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ANALYSIS OF TWITTER USER INTERACTIONS USING SOCIAL NETWORKS AT PAYDAY SALE EVENTS ON THE MARKETPLACE

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ABSTRACT

The goal of this study was to ascertain the marketplace companies' commitment to implementing SCRM on social media and to identify patterns of engagement, interaction, and communication between Twitter users and the marketplaces Shopee, Tokopedia, and Lazada that emerged on social media at payday sale events. The Social Network Analysis (SNA) approach is being used in this qualitative study. Twitter users in Indonesia are the focus of this study. The users of Tokopedia, Shopee, and Lazada are the research population. Dictionary, Notepad++, Wordij, and Gephi are supporting tools used in this study together with Jupyter Notebook. The Shopee Marketplace is superior and performs better, according to an analysis of network features. According to the analysis, the Shopee marketplace has a broader network. According to this study, many consumers utilize Shopee as their online shopping destination, particularly during payday sale events when each marketplace offers alluring discounts and free delivery.

Keywords: Marketplace, E-commerce, User Generated Content, Social Network Analysis, Payday Sale.

ABSTRAK

Tujuan dari penelitian ini adalah untuk memastikan komitmen perusahaan marketplace dalam mengimplementasikan SCRM di media sosial dan untuk mengidentifikasi pola keterlibatan, interaksi, dan komunikasi antara pengguna Twitter dengan marketplace Shopee, Tokopedia, dan Lazada yang muncul di media sosial saat payday sale. acara. Pendekatan Social Network Analysis (SNA) digunakan dalam studi kualitatif ini. Pengguna Twitter di Indonesia menjadi fokus penelitian ini. Populasi penelitian adalah pengguna Tokopedia, Shopee, dan Lazada. Kamus, Notepad ++, Wordij, dan Gephi adalah alat pendukung yang digunakan dalam penelitian ini bersama dengan Jupyter Notebook. Marketplace Shopee lebih unggul dan berkinerja lebih baik, menurut analisis fitur jaringan. Menurut analisa, marketplace Shopee memiliki jaringan yang lebih luas. Menurut studi ini, banyak konsumen yang memanfaatkan Shopee sebagai tujuan belanja online mereka, terutama saat acara payday sale ketika setiap marketplace menawarkan diskon menarik dan pengiriman gratis.

Kata Kunci: Marketplace, E-commerce, User Konten Buatan Pengguna, Social Network Analysis, Payday Sale.



Introduction

The rapid development of technology and knowledge is one of the great advances of human civilization. Information technology is needed for today's business world, and the need for technology and information also continues to increase from year to year. If business people can manage technology and information effectively and efficiently, they will produce valuable data (Indonesian Information System Journal 2019). With the rapid development of technology and information, Indonesia is currently entering the 4.0 revolution, and this digital era has a positive impact on the economy. One evidence of technological developments that have a positive effect on the economic sector is E-commerce (Bratawisnu and Alamsyah 2019).

With E-Commerce, buying and selling transactions that were previously carried out through face-to-face meetings between buyers and sellers have now been transformed. Transactions of buying and selling goods or services can work only with a finger-based electronic network (Bratawisnu and Alamsyah 2019). One of the E-Commerce models that are currently widely used is the Marketplace which is a place where buyers and sellers meet online (Genoveva, Ahyadi, and Ariestiningsih 2021). The presence of a Marketplace helps business people to sell or offer their goods or services to consumers and can reach a wider market (Genoveva et al. 2021). People's habits in the process of buying and selling transactions online have a big impact on the development of the Marketplace in Indonesia (Genoveva et al. 2021).

Table 1 2019 Marketplace Visitor Data

Year	Market	Visitors				Total
		Q1	Q2	Q3	Q4	
2019	Tokopedia	137,200,900	140,414,500	65,953,400	67,900,000	411,468,800
	Shopee	74,995,300	90,705,300	55,964,700	72,973,300	294,638,600
	Bukalapak	115,256,600	89,765,800	42,874,100	39,263,300	287,159,800
	Lazada	52,044,500	49,620,200	27,995,900	28,383,300	158,043,900
	Blibli	32,597,200	38,453,000	21,395,600	26,863,300	119,309,100
2020	Tokopedia	69,800,000	86,103,300	84,997,100	114,655,600	355,556,000
	Shopee	71,533,300	93,440,300	96,532,300	129,320,800	390,826,700
	Bukalapak	37,633,300	35,288,100	31,409,200	38,583,100	142,913,700
	Lazada	24,400,000	22,021,800	22,674,700	36,260,600	105,357,100
	Blibli	17,600,000	18,307,500	18,695,000	22,413,100	77,015,600
2021	Tokopedia	135,076,700	147,790,000	158,136,700	157,443,300	598,446,700
	Shopee	127,400,000	126,996,700	134,383,300	138,776,700	388,780,000
	Bukalapak	34,170,000	29,460,000	30,126,700	25,760,000	119,516,700
	Lazada	30,516,700	27,670,000	27,953,300	28,173,300	114,313,300
	Blibli	19,590,000	18,440,000	16,326,700	15,686,700	70,043,400

Source: iPrice.co.id, 2019

iPrice's data on the "Indonesian E-Commerce Ranking Map", shows that there are five Marketplace platforms that consistently rank in the top five from 2019 to 2021, namely Tokopedia, Shopee, Bukalapak, Lazada and Blibli (iPrice Group 2018). The large number

of markets in Indonesia is caused by intense market competition (Ginting et al. 2022). The rapid development of marketplaces in Indonesia is influenced by factors that encourage people to shop through marketplace websites including low prices, product quality, shopping convenience, ease of transactions, many product variations or choices, lots of promos available, and many others based on differences in the demand factors of each individual consumer (Ginting et al. 2022).

In each Marketplace, there are the same number of marketing events. Marketing events are promotional activities in which companies or brands are associated with themed events designed to create experiences for consumers and promote the products sold and services provided (Agesti et al. 2021). Marketing events that consumers have been waiting for are double-day events (date twins) such as the 12.12 Birthday Sale, and the Payday Sale event (payday sale) which takes place every 25th until the end of the month. at every marketing event, there are lots of promos, cashback, free shipping, and flash sales.

Because social media offers information into marketing company markets, it is a priority in online business marketplaces (Bratawisnu and Alamsyah 2019). The value that businesses offer to customers may be created, shared, and conveyed via social media (Bratawisnu and Alamsyah 2019). Global consumers utilize social media to post opinions about items on social media and to learn more about products on Marketplace. User Generated Content (UGC) is the term used to describe the data that users provide to social media platforms (Yang, Ren, and Adomavicius 2019). UGC is information that users who have internet access have left behind (Yang et al. 2019). Twitter is a social media platform that collects and disseminates a large amount of user-generated content (UGC) that includes opinions and publicly accessible information (Muhammad dianzah 2021). Twitter is a social media platform with several advantages, making it particularly effective in disseminating information. Some of these advantages include political communication, event business information for marketing, and customer service.

Social media analysis is needed to see patterns of interaction between companies and customers from UGC which are widely spread on social media (Dikky Prabhawa and Rahayu 2022). Social media characteristic data is unstructured and has a large volume (Big Data) (Risselada and van den Ochtend 2022), so sophisticated tools and techniques are needed to extract information from social media (Dikky Prabhawa and Rahayu 2022). Social Network Analysis (SNA) is a method that can be used in research. SNA is part of Social Computing Engineering to extract information on unstructured data and has a big volume (Dikky Prabhawa and Rahayu 2022) (DAY 2021). SNA is currently studying the study of human connections with graph utilization theory (Dikky Prabhawa and Rahayu 2022) (DAY 2021).

SNA is used to understand connections that symbolize social users with nodes and relationships between users which are denoted by lines (edges) on Online Social Networks (OSN) (Bratawisnu and Alamsyah 2019). SNA is used to study network patterns that connect organizations, ideas, and people through various methods in an environment (Bratawisnu and Alamsyah 2019). So SNA can be applied to business people to gain insight and knowledge from the market and society through social media. Businesses can take advantage of social property networks on SNA to be compared with business relationships on social networks (Bratawisnu and Alamsyah 2019). The in-depth data source study comes from tweets that have keywords from 3 official Twitter accounts belonging to Shopee, Tokopedia, and Lazada for Payday sale events, namely #Shopeegajiansale for the Shopee marketplace, #Waktuindonesiabelanja for the Tokopedia Marketplace, and #Pestagajian for the Lazada Marketplace.

Previous research examined Top Campaign Marketing using Social Network Analysis on Shopee and Tokopedia social media on Twitter social media with the data collection period when the marketing campaign was running, namely 20-30 April 2021 using the keywords #ShopeeGajian and #TokopediaWIB (Dikky Prabhawa and Rahayu 2022). The research results show that the top campaign from More Social Network Analysis formed on Twitter #TokopediaWIB is superior because it is most discussed by the public (Dikky Prabhawa and Rahayu 2022). Whereas previous research examined interactions between Twitter users and consumers from the company marketplaces Tokopedia, Shopee, and Bukalapak with the data collection period starting from 26 July 2021-23 October 2021 using keywords from three e-commerce sites namely @tokopedia, @shopeeID, and @Bukalapak (Muhammad Dianzah 2021). The study found that Shopee forms more optimal customer engagement through the implementation of SCRM by modeling companies and the most discussed topics are Hallyu or Korean wave, giveaways, and promos (Muhammad dianzah 2021).

From the results of the research, the researchers found a gap or gap, namely the Population Gap. Population Gap is the study of populations that are not adequately represented or do not have sufficient research in the evidence base or studies (Psomas and Antony 2019). The population referred to by the researcher is the limited period of data collection in the previous research, which resulted in the data and information obtained not being accurate enough (Psomas and Antony 2019). The population in this study is data taken from January 1 2019 to December 31, 2022, with a maximum limit of 2000 data and limited to using only Indonesian. With the gaps described, it is necessary to carry out further studies in the hope of broadening the information and strengthening the results, so the researchers took the title of the study "Analysis of Twitter User Interactions Using Social Networks at Payday

Sale Events in the Marketplace". The purpose of this research is to find out the company's marketplace commitment as an implementation of SCRM on social media and to see patterns of interaction, communication, and customer engagement between Twitter users and the company marketplaces Shopee, Tokopedia, and Lazada when Payday sale events form on social media. The SNA method and topic modeling are required methods for analysis because they can be applied to processing large data (big data) as well as unstructured. The results of the analysis from the second method can be used as insights that can be used by companies/industries to develop optimal social media marketing strategies. So that this strategy can increase SCRM and achieve company goals.

Method

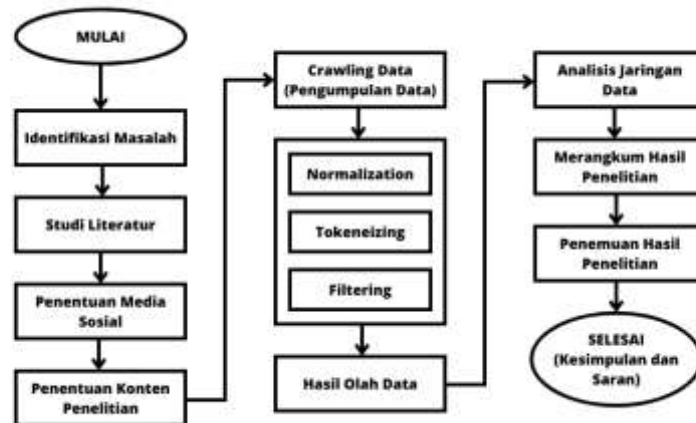
This study, which is part of a qualitative study using a descriptive methodology, makes use of the Social Network Analysis (SNA) technique., SNA represents the network structure at nodes as users and edges as relations (Mitei and Ghanem 2020). By giving a thorough explanation of research phenomena or social phenomena, qualitative studies are able to comprehend these phenomena (Rahman and Kurniawati 2021). Qualitative studies are understanding research phenomena or social phenomena by providing a detailed explanation of these phenomena (Rahman and Kurniawati 2021). Data collection for this cross-sectional study occurs at a single time, after which the data are processed, examined, and conclusions formed (Azmi et al. 2021). The subject of this research is Twitter users in Indonesia. The research population is the users of the Tokopedia, Shopee, and Lazada marketplaces.

In this study, the data collection techniques used were observation and documentation techniques. The observation technique used to obtain secondary data is there user-generated content (UGC) on Twitter social media which includes cover mentions, replies, and retweets with keywords from 3 official marketplace accounts namely #ShopeeGajianSale for Shopee users, #WaktuIndonesiaBelanja for Tokopedia users and #PestaGajian for Lazada users. Data collection was carried out from 1 January 2019 to 31 December 2022 with a maximum limit of 2000 data and limited to using only Indonesian. Documentation techniques in this study are Tweet. Id data, usernames, links, datetime, outlines, and content. The supporting tools used in this study, namely Jupyter Notebook Anaconda 3, Dictionary, Notepad++, Wordij, and Gephi, assisted in the data collection process.

The method of researching the validity of this data uses triangulation, which is the method most commonly used to increase the validity of data in qualitative research so that in conclusion it does not only come from one point of view (Lailia 2021). To test the credibility of the data in this study using triangulation techniques. The triangulation technique is used

to test the credibility of the data which is carried out by checking data obtained from many of the same sources but using different techniques, such as data obtained from interviews and then checking with documentation A (Lailia 2021). In this study, a triangulation technique will be visualized using descriptive assumptions with a systematic formula generated on the property network, and from these results, we will visualize We Can view keywords or busy topics discussed on Twitter social media.

Figure 1. Research Flow



Source: Author, 2023

The first research flow is observing the same phenomenon in the marketplace at the Payday sale event. Then the researcher chooses 3 marketplaces namely Shopee, Tokopedia, and Lazada. Problems or issues that arise from this phenomenon are then identified in the form of problem formulation, patterns of interaction that develop, and involvement between users and marketplaces on social media during Payday sale events on Twitter, by determining User Generated Content (UGC) which will be used as the object of study, namely #Shopeegajiansale, #WaktuIndonesiaBelanja, and #PestaGajian. This study uses Jupyter Notebooks (Anaconda 3) with the Python programming language and is assisted by the Snsrscrape library. Data generated from text or tweets about the topic of study at a certain time and the results from Indonesian tweets in CSV format.

The data preprocessing stage is the stage for eliminating noise (Lieharyani and Ambarwati 2022). In the tweet data that is interpreted by noise when processing text data such as emoticons, hashtags, symbols, retweets, abbreviations, and others, it seems that there are no standards that are difficult to understand (Lieharyani and Ambarwati 2022). The preprocessing stages generally consist of case folding, tokenizing, filtering, and stemming (Lieharyani and Ambarwati 2022). The sequence of preprocessing in this study is as follows: case folding To make all letters lowercase, remove special characters (such as tabs, newlines, etc.), remove non-ASCII characters (such as emoticons, Chinese characters,

etc.) remove Twitter features unnecessary (like hashtags, mentions, links), remove incomplete links, remove character noise (punctuation, lots of spaces, single letter characters), tokenizing, filtering (stopword use library nltk), text normalization (use slang dictionary from GitHub and finally stemming (using the Sastrawi library) (Lieharyani and Ambarwati 2022). This detailed preprocessing stage was carried out because studies were showing that informal language (slang, inappropriate writing, slang) and various anomalies in data tweets would affect accuracy (Murshed, Al-Ariki, and Mallappa 2020). This preprocessing stage also calculates the number of all words from the data for each tweet as well as the unique words contained in the tweet data (Lieharyani and Ambarwati 2022). Preprocessed data that has many words that appear below three and bigram phrases with a frequency below three will be removed so that only important data is processed (Abbas, Ali Memon, and Aleem Jamali 2019).

After data processing, network arrangement, and several groups that occur in interactions between Shopee, Tokopedia, and Lazada marketplace users, the result of this data processing is data visualization assisted by the Gephi tool and summarizes network property value data and from the results, we can see the word Key topics or topics that are busy being discussed on social media Twitter. The processing of the generated data and examination of its level of impact on the keywords #ShopeeGajianSale, #WaktuIndonesiaBelanja, and #PestaGajian constitute network data analysis. The last process summarizes the results of the study to prove that the SNA method with crawl data using Jupiter Notebook helps the Gephi tool for visualization to provide benefits for organizations. Twitter social media also has an important influence on SCRM for a marketplace in Indonesia because Twitter social media allows the marketplace to see consumer interaction and engagement so that the marketplace can determine the next strategy to be carried out to improve SCRM and achieve goals. company.

Results and Discussion

The steps taken after tweeting data from three keywords (#Shopeegajiansale, #WaktuIndonesiaBelanja, and #PestaGajian) were successfully collected at the preprocessing stage, namely conducting data analysis. The first data analysis carried out was crawling data (data collection) using User Generated Content (UGC) available on Twitter social media with the keywords used namely promos and free shipping at #ShopeeGajianSale for the Shopee marketplace, #WaktuIndonesiaBelanja for the Tokopedia marketplace and # PestaGajian for Lazada marketplace.

No.	Keywords	Content Payments Sale	Year	Amount of data
1.	Promo	#shopeepaidsale #Waktuindonesiabelanja	2019-2022	929 93

		#payday		13
		#shopeepaidsale		2000
2.	Free Shipping	#Waktuindonesiabelanja	2019-2022	51
		#payday		13
3.	@ShopeeID	#shopeepaidsale	2019-2022	2000
4.	@tokopedia	#Waktuindonesiabelanja	2019-2022	2000
5.	@LazadaID	#payday	2019-2022	36

Table 2. Crawling Data Results with Promo Keywords and Free Shipping

Source: Author, 2023

The amount of tweets retrieved from crawl data utilizing User Generated Content (UGC) is displayed in Table 2, namely tweets with the keywords used, namely promos and free shipping on #ShopeeGajianSale for the Shopee marketplace, #WaktuIndonesiaBelanja for the Tokopedia marketplace and #PestaGajian for the Lazada marketplace. The data collection period in this study is 2019-2022, with a maximum limit of 2000 data. After the data crawling process, the next process is data preprocessing by combining the Promo and Free Shipping keywords for each payday event content, then we normalize the use of Jupiter Notebooks to help stopwords and dictionaries to remove the same content and duplicate words. The normalization process aims to facilitate data analysis because the data is free from noise, from the normalization process, 2574 data are obtained for #Shopeegajiansale, 2147 data for #WaktuIndonesiaBelanja, and 65 data for #Pestagajiansale.

Table 3 Results of Data Processing Using Wordij

No	Focus	Year	Total Word Count	Unique Word	Average Word Frequency
1.	#shopeepaidsale	2019-2022	31160	330	94.424242
2.	#Waktuindonesiabelanja	2019-2022	2011	201	10.004975
3.	#payday	2019-2022	67	18	3.722222

Source: Author, 2023

The outcome of data processing using Wordij is Table 3, the data is obtained from preprocessing data using Jupiter Notebooks with an output file in CSV format. Preprocessing results Reprocessed using the Wordij application For data visualization purposes using Gephi, there are many output files generated in Wordij, namely net, stp, stw, wrd, wtg, and pr. The data used for visualization on Gephi is an stw format file, the file contains the total number of words that appear from the keyword #Shopeegajiansale in 2019-2022 of 31,1360 words, with a uniqueness of 330 words, and an average word frequency of 94.424242. In the period between 2019 and 2022, the keyword #WaktuIndonesiaBelanja generated a total of 2011 words, 201 of which were unique, with an average word frequency of 10,004975. With a total of 67 words and 18 unique terms, keywords #Pestagajian has an average word frequency of 3.722222.

After processing the data, the next process is to visualize the data. The design of the Social Network Analysis (SNA) used is Graph Theory where the visualization consists of Nodes

(nodes or points) that are connected using Edges (links or lines) (Diniyati, Triayudi, and Sholihati 2020) (Bratawisnu and Alamsyah 2019). Network data analysis plans the resulting data and looks the degree to which the data influenced the keywords #ShopeeGajianSale on Shopee, #WaktuIndonesiaBelanja on Tokopedia, and #PestaGajian on Lazada. The final process which summarizes the results of the For study proves that the SNA method with supporting tools, namely Jupiter Notebooks for Crawling data, and Gephi For data visualization, has advantages for marketplace companies Shopee, Tokopedia, and Lazada.

Visualization on Gephi

In the study, researchers used visualization with the help of Gephi Graph Visualization software version 9.0.9.2 to analyze data on networks and visualize data with the type of graph used (Wajahat et al. 2020), namely Indirect Network. An indirect network is a visualization of the relationship between nodes with one another using edges or lines (Pawening and Indonesia 2023). The thickness of the nodes or edges is based on how many big words are interconnected (Pawening and Indonesia 2023). The visualized data is the result of the data preprocessing process on Jupyter Notebook with CSV file output, then processed again using Notepad++ software to remove spaces, periods, and commas. After that, data processing uses Wordij with many output files, namely net, stp, stw, wrd, wtg, and pr. Then the data visualization is performed on the .Net format output file using Gephi software and the resulting visualization or image is as follows. Some of the network properties in statistics that must be run in Gephi are Density, Average Degree, Network Diameter, Modularity, and Average Path Length (Chansanam et al. 2021).

Figure 2 Network Properties



Source: Author, 2023

Network Property Analysis

An company may greatly benefit from SNA's multiple property networks for mapping relationships, which are highly useful for improving knowledge generation management. Several property networks in SNA include Nodes, Edges, Density, Average Degree, Network Diameter, Modularity, and Average Path Length.

Table 4 Results of Data Processing Using Wordij

No.	Property Network	Payday Sale Event		
		Shopee	Tokopedia	Lazada
1.	nodes	330	201	18
2.	edge	725	223	10
3.	Average Degree	4,394	2,219	1,111
4.	Network Diameter	15	9	2
5.	Modularity	0.557	0.632	0.48
6.	Average Path Length	4,238	3,718	1,231

Source: Author, 2023

Table 4 shows the analysis of the Shopee Social property network at the payday sale event getting the most data compared to Tokopedia and Lazada. The social network size Shopee has 330 actors and 725 relationships between actors. Modularity shows how actors can form different groups in a network (Chansanam et al. 2021). The modularity value on the Shopee Social network is 0.557. The better a network's modularity, or how well-established

and solidly connected its groups are to one another, the stronger it is (Chansanam et al. 2021). The diameter is the shortest distance between the 2 furthest nodes (Chansanam et al. 2021). The diameter value of the Shopee social network is 15. The shorter or smaller the diameter, the more content information is spread easily and quickly. Because of the small diameter, it won't take long to describe each step. The average degree depicts the average degree of connections used to connect one node to other nodes (Chansanam et al. 2021). On the Shopee social network, 4,394 is the average degree score. Information is spread more quickly and easily the higher the average degree that is held. The average number of nodes or accounts that one account must travel through on the way to another account is known as the average route length (Chansanam et al. 2021). On the Shopee Social network, the average path length value is 4,238. The smaller the sign of the average path length, the smoother it is, so that the average distance traveled to disseminate information is shorter and faster.

For the payday social event of the property network Tokopedia, sales get higher data compared to Lazada. There are 201 actors in the Tokopedia network, and there are 223 relationships between them. Modularity demonstrates how several groupings of actors may emerge in a network. The social network Tokopedia has a modularity score of 0.632. The better a network's modularity, or how well-established and solidly connected its groups are to one another, the stronger it is. The diameter is the shortest distance between the 2 furthest nodes. Network diameter value Tokopedia's social value is 9. The shorter or smaller the diameter, information about content spreads easily and quickly. So that the short diameter makes the step description not take a lot of time. The average degree displays the average degree of all connections that join one node to another node. The Tokopedia social network has an average degree score of 2,219. The speed and ease of information distribution increase with average degree ownership. The average path length may be seen as the typical number of accounts or nodes that one account needs transit through in order to get to another account. On the Shopee social network, the average path length value is 3,718. The average distance traveled to spread information should be shorter and faster, thus the less the sign of the average path length, the better.

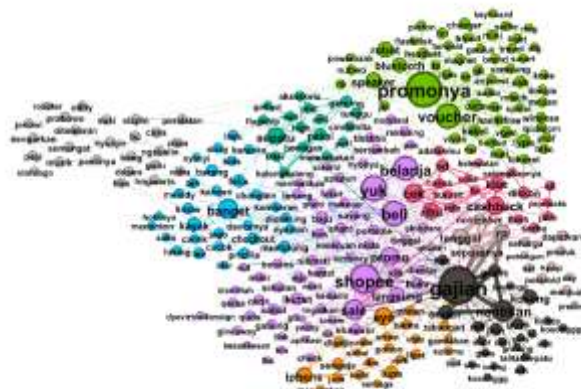
The final assessment of social property network analysis in this study is Lazada at the payday sale event. The Lazada social network contains 18 actors and 10 links between actors, according to the size of the network. Modularity demonstrates how several groupings of actors may emerge in a network. On the Lazada Social network, the modularity score is 0.48. A network is stronger the more modular it is, or the more firmly developed and interconnected its groups are. The diameter is the shortest path between the two nodes that are farthest distant. The Lazada social network has a diameter value of 2. The more

easily and swiftly information about a topic travels, the shorter or smaller the diameter. In order for the step description to go quickly due to the small diameter. The average degree displays the average degree of all connections that join one node to another node. The Lazada Social network has an average degree score of 1,111. The speed and ease of information distribution increase with average degree ownership. The average path length may be seen as the typical number of accounts or nodes that one account needs transit through in order to get to another account. On the Lazada social network, the average path length is 1,231. The smaller the sign of the average path length, the smoother it is, so that the average distance traveled to disseminate information is shorter and faster.

Network Model Network Visualization

The next process is data visualization, the SNA concept used is graph theory which consists of nodes (nodes or points) connected by edges (links or lines). In the process of visualizing the bigram phrase connection here using the Open Ord layout (Martin et al. 2011). Open Order is an algorithm to scale as directly as possible to more than 1 million nodes, making it ideal for large graphs (Martin et al. 2011). An indirect graph, or a graph that disregards the direct link between nodes, is the sort of graph that is employed. The visualization results for this connection bigram phrase are shown in Figure 3, Figure 4, and Figure 5.

Figure 3 Visualization of the Shopee Network



Source: Author, 2023

The visualization of the Shopee network in Figure 3 shows topic interactions between Twitter users and the Shopee marketplace at a payday sale event. The visualization results of the shopee payday sale phenomenon show the enthusiasm of Shopee application users, there are 7 nodes with big marks that exist as a group under the keyword #shopeepaidsale. The largest group focused on shopping at shopee ("shopee", "come on", "shopping", "buy", "promo", and "sale") are shown in purple. The second largest group is those focused on in-shop deals ("promotions", "vouchers", "speakers", "Bluetooth" and "robots") shown in green.

The third group focuses on the payday phenomenon (“payday”, “stay tuned”, “free”, “postage”, and “guys”) which are shown in gray.

Figure 4 Tokopedia Network Visualization



Figure 5 Lazada Network Visualization



Source: Author, 2023

The Tokopedia network visualization in Figure 4 shows topical interactions between Twitter users and the Tokopedia marketplace at a payday sale event. The results of the visualization of the phenomenon of Indonesian shopping time at Tokopedia show the enthusiasm of Tokopedia application users. There are 4 nodes with big signs that are in the group under the keyword #timeindonesiabelanja. The largest group focuses on Tokopedia discounts ("Tokopedia", "discounts", "shopping", "free", and "shipping"). The second largest group is a group that focuses on promos at Tokopedia ("promo", "shopping", "check", "wib"). In the visualization of the Lazada network, Figure 5 shows the topic interaction between Twitter users and the Lazada marketplace at the payday sale event. The visualization results of the payday party phenomenon at Lazada in this study show an anomaly in the visualization results because there are no associated nodes and edges. So it can be concluded that Twitter users use the Lazada shopping application very little compared to Shopee and Tokopedia.

Top Brand Market Analysis by Network Properties

From each property network in the social marketplace network Shopee, Tokopedia, and Lazada can be ranked as one the top brand marketplace alternatives. The property rating network between Shopee, Tokopedia, and Lazada can be seen in Table 6.

Table 5 Results of Data Processing Using Wordij

No.	Network Properties	Payday Sale Event			Rating
		Shopee (S)	Tokopedia (T)	Lazada (L)	
1.	nodes	330	201	18	Shopee Tokopedia Lazada
2.	edge	725	223	10	Shopee Tokopedia Lazada
3.	Average Degree	4,394	2,219	1,111	Shopee Tokopedia Lazada
4.	Network Diameter	15	9	2	Shopee Tokopedia Lazada
5.	Modularity	0.557	0.632	0.48	Tokopedia Shopee Lazada
6.	Average Path Length	4,238	3,718	1,231	Shopee Tokopedia Lazada

Source: Author, 2023

The comparison of the mark property network estimates made using Gephi for the three marketplaces, Shopee, Tokopedia, and Lazada, is shown in Table 5. The initial property value for network size. With more actors and relationships, the nice size and active has a larger size. According to statistics from data crawling, Shopee's social network is huge and contains a lot of actors and links, so it can be said that more content for the #ShopeeGajianSale event is superior. The modularity of the property network increases in value so that the larger the group formed, the clearer and more solid the relationship is. Based on the modularity mark from the third marketplace on the payday event sale, Tokopedia has the highest score of 0.632.

The network's diameter is the following property; because to their close proximity, communication between nodes is made simpler by their lower diameters. Social networks have a smaller diameter value, namely Lazada with 2 points compared to Shopee and Tokopedia. The average degree makes up the fourth property network. The propagation of information is made simpler and faster by the number of links (edges) connecting the nodes. The highest rating is 4,394 for Shopee. The average path length is the following property network. The connection network is more robust the fewer accounts that are transmitted. Shopee's rate is 4,238; it is greater than Tokopedia's and Lazada's.

Conclusion

The SCRM network created on social media may be utilized as a substitute for top brands by taking a look at social networks on social media like Twitter, according to property network analysis. The Shopee marketplace is superior to 4 out of 5 property networks and has better performance, followed by the second place Tokopedia marketplace and lastly

the Lazada marketplace. It can be concluded that the Shopee marketplace has a larger network, more groups are formed, and a stronger network of relationships compared to the Tokopedia and Lazada marketplaces.

For an expanded size so that the market is more active in posting tweets on Twitter and urging users to tweet or upload other people on social media in relation to events or promotions that are applicable in every market in Indonesia. As for increasing the average value, company marketplaces can carry out campaigns by asking users for mentions, and mention friends and business marketplaces can cooperate (follow) with already-existing influencers or brand ambassador supporters or numerous friends and campaign stages with one another. a market-appropriate catchphrase for the business.

The implication is an in-depth study that many people use Shopee as a marketplace to meet online shopping needs, especially at payday sale events where each marketplace has attractive promos and free shipping. Analysis using the SNA method analysis of Twitter user interactions with Shopee, Tokopedia, and Lazada marketplace users is expected to be able to evaluate Twitter user reviews to expand content marketing such as additional payday tagline events or other marketing events in each marketplace. Study these limitations yourself in the analysis. Because the data source for this research is only Twitter, which is one of the social media, it is not possible to see the interaction of market users as a whole.

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