is:

H4: The number of employees is a determining factor for the effectiveness of traffic from e-commerce.

METHODS

Research Design. The subject of this research is the effectiveness of e-commerce traffic. The objects of this study are independent variables such as app store ranking, play store ranking, type of social media (Facebook, Twitter, and Instagram), and number of employees from 2017 to 2021 obtained from the iPrice website <https://iprice.co.id/insights/mapofecommerce>. The research sampling technique uses a purposive sampling technique with e-commerce criteria having complete data regarding app store rankings, play store rankings, types of social media (Facebook, Twitter, and Instagram) and number of employees from 2017 to 2021.

Research Sample. The sample for this study is panel data obtained from the iPrice website and has been processed in spreadsheet form. In the 2017 quarter one data panel, 57 merchants were then selected for the completeness of the data starting from 2017-2021. Based on panel data, complete data was found from 2017 to 2021 in the first quarter of 28

merchants. The data on these 28 merchants is the sample in the research that will be carried out.

Operational Variables. The operating variables explained in this study are app store ranking, play store ranking, type of social media (Facebook, Twitter, and Instagram), and the number of employees as a determining variable for the effectiveness of e-commerce traffic. The operational variables contained in the study are shown in **Table 1** as follows:

Table 1. Operational Variables

No.	Variables	Scale
1	Dependent: Traffic of E-commerce (TOE)	Ratio
2	Independent Variable:	
	App Store Rankings (ASR)	Ordinal
	Play Store Ranking (PSR)	Ordinal
	Social Media Visitors (SMV)	Ratio
	Number of Employees (NOE)	Ratio

Source: Own Elaboration (2023)

Table 1 shows that the variable TOE in this study is the amount of e-commerce traffic, which is the average monthly website visitor obtained from SimilarWeb data. The list of e-commerce actors was obtained from the Indonesian E-commerce Association / IDEA website purposively, namely: (1) Not categorized as travel trade, rental, finance companies (insurance and investment), services such as food delivery, providing vouchers, and advertising; (2) Number of e-commerce visitors of at least 100,000 per month and those who have followers of at least 100,000 on their social media accounts.

This study's variables ASR and PSR are application rankings, namely app store rankings and Play store rankings, which are the average of e-commerce application rankings obtained from App Annie's data (www.data.ai). Variable SMV from the research is social media visitors, which shows the number of social media followers obtained from the big three social media visitors in 2017-2021: Facebook, Instagram, and Twitter, where the number of followers is obtained from the available pages of each country. At the same time, the variable NOE is the number of employees obtained from the data available on LinkedIn.

Research Model. Statistical data processing involves utilizing the Eviews 10.0 application. Panel data will be tested using common, fixed, and random methods. Subsequently, the test results will be chosen based on the research model. The research model is as follows:

$$TOE = C + b_1ASR + b_2PSR + b_3SMV + b_4NOE \dots \dots \dots (1)$$

Where TOE is Traffic of E-commerce, C is Constant, ASR is App Store Rank, PSR is Play Store Rank, SMV is Social Media Visitors, NOE is Number of Employees, b_1, b_2, b_3, b_4 are the regression coefficients of the variables ASR, PSR, SMV, NOE on TOE.



RESULTS

Stationarity And Cointegration Test. Descriptive statistics of variables. Descriptive statistical analysis serves to determine the comparison of the characteristics of the data used. The following is a table of descriptive statistics of variables.

Table 2. Descriptive statistics of variables

	TOE	ASR	PSR	SMV	NOE
Mean	12,778,601	8.500	9.914	1,022,724	646.693
Median	864,300	4.000	7.500	327,933.300	200.000
Maximum	1.370	32.000	31.000	11,525,797	10,530.000
Minimum	2,000.000	0.000	0.000	0.000	0.000
Std. Dev.	2,894,616	9.719	9.427	2,091,337	1,255.517
Skewness	2.940	0.810	0.486	3.332	4.459
Kurtosis	11.121	2.212	1.846	14.290	30.573
Jarque-Bera	586.377	18.943	13.280	1,002.599	4,898.713
Probability	0.000	0.000	0.001	0.000	0.000
Sum	1.790	1,190.000	1,388.000	1.430	90,537.000
Sum Sq. Dev.	1.160	13,131.000	12,352.970	6.080	2.190
Observations	140	140	140	140	140

Source: Own elaboration (2023)

Table 2 shows the mean value, which indicates the average value of the data obtained. The median value indicates the middle value of the data obtained. The maximum and minimum values indicate the highest and lowest values in the data. The standard deviation value indicates the fluctuating level of the data. The skewness value indicates whether the data is normally distributed (which occurs when the skewness is equal to zero), right-skewed (which occurs when the skewness is greater than zero) or left-skewed (which occurs when the skewness is lesser than zero), on the graph. Kurtosis measures the degree of peakedness in a graph. A zero value indicates a normal distribution, where the data is evenly spread around the mean. A positive value suggests a more peaked or clustered distribution than a normal distribution, with a higher concentration of data around the mean. Conversely, a negative value indicates a less peaked distribution, and more spread out than a normal distribution, indicating greater variability or heterogeneity in the data.

Based on **Table 2** above, it can also be seen that the amount of data used is 140 data obtained from 28 merchants. The highest standard deviation is observed for the variable App Store Rank, with a value of 9.720. This indicates that the App Store Rank variable exhibits substantial fluctuations or variations in the data. Conversely, the lowest standard deviation is found in the variable social media visitors, with a value of 0.819. This suggests that the social media visitor variable experiences relatively minor changes in the data.

The skewness value of the traffic variable from e-commerce, app store rank, and play store rank are positive and close to zero. This indicates that the distribution of these variables is slightly left-skewed or approaching a normal distribution. On the other hand, the variables social media visitors and number of employees have positive skewness values that are significantly different from zero. This suggests that the distribution of social media visitors and some employee variables is right-skewed, meaning their graphs slope towards the right. Based on the Jarque-Bera values obtained, all variables in this research have



values above 0.050, which is the chosen critical value. This suggests that all variables deviate from a normal distribution.

Correlation analysis. Correlation analysis is performed to measure the relationship between variables, which can range in value from negative one to positive one. The following presents the correlation values obtained from the variable analysis conducted in this study.

Table 3. Correlation Analysis Variables

	ASR	PSR	SMV	NOE
ASR	1.000	0.610	-0.182	-0.159
PSR	0.610	1.000	-0.272	-0.185
SMV	-0.182	-0.272	1.000	0.671
NOE	-0.159	-0.185	0.671	1.000

Source: Own elaboration (2023)

Table 3. displays the correlation values between the independent variables ASR (App Store Rank), PSR (Play Store Rank), SMV (Social Media Visitors), and NOE (Number of Employees). The correlation values obtained for all variable combinations are not greater than 0.800. This indicates the absence of multicollinearity symptoms among the variables, making it suitable for a multiple regression analysis.

Panel data regression estimation. In estimating panel data regression, three analytical models were tested, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Tests carried out on the analysis model are the Chow test, Hausmann test, and the Lagrange Multiplier test. This test is carried out to obtain data that is more appropriate to use in determining conclusions.

Table 4. Regression Estimation Panel Data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Common Effect Model				
C	6.598	0.507	13.021	0.000
App store rank (ASR)	0.004	0.012	0.331	0.741
Play store rank (PSR)	-0.079	0.012	-6.315	0.000
Social media visitor (SMV)	0.119	0.076	1.565	0.120
Number of employees (NOE)	0.001	0.000	3.181	0.002
Fixed Effect Model				
C	6.706	0.442	15.170	0.000
App store rank (ASR)	-0.002	0.011	-0.171	0.864
lay store rank (PSR)	-0.030	0.011	-2.804	0.006
Social media visitor (SMV)	-0.040	0.074	-0.543	0.588
Number of employees (NOE)	0.001	0.000	2.140	0.035
Random Effect Model				
C	6.655	0.424	15.696	0.000
App store rank (ASR)	-0.010	0.010	-1.078	0.283
Play store rank (PSR)	-0.051	0.010	-5.327	0.000
Social media visitor (SMV)	0.062	0.066	0.945	0.347
Number of employees (NOE)	0.001	0.000	3.141	0.002

Source: Own elaboration (2023)

Table 4. shows the results of three analytical models based on panel data used in this study.



Chow test. The Chow test determined the analytical model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The following is a table of Chow test results.

Table 5. Chow Test Result

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.927	(27,106)	0.000
Cross-section Chi-square	166.032	27	0.000

Source: Own elaboration (2023)

Table 5. shows that the p-value (prob.) is less than 0.050, so it can be concluded that the Fixed Effect Model (FEM) is more feasible to use than the Common Effect Model (CEM).

Hausman test. The Hausman test was carried out to determine the analytical model used between the Fixed Effect Model (FEM) and the Random Effect Model (REM). The result shows that the p-value (prob.) is 0.000, which is less than 0.050, so it can be concluded that the Fixed Effect Model (FEM) is more appropriate to use than the Random Effect Model (REM).

Lagrange Multiplier Test. The Lagrange Multiplier test determines the analytical model between the Common Effect Model (CEM) and the Random Effect Model (REM). In the research conducted, the Lagrange Multiplier test yielded no results.

Table 6. Panel Data Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.706	0.442	15.170	0.000
App store rank (ASR)	-0.002	0.011	-0.171	0.864
lay store rank (PSR)	-0.030	0.011	-2.804	0.006
Social media visitor (SMV)	-0.040	0.074	-0.543	0.588
Number of employees (NOE)	0.001	0.000	2.140	0.035
R-squared	0.905	Mean dependent var		6.114
Adjusted R-squared	0.876	SD dependent var		0.993
SE of regression	0.350	Akaike info criterion		0.946
Sum squared resid	12.990	Schwarz criterion		1.660
Log-likelihood	-32.225	Hannan-Quinn criteria.		1.236
F-statistic	30.679	Durbin-Watson stat		2.008
Prob(F-statistic)	0.000			

Source: Own elaboration (2023)

Table 6. shows the fixed effect model utilized in this study. Fixed effect model data will be used to determine the regression equation.

Double Regression Analysis. Based on the results of the Chow test and Hausman test, it can be seen that the analytical model used in this study is the Fixed Effect Model (FEM). From the FEM presented in **Table 6**, the regression equation between variables can be obtained as follows:

$$TOE = 6.706 - 0.002ASR - 0.030PSR - 0.040SMV + 0.001NOE \dots \dots \dots (2)$$



Based on the regression equation, it can be seen that if there are no changes in the App Store rank variable, Play Store rank, social media visitors and number of employees, then the amount of traffic from e-commerce is 6.706.

The variable App Store Rank has a coefficient value of -0.002, the Play Store Rank has a coefficient value of -0.030, and social media visitors have a coefficient value of -0.040. These coefficients indicate a negative relationship between these variables and the traffic from e-commerce. On the other hand, the variable number of employees has a coefficient value of 0.001, indicating a positive relationship between the number of employees and the traffic from e-commerce.

Coefficient of Determination. The coefficient of determination is utilized to assess the proportion of influence exerted by the independent variables on the dependent variable. Based on the Adjusted R-squared value of 0.876, as presented in **Table 6**, it can be concluded that 87.6 per cent of the variation in traffic from e-commerce is explained by the variables App Store rank, Play Store rank, social media visitors, and the number of employees. The remaining 12.4 per cent is attributed to other independent variables not included in the research.

T-test. The t-test is used to determine the partial effect of the independent variables in this study, namely App Store rank, Play Store rank, social media visitors and number of employees on the dependent variable.

Based on the results of the Fixed Effect Model (FEM) test presented in **Table 6**, the t-statistic values for the variables are as follows: -0.171 for App Store Rank, -2.804 for Play Store Rank, -0.543 for social media visitors, and 2.141 for the number of employees. Additionally, **Table 6** displays the p-values (prob.) for each variable: 0.864 for App Store rank, 0.006 for Play Store rank, 0.588 for social media visitors, and 0.035 for the number of employees.

To determine the t-table value, the parameters considered in this study are as follows: the data size (n) is 140, the number of variables (k) is 5, and the confidence level is set at 0.950, resulting in a significance level (α) of 0.050. The resulting t-table value is ± 1.978 , where positive 1.978 corresponds to the upper critical value and negative 1.978 corresponds to the lower critical value.

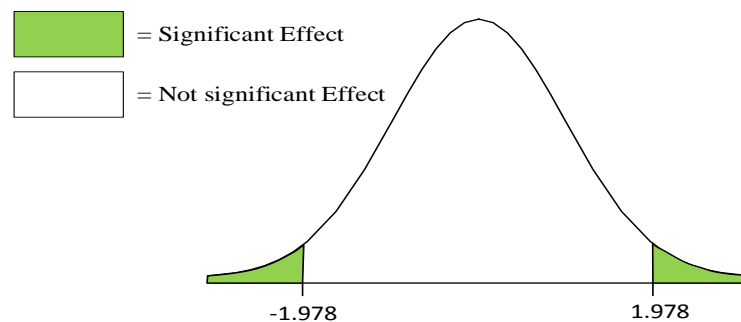


Figure 6. T-test result

Source: Own elaboration (2023)

Figure 6 illustrates the normal distribution curve representing the difference between the two means. If the t-statistic value for the independent variable in this study falls within the green section, it indicates a significant effect on the dependent variable. Conversely, if the t-statistic value falls within the white section, it implies that the data has

no significant impact on the dependent variable. Specifically, suppose the t-statistic value is less than -1.978 or greater than 1.978, and the p-value (prob.) is less than 0.050. In that case, it indicates that the independent variable significantly affects the dependent variable.

The App Store rank variable has a t-statistic of -0.171 and a p-value of 0.864, indicating that the App Store rank variable does not significantly affect traffic from e-commerce. On the other hand, the Play Store rank variable has a t-statistic of -2.804 and a p-value of 0.006, indicating that the Play Store rank variable significantly affects traffic from e-commerce.

The social media visitor variable has a t-statistic of -0.543 and a p-value of 0.588, indicating that the social media visitor variable does not significantly affect traffic from e-commerce. On the other hand, the variable number of employees has a t-statistic of 2.141 and a p-value of 0.035, indicating that the number of employees variable significantly affects traffic from e-commerce.

F test. The F-test was conducted to assess whether the independent variables significantly affect the dependent variable in this study. Using a significance level (α) of 0.050, with five variables and 140 data, the obtained F-table value is 2.439. In the Fixed Effect Model (FEM) test (**Table 6**), the calculated F-statistic value is 30.679. Since the F-statistic value is higher than the F-table value, it can be concluded that the overall independent variables significantly affect the dependent variable in this study.

DISCUSSION

The current era of digitalization has become part of business processes and has a big influence on customer behaviour. Based on the analysis results, changes in the Play Store rating impact the effectiveness of e-commerce traffic more than changes in the App Store rating. This proves that in Indonesia, there are more Play Store users than App Store users.

The research results also indicate tight competition from e-commerce players such as Gojek, Tokopedia, Lazada, Blibli, and others that make visitors to each e-commerce player's website often change their choices all the time, thus making the number of purchase transactions sometimes high and low, for an e-commerce player. The difficulty of accessing e-commerce applications can assess e-commerce applications insignificant. The App Store is considered a locked platform that is difficult to access and can only be accessed with iOS-based cellphones, namely the iPhone. This is to the statement of (Morrison et al., 2018), where the IOS security model makes it difficult for users to use the App Store to be able to access applications that are already available, in contrast to the Play Store which is more open and can access applications more easily.

In contrast to Google, which distributes Android devices that many companies can access on condition that they have to pay for a distribution license from Google App (Kollnig et al., 2022). Social media visitors' behaviour will increase e-commerce traffic, but this is different from the research results. So, to be effective and have an influence, e-commerce traffic depends on the effectiveness of digital marketing promotions from e-commerce players such as Gojek, Bukalapak, Shopee, Tokopedia, Lazada, etc.

The research results also indicate that social media visitors have little impact on the effectiveness of e-commerce in Indonesia. This suggests that social media has yet to be successful in generating posts that stimulate increased purchasing transactions for e-commerce products. Existing social media posts differ from one another and only



contribute to increased e-commerce traffic temporarily, gradually fading away once the post is no longer a 'trending topic'.

Clickbait on social media means that visitors do not influence e-commerce traffic. When using social media, many types of advertising can be done, such as using images and descriptions, creating unique and creative product videos, and product video clips. Of course, these advertisements will provide a website link that directs social media users to visit the e-commerce location where the product is sold.

However, the large clickbait spread on social media is a big obstacle for platforms to get the desired data. This is to the statement by (Wang et al., 2021) that the level of traffic detected on social media platforms is only seen based on the number of clicks on a video, advertisement, thumbnail or link listed. This is what makes a lot of e-commerce traffic misdirected.

Various activities of e-commerce actors change the behaviour of providers of goods and services and customers' behaviour in meeting their needs for goods and services. Employees also have an important role in increasing the number of colleagues and the interaction of traffic e-commerce. This is by (Girotra and Kaushik, 2018) statement that e-commerce startup companies initially need help finding colleagues or businesses willing to market their products through e-commerce applications.

E-commerce needs to find employees who can be hired as salesmen and place them in specific areas; failure to prepare human resources related to the development of digitalization can result in digital transformation not achieving the expected results and reducing the effectiveness of the use of resources. Increasing the number of salesmen can increase the number of colleagues, increasing the variety of products available in the application. In addition, employees can act as a customer service that helps answer questions from colleagues and e-commerce visitors about e-commerce.

The findings in this research show that individuals who mostly generate content on social media are considered sellers. This contrasts with the conclusions presented by (Sarin et al., 2021), which assert that developer companies mostly create content on social media. These divergent findings can be attributed to the nature of e-commerce as a digital space where numerous individuals engage in selling activities, resulting in content being generated and distributed by these sellers within the e-commerce platform. When an e-commerce platform already boasts many sellers, developer companies may find it unnecessary to create extensive content for the platform's distribution.

This research employs three social media platforms, Twitter, Instagram, and Facebook, to assess visitor counts. In contrast, a prior study conducted by (Sarin et al., 2021) utilized hashtag analysis on Twitter to evaluate transaction costs. This research also uses panel data from Iprice, which encompasses the entire Indonesian context. Conversely, an earlier study by (Priansa et al., 2020) relied on questionnaire sample data limited to a single city in Indonesia, namely Bandung.

CONCLUSION

The current era of digitalization has become part of business processes and has a major influence on customer behaviour. Today, the number of internet users continues to grow, providing impetus and opportunities for global and regional e-commerce. The COVID-19 pandemic increased transactions through e-commerce that occurred because of the convenience and flexibility provided.



For consumers, the presence of e-commerce will save money, time and energy. For manufacturers, e-commerce services will expand target consumers, marketing scope, and efficiency. With limitations to interacting directly, people have diverted the way they communicate and interact through social media. The use of social media has developed from media to communicate to become more diverse, including in communicating and marketing products.

Based on the results of the empirical analysis that has been carried out, the variables App Store Ranking, Play Store Ranking, Social Media Visitors and the number of employees influence traffic from e-commerce. The following are the results of empirical conclusions in this study: (1) Rank App Store does not significantly affect traffic from e-commerce; (2) Rank Play Store has a significant effect on traffic from e-commerce; (3) Social media visitors have a negative relationship and do not significantly influence traffic from e-commerce; (4) The number of employees has a positive relationship and significantly influences traffic from e-commerce.

The data processing results show that the Play Store rank has a more significant effect on the effectiveness of e-commerce traffic than the App Store. Social media visitors do not significantly influence the effectiveness of traffic from e-commerce. At the same time, the number of employees has a positive relationship and significantly impacts the effectiveness of traffic from e-commerce. This shows that the factors affecting the effectiveness of traffic from e-commerce are still dominated by the intellectual abilities of employees in managing and maintaining the security of the application devices used in e-commerce.

The research results imply that for e-commerce players to remain in the top ranks, they are expected to update websites and transaction application features optimally at any time. To obtain precise data on visitor traffic, please do not count based on the number of websites when visited, but add other things such as the account formed in the application, the number of products liked, the products added to the basket, visitor comments on the product and the number of products purchased.

The drawback of this research is the unavailability of transaction and bookkeeping data from e-commerce actors because some e-commerce actors who are small companies need to own and publish their sales data.

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