Jurnal Informasi dan Teknologi
https://jidt.org/jidt
2023 Vol. 5 No. 4 Hal: 189-195 e-ISSN: 2714-9730

Comparison Analysis of Service Performance Using Kruskal Wallis-Friedman Test to Minimize Waiting Time in Toll Gate System

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Abstract

The purpose of this study is to compare how well conventional, automatic, and OBU toll gates perform in terms of service. The author of this study employed two data collection techniques: primary data was gathered through interviews and field observations, and secondary data was obtained through a review of the literature. You choose which features and parameters are subject to change while the simulation is running. The system will be used to simulate how each algorithm performs in accordance with ideas and scenarios that have already been decided. Following the recording of the simulation findings, the verification step will be completed. On the basis of the outcomes of earlier data processing and analysis, the following conclusions are possible: In creating a toll gate model, two automatic toll booths spaced 60 meters apart from the toll gate were used as simulations to approximate the real thing. utilizing the Kruskal-Wallis-Friedman test computations to compare the performance of the toll gate service with six scenarios. The OBU-OBU scenario has the system's shortest waiting time, according to the computation findings. Conversely, the server utilities that are in use are traditional and traditional.

Keywords: Simulation, Promodel, Toll Gate Service, Utility, Kruskal Wallis Test – Friedman Test.

1. Introduction

Roads serve as a vital component of the community's activities and the efficient movement of goods and services by acting as a transportation infrastructure. The increasing number of vehicles on the road, which is out of proportion to the capacity of the current highways, is making the community's demand for a road network more and more urgent [1]. Alternative routes that are a component of the national road network system and for which users must pay tolls are known as toll roads [2]. By offering advantages over non-toll roads, such as time savings and lower operating costs for vehicles, toll roads make it easier to move between different regions. Toll roads are also often referred to as freeways; therefore, toll roads should provide this convenience to every person who uses them [3] [4]. But in reality, this is not always the case. People who use toll roads still encounter challenges, such as long lines when trying to enter the toll road [5]. Based on observations made by the author, there are also drivers who are impatient in queuing and then overtake other vehicles both on the main highway and when queuing at toll entrances, which will disturb other drivers who use the road and are queuing, or, in other words, take away the rights of other drivers in using available roads [6].

The toll road collection system is a series of activities related to transactions at toll gates in the form of service processes to road users, control over the implementation of transactions, the process of administering toll road revenues, and other processes that support it [7]. In principle, the toll road collection system process must be based on the following: Providing fast, precise, safe, and comfortable service to toll road users. Provide guarantees to road users and toll road business entities that transactions have been carried out in accordance with the predetermined rates [8]. Can provide feedback and be integrated with existing systems and systems that will be developed [9] [10]. Always pay attention to technological development and human resource management, which ultimately provide maximum service to toll road users on the one hand and provide efficiency in all fields for toll road business entities [11]. Service is one of the important things that must be considered because it affects customer comfort in carrying out transactions. Queuing problems are one of the things that customers often complain about [12]. Queues that are too long and the service takes a long time can result in people not using toll road services because they are considered time-inefficient and are the same as regular highways, which do not require payment or free transactions [13]. An excessively lengthy line indicates that additional time will be lost

Diterima: 13-12-2023 | Revisi: 14-12-2023 | Diterbitkan: 17-12-2023 | doi: 10.60083/jidt.v5i4.437

waiting in the line. It goes without saying that this could be bad for the agency since client satisfaction would drop [14].

One aspect of service that is a problem is the waiting time for motorists at the entrance toll gate. Based on observations made, long queues often occur at the entrance toll gate during peak hours when both toll booths are still conventional [15]. This long queue results in a long wait for toll users to be able to enter; besides that, the queue at the entrance toll gate often extends until it reaches the main highway [16] [17]. This really disturbs not only the comfort of toll road users but also the public who use the main highway [18]. Data on the number of transactions that occurred on the toll road one year before the implementation of automatic toll gates at both toll booths, namely in 2023, showed a significant increase, namely from more than 350,000 transactions [19] [20]. The increasing number of toll road users, which can be seen from the increase in the number of transactions, increases the urgency of improving services at toll gates. The increase in the number of toll road users and queue and congestion problems mainly occur during peak hours [21]. Non-cash transactions on all toll roads were introduced in 2017 by Bank Indonesia (BI) and the Ministry of Public Works and Public Housing (PUPR). Transaction times are expected to be greatly reduced by this technique [22]. So far, a lot of time has been wasted on transactions at toll gates. Starting with receiving payments, ensuring the money paid is correct, and calculating change. This is what often causes traffic jams on toll roads [23]. Cash transactions can usually take 11 seconds. But with non-cash, it only takes 4 seconds, or even less. Apart from reducing the density of queues at toll gates, which often occurs, electronic transaction services at all toll gates are intended to improve a cashless society (non-cash culture) [24].

The non-cash transaction implemented is the automatic toll gate (GTO) system, namely a toll gate system that only serves non-cash payments by attaching a subscription card to the GTO system [25]. Apart from GTO, another automatic gate is the E-toll Mandiri pass on board unit (OBU), which is a special tool for toll road users so they can pay tolls without having to stop and open the car window [26]. This OBU (on-board unit) transmitter device is installed on the car's windshield, making it easier for drivers to cross the automatic toll gate (GTO) marked e-tollpass. After you hear a 'beep' sound on the on-board unit, the toll booth gate will open automatically, and you can continue driving [27]. Very practical and time-saving. The e-toll pass can also be used to view the balance on the e-toll card. In this research, a system simulation model will be built that describes services at toll gates. The service system at the entrance toll gate is the system that is discussed in this study [28]. In order to determine whether an automatic toll gate is the best option or even to obtain the best system solutions for enhancing the toll gate service system, the simulation model will be utilized to aid in the process of simulating the toll service system [29]. ProModel is the simulation program of choice since it has a very high degree of precision, which ensures highly accurate results. After getting the simulation results, the next thing to do is compare alternative system designs using the Kruskal-Wallis test and Friedman test so that you can find out the best system for the utilities being compared [30].

There are five studies that the author used as similar research in this research. First, research simulating toll gates to analyze the optimal number of toll booths using Promodel software with four scenarios. The second research, namely research that simulates a toll gate, analyzes the efficiency of the promodel software toll booth. The third research is research that simulates toll gates to provide suggestions for service systems at toll gates using FlexSim software with three scenarios [31]. The fourth research is research that simulates toll gates to analyze traffic jams on toll roads using promodel software. The fifth research is research that simulates toll gates to determine the utility of toll gates using promodel software [32]. Alternative routes that are a component of the national road network system and for which users must pay tolls are known as toll roads. Travel between regions is made easier by toll roads, which offer advantages like time savings over non-toll highways and a reduction in vehicle operating expenses [33]. According to the toll road idea, investors provide the initial investment but all road construction is financed by toll road payments. Investors obtain a return on their investment through collection results, which have been calculated from the start of operations until the end of the concession period [34]. With adjustments to toll rates every 2 years as regulated in Republic of Indonesia Law No. 38 concerning roads and PP No. 15 concerning toll roads. The benefits of toll roads in everyday life have been greatly felt by the wider community and business people (entrepreneurs), because toll roads are a link for the smooth distribution of trade between regions and provinces, so they have a multiplier effect on the growth and development of surrounding industries on a small, medium, and large scale [35]. The largest industries, such as factories, offices, schools, hospitals, and retail, continue to grow around toll road corridors [36].

The PROMODEL company has released an application known as ProModel, which stands for Production Modeler. The purpose of this program is to replicate or model different kinds of service and manufacturing systems [37]. ProModel can be used to mimic a variety of manufacturing systems, including job shops, conveyors, assembly, just-in-time systems, and flexible production systems [38]. Promodels give engineers and management the chance to test a concept in a system that has been built before implementing it in real-world settings [39]. ProModel concentrates on problems related to production capacity, inventory levels, production, and resource utilization. Through the modeling of critical components of a production system, including capacity systems, production plans, and resource utilization, we may test various operating strategies and determine which ones yield optimal outcomes.

2. Research Methods

In this research, the author used two methods of collecting data, a literature study to obtain secondary data and interviews and field observations to obtain primary data. In this research, the author uses a simulation method to compare scenario configurations for toll gates. Accordingly, there are different types of life cycles proposed for study in modeling and simulation. In this research, the basic steps that must be considered when carrying out a simulation. This simulation method includes the basic steps that must be carried out, namely: The problem formulation stage is the initial step in designing the simulation method model. Create a conceptual model so as to obtain research results that match real-life conditions. The author determines what input and output variables will be used in the simulation; this aims to determine the distribution form of the data to be studied. To determine which parameters and characteristics are allowed to undergo changes during the simulation. The system will be used to simulate how each algorithm performs in accordance with ideas and scenarios that have already been decided. Following the recording of the simulation findings, the verification step will be completed. The simulations that were run in the earlier phases were confirmed and validated by the author. In accordance with the scenario model developed during the modeling phase, the author conducted experiments. In this final stage, researchers analyze the output and simulations carried out during experimentation.

3. Results and Discussion

Problem formulation: this stage is carried out to find out in detail the service conditions and vehicle flows that occur at the toll gate. The information gathered from this phase will be utilized to create a conceptual model of the system. Two toll booths stood at the toll gate. Before 2018, conventional toll booths were still implemented, and after that, automatic booths were implemented at both toll booths. Classes of types of motorized vehicles on toll roads that are already in operation: there are 5 categories of vehicles related to the cost of using the toll road, starting from classes I–V. This grouping of vehicles is based on the destructive power of the road, so that the greater the destructive power of the vehicle on the toll road, the more expensive it is. There are toll road usage fees that must be paid. Another thing that was obtained from the observations was that the distance between the entrance toll gate and the toll booth is 60 meters. The lengthy line of vehicles at the entrance toll gate frequently exceeds this distance, which ultimately results in traffic jams. By observing the condition of vehicle flow and the toll gate service system, several types of data were collected to build a conceptual model. This data includes the time between vehicle arrivals from the toll gate and the service time for each toll gate. The time for collecting these two types of data is adjusted to the research objectives, which focus on the peak period of vehicle flow, so that it is determined that data collection on customer arrival times is random during peak hours. Meanwhile, vehicle service time data is taken randomly. Service times are divided into three categories: conventional, automatic, and OBU for comparative data on service times during peak hours, namely 16.00. The data taken, namely for conventional toll booths, is taken by looking at CCTV; for automatic toll booths, it is taken directly from the area; and for OBU toll booths, it is taken by looking at CCTV. This is slightly different in that the data is not only taken at 16.00 because there are still very few OBU users.

After determining the problem formulation, the next step in creating a simulation is to create a conceptual model that aims to represent the structure of the elements in the system so as to obtain research results that match real conditions. Entity flow in this research begins when the vehicle comes through the toll gate, passes through the queue, then enters the toll road to make a toll road entry transaction. The officer then serves the vehicle driver. After completing the transaction at the substation, the vehicle passes through the toll road line so that it can enter the toll road area. Determining the processes in the system, namely determining the process operations in the system that occur at the toll gate queue, where a detailed explanation of the image of the entity diagram is provided. The input data analysis aims to determine the form of distribution of the output results to be studied. The data needed in this simulation is the distribution of each time variable to be tested. The input data that will be searched for distribution is inter-arrival time and conventional service time. Before looking for the right distribution for each variable, it is necessary to characterize the data to ensure its suitability for use in the simulation model. Because the variable data is not normal, it is non-parametric data.

In this research, the author will test six scenarios at toll gates. Create a toll gate model with simulations that match the actual, namely: Scenario 1 (conventional-conventional) is made up of two traditional substations. This is because before the implementation of 100% non-cash at the toll gate, both substations were implemented conventionally. Scenario 2 (conventional-automatic) consists of 1 conventional substation and 1 automatic substation. This combination of substations has never been implemented. Scenario 3 (automatic-automatic) consists of two automatic substations. This is because after implementing 100% non-cash at the toll gate, both substations were implemented automatically in accordance with policy. Scenario 4 (conventional-OBU) consists of 1 conventional substation and 1 OBU substation. This combination of substations has never been implemented.

Scenario 5 (automatic-OBU) consists of 1 automatic substation and 1 OBU substation. This combination of substations has never been implemented. Scenario 6 (OBU-OBU) consists of 1 OBU substation and 1 OBU substation. This combination of substations has never been implemented. creating a toll gate simulation using Promodel software. The following are the steps for creating a toll gate simulation using Promodel software: Open Software Promodel: Build: location, entity, error, or processing. Simulation is an option. Set the runtime for 1 day or 24 hours. Simulation: Save and Run.

The location of the work area in the service at the toll gate is the place where service process activities occur. The following is toll gate location data, which will be used to support the creation of simulations with Promodel software. An automatic-automatic simulation model is a model of the toll gate queuing system that resembles the real system. The current condition of the real system is to operate two substations. In designing the queue simulation using Promodel version 7, the model created follows the real system conditions at the current toll gate, namely operating two substations. Next, queue locations for substations and vehicle queue lines are created, where the function of these locations is to analyze the length of vehicle queues. Service discipline at toll gates follows the rule that those who come first are served first, or First in, First Out (FIFO). The simulation is only made during peak hours because during these hours there is heavy traffic, which produces peak hours. An entity is an object whose existence can be differentiated from other objects. The entity in this study is a car, given the speed at which the car is running. Arrivals are the arrival of entities required in a process or system, where the entity arrivals in this research are at toll gates. The number of arrivals is not limited by the interarrival time, according to the Fitting test for a certain theoretical distribution. After the data needed to create a simulation model is processed, the data is used in the simulation model. The simulation model that will be created is in accordance with real conditions, namely that the queuing system at the toll gate service is automatic. Verification and validation models can be said to be quantitatively valid if the differences in results from the real system are not much different from the simulation results. The model can also be said to be verified and valid if the paths created in the Promodel software match the real system observed in the company. The validation process of the model is carried out using data in the form of output data from the real system and data from simulation results.

To reduce variance, the simulation must be carried out in n replications. To get the value n, it is necessary to carry out an initial replication of n_0, namely 10 replications. The results of the 10 replications indicate the nth replication. From the calculations, we can get a half-width value of 0.01. So the error value regarding the average data is 0.01%. This error value is very small, so we can calculate the value of n', namely the new replication value needed. So the number of replications required during the waiting time in the system is 15 replications, so an additional 5 replications are required at the simulation test stage. From the calculation above, you can get a half-width value of 0.01. So the error value regarding the average data is 0.01%. This error value is very small, so we can calculate the value of n', namely the new replication value needed. So the number of replications required on the server utility is 8 replications, so no additional replication is needed at the simulation test stage. To identify the actual level of system performance, the system waiting time simulation model was run 15 times, and the server utility was run 8 times for the six simulations that had been created. The performance level measured is the waiting time in the system and server utilities. In accordance with the calculations obtained from determining the number of replications, the results obtained were 15 replications, so it was necessary to carry out a direct test stage. In accordance with the calculations obtained from determining the number of replications, the results obtained were 8 replications, so there was no need to carry out the direct test stage.

The calculation of differences in each model uses Kruskal-Wallis and then continues with the Friedman test because the data is non-parametric. The Kruskal-Wallis test is a non-parametric, ordinal-based test designed to ascertain whether there are statistically significant differences between many independent samples on an ordinal scale and a numerical data scale (interval or ratio). The Kruskal-Wallis h test will be employed to assess the aforementioned scenario because to the presumption that the data does not satisfy the normalcy assumption. The hypothesis that has been formulated can then be used to conclude that there are differences in the utility of substation performance in the six scenarios, allowing for more testing to determine the optimal scenario at the toll gate. Afterward, H0 is rejected and Ha is accepted. If the data is on an ordinal scale, the Friedman test is used to test differences in k-paired samples. This test, in theory, evaluates the appropriateness or disparities in ranking between paired sample groups. The data must first be transformed into ordinal data if it was collected in interval or ratio form. The ranking of the scenarios is shown by the rank value that is acquired. The obtained results are presented in the following order: scenario 6 of 1.00 is at the top, followed by scenario 5 in second place, scenario 4 in third place, scenario 3 in fourth place, scenario 2 in fifth place, scenario 2 in fourth place, scenario 90 in fifth place, and scenario 1 in third place. The ranking of the scenarios is shown by the rank value that is acquired. The outcomes are listed in order of highest to lowest: scenario 1 is 1.20, followed by scenario 2, which is 2.40, scenario 3, which is 2.90, scenario 4, which is 4.20, scenario 5, which is 5.20, and scenario 6, which is 6.20, in sixth place.

4. Conclusion

Using the outcomes of earlier data processing and analysis, the following conclusions can be drawn in order to create a toll gate model with simulations that closely resemble the real thing: two automatic toll booths placed 60 meters apart from each other. utilizing the Kruskal-Wallis-Friedman test computations to compare the toll gate services' performance with six scenarios. The OBU-OBU scenario has the system's shortest waiting time, according to the computation findings. Conversely, the server utilities that are in use are traditional and traditional. The author realizes that conducting research still has shortcomings. Therefore, the author suggests developing this research, including using a different model. The processing data obtained is parametric data, so it uses model difference calculations that are in accordance with the parametric data.

References

[1] Dhaniswara, E., Wahyuningsih, S. S., Eldo, H., Bakri, A. A., & Junaidi, A. (2023). The influence of electronic service quality and electronic recovery on online re-purchase intention: Role of e-loyalty as intervening variable. *Jurnal Sistim Informasi dan Teknologi*, 1-5.

[2] Bakri, A. A., Wandanaya, A. B., Violin, V., & Fauzan, T. R. (2023). The Application of UTAUT Modified Model to Analyze the Customers Use Behavior of Shopee Paylater. *Jurnal Sistim Informasi dan Teknologi*, 96-101.

[3] Sutrisno, S., Wulandari, W., Violin, V., Supriyadi, A., & Tawil, M. R. (2023). Prioritization of the Best Online Platform for MSMEs Using Simple Additive Weighting Method. *Journal on Education*, *5*(3), 10265-10275.

[4] Violin, V. (2022). Influence Leadership, Competence and Motivation To Performance Employee Service Health Regency Bay Bintuni West Papua Province. *J. Adm. J. Pemikir. Ilm. dan Pendidik. Adm. Perkantoran*, *9*(2), 305-310.

[5] Gandomi, a, Tafti, V. A., Ghasemzadeh, H., Madani, S., Kazmi, J., & Mahlknecht, S, "Wireless sensor networks: modeling and simulation," *Computer Research and Development, 2010 Second International Conference On*, pp. 251–254, 2021, https://doi.org/10.1109/ICCRD.2010.72

[6] Hendriyanto, D., Setiamika, M., & Primadewi, N. (2020). The effect of Ginkgo biloba against ototoxic hearing loss on advanced stage undifferentiated nasopharyngeal carcinoma receiving cisplatin chemotherapy. *INTERNATIONAL JOURNAL OF NASOPHARYNGEAL CARCINOMA*, *2*(02), 44-46.

[7] Nurcahyo, V. E., & Hendriyanto, D. (2020). The depression level effect on the QOL of patients with obstructive sleep apnea syndrome. *Oto Rhino Laryngologica Indonesiana (ORLI)*, *50*(2), 135-40.

[8] Haddar, G. A. H., Hendriyanto, D. ., Munandar, H. ., Kelibia, M. U. ., & Muhammadiah, M. . (2023). ANALYSIS OF THE EFFECTIVENESS OF PROJECT STEAM-BASED LEARNING MODEL TO IMPROVE STUDENTS' CRITICAL THINKING SKILLS. *Community Development Journal : Jurnal Pengabdian Masyarakat*, *4*(5), 10519–10525.

[9] Hendriyanto, D., & Helmi, H. Protective role of Nigella sativa oil against cisplatin-induced ototoxicity: a literature review. *Journal of the Medical Sciences (Berkala Ilmu Kedokteran)*, *55*(2).

[10] Turyadi, I., Zulkifli, Z., Tawil, M. R., Ali, H., & Sadikin, A. (2023). The Role Of Digital Leadership In Organizations To Improve Employee Performance And Business Success. *Jurnal Ekonomi*, *12*(02), 1671-1677.

[11] Suriadi, S., Rafid, M., Zulkifli, Z., Abdurohim, A., & Damirah, D. (2023). The Influence of Organizational Culture, Work Environment and Work Discipline on Job Satisfaction of Teachers at Boarding School. *Journal on Education*, *5*(4), 14777-14781.

[12] Tubagus, M., Syarifuddin, S., Syafie, L., Koderi, K., Satra, R., & Azis, H. (2023, May). The effectiveness test of the hybrid learning model based on the learning management system using statictical analysis. In *AIP Conference Proceedings* (Vol. 2595, No. 1). AIP Publishing.

[13] Jakarta, P. J. L, "*Toll Road Collector System*," Bekasi: PT Jalantol Lingkarluar Jakarta, 2016.

[14] Tubagus, M., & Muslim, S. (2019). The Impact of The Development of Blended Learning Models Using Computer applications in Higher Education. *International Journal of Educational Research Review*, *4*(4), 573-581.

[15] Aziz, F., Mayasari, N., Sabhan, S., Zulkifli, Z., & Yasin, M. F. (2022). The Future of Human Rights in the Digital Age: Indonesian Perspectives and Challenges. *Journal of Digital Law and Policy*, *2*(1), 29-40.

[16] Tubagus, M., Muslim, S., & Suriani, S. (2020). Development of learning management system-based blended learning model using claroline in higher education.

[17] Violin, V., Hasan, S., & Sufri, M. (2022). Pengaruh Konsep Low-Cost Carrier dan Kualitas Layanan terhadap Kepuasan dan Loyalitas Pelanggan pada Maskapai Lion Airlines di Indonesia. *Journal of Management Science (JMS)*, *3*(1), 150-160.

[18] Violin, V. (2019). PENGARUH HARGA POKOK PRODUKSI TERHADAP VOLUME PENJUALAN PADA PT. SEMEN BOSOWA MAROS. *Jurnal Bisnis dan Kewirausahaan*, *8*(2).

[19] Tubagus, M., Haerudin, H., Fathurohman, A., Adiyono, A., & Aslan, A. (2023). The impact of technology on islamic pesantren education and the learning outcomes of santri: new trends and possibilities. *Indonesian Journal of Education (INJOE)*, *3*(3), 443-450.

[20] Wibowo, T. S., Suhendi, D., Suwandana, I. M. A., Nurdiani, T. W., & Lubis, F. M. (2023). The Role Of Transformational Leadership And Organizational Culture In Increasing Employee Commitment. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *7*(2).

[21] Satra, R., Syafie, L., & Tubagus, M. (2023, May). Comparison of server technologies using Kernel-based virtual machine and container virtualization. In *AIP Conference Proceedings* (Vol. 2595, No. 1). AIP Publishing.

[22] Sarah, S., Aswita, D., Ainun, N., Maulidar, M., & Azzarkasyi, M. (2022). The development of HOTS-based assessment instruments on educational statistics. *International Journal of Trends in Mathematics Education Research*, *5*(1), 38-43.

[23] Jefriyanto, J., Ainun, N., & Al Ardha, M. A. (2023). Application of Naïve Bayes Classification to Analyze Performance Using Stopwords. *Journal of Information System, Technology and Engineering*, *1*(2), 49-53.

[24] Ainun, N., & Jefriyanto, J. (2023). Development of Kirchoff's Law Drawing Tools to Improve Student's Science Skills in Learning Process of Direct Flow Circuits. *Journal of Information System, Technology and Engineering*, *1*(2), 32-37.

[25] Mahdalela, R., Ainun, N., & Roslina, R. (2022, December). An Analysis of Students' Mathematical Communicative Skills in Solving Sets Problems at SMP Negeri 1 Darul Hikma Aceh Jaya. In *Proceedings of International Conference on Multidiciplinary Research* (Vol. 5, No. 2, pp. 70-81).

[26] Suryawati, I., Rahmani, R., & Ainun, N. (2022, November). Students' Mathematical Communication Ability through Blended Learning Model for Elementary School Students in Banda Aceh. In *Proceedings of International Conference on Multidiciplinary Research* (Vol. 5, No. 1, pp. 53-57).

[27] Rony, Z. T., Lubis, F. M., & Rizkyta, A. (2019). Job shadowing as one of the effective activities in the promotion process creates quality managers. *International Journal of Recent Technology and Engineering*, *8*(2), 388-396.

[28] Rony, Z. T. (2019). An effective promotion strategy for managers in Era Disruption. *Asia Proceedings of Social Sciences*, *4*(2), 57-59.

[29] Lubis, F. M. (2019). DIGITAL LEADERSHIP IN MANAGING WORK MOTIVATION OF MILLENIAL EMPLOYEES:(STUDY CASE: OIL AND GAS INDUSTRY IN INDONESIA). *Asia Proceedings of Social Sciences*, *4*(2), 108-110.

[30] Lubis, F., Rony, Z., & Santoso, B. (2020, March). Digital leadership in managing employee work motivation (case study: oil and gas industry in Indonesia). In *Proceedings of the 2nd International Conference on Social Sciences, ICSS 2019, 5-6 November 2019, Jakarta, Indonesia*.

[31] Aryanto, T., Tukinah, U., Hartarini, Y. M., & Lubis, F. M. (2020). Connection of Stress and Job Satisfaction to Successful Organizational Stress Management: A Literature Review. *International Journal of Advanced Engineering Research and Science*, *7*(11).

[32] Sunarso, B., & Mustafa, F. (2023). Analysing the Role of Visual Content in Increasing Attraction and Conversion in MSME Digital Marketing. *Journal of Contemporary Administration and Management (ADMAN)*, *1*(3), 193-200.

[33] Mustafa, M. Y., Mustafa, F., Mustafa, R., & Mustafa, R. (2018). Japanese enterprises role on SMEs development in Indonesia: inside tobiko export and import. *Hasanuddin Economics and Business Review*, *2*(2), 83-95.

[34] Sudirjo, F., Mustafa, F., Astuti, E. D., Tawil, M. R., & Putra, A. S. B. (2023). Analysis Of The Influence Of Hedonic Motivation, Digital Devices Ease Of Use Perception, Benefits Of Digital Technology And Digital Promotion On Intention To Use Of Digital Wallets Consumers. *Jurnal Informasi Dan Teknologi*, 33-38.

[35] Angreyani, A. D., Akbar, A., Haeruddin, M., Mustafa, M., & Mustafa, F. (2023). The Phantom Menace: A Moderation Analysis of Gender on MSMEs' Financial Literacy and Financial Performance. *Asian Research Journal of Arts & Social Sciences*, *21*(2), 48-55.

[36] Fitri, S., Wardana, Y. F. W., Mustafa, F., Sari, E. N., & Arief, I. (2023). Analysis of The Influence of Online Purchase Decisions, Digital Perceive Value of Quality and Digital Viral Marketing on Consumer Satisfaction of Skincare Products. *Jurnal Informasi dan Teknologi*, 148-152.

[37] Sutaguna, I. N. T., Razali, G., & Yusuf, M. (2023). Hanan Catering's Instagram promotions, pricing, and menu variety influence consumer purchasing decisions in Bandung. *International Journal of Economics and Management Research*, *2*(1), 76-87.

[38] Handayani, N., & Yuliani, R. (2019). Strategi Dinas Perdagangan dan Perindustrian Kota Banjarmasin dalam Pengembangan Industri Kecil Menengah. *Jurnal Studi Ekonomi*, *10*(2), 142-156.

[39] Octiva, C. S., Wahyuningsih, S. S., Hakim, M. L., & Hasti, N. (2023). Application of The Speed-Up Robust Features Method To Identify Signature Image Patterns On Single Board Computer. *Jurnal Sistim Informasi dan Teknologi*, 14-18.