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**7TH INTERNATIONAL CONFERENCE ON
SOCIAL SCIENCES, HUMANITIES AND
TECHNOLOGY 2023 (7TH ICSHT 2023)**



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**GLOBAL ACADEMIC EXCELLENCE (M) SDN BHD
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ORGANISATIONAL LEADERSHIP CHALLENGES IN ADOPTING DEVOPS IN NORTHERN NIGERIA SMES

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Abstract: *The issue of development and operation is growing rapidly as some organisations in northern Nigeria seek to capitalise on the benefits it can provide to software development organisations and information technology projects. Adopting DevOps, on the other hand, necessitates significant organisational change, particularly where tradition and established processes exist. The results of a five-month qualitative diary study following the adoption of DevOps in a Nigerian SME with over 100 employees are presented in this study as part of a large-scale doctoral research project that investigates software development processes and leadership challenges. Based on the study's findings, the case study organisation uses the DevOps approach to develop new software that will be used internally and by customers. DevOps appears to be highly recognised in theory, but it is extremely difficult to implement in practise. The need to maintain old systems, a lack of technical leadership, management systems, and resilience all contribute to this difficulty. This study also discovered evidence of job creation, particularly among software developers. Taken together, we contend that DevOps is an interdisciplinary topic that necessitates the participation of all stakeholders in order to communicate and collaborate, and that it would benefit greatly from more leadership and possibly deeper psychological research..*

Keywords: *DevOps, Leadership Challenges, Adoption Benefits, Nigeria SME, Case Study*

Introduction

Typically, the DevOps software development strategy focuses solely on software development teams, IT managers, and quality assurance. After it has been developed, the software is typically handed over to the IT operations team, who are in charge of its deployment, ongoing maintenance, and support. This silo system can result in organisational issues such as a blame culture between the two organisations Raffo et al. (2019); Sanchis et al. (2020); da Silva et al. (2017), communication problems Maroukian and Gulliver (2020); Maroukian and R. Gulliver (2020) and delays in providing software updates (Kenner III 2019; Mayner and Daniels 2017). However, suitable stakeholders for communication and collaboration during software development are limited to DevOps' primary stakeholders (Bierwolf, Frijns, and van Kemenade 2017; Nisha and Khandebharad 2022; Shichtman 2018).

Organizations are increasingly forming software development and IT operations teams to address this issue. This integration is critical for the DevOps approach, which emphasises a

collaborative culture through collaborative software and IT service development (Khan et al. 2022; Maroukian and Gulliver 2020). The goal of this type of integration is to incorporate new code and features easily and quickly into software products and business information tools (Ampatzoglou et al. 2019; Maroukian and R. Gulliver 2020).

We conducted a diary and interview study in a Nigerian organisation beginning in July 2022 to compare two Nigerian organisations that use DevOps. Case studies will be analysed and compared, as will key findings from a systematic review of the growing DevOps literature. This study's main goal is to identify management and social challenges, as well as best practises. Proposed actions are the physical and cognitive changes that people make while defining the boundaries of their actions (Azad and Hyrynsalmi 2021; Mayner and Daniels 2017). As a result, these roles are critical to the employee-employer relationship, and job creation entails establishing physical, cognitive, and relational work boundaries.

Work creativity is classified into three types: task, relational, and cognitive (Khan et al. 2022; Maroukian and Gulliver 2020). Task creation is a type of work creation in which work is completed quickly and the definition of work can change so that the worker becomes a work supervisor or a driver. Employees who see their work as an important part of a larger whole are more likely to use a relational work model. Finally, cognitive work innovation is the process by which employees change their perspective on work so that they are no longer solely concerned with producing high-quality results. Employee engagement has received a great deal of attention over the years. We want to learn more about the social and cognitive aspects of DevOps adoption at our case study company. We plan to expand on the preliminary research presented in this paper by conducting additional studies through the lens of action theory.

This research seeks to clarify how the organisation and leadership structure influence DevOps support in the delivery of quality software systems, and vice versa, and to present the findings of a study that examines the adoption of DevOps in a small to medium-sized software development organisation in Nigeria with 50 to 100 employees, and what this means in terms of business leadership. Many case studies of various DevOps tools and methodologies have now been published in the literature. The impact of technical and social debt on export development has been investigated (Azad and Hyrynsalmi 2021; Maroukian and Gulliver 2020). Our activity, on the other hand, is distinct in that it addresses not only continuous deployment but also various leadership and business issues associated with DevOps adoption.

Methodology

To better understand DevOps adoption in the organisation, we conducted a qualitative diary study with software development and IT operations teams. These studies began in early July 2022 and had last six months. The same tools are used in diary analysis as in organisational software development projects. Bitbucket and Git log, in particular, are used to upload weekly log entries written in Markdown. The repository is secure and can be used to collect and monitor quality data. diaries are opened, and each participant is given a list of questions to consider.

We completed a diary study with questions designed by Sayagh et al. (2020) at the beginning, middle, and end of the research period in this study. The interviews were conducted in order to elicit additional information from the diaries (Hosio 2019). In addition, participant recruitment

is an ongoing concern in this type of longitudinal study, and questionnaires provide a useful way to observe diary entry as well as a method to collect data when needed. Figure 1 depicts the method.

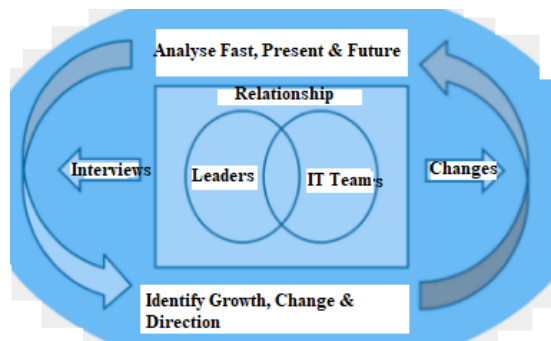


Figure 1: Diary Study and Interviews Process.

We use diary entries and interviews to analyse data. By comparing what has previously been described in the literature, we attempt to identify new practises and trends. Finally, we interpret the data to reach a conclusion.

Results

The results depend on questions and 23 diary entries from the study's five (5) months. As a result, we organise the findings based on the data, with a special emphasis on the organization's DevOps adoption.

Adoption of DevOps

Acceptance of the organization's DevOps system is dependent on the software manager's awareness and the organization's goals for the new structure. Despite senior security officials' lack of interest in the actual methods used, the software development manager stated in his interview that he believes it is his responsibility to bring the new system online. However, the team is concerned that the new system will be efficient, easy to maintain, and capable of quickly deploying new features and updates. Such objectives are shared by the software development manager, who works to improve the new system's development process.

Because they are critical to the organization's operations, the operating system must run concurrently with the development of new systems. As a result, time must be allocated to legacy system maintenance in addition to new system development activities. Every member of the software development team, according to the input draught, does not want to deal with legacy systems because of their generally poor quality, highly integrated nature, and lack of documentation. Although the current bed structure is adequate despite obvious sustainability concerns, the previous structure was described as "somewhat" and not a drain by the house's first developer.

Distressingly, the current system's reliance on obsolete technology can stymie new system development by requiring developers to "shift" between technologies. Implementation necessitates a lengthy manual process, which causes existing systems to be unavailable for several hours, causing disruptions for the organisation. When an existing system deployment fails, the deployment time skyrockets.

Software development unit heads envision a DevOps process in which software developers and IT managers collaborate as one team. Managers believe that continuous deployment of the system will be very beneficial to the team because new system updates can be quickly tested and pushed to release versions while maintaining a high level of quality. service (QoS), such as avoiding issues when increasing the speed and frequency with which new features and improvements are used. Despite the literature claiming that DevOps and traditional development methods are incompatible, software development managers are convinced that such a process is based on the Scrum method, which is used for new development processes (Maroukian and Gulliver 2020; Maroukian and R. Gulliver 2020).

Adopting DevOps for new systems is more difficult because software developers and IT managers must learn new technologies, tools, and methods. This comes on top of the ongoing development process. On the developer side, learning and acquiring new skills is not a problem. All developers stated during the first interview that learning new technologies and methods was an important part of their job that they enjoyed. The challenge instead focuses on the psychological factors that "change" or "disrupt" the new continuous learning process while keeping the legacy system in place. Some developers have described this challenge as "one of the most difficult issues they've ever faced," citing, for example, the need to switch between existing and new systems because they wear different hats. A clear preference for working on new systems, with developers expressing concern about the quality of the existing system base *"You cannot make changes when working on an existing system. More changes are not necessary because removing something is similar. He pulled the strings, and everything is in order."*

Leadership Structure, Composition, and Rigidity

According to this study, software development team managers are enhancing the team's use of DevOps approaches with new systems. Despite the fact that the system is being intelligently developed, this work is being slowed by a lack of business analysis. The software development manager is concerned about the organization's critical skill gap, and he is forced to do this work despite the fact that he requires the organisation to hire someone specifically for him. As a result, the DevOps process's quality is jeopardised, and software managers' ability to support DevOps-related changes and individual employees in software development and IT operations is limited.

According to the previous research, the organization's IT Operations team was made up of two system administrators, both of whom were proficient in the Microsoft environment. Another (Sysadmin A) is just starting their career, while the other (Sysadmin B) is late in their career, and Sysadmin A respects them despite their age. Because DevOps appears to be a national process led by the head of the software development department, senior management remains sceptical of its benefits. There also appears to be opposition from IT services, which believe that their jobs are unrelated to software developers.

This is further complicated by the management structure (see Figure 2), where both the IT operations team and the head of the software development department report to the chief operating officer.

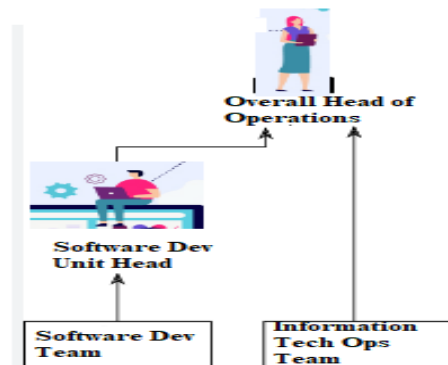


Figure 2: The Current Leadership Structure for Software Development and IT Operations.

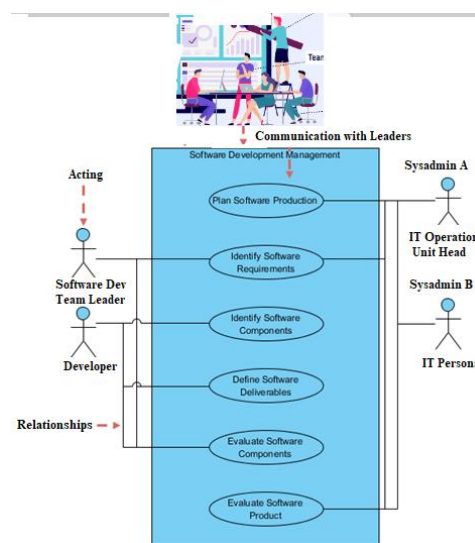


Figure 3: Proposed Leadership Structure for Software Development and IT Operations Within the Organisation

The overall leadership style facilitates dealing with disruptions caused by IT service resistance, which occurs frequently. Without first contacting the software development manager, a system administrator, for example, explains the cost savings of using Azure. As stated in the diary, this type of disruption affects software developers as well, as evidenced by increased frustration and the realisation that the development team is expected to do everything. Given the organization's traditional management structure, these "various IT operations" must be safeguarded. This observation demonstrates that, in order for the DevOps process to be successful in the organisation, both the IT operations and software development teams must report as shown in Figure 3: Recommended management system for software development and IT operations in the organisation.

Similar factor to consider is Sysadmin B's knowledge gained over their long career. Despite his enthusiasm, Sysadmin A regards himself as a "student," whereas Sysadmin B regards himself as a "organisational system administrator" due to his expertise. This sense of seniority and expertise seemed to rub off on CEO Jobs, who admitted he lacked the necessary skills.

These findings are context specific and may not apply to other organisations, especially when leadership systems, employee attitudes, and technology systems differ.

The Social Sensation of DevOps

The findings of the group show that DevOps is a social and cultural phenomenon. According to their initial interviews, both system administrators believed their roles were limited to end-user support and hardware maintenance. During the interview, Sysadmin A expressed an interest in learning more technical skills, specifically some programming language, command line, and git. In fact, the head of the software development department organised additional Microsoft PowerShell and git training for IT Services, which Sysadmin A took advantage of. In conjunction with the available diary entries, this could be interpreted as a management strategy to leverage Sysadmin A's passion and ambition to persuade IT services to become more involved in Azure PowerShell projects and new deployment processes. The risk here is the emergence of IT Service silos, because all system administrators appear to have different work goals and beliefs about what their work entails at this time. Sysadmin B, on the other hand, believes that using the command line is the responsibility of the developer because it requires coding. "As a result, he is acting outside of his responsibilities. According to the installation diary, Sysadmin B considers his role as IT Services to be limited to answering questions from his end users about the software we are developing and supporting the equipment that works in it. Development is in charge of configuring a virtual machine, as well as any other web server or database."

Meanwhile, preliminary interviews and diary entries revealed that the case study group separated software development and IT activities. Organizational silos, on the other hand, can cause significant problems. Although DevOps seeks to align both activities and, as a result, break down these silos, our case study team found DevOps implementation difficult, especially given the observed management structure and resilience of IT Services.

Discussion

A variety of factors influence the structure of a software development team and an IT operation team. These factors include the type and complexity of the software product, the time required to deliver the product, and the budget allotted as well as the experiences among the expertise. A business analyst, a product owner, a project manager, a product designer, a software architect, software developers, software testing engineers, including test automation engineers, and a DevOps engineer are typical members of a software development team. To assemble the ideal teams, we carefully examine the prerequisites and determine team size, select the team structure that best suits a project, and ensure that all necessary software development team roles and IT operations roles are covered. Deploy project management software to streamline daily operations and increase the transparency of project processes, as well as to foster productive communication for quick software deployment and delivery.

Conclusion

In this paper, we present the preliminary findings of an in-depth diary study of DevOps adoption in Nigerian SMEs. DevOps, we conclude, is a highly interdisciplinary topic. The organization's leadership structure must be addressed, as IT Services' resistance is now affecting the software development management process. The need to maintain legacy systems is one of the quality issues that developers face. Furthermore, this prevents learning new skills associated with the new system, which may present quality issues with the new system's foundation. Despite the fact that our research is still in its early stages, it has yielded interesting insights and insights into software development. Moreover, we genuinely believed that

DevOps has an important management component and that more business leadership research is required to fully investigate this issue.

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References

- Ampatzoglou, Apostolos, Stamatia Bibi, Paris Avgeriou, Marijn Verbeek, and Alexander Chatzigeorgiou. 2019. "Identifying, Categorizing and Mitigating Threats to Validity in Software Engineering Secondary Studies." *Information and Software Technology* 106:201–30.
- Azad, Nasreen, and Sami Hyrynsalmi. 2021. "What Are Critical Success Factors of DevOps Projects? A Systematic Literature Review." in *Lecture Notes in Business Information Processing*. Vol. 434 LNBIP.
- Bierwolf, R., P. Frijns, and Paul van Kemenade. 2017. "Project Management in a Dynamic Environment: Balancing Stakeholders." *Proceedings of the 2017 IEEE European Technology and Engineering Management Summit, E-TEMS 2017* 2017-Janua:1–6. doi: 10.1109/E-TEMS.2017.8244226.
- Hosio, Simo. 2019. "Applying Surveys and Interviews." Pp. 20–36 in *International Conference on Product-Focused Software Process Improvement*. Vol. 1. Springer International Publishing.
- Kenner III, Burl T. 2019. "Too Agile? - DevOps Software Development Challenges in a Military Environment." *ProQuest Dissertations and Theses*.
- Khan, Muhammad Adnan, Nouh Sabri Elmitwally, Sagheer Abbas, Shabib Aftab, Munir Ahmad, Muhammad Fayaz, and Faheem Khan. 2022. "Software Defect Prediction Using Artificial Neural Networks: A Systematic Literature Review." *Scientific Programming* 2022.
- Maroukian, Krikor, and Stephen R. Gulliver. 2020. "Defining Leadership and Its Challenges While Transitioning to DevOps." *The Fifteenth International Conference on Software Engineering Advances ICSEA 2020*.
- Maroukian, Krikor, and Stephen R. Gulliver. 2020. "Exploring the Link Between Leadership and Devops Practice and Principle Adoption." *Advanced Computing: An International Journal* 11(4). doi: 10.5121/acij.2020.11401.
- Mayner, Stephen W., and Rick Daniels. 2017. "Transformational Leadership and Organizational Change during Agile and Devops Initiatives." *ProQuest Dissertations and Theses* (January).
- Nisha, T. N., and Amit Khandebharad. 2022. "Migration from DevOps to DevSecOps: A Complete Migration Framework, Challenges, and Evaluation." *International Journal of Cloud Applications and Computing* 12(1). doi: 10.4018/IJCAC.2022010102.
- Raffo, David, Reda Bendraou, Li Guo Huang, and Fabrizio M. Maggi. 2019. "Innovative Process Paradigms and Data Driven Analytics: A New Horizon for Software and Systems Process." *Journal of Software: Evolution and Process* 31(6).
- Sanchis, Raquel, Óscar García-Perales, Francisco Fraile, and Raul Poler. 2020. "Low-Code as Enabler of Digital Transformation in Manufacturing Industry." *Applied Sciences (Switzerland)* 10(1). doi: 10.3390/app10010012.
- Sayagh, Mohammed, Nouredine Kerzazi, Bram Adams, and Fabio Petrillo. 2020. "Software Configuration Engineering in Practice Interviews, Survey, and Systematic Literature

- Review.” *IEEE Transactions on Software Engineering* 46(6):646–73. doi: 10.1109/TSE.2018.2867847.
- Shichtman, Diane. 2018. “Stakeholders Connecting the Curricular Guidelines to the Code.” *SIGITE 2018 - Proceedings of the 19th Annual SIG Conference on Information Technology Education* 89. doi: 10.1145/3241815.3241831.
- da Silva, Antonio Cesar Brandão Gomes, Glauco de Figueiredo Carneiro, Fernando Brito e Abreu, and Miguel Pessoa Monteiro. 2017. “Frequent Releases in Open Source Software: A Systematic Review.” *Information (Switzerland)* 8(3).

SYSTEM DYNAMICS MODELLING: THE IMPACT OF FARE ADJUSTMENT AND SERVICE IMPROVEMENT TO PUBLIC SERVICE OBLIGATION (PSO) SUBSIDIES ON JABODETABEK COMMUTERLINE

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Abstract: Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) Commuterline is one of the modes of transportation in Indonesia that receives subsidies in the form of Public Service Obligation (PSO) from the Government. The PSO subsidy is based on the difference between published fare which set by the Government and the fare calculated by the operator, so that fare can be reached by all communities. The PSO subsidy is given to all passengers. More passengers, greater subsidy must be given. Every year the PSO subsidy continues to increase and burdens the state budget. In 2016 it was IDR1.079 trillion while in 2021 it was IDR1.628 trillion. Therefore, it is necessary to study the PSO subsidies scheme for the Jabodetabek Commuterline currently used, in order to obtain a more effective scheme or policy from the perspective from all parties. This study will focus on knowing the effect of implementing fare adjustment and service improvement policies on Jabodetabek Commuterline PSO subsidies. This study creates a system dynamic model for providing the PSO subsidies. After model testing was carried out, the model created and its input parameters were stated to be able to describe the actual condition of the PSO subsidy system. Based on the results of running 5 scenarios, it can be concluded that the most optimal scenario for reducing PSO subsidies in Jabodetabek Commuterline with fare adjustment and service improvement policies is Scenario 5. This is because in 2029 to 2044, the PSO subsidy is IDR0. This means that the revenue earned by operator is greater than the IOM Cost that needs to be spent. Thus, the fare adjustment and service improvement policies can reduce PSO subsidies with a fixed rate below the ATP value and an ever-increasing demand.

Keywords: Public Service Obligation, Commuterline, System Dynamics Modelling, Fare Adjustment, Transport Policy.

Introduction

Indonesia has a metropolitan area around the capital city of Jakarta, which is called Jabodetabek (Jakarta, Bogor, Depok, Tangerang, and Bekasi). Jakarta as the centre of government and economy in Indonesia requires a buffer city around it as a unit because the population density in Jakarta is already very high. The buffer city is a place of residence for workers in Jakarta. Therefore, the Jabodetabek Area is filled with commuters who commute daily to work in Jakarta.

In order to support the movement of commuters, an efficient public transportation system is needed. There are several types of public transportation such as Commuterline, Bus Rapid Transit and Light Rail Transit that serve the Jabodetabek Area. Commuterline is the largest mode of mass transportation in Jabodetabek. The Jabodetabek Commuterline consists of 5 lines with 7 connections covering a service distance of 418.5 km and has 81 stations. Based on the data from KAI Commuter Ltd. as an operator, the number of the Jabodetabek Commuterline's passengers averaged 795,257 people per day on weekdays and 617,431 people per day on weekends on January 2023. Before the COVID 19 pandemic occurred, the average number of Jabodetabek Commuterline passengers reached 1.2 million people per day.

Therefore, the Jabodetabek Commuterline is one of the modes of transportation in Indonesia which receives subsidies from the Government in the form of a Public Service Obligation (PSO). Public Service Obligation (PSO) is a form of subsidy that is currently developing in the Indonesian transportation sector. In general, PSO is a cost that must be incurred by the state due to the disparity in the cost of products/services sold by a Business Entity with prices for certain products/services set by the Government so that products/services are guaranteed and affordable for most of society (Indonesian Ministry of Finance, 2007).

The Jabodetabek Commuterline fare since 2016 until now is IDR 3,000 for the first 25 km and IDR 1,000 for every additional 10 km that follows. The fare is a commercial rate set by the Government. Meanwhile, the fare calculated by the operator is IDR 6,250 for the first 25 km and IDR 2,500 for each additional 10 km that follows. This difference in fare then becomes a PSO subsidy from the Government (KAI Commuter, 2016).

The number of PSO subsidies for The Jabodetabek Commuterline continues to grow every year. In 2016 it was IDR 1.079 trillion while in 2021 it was IDR 1.628 trillion. This is in line with the increasing number of passengers and efforts to improve services. Because the PSO subsidies are given to all passengers in the form of a fare difference so that the fare paid by passengers remains reasonable, as the number of passengers increases, the PSO subsidy that must be given will also increase.

Currently, the amount of the PSO subsidies for the Jabodetabek Commuterline is too much of a burden on state finances. In addition, giving subsidies that are too large can also make a business entity not self-sufficient. The principle of providing subsidies that are right on target needs to be maintained so that social inequality does not occur. Therefore, it is necessary to study the PSO subsidies scheme for the Jabodetabek Commuterline currently used, in order to obtain a more effective scheme or policy from the perspective of the Government, Business Entities, the Jabodetabek Commuterline users and the wider community. This research will focus more on knowing the effect of implementing fare adjustment and service improvement policies on Jabodetabek Commuterline PSO subsidies.

Literature Review

Subsidies in the Transportation Sector

Subsidy policies in the transportation sector, especially public transport, have been implemented in many countries, both developed and developing countries. Basically, these subsidies are implemented to make transportation more affordable for all levels of society. References regarding the implementation of subsidies in the transportation sector in the world,

are taken from the Estupinan et al., (2008) journal entitled Affordability and Subsidies in Urban Public Transit.

Subsidies in the transportation sector can be classified into the following aspects:

Who can receive subsidies?

Subsidies can be distributed to transportation providers (supply side subsidies) or directly to beneficiaries, namely transportation users (demand side subsidies). Supply side subsidies themselves can be distributed in the form of capital subsidies for infrastructure development, operating cost subsidies or both with the aim of reducing service costs (tariffs) that must be borne by users. Meanwhile, demand side subsidies can be provided by reducing the expenditure of transportation users.

How subsidies are distributed?

Subsidies can also be classified based on distribution method. Supply side subsidies are given to operators or transportation service providers. Meanwhile, demand-side subsidies are given to transportation users who need them. This can be done by looking at the passengers' socioeconomic conditions, making passenger categories such as students or the elderly, looking geographically so that subsidies are distributed to underdeveloped areas, or if there are different service classes, then provide subsidies for the lowest service, so that it can be affordable to all.

How subsidies are budgeted?

The subsidy budget can come from state taxes, regional taxes, special taxes, or cross subsidies. Cross subsidies come from the same company or in the same city. Suppose a company provides bus and train modes of transportation. When bus revenue reaches a surplus, the budget can be allocated to train modes in the form of cross subsidies to reduce fare.

Public Service Obligation

Public Service Obligation (PSO) is the obligation of the state in the field of service to the community as a representation of the desires and needs of the people it represents (Suryaningtyas, 2005). One of the forms of PSO implementation is providing public facilities and amenities in supporting the socio-economic activities of the community. These facilities are facilities that meet the following criteria: able to reach all service areas, have the same minimum quality between service areas and can be used by all levels of society.

The Public Service Obligation (PSO) policy in the field of rail transportation in Indonesia has started since 2000, because of the "Loan Agreement" No. 4106-IND dated January 15th, 1997 in the form of project assistance from the World Bank, which later became known as the Railway Efficiency Project. One of the programs was to carry out a restructuring of railway funding through a funding scheme including Public Service Obligation PSO, Infrastructure, Maintenance and Operation IMO and Track Access Charge TAC (Directorate General of Railways, 2007).

The philosophy of the funding scheme is that there is a clear separation between the public service function by the Government and the company's "commercial" function as an Organizing Business Entity. The government as a public service provider is obliged to provide rail transportation that is comfortable, safe, and fast with affordable prices to all levels of society. The government appointed the Kereta Api Indonesia Co. Ltd. to carry out the public

service function by requiring it to run trains with operational requirements, physical conditions of facilities, schedules, trip frequency and rates set by the Government.

System Dynamics

System dynamics is a methodology based on feedback systems taken from control theory and can be used to solve non-linearity problems, time delays and multi-loop structures of complex and dynamic systems (Bala, 2014). System dynamics combines the theory, methods and philosophy needed to analyse the behaviour of systems is not only management, but also in environmental changes, politics, economics behaviour, medicine, engineering, and other fields (Forrester, 1991). In general, the stages of modelling using a dynamic system can be seen in the following diagram:

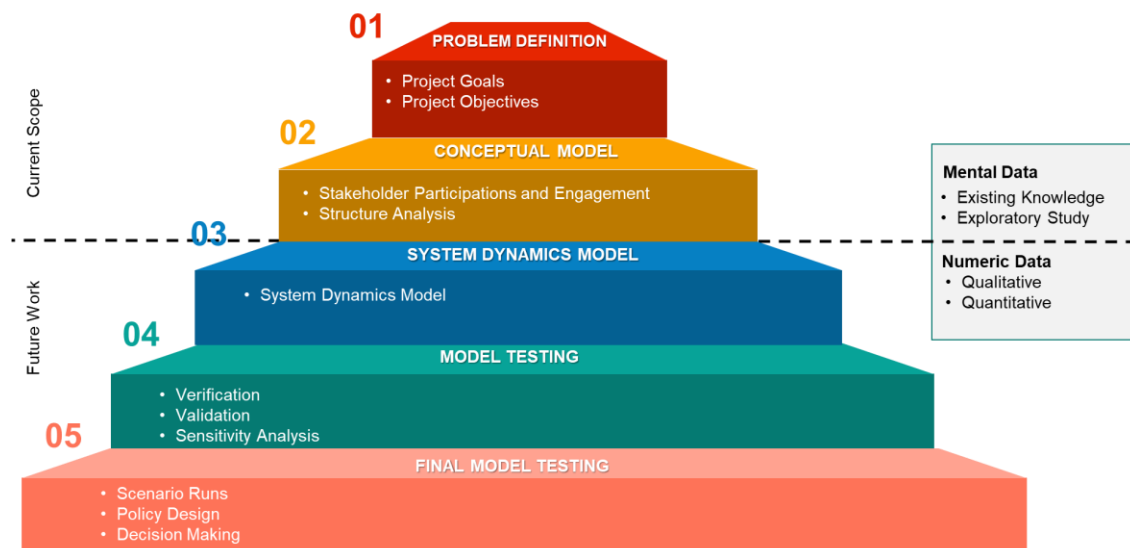


Figure 1: Stages of Dynamic System Modelling

Fare Adjustment

According to Tamin et.al, (1999), in principle, determining the fare can be viewed in three main aspects of the public transport system, namely Users, Operators and Government (Regulators). In determining fare that refer to user aspects, the parameters reviewed are ATP and WTP, with the following principles:

ATP is a function of the ability to pay, so the rate applied cannot exceed the ATP value of the target community group. Government intervention in the form of direct subsidies or cross subsidies is needed in conditions where the value of the applicable tariff is greater than the ATP for some groups of people.

WTP is a function of the level of service of public transport, so that if the value of WTP is still below ATP, it is still possible to increase the value of the fare accompanied by an improvement in the level of service.

Methodology

This study uses dynamic system modelling which requires two types of data, namely mental data, and numerical data. Mental data is a type of information source that has the most information content and is the main source in making a model. Mental data is formed based on experience and understanding of the structure of a system or problem. Meanwhile, numerical data has very specific and precise information. Therefore, numerical data plays an important

role in the scientific approach to problem solving. Numerical data support the quantification process of modelling and provide mathematical clarity of system function. Both data can be obtained from interviews, field observations or literature reviews. Historical data used is data from 2013 – 2022 while model simulations are carried out until 2050.

Model Development

Problem Definition

This research started with concerns that the amount of PSO subsidies for the Jabodetabek Commuterline continues to increase even though the number of passengers has also increased. The value of the subsidies is too burdensome to state finances so it is necessary to review the existing subsidies scheme. The purpose of this study is to find out how the effect of implementing fare adjustment and service improvement policies on PSO subsidies on Jabodetabek Commuterline.

Conceptual Model

After determining the problem definition, the next step is to develop a theory called the dynamic hypothesis which consists of research hypothesis, global models, and the concept of Causal Loop Diagram (CLD).

Hypothesis

The hypothesis of this research is that the population in Jabodetabek will continue to grow so that the need for public transportation will continue to increase. Along with the increase in demand, it is also necessary to improve services so that passengers can be served properly. Improved service will certainly increase operational and maintenance costs, so the fare will be more expensive. If there is no fare adjustment over time, the subsidy will increase. While adjusting fares can reduce subsidies, it can also reduce demand.

Global Model

At the stage of developing the global model, the role of each stakeholder involved in the problem is identified. In this case, the stakeholders involved are broadly divided into three, namely Passengers, Operators and Regulators. Passengers are people who use Jabodetabek Commuterline services to move from a point of origin to a destination point. Variables in this model related to passengers include: GRDP per Capita, Ability to Pay (ATP), Willingness to Pay (WTP), Demand and Expected Fare.

The operator is the party that operates the Jabodetabek Commuterline, in this case KAI Commuter, Ltd. Variables related to Operators include: Investment, Operation and Maintenance Costs (IOM Costs) that need to be incurred by operators, the Level of Service offered by operators, and the fare that the operator needs to be able to operate the Jabodetabek Commuterline.

Regulators or policy maker in this case are the Indonesian Ministry of Transportation as part of the government that takes care of transportation. The regulator can determine the commercial fare that passengers need to pay, the subsidies that can be given and the minimum service standards that operators need to comply with. The Global Model based on the problems in this study can be seen in the following diagram:

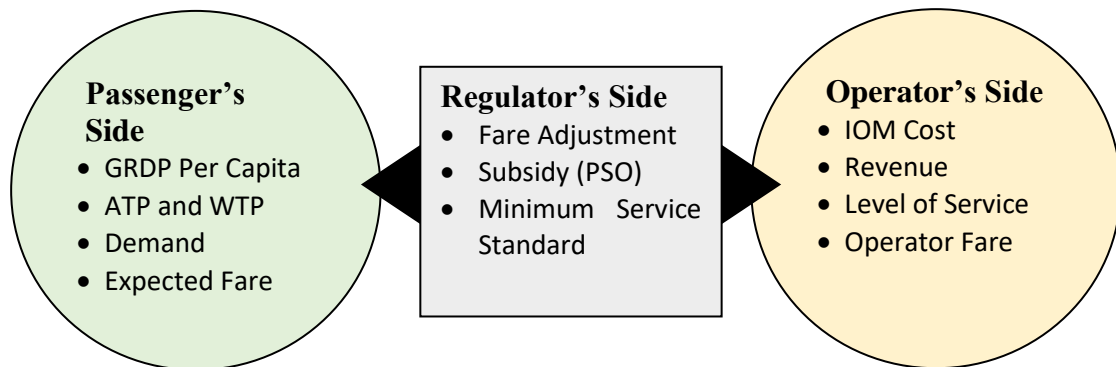


Figure 2: Global Model

Causal Loop Diagram

Causal Loop Diagram (CLD) is a tool to represent global models and then developed based on the mental data that has been collected so that it can be the basis for building models. CLD consists of variables connected by arrows indicating causal influences between these variables (Bala, 2004). Causal Loop Diagram in this study can be seen in Figure 3.

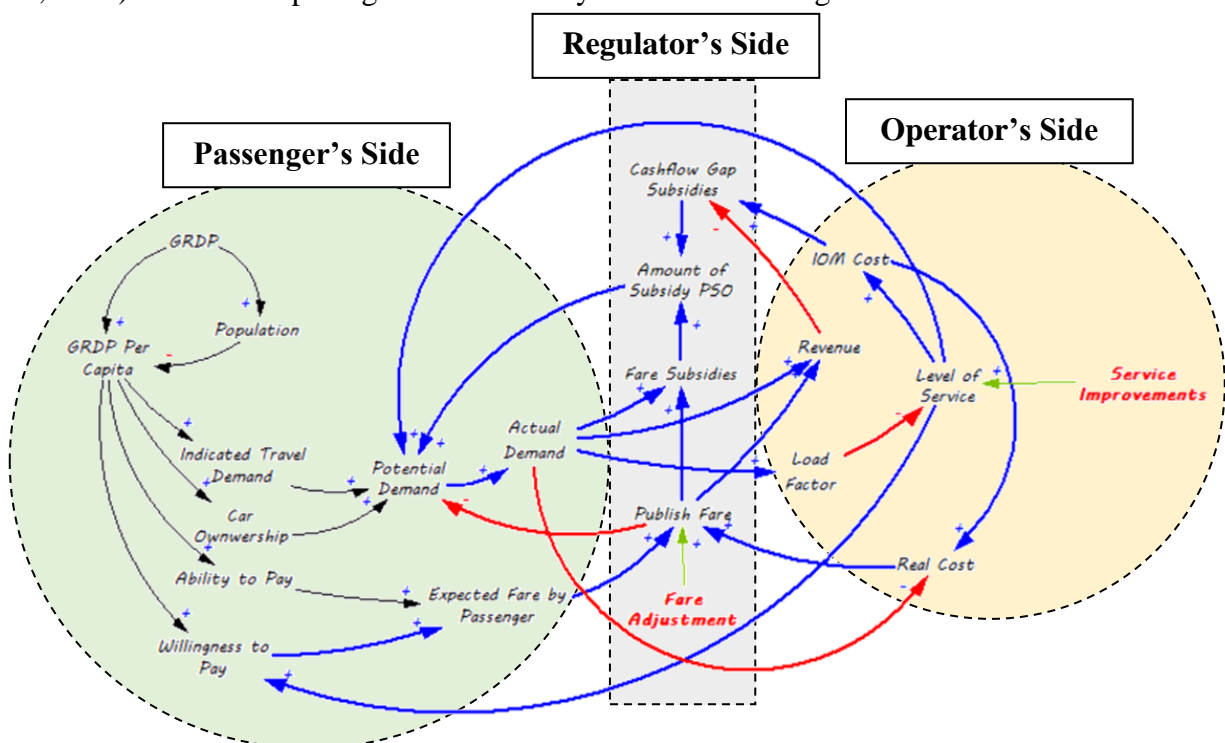


Figure 3: Causal Loop Diagram

A positive arrow indicates that the causal relationship between variables is unidirectional or mutually reinforcing. For example, the relationship between Level of Service and Willingness to Pay (WTP). The higher the Jabodetabek Commuterline service level, the greater the willingness of people to pay the fare so that the WTP value will be greater. Conversely, an arrow with a negative sign indicates that the two variables are mutually opposite or the causal relationship is mutually weakening. For example, the relationship between Publish Fare and Potential Demand. This means that the greater the fare that needs to be paid by passengers (published fare) will reduce the amount of potential demand.

System Dynamics Model

After CLD is formed, the next step is to create a system dynamics model using Stock and Flow Diagrams (SFD). Stock is an accumulation that can increase and decrease, which is measured at a certain point in time. While flow is a process that causes inventory to increase or decrease, which is measured for each unit of time (Bala, 2004). To facilitate model development, this study is divided into several sub-models.

Sub Model Population and GRDP

This sub model discusses the relationship between Jabodetabek GRDP and Jabodetabek Population. Historical data of GRDP and Population were obtained from the Indonesian Central Bureau of Statistics, which were then subjected to regression analysis so that the elasticity of GRDP to Population was 0.22. This means that every 1% increase in GRDP will increase the population by 0.22%. Population and GRDP are inputs in the GRDP per Capita sub model, which is the average income of a person in an area. GRDP per Capita is obtained from the division between GRDP and Population.

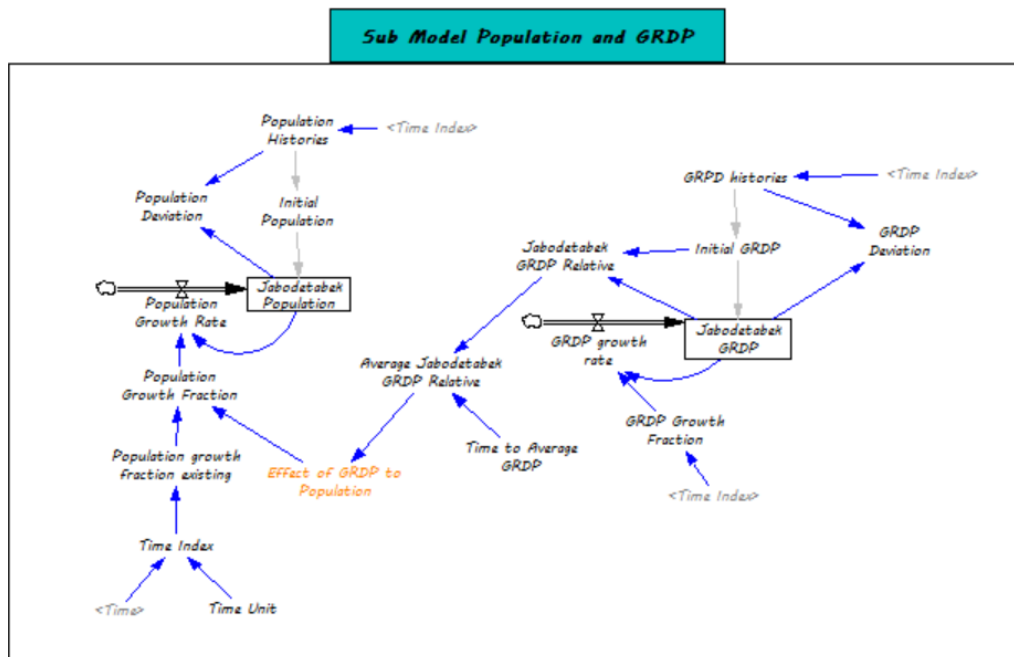


Figure 4: Sub Model Population and GRDP

Sub Model Indicated Travel Demand

Indicated Travel Demand in this model means the number of possible movements for Jabodetabek residents. Indicated Travel Demand is influenced by the amount of GRDP per Capita. Increased income is expected to increase the number of trips and the average length of a person's trip (Paulley, et.al. 2006).

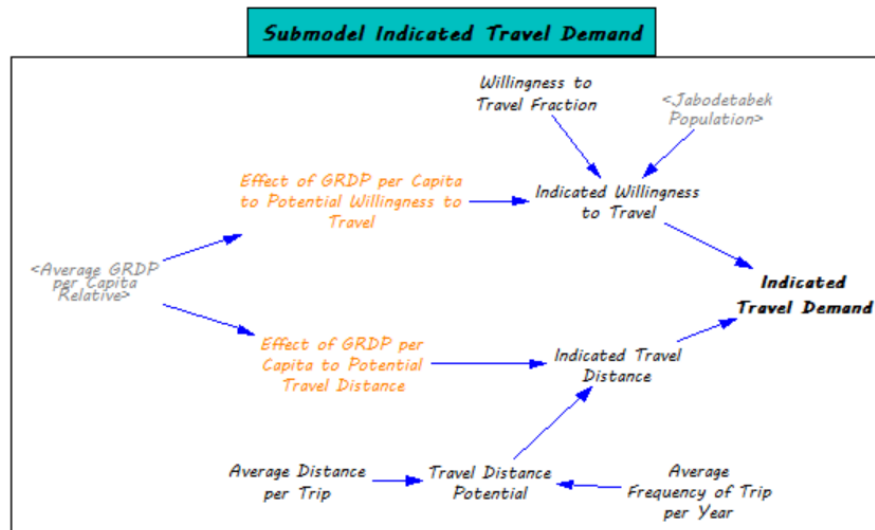


Figure 5: Sub Model Indicated Travel Demand

Sub Model Ability to Pay and Willingness to Pay (ATP & WTP)

Ability to Pay is a measure of a person's ability to pay for the services he receives and is considered ideal based on his income (Mataria, et.al. 2016). The approach method used is the household budget method which is obtained from the overall transportation allocation for public transport from monthly income per total trip distance for a month (Musgrave, et.al. 1975).

Willingness to Pay is the maximum willingness of a person to pay for services in accordance with the services they receive (Al-Ghuraiz and Enshassi, 2005). The approach used in the WTP analysis is based on user perceptions of the fares of these public transport services (Tamin, et.al. 1999).

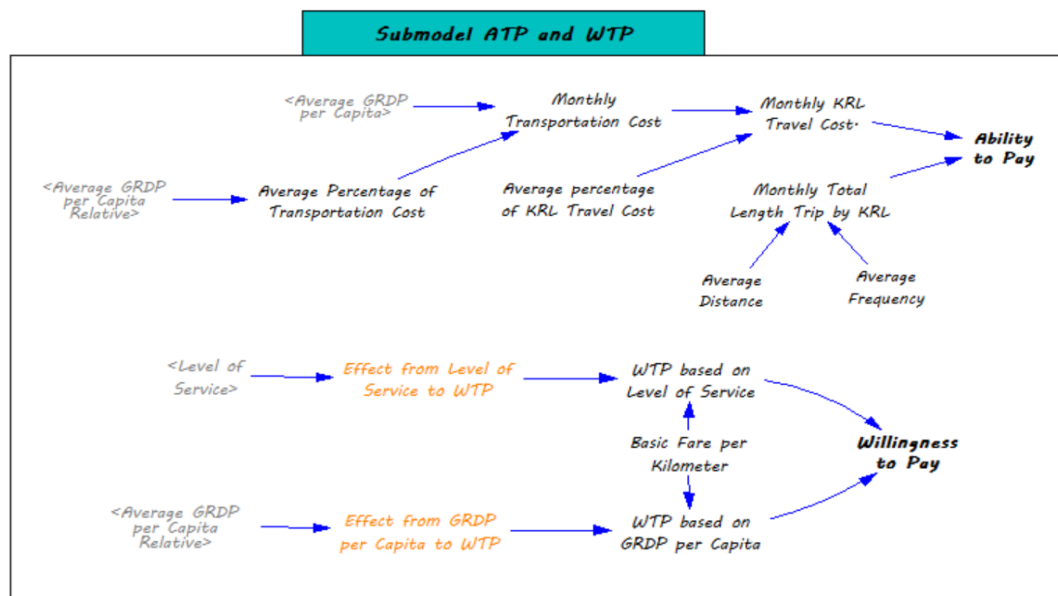


Figure 6: Sub Model Ability to Pay and Willingness to Pay

Sub Model Demand Passenger

Paulley N., et.al from the University of Leeds, in 2006 conducted research on the effect of fares, service quality, income and private vehicle ownership on public transportation demand. The results, among others, are that fare and private vehicle ownership have a negative relationship with demand, meaning that the higher the fare or the more private vehicles, the smaller the demand. Meanwhile, service quality and income have a positive relationship with demand. The better the service offered by a service, the higher the demand for the service.

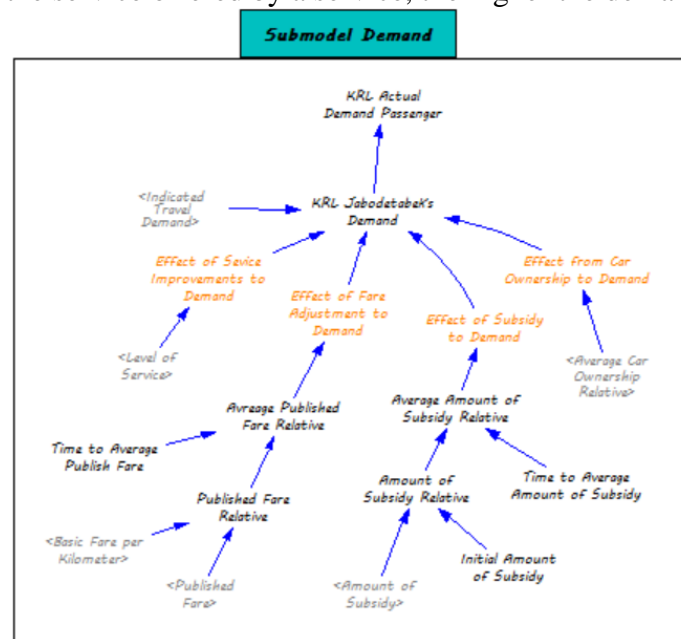


Figure 7: Sub Model Demand Passengers

Sub Model IOM Cost

Investment, Operation and Maintenance Costs are costs incurred by KAI Commuter, Ltd to organize and operate the Jabodetabek Commuterline. In the case of the Jabodetabek KRL, the investment costs incurred by the operator are for the purchase of KRL facilities and business development in the non-transport sector. Meanwhile, railway infrastructure such as rail lines, operating facilities, overhead electricity, and stations belong to the state. PT KCJ needs to pay rent to the government which includes facility and stabling leases, Track Access Charge (TAC) and station leases. Meanwhile, Operation and Maintenance (O&M) costs are costs that need to be incurred by operators to carry out transportation operations and maintenance, including employee operations.

This sub model starts with the load factor which is an indicator to measure the level of occupancy of a vehicle. Load factor is the ratio between sold capacity and available capacity. In this model, the load factor can be calculated by comparing the peak hour demand with the total capacity of the train cars. When the load factor exceeds 1, it means that the vehicle has exceeded its capacity. The greater the load factor will cause inconvenience and insecurity for passengers. Therefore, it is necessary to carry out service improvements.

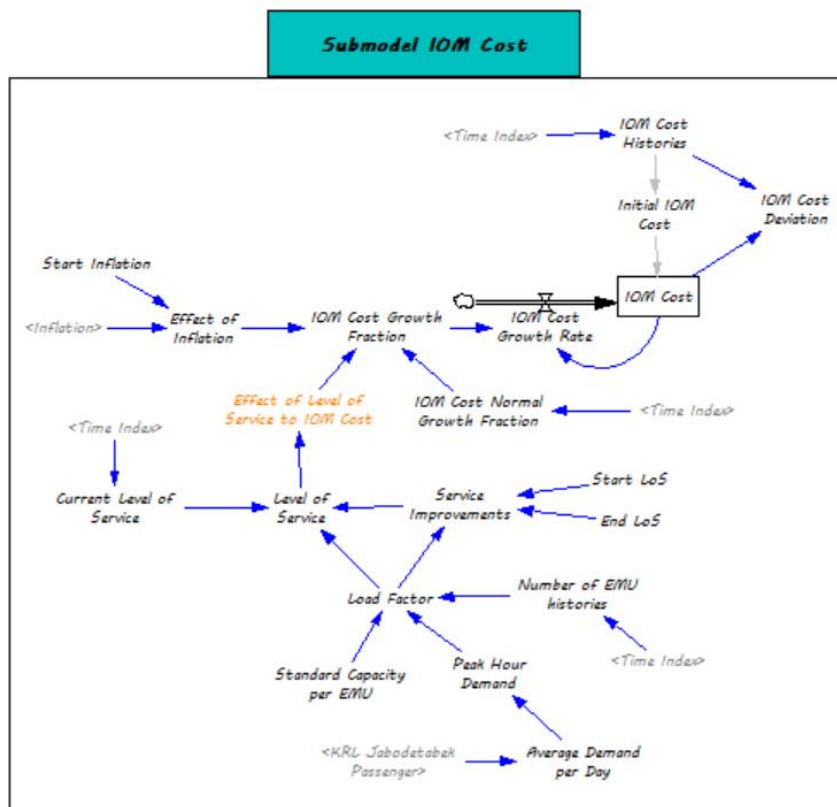


Figure 8: Sub Model IOM Cost

Sub Model Revenue

Revenue is income received by the operator for the business results of providing transportation services. Revenues for the Jabodetabek Commuterline consist of passenger transportation revenues, other train support revenues and non-transport business revenues. Farebox revenue is the multiplication of published fare and passenger kilometers. Meanwhile, based on empirical data, other revenue is 13% of farebox revenue.

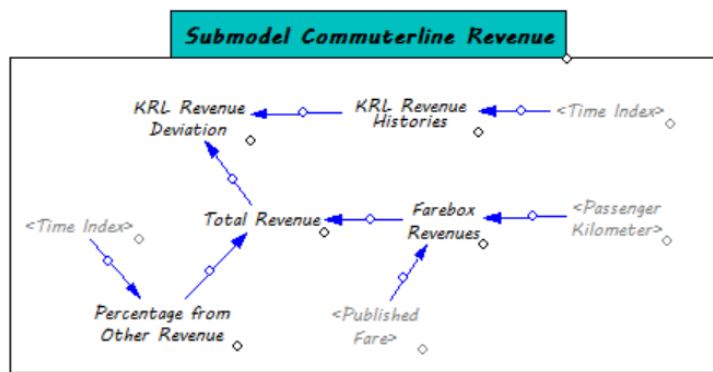


Figure 9: Sub Model Revenue

Sub Model Fare, Real Cost and Amount of Subsidy

Real Cost is the fare for public transport services determined by the Operator with a calculation method based on statutory regulations. In Jabodetabek Commuterline, Real Cost is IOM Cost plus Profit which is set at a maximum of 10%, divided by Passenger Kilometers.

Publish Fare is a rate set by the Government through a rate adjustment and ultimately becomes the amount of fare that must be paid by passengers to use Jabodetabek Commuterline services. Meanwhile, in the process of determining fares, it is necessary to look at the expected fare by passenger, which is the average between ATP and WTP. Meanwhile, Amount of Subsidy means the difference between Real Cost and Average Fare Expected by User. If the difference is positive, or the real cost is greater, it is necessary to provide subsidies so that fares are affordable to the public, but operators can still provide optimal service.

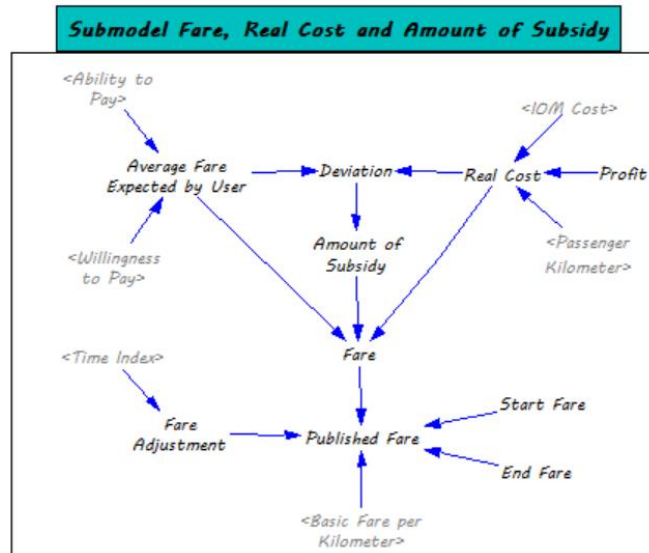


Figure 10: Sub Model Fare, Real Cost and Amount of Subsidy

Sub Model PSO Subsidies

Calculation of the amount of PSO subsidies can be done using two approaches, namely Fare Subsidies and Cashflow Gap Subsidies. Fare Subsidies is the difference between Real Cost and Publish Fare, multiplied by Passenger Kilometers. Meanwhile, Cashflow Gap Subsidies means the difference between IOM Cost and Revenue.

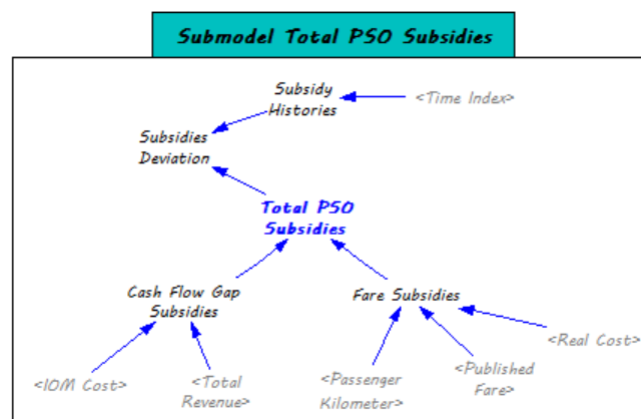


Figure 11: Sub Model PSO Subsidies

Model Testing

Model testing is carried out in several stages. After the model is compiled, it is necessary to input data or parameters for each variable, so that the model can be run or verified. After running and successful, it means that the parameters and equations in the model are appropriate. The next step is the Structure Test, which is to find out that the model created already has a structure that is relevant to the system and the concept of the problem. This test can be done by looking at the suitability between CLD and SFD. Next is the Model Behavior Test. At this stage, a comparison is made between the model output on a variable, with the actual data of that variable in the field. This stage is important to ensure that the dynamic system model can describe actual conditions. The behavior test in this study was carried out on the Population, GRDP, Actual Demand, Car Ownership, IOM Cost and Revenue variables.

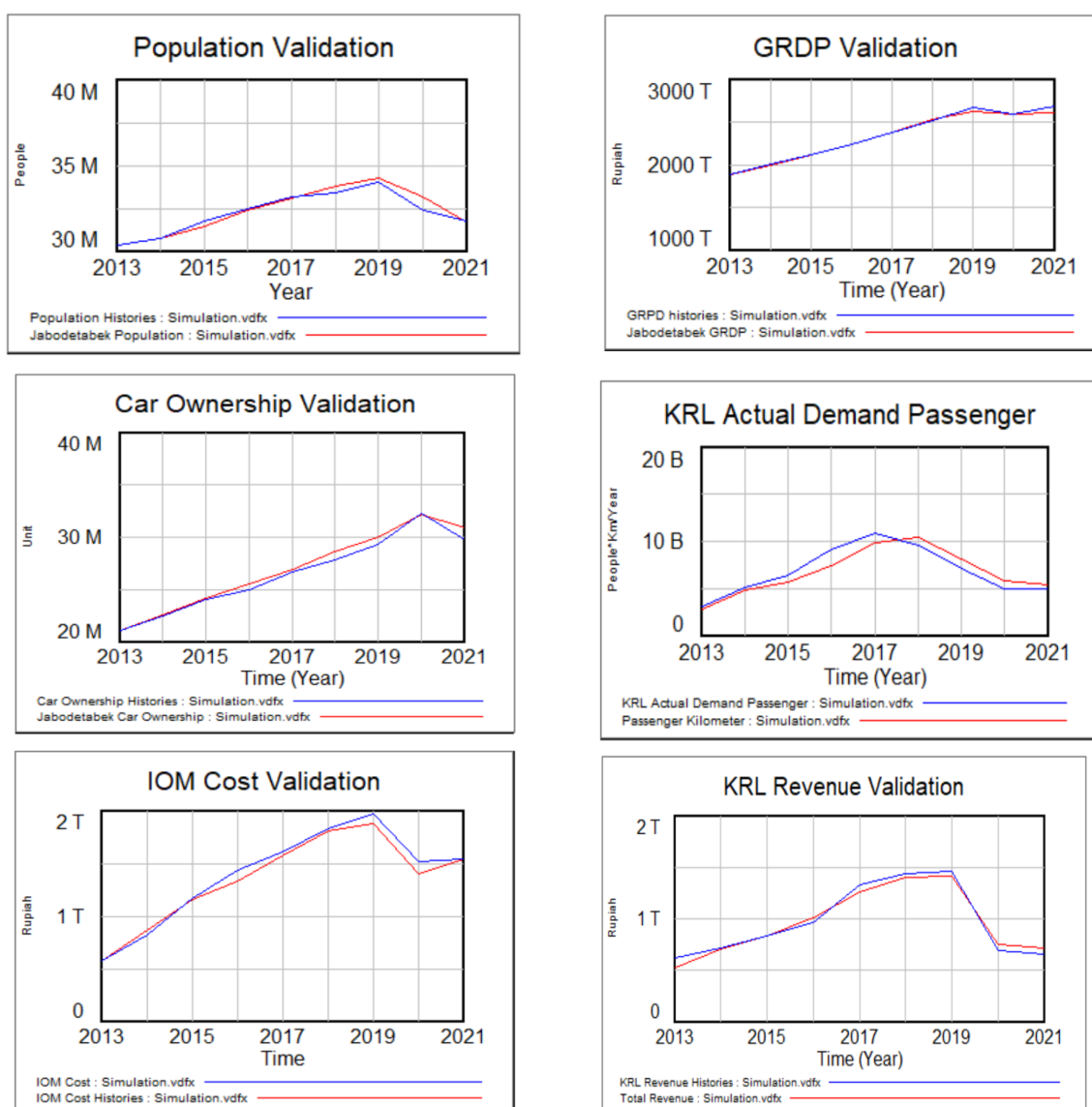


Figure 12: Validation

Based on the validation of the behavior test on the six variables above, the result is that the behavior of all these variables resembles the actual conditions shown by the overlapping of the

simulation results graphs with historical data graphs. Even if there is a deviation, the value is not too big. Thus, the model created and the parameters entered can be used to describe the PSO subsidy calculation system in Jabodetabek Commuterline.

Final Model Testing

To find out how the effect of fare adjustments and service improvements on the Jabodetabek Commuterline PSO subsidy, the following policy scenario is created:

Table 1: Scenarios

Scenario	Fare Adjustment	Service Improvements
Business as Usual (BAU) (2013 – 2050)	The current fare is IDR 3000 per passenger for the first 25 km	No service improvements have been carried out
Scenario 1 (2023 – 2050)	The fare is determined based on the amount of ATP and WTP	No service improvements have been carried out
Scenario 2 (2023 – 2050)	No fare adjustments were made	Service improvement is carried out when the load factor exceeds 150%
Scenario 3 (2023 – 2050)	Fares are increased by 5% annually from BAU conditions	Service improvement is carried out when the load factor exceeds 150%
Scenario 4 (2023 – 2050)	Fares are increased by 10% annually from BAU conditions	Service improvement is carried out when the load factor exceeds 100%
Scenario 5 (2023 – 2050)	The fare is determined based on the amount of ATP and WTP	Service improvement is carried out when the load factor exceeds 100%

Business as Usual (BAU) conditions indicate that the model will run as usual under current conditions without any changes. The current fare, which is IDR 3000 for the first 25 km or IDR 120/km, will be left intact until 2050. Service levels will also be left as they are today.

In scenario 1, a change in fare setting policy was made which was previously based on government policy, to be determined based on ATP, WTP and Real Cost. When the Real Cost is greater than the average ATP and WTP, then the fare is in accordance with the average ATP and WTP value, and vice versa. As for the level of service, no changes were made.

Scenarios 2, 3, 4, 5 carried out service improvement by looking at the load factor. When the load factor at peak hours exceeds the limit, services are gradually increased, including increasing the number of train trips at peak hours, reducing headway, increasing the number of carriages on routes that allow the use of a 12-car train set.

Result and Discussion

After running all scenarios, the result is that the published fare per passenger for the first 25 km will continue to increase in the scenario that applies the fare adjustment policy. Whereas in BAU and scenario 2 conditions where fare adjustments are not carried out, the published fare

will remain at IDR 3,000 / 25 km until 2050. The largest increase in value occurs in scenario 5, where fares are determined based on the value of ATP, WTP and real cost and are carried out service improvement when load factor exceeds 100%. The magnitude of the increase was due to the more massive service improvement that led to an increase in IOM costs. Even though the number of passengers has also increased, the real costs generated are still greater, so the published fare is also high.

Table 2: Published Fare All Scenarios

Scenario	Published Fare P(IDR/25km)				
	2023	2025	2030	2040	2050
BAU	3000	3000	3000	3000	3000
Scenario 1	5908	6679	9038	7892	8362
Scenario 2	3000	3000	3000	3000	3000
Scenario 3	3150	3450	4200	5700	7200
Scenario 4	3300	3900	5400	8400	11400
Scenario 5	5979	6793	9194	15184	23823

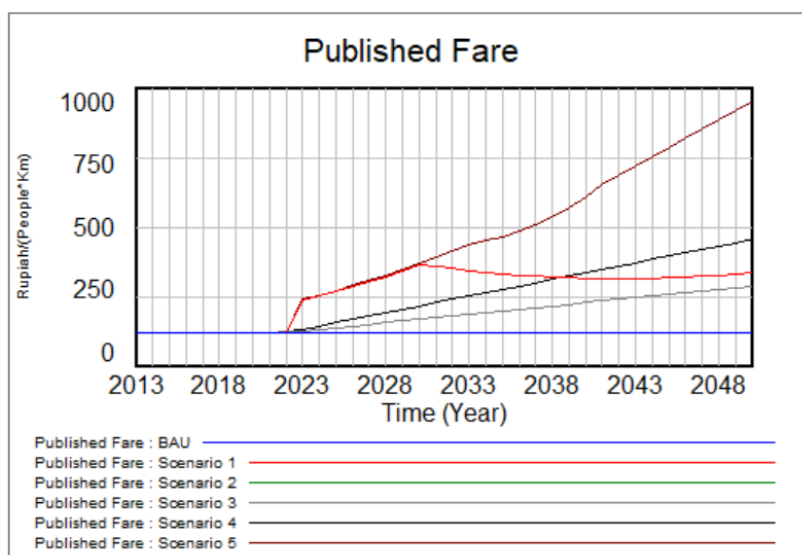


Figure 13: Published Fare All Scenarios

Based on the results of running all scenarios, the result is that the increase in the value of PSO Subsidies drastically occurs in scenarios 2, 3, and 4. Meanwhile, under BAU conditions, the increase is not dramatic due to the absence of service improvements that can increase IOM costs. In scenario 1, subsidies are no longer needed since 2030 because there are no service improvements but there are fare adjustments. However, scenario 1 cannot be implemented because service facilities will experience depreciation over time and the population will continue to increase, so that the number of demands will continue to increase. If there are no service improvements at all, the Jabodetabek Commuterline will no longer be able to serve passengers optimally.

Table 3: PSO Subsidies All Scenarios

Scenario	PSO Subsidies (IDR Billion)				
	2023	2025	2030	2040	2050
BAU	1,700	1,794	2,247	4,644	14,007
Scenario 1	999	711	0	0	0
Scenario 2	1,578	1,699	2,595	11,963	110,882
Scenario 3	1,542	1,567	2,013	8,402	95,839
Scenario 4	1,596	1,536	1,590	5,471	85,599
Scenario 5	950	684	0	0	41,103

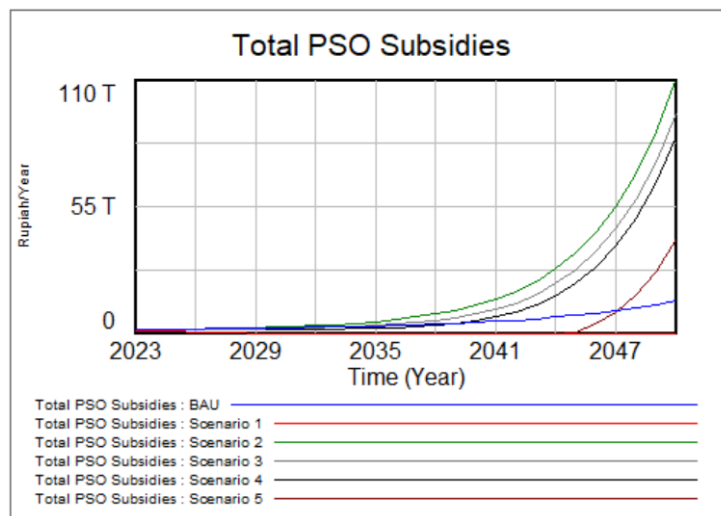


Figure 14: PSO Subsidies All Scenarios

Based on the results above, it can be concluded that the most optimal scenario for reducing PSO subsidies in Jabodetabek Commuterline with fare adjustment and service improvement policies is Scenario 5. This is because in 2029 to 2044 in this scenario the PSO subsidy value is 0. This means that the income earned operator is greater than the IOM Cost that needs to be spent. Even though in 2045 to 2050 subsidies will be needed again, the value will not be as big as in other scenarios. Thus, the fare adjustment and service improvement policy can reduce PSO subsidies with a fixed rate below the ATP value and an ever-increasing demand.

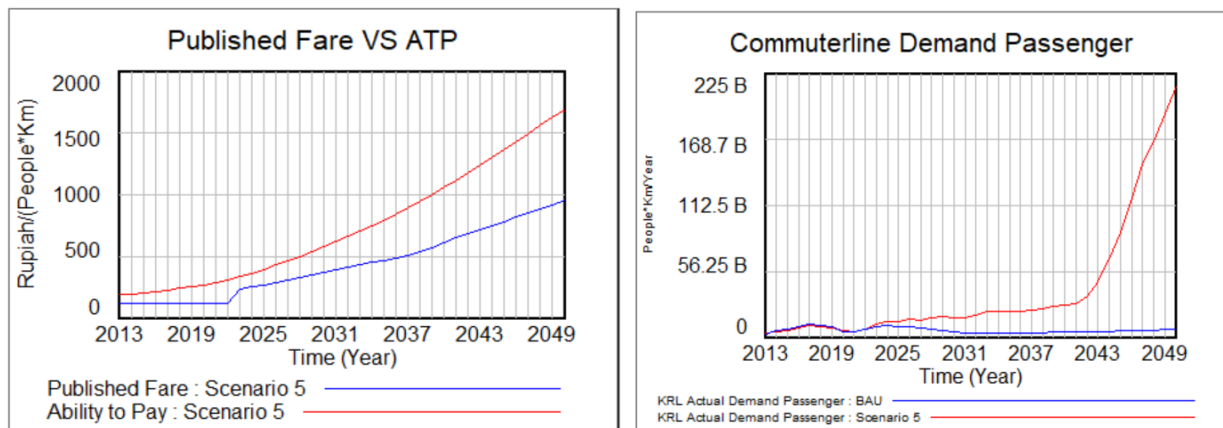


Figure 15: Demand Passengers and Published Fare Best Scenarios

Conclusion

The amount of PSO subsidies for Jabodetabek Commuterline continues to increase every year until it is too much of a burden on the state budget as a source of funds. This happened because no tariff adjustments have been made since 2016 until now. Meanwhile, the PSO subsidy system is in the form of the difference between the published fare and the real cost calculated by the operator, which is given to all passengers. What happened was that the number of Jabodetabek Commuterline passengers continued to increase except during the COVID 19 pandemic. To provide optimal service, operators need to improve their services so that passengers remain safe and comfortable. Service improvement will certainly have an impact on increasing IOM Cost. The greater the IOM Cost will have an impact on the greater the real cost. When there is no fare adjustment, the difference between the real cost and the published fare will be even greater so that the subsidy that needs to be given by the government is getting bigger for each passenger kilometer. Moreover, the number of passengers continues to increase, so the total PSO Subsidies for Jabodetabek Commuterline will be even greater.

This research creates a dynamic system model for providing PSO subsidies to Jabodetabek Commuterline. After model testing was carried out, the model created and its input parameters were stated to be able to describe the actual condition of the PSO subsidy system. To determine the effect of fare adjustment and service improvement policies on PSO subsidies, 5 scenarios with different conditions were created. Based on the results of running all scenarios, it can be concluded that the most optimal scenario for reducing PSO subsidies in Jabodetabek Commuterline with fare adjustment and service improvement policies is Scenario 5. This is because in 2029 to 2044 in this scenario the PSO subsidy value is IDR 0. This means that the revenue earned by the operator is greater than the IOM Cost that needs to be spent. Even though in 2045 to 2050 subsidies will be needed again, the value will not be as big as in other scenarios. Thus, the fare adjustment and service improvement policy can reduce PSO subsidies with a fixed rate below the ATP value and an ever-increasing demand.

References

- Al-Ghuraiz, Y., and A. Enshassi. (2005). *Ability and Willingness to Pay For Water Supply Service In The Gaza Strip*. Building and Environment 40: 1093–1102.
- Bala, B., Arshad, F., Noh, K., (2014). *System Dynamics Modelling and Simulation*. Singapore: Springer.
- Direktorat General of Railway. (2007). *Kajian IMO, TAC, PSO*. Jakarta.
- Estupinan, N., Gomez-Lobo, A., Serebrisky, T., Munoz-Raskin, R. (2008). *Affordability and Subsidies in Public Urban Transport: What Do We Mean, What Can be Done?*. America Latin: Policy Research Working Paper 4440 The World Bank.
- Forrester, J. W. (1994). *Policies, Decisions, and Information Sources for Modelling*. Modelling for Learning Organization, 51-84.
- Indonesian Ministry of Finance. (2007, July). *Public Service Obligation*. Retrieved from <http://www.anggaran-old.kemenkeu.go.id/dja/edef-konten-view.asp?id=193#>
- Mataria, A., et.al. (2006). *Impoverishment and Patient's "Willingness" and "Ability" To Pay for Improving The Quality Of Health Care In Palestine: An Assessment Using The Contingent Valuation Method*. Health Policy 75(3): 312–328.

- Musgrave, R.A., and P.B. Musgrave. (1975). *Public Finance in Theory and Practice*, McGraw-Hill, New York.
- Paulley, N., Balcombe, R., Mackett, R., Titheridge, H., Preston, J., ..., Shires, J., (2006). *The demand for public transport: The effects of fares, quality of service, income, and car ownership*. Leeds, UK: Transport Policy, 13(4), pp. 295-306.
- Peraturan Menteri Perhubungan Nomor 56 Tahun 2013 tentang Komponen Biaya yang dapat Diperhitungkan dalam Penyelenggaraan Angkutan Kewajiban Pelayanan Publik dan Angkutan Perintis Perkeretaapian. Jakarta
- Peraturan Menteri Perhubungan Nomor PM 35 Tahun 2016 tentang Tarif Angkutan Orang dengan Kereta Api Pelayanan Kelas Ekonomi untuk Melaksanakan Kewajiban Pelayanan Publik (*Public Service Obligation*). Jakarta
- Peraturan Menteri Perhubungan Nomor PM 151 Tahun 2016 j.o. Peraturan Menteri Perhubungan Nomor PM 68 Tahun 2016 tentang Tata Cara Penyelenggaraan Kewajiban Pelayanan Publik Angkutan Orang dengan Kereta Api Pelayanan Kelas Ekonomi. Jakarta.
- Peraturan Menteri Perhubungan Nomor 17 Tahun 2018 tentang Pedoman Tata Cara Perhitungan dan Penetapan Tarif Angkutan Orang dengan Kereta Api. Jakarta.
- Suryaningtyas, Annisa Dewi. (2005). *Kajian Hubungan PSO dan Variabel-variabel yang mempengaruhinya, studi kasus KRL Jabodebek*. Bandung: Departemen Teknik Planologi Fakultas Teknik Sipil dan Perencanaan Institut Teknologi Bandung.
- Tamin, Ofyar Z, et.al, (1999). *Evaluasi Tarif Angkutan Umum dan Analisis Ability to Pay (ATP) dan Willingness to Pay (WTP) di DKI Jakarta*. Jurnal Transportasi Forum Studi Transportasi Antar Perguruan Tinggi (FSTPT) Vol 1 No.2, Tahun I, Desember 1999, ISSN: 1411-2422.

MAQASID SHARI'AH FOR ELDERLY COHOUSING DEVELOPMENT IN MALAYSIA

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Abstract: *This paper presents the integrating elements of the principle of Maqasid Shari'ah in the context of elderly cohousing development in Malaysia. The concept of Maqasid Shari'ah, which refers to the objectives and goals of Islamic law, serves as a guiding framework for creating sustainable and inclusive living environments for the elderly population. The aging population in Malaysia is rapidly growing, necessitating the exploration of innovative solutions that address the needs for elderly to have an active living lifestyle. The findings proved that most elderly supported and agreed that the suggested cohousing development is beneficial towards the community, particularly the Muslim community. The study's objective is to find out Muslim's elderly views and support towards cohousing development for an active aging living. Primary data is collected from questionnaire distribution towards Muslim elderly in Selangor and Johor states in Malaysia. Qualitative data was collected from 641 respondents, and frequency distribution analysis is applied towards the data. The majority of respondents agreed on the suitability of cohousing development for the Muslim elderly with the governance of Maqasid Shari'ah. This research contributes to the emerging field of Islamic gerontology and presents a practical approach to designing and implementing elderly cohousing developments rooted in Maqasid Shari'ah principles.*

Keywords: *Maqasid Shari'ah, Elderly Cohousing, Islamic Gerontology, Active Aging, Well-Being*

Introduction

The aging population is a global phenomenon that presents unique challenges and opportunities for societies worldwide. Malaysia, like many other countries, is experiencing a rapid increase in its elderly population, leading to a growing need for innovative approaches to address the specific needs of the elderly (Tobi et al., 2017). In line with the principles of Islamic law, the concept of Maqasid Shari'ah provides a comprehensive framework that emphasizes the preservation of human well-being, social harmony, and justice. This study included the integration of the principles of Maqasid Shari'ah into the design and development of housing solutions for the elderly with a holistic and culturally sensitive approach to promote their overall well-being.

The concept of Maqasid Shari'ah encompasses the overarching objectives and goals of Islamic law, which include the preservation of faith, life, intellect, progeny, and wealth. While Islamic teachings emphasize the importance of respecting and caring for the elderly, there is a need to translate these principles into practical solutions that address their specific needs and challenges within the context of housing and community development. By incorporating the principles of Maqasid Shari'ah into the planning and design of elderly cohousing developments, Malaysia can take significant strides towards creating inclusive and sustainable communities that cater to the unique needs of its aging population.

This paper aims to present a comprehensive framework for the implementation of Maqasid Shari'ah in the development of elderly cohousing in Malaysia. Through an exploration of existing literature, best practices, and case studies, this research seeks to identify key principles and strategies that can guide the design and development of cohousing communities specifically tailored for the elderly population. This study offers practical insights and recommendations to create sustainable, inclusive, and culturally sensitive living environments for the elderly in Malaysia.

The integration of Maqasid Shari'ah principles in elderly cohousing development aligns with the broader concept of Islamic gerontology, which emphasizes the holistic well-being and dignified aging of individuals within an Islamic framework. By considering the physical, social, psychological, and spiritual dimensions of elderly residents, this approach goes beyond mere housing provision and fosters an environment that promotes active engagement, social integration, and a sense of purpose among the elderly.

By implementing Maqasid Shari'ah in elderly cohousing development, Malaysia can not only address the pressing needs of its aging population but also contribute to the broader discourse on sustainable and culturally sensitive housing solutions for the elderly in Muslim-majority countries. Furthermore, this research serve as a foundation for policy development and to inspire future initiatives that prioritize the well-being and dignity of the elderly population while upholding Islamic principles.

In summary, this paper aims to explore the implementation of Maqasid Shari'ah in elderly cohousing development in Malaysia. By integrating Islamic principles, architectural design, and social considerations, the framework presented in this study seeks to create sustainable, inclusive, and culturally sensitive living environments for the elderly. The subsequent sections will delve into the key principles of Maqasid Shari'ah and their application in the design, planning, and implementation of elderly cohousing communities, offering practical insights and recommendations for policymakers, developers, and designers in Malaysia and beyond.

Cohousing Development

Cohousing development is an innovative housing model that emphasizes community, social interaction, and shared resources among residents. Originating in Denmark in the 1960s, cohousing has gained popularity worldwide as a response to the social isolation and disconnection prevalent in conventional housing arrangements. Cohousing communities are typically designed to foster a sense of belonging, mutual support, and sustainable living, making them particularly appealing to various demographic groups, including families, young professionals, and seniors (Williams, 2008).

The concept of cohousing revolves around the principle of creating intentional communities where individuals or families live in separate private units while sharing common spaces, facilities, and responsibilities (Williams, 2008). These shared areas often include communal kitchens, dining spaces, gardens, and recreational facilities. Residents actively participate in the decision-making process, governance, and maintenance of the community, encouraging a strong sense of ownership and connection (McCamant and Durrett, 2011).

Cohousing offers numerous benefits to its residents. It promotes social interaction, reduces social isolation, and provides a support network, particularly for individuals or groups who may be vulnerable to loneliness, such as the elderly (McCamant and Durrett, 2011). The shared spaces and collaborative atmosphere enable residents to engage in meaningful relationships, exchange knowledge and skills, and support each other as they navigate the challenges and joys of daily life (Brenton, 2011).

Within the context of an aging population, cohousing has emerged as a promising housing solution for the elderly. As individuals age, elderly housing needs often change, and conventional options may not adequately address their preferences and requirements (Tobi et al., 2017). Cohousing provides an alternative that prioritizes aging in place, community engagement, and social connections, promoting a higher quality of life for seniors.

Furthermore, cohousing can address specific challenges faced by the elderly, such as accessibility, affordability, and the provision of supportive services (Glass et al., 2009). By integrating universal design principles, cohousing communities can create living environments that are accessible and adaptable to the changing needs of elderly residents. Additionally, shared resources and economies of scale can help reduce costs, making cohousing an affordable option for seniors seeking housing alternatives (McCamant and Durrett, 2011).

In recent years, cohousing developments tailored to the specific needs of the elderly have gained attention worldwide. These communities often incorporate features like age-friendly design, healthcare facilities, social and recreational spaces, and support services to enhance the well-being and independence of their elderly residents (Bamford, 2005). By fostering a sense of belonging and social integration, these developments promote active and healthy aging, reducing the risks of social isolation and age-related health issues (Tobi et al., 2017).

Given Malaysia's rapidly aging population, there is an increasing need to explore housing models that cater to the unique needs and aspirations of the elderly (Jumadi et al., 2019). Cohousing development presents an opportunity to address these challenges by creating sustainable, inclusive, and socially connected communities (Lietaert, 2010). By integrating the principles of Maqasid Shari'ah into the design and implementation of elderly cohousing, Malaysia can further enhance the well-being and dignity of its elderly population while aligning with Islamic values and principles.

Active Aging Living

Active aging living is a concept that promotes the physical, social, and mental well-being of individuals as they age. It emphasizes maintaining an active and engaged lifestyle, enabling older adults to lead fulfilling lives and contribute to society. Active aging living aligns with the principles of Maqasid Shari'ah by focusing on the preservation of life, well-being, and dignity, as well as fostering social integration and productive engagement.

Within the context of elderly cohousing development, incorporating active aging living principles is crucial to creating an environment that supports the holistic well-being of elderly residents. By designing cohousing communities that facilitate active aging, the principles of Maqasid Shari’ah can be upheld and promoted in several ways:

Table 1: Active Aging with the Principles of Maqasid Shari’ah

Active Aging Elements	Active Aging with the Principles of Maqasid Shari’ah
Physical Well-being	The physical health of elderly residents should be prioritized through accessible design, exercise facilities, walking paths, and wellness programs. Ensuring that the living environment promotes physical activity, healthy eating, and easy access to healthcare services aligns with the principle of preserving life and well-being in Maqasid Shari’ah.
Social Integration	Active aging living recognizes the importance of social connections and interaction in maintaining overall well-being. Cohousing communities can provide shared spaces, communal dining areas, and social activities to encourage meaningful social engagement among residents. This promotes the preservation of relationships, social harmony, and productive interaction, which are integral to the principles of Maqasid Shari’ah.
Lifelong Learning	Creating opportunities for continuous learning and personal growth is another essential aspect of active aging living. Cohousing communities can offer educational programs, workshops, and skill-sharing activities that cater to the diverse interests and aspirations of elderly residents. By fostering intellectual stimulation and personal development, these initiatives align with the principle of preserving intellect in Maqasid Shari’ah.
Spiritual Well-being	Maqasid Shari’ah emphasizes the preservation of faith, which encompasses spiritual well-being. Cohousing communities can incorporate prayer spaces, mosques, or gardens that provide a serene and contemplative environment for residents to nurture their spiritual connection. Engaging in spiritual activities and fostering a sense of transcendence aligns with the principle of preserving faith.
Purposeful Engagement	Active aging living encourages older adults to remain active contributors to society by engaging in meaningful roles and activities. Cohousing communities can create opportunities for residents to volunteer, mentor younger generations, or participate in community initiatives, enabling them to make meaningful contributions and fulfill their social responsibilities, which resonates with the principles of Maqasid Shari’ah.

Source: (WHO, 2015; McCamant and Durrett, 2011; Brenton, 2011; Radhi and Arumugam, 2019)

By incorporating the principles of active aging living within the framework of Maqasid Shari’ah, elderly cohousing developments can provide a supportive and enriching environment for elderly residents. This approach acknowledges the importance of holistic well-being and

aligns with the Islamic principles of preserving life, well-being, faith, and social harmony. It reinforces the notion that aging should not be seen as a decline but as a stage of life to be embraced with purpose and active engagement.

Cohousing Development with the Compliance of Maqasid Shari'ah

In this study, the implementation of cohousing is concentrated on the Muslim elderly in Malaysia. Therefore, to enhance the suitability of cohousing towards the locality and culture of Malaysian Muslim elderly, the application of Maqasid Shari'ah is considered to be coherent with the cohousing development. Islamic Shari'ah is the Islamic principle that aims to enhance the well-being and peacefulness of human lives. There are three main components of Maqasid Shari'ah, which are the needs of *daruriyyah* (human necessities), *hajiyyah* (needs to ease human life), and *tahsiniyyah* (complementary purposes that lead to a better life). From the three human needs, the Maqasid Shari'ah filter the needs to five essential elements known as religion (*ad-din*), life (*an-nafs*), intellect (*al-aql*), descendants (*an-nasl*), and property (*al-mal*) (JAKIM, 2015).

Cohousing development that adheres to the principles of Maqasid Shari'ah aims to create inclusive, sustainable, and socially responsible communities that align with Islamic values. Table 2 represents the key considerations for cohousing development with compliance to Maqasid Shari'ah.

Table 2: Key Considerations for Cohousing Development with the Compliance of Maqasid Shari'ah.

Principle of Maqasid Shari'ah	Cohousing Development with the Compliance of Maqasid Shari'ah
Preservation of Faith (<i>Hifz al-Din</i>)	Cohousing communities should provide spaces and facilities that enable residents to practice their faith. This includes designing prayer areas, dedicated spaces for religious gatherings, and access to religious resources. Encouraging religious observance and providing opportunities for spiritual growth and connection within the community are essential aspects of preserving faith.
Preservation of Life (<i>Hifz al-Nafs</i>)	Safety and security measures should be incorporated into the design of cohousing developments. This includes well-designed pathways, lighting, and accessibility features to minimize risks and accidents. Health and emergency services should also be easily accessible to ensure the well-being and preservation of life for all residents.
Preservation of Intellect (<i>Hifz al-Aql</i>)	Cohousing communities should promote lifelong learning and intellectual stimulation. Incorporating libraries, learning centers, and educational programs regarding the needs and interests of elderly. These can contribute to the residents' intellectual growth and preservation of intellect. Encouraging knowledge exchange and providing opportunities for intellectual engagement are integral to the compliance of Maqasid Shari'ah.

Preservation of Progeny (<i>Hifz al-Nasl</i>)	Cohousing developments can incorporate family-friendly spaces and amenities that cater to intergenerational living. Creating environments that facilitate strong family bonds and intergenerational interactions that promote the well-being and preservation of the family unit. This includes common areas for family gatherings, children's play areas, and facilities that foster a sense of family cohesion.
Preservation of Wealth (<i>Hifz al-Mal</i>)	Cohousing communities should prioritize affordability, resource-sharing, and sustainable practices. Shared facilities and economies of scale can help reduce costs and promote efficient use of resources. Encouraging environmentally friendly practices, such as renewable energy and waste management systems, can contribute to the preservation of wealth for both individual residents and the community.
Social Harmony (<i>Hifz al-'Ard</i>)	Cohousing developments should foster a sense of community, inclusivity, and social cohesion. Creating shared spaces and organizing communal activities can promote social interaction and harmony among residents. Encouraging mutual support, cooperation, and participation in decision-making processes within the community are essential elements for achieving social harmony.
Justice (<i>'Adl</i>)	Ensuring fairness and equity within the cohousing community is crucial. This includes transparent governance structures, equitable allocation of resources, and addressing the diverse needs and concerns of residents. Upholding principles of justice in the distribution of responsibilities, decision-making processes, and access to community resources is fundamental to compliance with Maqasid Shari'ah.

Source: (Lak et al., 2020; Bosman, 2015; JAKIM, 2015; Kalache and Gatti, 2003)

By integrating these considerations into the design, planning, and implementation of cohousing developments, Malaysia can create communities that not only meet the housing needs of the elderly but also uphold the principles of Maqasid Shari'ah. These communities can serve as models of sustainable, inclusive, and spiritually enriching environments that prioritize the well-being and dignity of their residents, contributing to a more harmonious and socially responsible society.

Research Methodology

As stated by Creswell (2012), the research methodology flow started with the identification of research problem, literature review, formation of research objectives, data collection, data analysis, and the results and discussion. The main objective of this study is to identify the Muslim's elderly views and support regarding the cohousing development for active aging living alongside Maqasid Shari'ah compliance. The data collected are primary and qualitative data that contained the respondents' viewpoints towards the cohousing development. The respondents consist of Muslims elderly aged 50 to 70, staying in either Selangor or Johor state in Malaysia. The study area focuses on Selangor and Johor because the Department of Statistics Malaysia projects that the numbers of elderly are mostly from Selangor (16%) and Johor (12%) in the year 2020. The qualitative data collected are from the open-ended questions stated in the questionnaire, and the data are analyzed using Microsoft Excel. The data collected are analyzed

and grouped among the same categories, then calculated and summed up with the frequency method. The analysis of demographic data of the respondents are stated in the next section.

Demographic Data

The respondents' demographic data are analyzed using the descriptive statistic, frequency analysis from the Statistical Package for Social Sciences (SPSS). The total data collected are 641, which are 308 from Selangor and 333 from Johor state. The first section of the questionnaire contained the question regarding the demographic information of respondents. The respondents' demographic data consist of variables regarding the gender, age, status, number of children, educational level, working status, working sector, state residents, and monthly income of the respondents. Table 3 simplified the demographic data of respondents with numbers of total frequency and percentage of the variables.

Table 3: Demographic Data of Respondents

Variables	Frequency	%
<i>Gender</i>		
Male	284	44.3%
Female	357	55.7%
<i>Age</i>		
50-55	267	41.7%
56-60	177	27.6%
61-65	127	19.8%
66-70	70	10.9%
<i>Status</i>		
Married	545	85%
Single	18	2.8%
Widow/Widower	78	12.2%
<i>Number of children</i>		
None	33	5.1%
1-3	218	34%
4-6	307	47.9%
7 and above	83	12.9%
<i>Education level</i>		
No formal education	28	4.4%
SPM and below	286	44.6%
Certificate/Diploma	118	18.4%
Degree	139	21.7%
Master/ PhD	70	10.9%
<i>Working status</i>		
Unemployed/Retired	275	42.9%
Working	366	57.1%

<i>Working Sector</i>		
None/Not related	275	42.9%
Government	102	15.9%
Private	101	15.8%
Self employed	100	15.6%
Business	63	9.8%
<i>State resident</i>		
Johor	333	52%
Selangor	308	48%
<i>Monthly income</i>		
Less than RM3,000	298	46.5%
RM3,000-RM6,000	194	30.3%
RM6,000-RM9,000	69	10.8%
RM9,000-RM12,000	34	5.3%
RM12,000-RM15,000	10	1.6%
More than RM15,000	15	2.3%
Missing	21	3.3%

As stated in Table 3, most respondents are female and aged around 50 to 55 years old. The range of respondents aged 50 to 60 years old is included in this study to expected the acceptance of the elderly in the future ten years. Most of the respondents are married, with 85 percent of the respondents are married. The number of children is considered under this demographic data to presume the size of the respondent's family. Surprisingly, many respondents are considered to have a large family with around 4 to 6 children. Since the respondents are Muslims elderly, the number of children is deemed to be acceptable. This is because Islam emphasizes the build of family through legal marriages and encourage the number of children with the safe right of children, as stated in the Maqasid Shari'ah elements of descendants (*an-nasl*).

The respondents' education level is mostly the Malaysian high-school certificate *Sijil Pelajaran Malaysia* (SPM) and below. The working status of the respondents is mainly working with 57.1 percent. Meanwhile, 42.9 percent are unemployed or retired. Therefore, the working sector stated that the not related or none working sector is the same as the non-working respondents with 42.9 percent. The number of governments, private, and self-employed working sectors is almost the same, around 100 respondents. Lastly, as stated in Table 1, respondents' monthly income is less than RM3,000 (46.5%), followed by RM3,000 to RM6,000 (30.3%). The respondents' range of monthly income has proven that the development of cohousing is supposedly affordable for middle to low-income people. The demographic data represents the state of most elderly, and it is essential to study the conditions and suitability of the cohousing development with the current or future state of the elderly.

Results and Discussions

The viewpoints of the elderly are obtained from the answers of the four open and ended questions regarding the development of cohousing that are aims to encourage the active aging

living alongside the application of Maqasid Shari'ah elements. The specification of the questions is as stated in the Table 4.

Table 4: Questions Regarding the Elderly Views and Support on Cohousing

Question	Specification
Q1	What is your view on cohousing based on Maqasid Shari'ah? Is this suggest development could enhance the elderly active aging living?
Q2	Does the community development based on cohousing could improve the lifestyle of the elderly? What is your opinion on this matter?
Q3	What is your opinion on religious activities? Does it enhance the spiritual needs and become the fundamental of the development of cohousing?
Q4	Does the proposal design of cohousing development based on social, physical, and religious factors could develop a good neighborhood? What is your opinion on this matter?

Table 4 specified the questions regarding the elderly views and support on the cohousing development for active aging living with Maqasid Shari'ah compliance. The first questions is considering the respondents view on cohousing based on Maqasid Shari'ah and whether the suggested development could enhance the elderly active aging living. Figure 1 until 4 represented the elderly viewpoint which are group by researchers using Microsoft Excel. The figures shown the percentage of each group of answers by the respondents. The result for the first questions is shown in Figure 1.

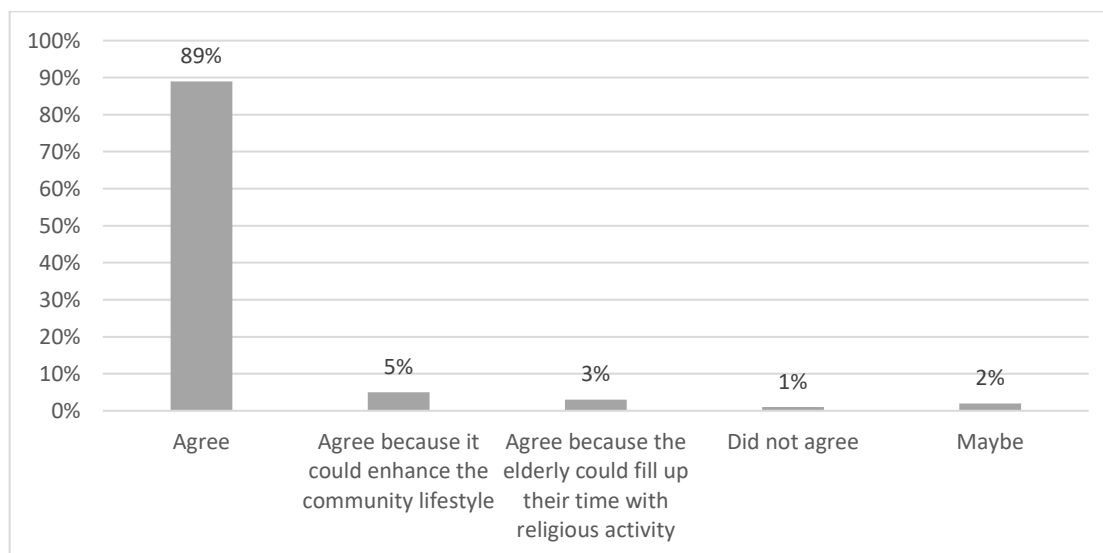


Figure 1: Elderly Views on Cohousing Based on Maqasid Shari'ah and The Enhancement of Active Aging Living

Figure 1 represents the group of answers from question one regarding the elderly views on cohousing based on Maqasid Shari'ah and how the suggested development could enhance the active aging living. The majority of respondents (89%) answer with the solid "Agreed" with the statement. Secondly are followed by the answer to "Agree because it could enhance the community lifestyle". This statement supports the livelihood element of cohousing as it is favour by the elderly. The next view is that around 3% of respondents answered with "Agree

because the elderly could fill up their time with religious activity". It is known that cohousing provided support towards the residents with various activities (Sanguinetti, 2014), and religious activity could be considered part of the community engagement activities together. Around 1% of respondents did not agree with the statement, and 2% answered with the solid "Maybe". The respondents that did not agree with the statement stated that they prefer to live among others with different race or beliefs. Therefore, to simplify, the application of cohousing for Muslim elderly might not be preferable for every Muslim. However, the suggested development is suitable for most Muslims since most respondents agreed with this suggested development.

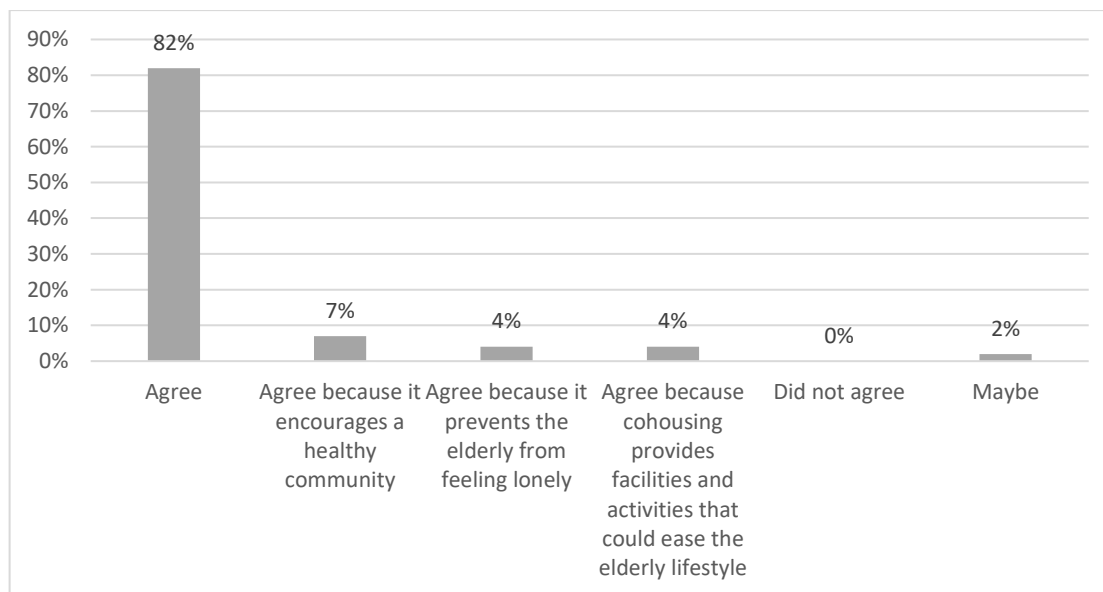


Figure 2: Elderly Views on The Improvement of Elderly Lifestyle from Cohousing

The respondent's answers for question two are portrayed in Figure 2. The elderly views on the improvement of lifestyle from the cohousing community show positive feedback since almost none of the respondents disagreed with the statement. Around 82% of respondents who represented the majority agreed that the cohousing community led to a better lifestyle. Meanwhile, 7% of respondents stated that they agreed with the statement because it encourages a healthy community. Moreover, about 4% of the elderly agreed because the cohousing community would prevent the elderly from being lonely. Another 4% of respondents agree because the cohousing development provides the facilities and activities that could ease the elderly's daily lifestyle. Only around 2% of respondents are uncertain about the outcome of the cohousing community. Therefore, most elderly approved the beneficial function of the community from cohousing.

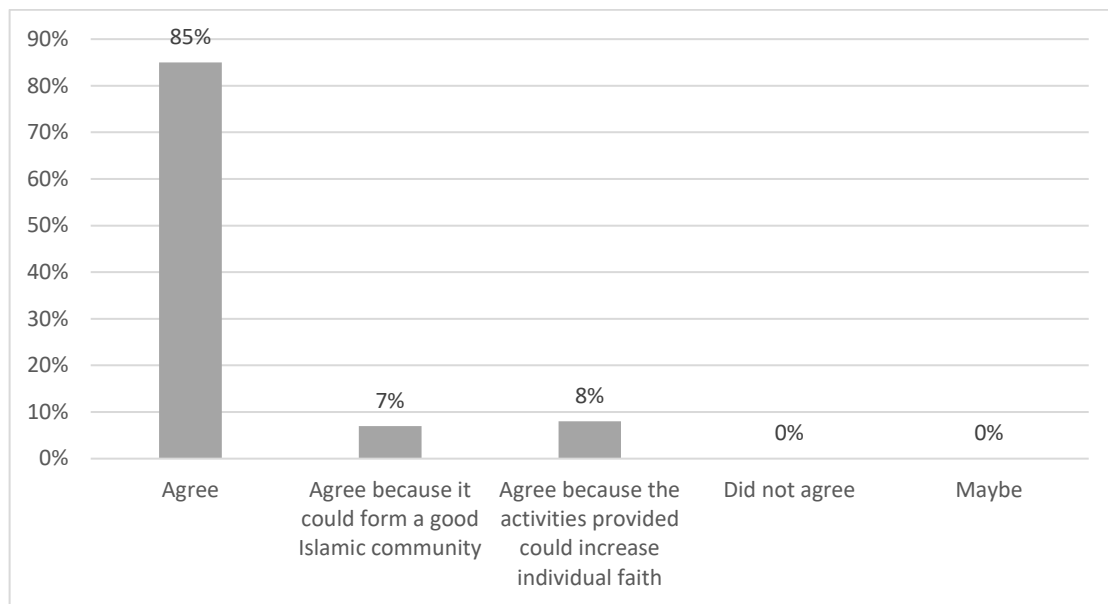


Figure 3: Elderly Views on The Important of Religious Activities as Part of The Cohousing Development

The elderly perspectives towards the importance of religious activities as part of spiritual needs on cohousing development are shown in Figure 3. The spiritual or religious activities became the fundamental of this suggested cohousing development when the application of Maqasid Shari'ah is implemented to develop and manage the cohousing. This statement received positive feedback from the respondents since none of the respondents disagree or uncertain about the outcome. Most of the respondents (85%) agreed that religious activities are crucial as part of the cohousing development. Around 7% of respondents stated that they agreed with the statement because it is possible to form a good Islamic community from the cohousing development. Meanwhile, about 8% of the elderly agree because religious activities could increase personal faith and belief. A significant part of Islamic values is considered vital among Muslims. Therefore, the application of Maqasid Shari'ah are highly supported and beneficial towards the Muslim lifestyle.

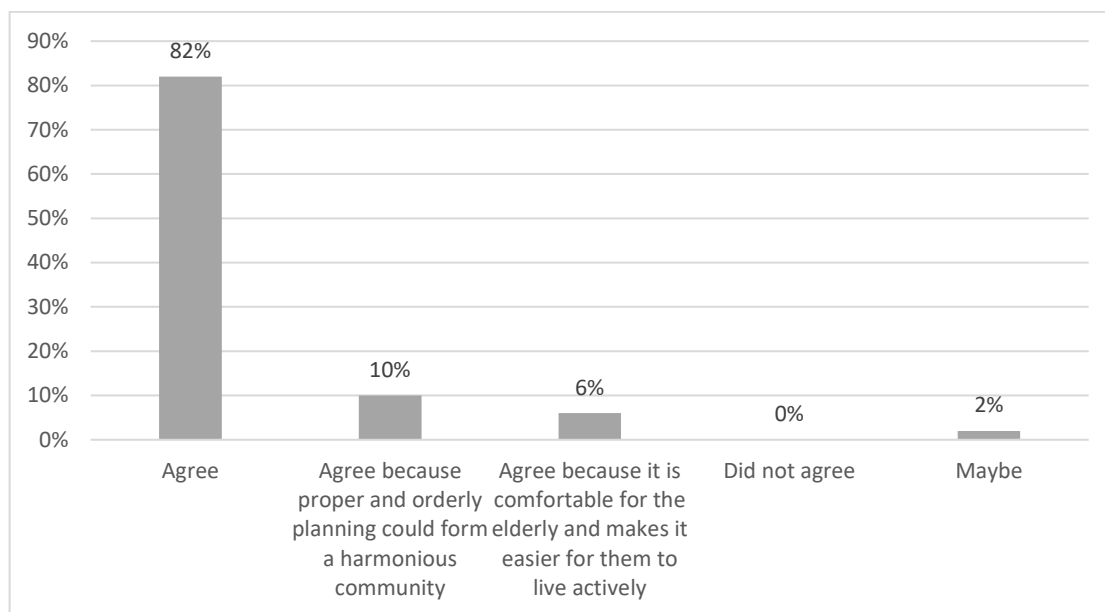


Figure 4: Elderly Views on The Proposal Development of Cohousing based on Social, Physical, and Religious Factors

Figure 4 addresses the answers of the elderly from the functional of the proposed development of cohousing based on the social, physical, and religious factors in developing a good neighborhood. Most elderly (82%) agreed that the proposed development could positively initiate a good neighborhood among Muslims. Around 10% of respondents agree because they view that the cohousing's proper and orderly planning could form a harmonious community. Meanwhile, about 6% of the elderly agree because cohousing could make the elderly comfortable and ease them to live actively every day. None of the respondents disagree, and about 2% of respondents are uncertain of the cohousing development outcomes. The respondents who unsure about the outcome stated that the development result might be varied among the elderly since different people have their own preferences in life. However, most respondents show positive feedback towards the suggested development of cohousing with the social, physical, and religious factors as the fundamental to develop good neighborhood surroundings.

Conclusions

In conclusion, implementing Maqasid Shari'ah principles in the development of cohousing for the elderly in Malaysia offers a comprehensive framework that aligns with Islamic values, promotes inclusive living environments, and enhances the well-being of the elderly. By incorporating the preservation of faith, life, intellect, progeny, wealth, and social harmony into the design, planning, and implementation of cohousing communities, Malaysia can create sustainable, culturally sensitive, and socially responsible housing solutions. The integration of active aging living principles further reinforces the holistic approach, emphasizing physical, social, and spiritual well-being for elderly residents. The findings proved that most elderly supported and agreed that the suggested cohousing development is beneficial towards the community, particularly the Muslim community. The improvement of active aging living among the elderly could improve their physical health and positively impact their role in society. The proposed development covered the social, physical, and spiritual needs of the Muslim elderly from establishing the cohousing community. Islamic values are closely related to cohousing elements since individuals' needs to be a part of the community is always

encouraged in Islamic teachings. Ultimately, this approach contributes in creating the communities that prioritize the well-being, happiness, and meaningful engagement with the elderly. Together in fostering a society that upholds Islamic principles and values.

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References

- Alidoust, S., & Bosman, C. (2015). Planning for an ageing population: links between social health, neighbourhood environment and the elderly. *Australian Planner*, 52(3), 177–186. <https://doi.org/10.1080/07293682.2015.1034145>
- Bamford, G. (2005). Cohousing for older people: housing innovation in the Netherlands and Denmark. *Australasian Journal on Ageing*, 24(1), 44-46.
- Belk, C. L. (2006). Cohousing Communities: A Sustainable Approach to Housing Development. Retrieved from https://extension.ucdavis.edu/sites/default/files/co_housing.pdf.
- Brenton, M. (1998). *We're in Charge: Cohousing Communities of Older People in the Netherlands: Lessons for Britain?*. Bristol: Policy Press.
- Brenton, M. (2001). *Inclusive housing in an ageing society: innovative approaches*. Part Eight: Older people's CoHousing Communities. Policy Press.
- Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Pearson. Available at: <https://books.google.com.my/books?id=4PywcQAACAAJ>
- Glass, A. P. (2009). Aging in a community of mutual support: The emergence of an elder intentional cohousing community in the United States. *Journal of Housing for the Elderly*, 23(4), 283-303.
- Glass, A. P., & Vander Plaats, R. S. (2013). A conceptual model for aging better together intentionally. *Journal of Aging Studies*, 27(4), 428-442.
- Jabatan Kemajuan Islam Malaysia (JAKIM), Indeks Syariah Malaysia Model Tadbir Urus Berteraskan Maqasid Syariah, Putrajaya, Malaysia 2015.
- Jumadi, N., Noor, N. A. M., Bujang, A. A., Maimun, N. H. A., Ismail, W. I. F. W., Yusoff, N. S. M., & Rahman, M. S. A. (2019). Active ageing and housing environment concept among elderly Muslims. *PLANNING MALAYSIA*, 17(9).
- Kalache, A., & Gatti, A. (2003). Active Ageing: A Policy Framework. (2002). *The Aging Male*, 5(1), 1–37. <https://doi.org/10.1080/tam.5.1.1.37>
- Lak, A., Rashidghalam, P., Myint, P. K., & Bradaran, H. R. (2020). Comprehensive 5P framework for active aging using the ecological approach: an iterative systematic review. *BMC Public Health*, 20(1), 1-22.
- Lietaert, M. (2010). Cohousing's relevance to degrowth theories. *Journal of cleaner production*, 18(6), 576-580.
- McCamant, K., & Durrett, C. (2011). *Creating cohousing: Building sustainable communities*. New Society Publishers.
- Radhi, N. A. M., & Arumugam, T. (2019). Are we ready for an ageing Malaysia?. *New Straits Times*. Dec 15 2019.



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- Sanguinetti, A. (2014). Transformational practices in cohousing: Enhancing residents' connection to community and nature. *Journal of Environmental Psychology*, 40, 86-96.
- Tobi, S. M., Fathi, M. S., & Amaratunga, D. (2017, October). Ageing in place, an overview for the elderly in Malaysia. In *AIP conference proceedings* (Vol. 1891, No. 1, p. 020101). AIP Publishing LLC.
- United Nations (2015) 17 Sustainable Goals. Derived from <https://www.un.org/sustainabledevelopment/>
- Williams, J. (2008). Predicting an American future for cohousing. *Futures*, 40(3), 268-286.
- World Health Organization. Active ageing: A policy framework. World Health Organization; 2002.
- World Health Organization. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychological medicine*, 28(3), 551-558.
- Zanjari, N., Sani, M. S., Chavoshi, M. H., Rafiey, H., & Shahboulaghi, F. M. (2017). Successful aging as a multidimensional concept: An integrative review. *Medical journal of the Islamic Republic of Iran*, 31, 100.

INTEGRATION OF MODE TRANSFER FACILITIES AT TRANSIT NODE BASED ON COMMUNITY PREFERENCES

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Abstract: *The development of facilities and infrastructure in Jakarta city makes people many choices of public transportation modes to meet their daily movements. Although it does not take into account the transfer between modes. Especially at transit nodes, sometimes people have to deal with less humane transfer facilities. To change lanes or modes, you have to walk up a long flight of stairs and often do not take into account safety factors for all groups of people. The lack of integration of transfer facilities sometimes makes travel time longer when compared to using private vehicles. Dukuh Atas Transit Node is a meeting point for MRT, LRT (Jabodebek), TransJakarta and Airport Train transportation modes. In addition, this node area is also a node of transportation and economic activities, so intermodal integration is very important to reduce the volume of private vehicles on the road.*

The purpose of this study is to evaluate the integration of transfer mode facilities and analyze the willingness of people to use public transportation. The research method uses regression analysis processed with the SPSS software program. The results show that there is a positive correlation between the proximal aspect of the modal transfer facility and the level of public satisfaction in carrying out modal transfer activities at the Dukuh Atas transit node. As well as the positive influence of walking time on people's willingness to switch to using public transportation.

Keywords: *Integration, Transit Nodes, Modal Transfer Facilities*

Introduction

Jakarta is one of the cities in Indonesia that has a high level of movement. With an area of 661.52 km², DKI Jakarta serves daily movements of 25.4 million trips with a population of 15,978 people per square kilometre. The high level of mobility in Jakarta needs to be balanced with the availability of transportation that can meet the daily movement needs of the community. The need for a user-friendly public transit system is particularly important, as the increase in private vehicles contributes significantly to climate change (Uherek E., 2010; Kingham, 2021). The current development of transportation facilities and infrastructure in the city of Jakarta makes people many choices of transportation modes for their needs. However, there are still many facilities and infrastructure developments that stand alone without taking into account intermodal transfers. Intermodal integration is the overall integration used to move people and/or goods from one place (origin) to another (Cortés C. E.-D., 2011).

Network integration is key to the success of a public transportation service system in a region or city (Neuman. A, 2011). Network integration can lead to other integrations, such as physical,

schedule, and fare integration (Hadas, 2012). Modal transfer facilities are facilities used for transportation switching activities. This facility is needed to connect public transportation facilities and form a network (Andriani, 2017). Modal transfer activities need to be made easier, faster and more convenient so that there will be opportunities for better travel, as well as more travel frequency for current and future passengers. At transit nodes sometimes people have to deal with transfer facilities that are considered less humane, to change lanes or modes must walk up long enough stairs and often do not take into account safety factors for all people. The lack of integration of transfer facilities sometimes makes travel time longer when compared to using private vehicles. The purpose of this study is to evaluate the integration of transfer mode facilities and analyze the willingness of people to use public transportation.

Literature Review

The lack of efficient connections between public transportation modes has led to serious traffic network congestion (Yang, 2020). The development of an effective and efficient transportation system must be able to provide intermodal transportation services in a single seamless service, to provide door-to-door services effectively and efficiently (Capah, 2013). But, in reality in big cities, mode transfer facilities tend to be provided as they are and do not fulfil the aspects of seamless service as well as safety and security. According to (Isradi, 2021) factors that need to be improved are access to station locations including integration with other modes of transportation as well as ease of reach, schedule accuracy, speed of ticket purchase services and quality of operator services. Positive correlation between passenger flow and transfer station distance coverage (Zhu, 2021). Results from research (Papaioanmou, 2015) accessibility and connectivity of public transportation facilities have an important role as a determinant of the community in choosing public transportation.

Physical integration regulates the physical facilities available as infrastructure, one of which is the mode shift facility (Miller, 2004). Three characteristics of integrated physical connection for transfer, sheltered walkways, a security measure to protect transit user between separate stations/stop dan information such as directional signage and maps to link stations/ stop at a separate location (Chowdhury, 2013). Sheltered sidewalks at transit nodes need to consider comfort and safety aspects (Magdalena, 2019). In research (Gusleni, 2021) there are six indicators for evaluating transfer mode facilities, namely proximity, connectivity, convenience, safety, security, and attractiveness. Strategic transfer locations are an option for public transportation users and thereby improve service accessibility (Luk, 2003). One of the most important operational attributes of public transportation services is reliability (Redman, 2013). (Kumar, 2011) mentioned that security at the terminal can be identified through a good station environment, with indicators of good lighting, clear architectural design, CCTV, security guards and emergency phone booths. Waiting time is one of the indicators to measure transportation services (Ólafsdóttir, 2017). According to (Chowdhury S. C., 2014) average walking time, travel time and information availability contribute most to the performance of the public transport network. Delays and missed connections are shown to be a major source of anxiety for public vehicle users on transfer routes (Cheng, 2010). In this study, the authors analyzed the impact of walking time and waiting time for public transportation as one of the service accessibilities factors and its influence on the willingness to use public transportation.

Method

Regression analysis is a method or technique of analyzing research hypotheses to test whether there is an influence between the independent variable and the dependent variable, which is

expressed in the form of a regression equation. The research method uses regression analysis processed with the SPSS software program.

Materials

Data collection by direct interview and questionnaire distribution for transit node users. The minimum sample size for research that includes statistical data analysis is 30 samples (Roscoe & Sugiyono, 2012).

The Dukuh Atas node area is a transit-oriented development area that is the meeting point for five types of public transportation modes, the Jakarta MRT, Transjakarta BRT, airport train, KRL and Jabodebek LRT (construction process). This transit node is one of the centres of economic growth in Jakarta.

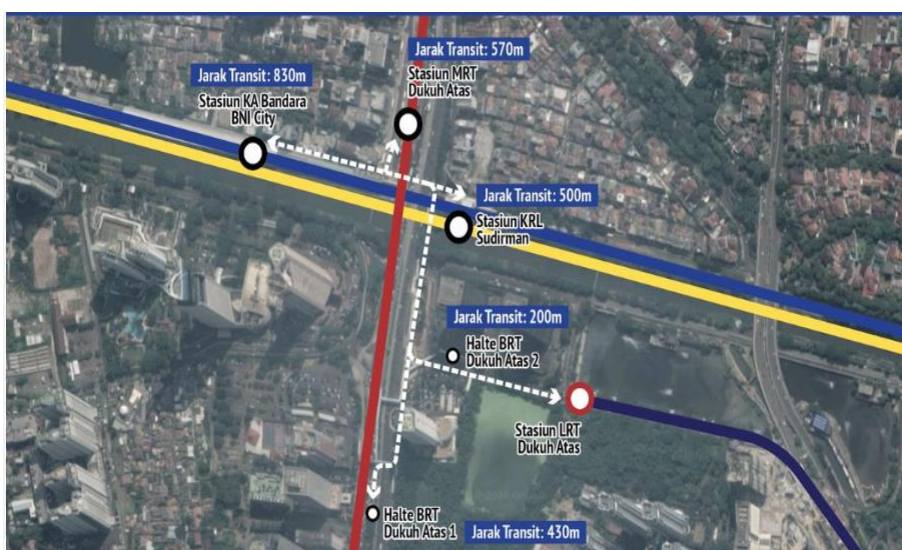


Figure 1: Dukuh Atas Node Map Station

(Source: <https://lrtjakarta.co.id/id>)



Figure 2: Dukuh Atas Station and Sorounding

(Source: <https://jakartamrt.co.id/id>)

Evaluation of transfer facilities related to physical facilities with 5 variables each consisting of several indicators. Then, the preference scenarios consist of walking time and waiting time scenarios. A Likert scale was employed in this study to evaluate participants' familiarity with, objectivity toward, and perspectives on a social issue. The variables that need to be altered will convert into variable indicators based on the Likert scale. Each instrument that uses a Likert scale has answers that range from very positive to very negative. The indikator variables used in this study can be seen in Tabel 1:

Tabel 1: Indikator Variabels

No	Variabel	Indikator	References					
			(Yaning, 2020)	(Magdalena, 2019)	(Guslani, 2021)	(Isradi, 2021)	(Cao, 2017)	(Chowdhury, 2014)
1	Sosio Demografi	Age	√	√		√	√	
		Gender	√	√		√	√	
		Job		√			√	
		Income	√	√			√	
		Number of vehicles owned	√	√			√	
		type of PT used	Benchmarking					
		Frequency	Benchmarking					
2	Evaluation of transfer Facilities							
		Proximity						
	Proximity	Distance of stop/station	√	√	√	√	√	
		Walking time		√	√		√	√
		PT waiting time		√	√	√	√	√
	Connectivity	Sheltered & covered walkways			√	√	√	√
		Signage & information boards			√	√		√
		Maps for separate stops/stations			√	√	√	√
	Convenience	Elevator			√			√
		Staircase facility			√	√	√	√
		Pedestrian lane capacity			√	√	√	
		The access road for Disabilities			√	√	√	
		elderly and child-friendly facilities	Benchmarking					
	Security	sheltered waiting room			√	√	√	√

		CCTV			√	√	√	√
		security officer			√	√	√	√
		Security breach information	Benchmarking					
	Health	air circulation/open space	Benchmarking					
		trash can	Benchmarking					
		health and first aid room	Benchmarking					
		Nursery room	Benchmarking					
3	Preferences scenario							
	Walking time		Benchmarking					
	Waiting time		Benchmarking					

The independent variables used are proximity, connectivity, comfort, safety, and health. Where each variable has indicators that support the evaluation of the integration of transfer mode facilities. The dependent variable aims to measure the level of customer satisfaction with the integration of transfer facilities at the transit node based on the answers to the questions on the independent variable. As well as seeing the effect of walking time and mode waiting time on people's willingness to use single daily public transportation.

Data Analysis

In this research, linear regression analysis is used to determine the relationship between the variables of proximity, connectivity, safety, comfort and health to the level of customer satisfaction with the integration of intermodal facilities at the Dukuh Atas transit node. The linear regression equation can be seen in Equation 1 as follows:

$$Y' = a + b_1X_1 + b_2X_2 + \dots + b_nX_n \quad (1)$$

Result and Discussion

The results of linear regression analysis obtained using the SPSS Ver.21 application can be seen in Table 2 as follows:

Table 2: Results Dependent Variable Passenger Satisfaction with Mode Transfer Facilities

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.351	.837		-.420	.677
Proximity	.260	.052	.618	4.996	.000
Connectivity	-.105	.067	-.285	-1.553	.129
Convenience	.138	.064	.459	2.161	.038
Security	.016	.059	.043	.265	.793
Health	.004	.053	.013	.082	.935

After obtaining the model, the f test is carried out, the t-test is the coefficient of determination to interpret the results of regression modelling. Based on the data analysis above, the regression equation results are as follows:

$$Y = 0.351 + 0.260 \text{ Proximity} - 0.105 \text{ Connection} + 0.138 \text{ Comfort} + 0.016 \text{ Security} + 0.004 \text{ Health}$$

The level of user satisfaction is measured based on the results of the analysis, namely:

- The proximity coefficient number is 0.26 or 26% and a significant level of $0.000 < 0.05$ which means it has a low influence or significance. This means that this condition is still included in the category of variables that affect the satisfaction complaints of users on the integration of the Dukuh Atas transit node transfer facilities.
- The Connection coefficient number is -0.105 or -10.5% and the significance level is $0.129 > 0.05$, which means it has no influence or low significance. This means that this condition is not included in the category of variables that affect the satisfaction complaints of users on the integration of transfer facilities of the Dukuh Atas transit node.
- The Connection coefficient number is 0.138 or -14% and the significance level is $0.038 > 0.05$, meaning that it has a low influence or significance. This means that this condition is still included in the category of variables that affect the satisfaction complaints of users on the integration of transfer facilities of the Dukuh Atas transit node.
- The Connection coefficient number is 0.016 or 2% and the significance level is $0.739 > 0.05$, meaning that it has no influence or low significance. This means that this condition is not included in the category of variables that affect the satisfaction complaints of users on the integration of transfer facilities of the Dukuh Atas transit node.
- The Connection coefficient number is 0.004 or 0% and the significance level is $0.935 > 0.05$, meaning that it has no effect or low significance. This means that this condition is not included in the category of variables that affect the satisfaction complaints of users on the integration of the Dukuh Atas transit node transfer mode facility.

From the results of the evaluation of the integration of modal transfer facilities, the most influential factor is proximity. Where this proximity factor includes distance, walking time and mode waiting time. Furthermore, it will be investigated how the influence of walking time and mode waiting time on users' willingness to switch to using public transportation in meeting their daily travel needs. The analysis of the comparison of the actual time required with the expected time for people to walk and wait for the mode is presented in Table 3 below:

Table 3: Comparative Recapitulation of Actual and Expected Time

	Actual		Expected	
	Walking time	Waiting Time	Walking time	Walking time
Mean	9,93	17,56	5,07	6,98
Median	7,00	15,00	5,00	5,00
Std. Deviation	5,914	10,847	2,054	2,842
Minimum	5	5	3	3
Maximum	30	50	10	15
Sum	407	720	208	286
Percentiles				
50	7,00	15,00	5,00	5,00
75	12,50	20,00	5,00	10,00

The 50-70 percentile analysis shows that at the current transit node, the time required for people to walk is in the range of 7-12.5 minutes, and the expected time to walk is 5 minutes. While the time required to wait for public transportation modes is in the range of 15-20 minutes, and the expected time is in the range of 5-10 minutes.

Furthermore, the effect of walking time and waiting time for public transport if made better on the community's willingness to use public transport at transit nodes was analyzed.

Table 4: Loglikelihood Value Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	34.564 ^a	.235	.351

From Table 4, the log-likelihood value is greater than the chi-square number, and the results of the omnibus test model and ANOVA test showed that the model is said to fit the statistical data.

Table 5: Willingness to Transfer Analysis

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 ^a								
Gender	1.011	1.018	.987	1	.321	2.748	.374	20.192
Frequency	1.063	1.383	.591	1	.442	2.894	.193	43.498
Mode Choice	-.264	.168	2.478	1	.115	.768	.552	1.067
Walking time	.670	.345	3.777	1	.050	1.954	.994	3.839
Waiting time	-.209	.370	.319	1	.572	.811	.393	1.676
Constant	.421	1.368	.095	1	.758	1.523		

Based on the data analysis above, the regression equation results are as follows:

$$Y = 1.011 + 1.063 \text{ Frequency} - 0.264 \text{ Mode Choice} + 0.670 \text{ Walking time} - 0.209 \text{ Waiting time}$$

The walking time variable is positive, this indicates that there is a greater influence on the increase in respondents' interest in switching activities. While the mode waiting time is negative, the greater the influence of this variable on the decrease in respondents' interest in switching activities at the transit node. Judging from the significance value, only walking time shows a significant influence (5% significance value) on the willingness to switch using public transportation at the transit node.

Gender and frequency show a positive influence but have no significant relationship with the willingness of users to transfer modes. And the choice of mode has a negative influence and has no significant relationship with the willingness of communities to transfer modes.

Conclusion

Variable integration of transfer facilities that affect the level of customer satisfaction at the Dukuh Atas transit node is proximity 26%, connection 10.5%, comfort 13.8% security 1.6% and health 0.4%. The most dominant factor that greatly affects the level of user satisfaction is the proximity factor, in which there are components of the distance between stations/stops, walking time and mode waiting time. If the proximity factor is made better, it will have a significant effect on the level of customer satisfaction with the transit node.

The average total time required by the public to walk and wait for vehicles is 28 minutes, while the results of the sensitivity analysis obtained the expected total average time of 15 minutes.

Walking time has a positive influence and considerable significance on the willingness of the community to carry out modal shift activities at the transit node. While the waiting time of the mode has a negative effect and low significance.

The lack of schedule compatibility between modes is also a consideration for people in choosing public transportation modes. In addition, the lack of greenery in the pedestrian area is a factor that many people complain about, especially for Transjakarta bus users who will continue their modal shift activities at the Dukuh Atas transit node.

References

- Andriani, I. S. (2017). Persepsi Pelayanan Fasilitas Alih Moda Transportasi Untuk Menunjang Destinasi Pariwisata Di Kawasan Tanjung Kelayang Belitung. *Jurnal Transportasi Multimoda* 15, 75-88.
- Capah, J. (2013). Kajian Peningkatan Fasilitas Pelayanan Dalam Rangka Mendukung Transportasi Antarmoda di Bandara Juanda Surabaya. *Transportasi Multimoda* 25.
- Cao, J., & Cao, X. (2017). Comparing importance-performance analysis and three-factor theory in assessing rider satisfaction with transit. *Journal of Transport and Land Use*, 10(1), 65–68.
- Cheng, Y. H. (2010). Exploring Passenger Anxiety Associated With Train Travel. *Transportation* 37 (6), 875-896.

- Chowdhury, S. &. (2013). Definition of Planed and Unplaned Transfer of Public Transport Service and User Decisions to Use Routes with Transfer. *Journal of Public Transportation Vol. 16*.
- Chowdhury, S. C. (2014). Measuring Public-Transport Network Connectivity Using Google Transit With Comparison Across Cities. *Journal of Public Transportation Vol. 17 Issue 4*, 76-92.
- Cortés, C. E.-D. (2011). Integrating Short Turning And Deadheading in the optimization of Transit Service. *Transportation Research Part A : Police and Practice*, 419-434.
- Dorbritz, R. M. (2009). Effects of onboard ticket sales on public transport reliability. *Transportation Research Record*, 112-119.
- Gusleni, Y. L. (2021). Evaluasi Integrasi Fasilitas Alih Moda Pada Simpul Transportasi di Perkotaan Yogyakarta. *Jurnal Transportasi Multimoda 19*, 17-24.
- Hadas, Y. P. (2012). Modeling Public-Transit Connectivity With Spatial Quality of Transfer Measurement. *Journal of Transport Gography*.
- Isradi, M. F. (2021). Analysis of Passenger Satisfaction With LRT Jakarta Service Route Velodrome Boulevard Utara. *Attribution 4.0 International Vol. 5*.
- Kingham, S. J. (2021). Traveling to work : Will people move out of their cars. *Transport Policy 8*, 151-160.
- Kumar, P. S. (2011). Security Perceptions of Delhi Commuters at Metro-Bus Interchange in Multimodal Perspective . *Journal of Transport Security 4*, 295-307.
- Luk, J. a. (2003). Integrated Public Transport in Singapore and Hong kong. *Road and Transport Research 12*, 41-51.
- Magdalena, M. (2019). Analisa Penentuan Simpul Integrasi Jalur Kereta Api dan Bus Rapid Transit Dengan Bandara Syamsudin Noor di Banjarbaru. *Jurnal Transportasi Multimoda*, 23-35.
- Miller, M. (2004). Assessment of Service Integration Practices for Public Transportation : Review of Literatur.
- Neuman. A, a. N. (2011). A Paratransit-inspired evolutionary process for public transit network design. *Annual Meeting Preprint-Ahnliche Artikel-Alle 4 Versionen, Berlin*.
- Ólafsdóttir, A. R. (2017). Bus Service Performance Analysis : Case Study : Bus Route 1 In The Reykjavik Capital Area. *European Transport Research Review*, 1-14.
- Papaioanmou, D. (2015). The Role of Accessibility And Connectivity in Mode Choice . *Transportation Research Procedia 10*, 831-839.
- Redman, L. M. (2013). Quality Attributes of Public Transport That Attract Car Users : A research Review. *Transport Policy 25*, 119-127.
- Uherek E., T. H.-K.-R. (2010). Transport impact on atmosphere and climate : Land Transport. *Atmospheric Enviroment 44*, 4772-4816.
- Yang, Y. C. (2020). Analysis of The Passanger Flow Transfer Capacity of a Bus-Subway Transfer Hub in an Urban Multi-mode Transportation Network. *Sustainability (Switzerland)*.
- Zhu, Z. Z. (2021). Analyzing Influencing Factors of Transfer Passenger Flow of Urban Rail Transit : A New Approach Based on Nested Logit Model Considering Transfer Choices. *International Journal of Enviromental Research and Public Helath*.

ISU PERUNDANGAN BERKAITAN PERKHIDMATAN E-HAILING DI MALAYSIA

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Abstrak: *Perkhidmatan e-hailing seperti inDriver dan Grab merupakan sebahagian daripada pengangkutan awam yang popular di Malaysia. Melalui perkhidmatan e-hailing, penumpang boleh menempah perjalanan menggunakan peranti maya seperti telefon bimbit. Perkhidmatan ini dijangkakan akan terus berkembang dengan pesat. Jangkaan ini bertitik tolak daripada permintaan tinggi oleh pengguna lantaran kelebihan-kelebihan perkhidmatan e-hailing termasuk kelajuan, keselesaan dan penjimatan kos kepada pengguna. Mulai Oktober 2019, pengendali e-hailing Malaysia adalah tertakluk kepada undang-undang berorientasikan kawalan yang sama seperti dikenakan atas pemandu teksi. Artikel ini akan memaparkan kerangka perundangan yang mentadbir perkhidmatan e-hailing di Malaysia, serta isu-isu perundangan dan risiko utama yang masih wujud dalam perkhidmatan e-hailing. Penulisan artikel ini adalah berlandaskan penyelidikan kualitatif, berorientasikan secara utama kepada pendekatan kajian sosio-perundangan. Data primer dan data sekunder telah distrukturkan oleh penulis-penulis dengan mengaplikasikan analisis tema untuk menjana naratif perbincangan tentang perkhidmatan e-hailing di Malaysia, termasuk aspek kerangka perundangan dan isu perundangan serta risiko yang terdapat dalam industri ini. Antara dapatan penting yang diketengahkan adalah legitimasi am bagi perkhidmatan e-hailing di Malaysia berdasarkan kewujudan undang-undang penting yang mengawal selia perkhidmatan e-hailing. Selain itu, dapatan menunjukkan bahawa isu-isu perundangan dan risiko melibatkan perkhidmatan e-hailing adalah berlaku di Malaysia. Isu-isu perundangan dan risiko tersebut adalah berkait secara signifikan dengan status keesahan operasi daripada segi undang-undang, keselamatan pemandu serta pengguna, liabiliti syarikat pengendali (penyedia) dan privasi pemandu serta pengguna. Segenap isu perundangan dan risiko melibatkan perkhidmatan ini perlu diberikan perhatian dan langkah penyelesaian yang praktikal dan ampuh bagi melestarikan dan memajukan perkhidmatan e-hailing di Malaysia.*

Kata Kunci: *E-Hailing, Undang-Undang, Logistik, Keselamatan, Jenayah*

Pengenalan

Pelancaran perkhidmatan e-hailing adalah antara refleksi signifikan kepada pengaplikasian *internet of things* sebagai kemajuan teknologi dalam sektor pengangkutan. E-hailing, biasanya dirujuk sebagai perkongsian perjalanan, iaitu sejenis pengangkutan yang membolehkan pengguna menempah perjalanan dalam masa nyata dari tempat pengambilan ke destinasi tertentu menggunakan peranti maya seperti telefon pintar dan komputer. Antara contoh perkhidmatan e-hailing yang popular ialah Maxim, Grab dan Go-Jet. Dengan bantuan aplikasi telefon pintar, perkhidmatan e-hailing menghubungkan pengguna yang mencari perjalanan tambang tetap dengan pemandu yang bersedia untuk menyediakan perkhidmatan tersebut. Apabila pengguna menekan butang pada telefon bimbit mereka, syarikat pengendali (penyedia) e-hailing menyediakan cara untuk menjamin pengangkutan mereka. Sebahagian daripada tambang transaksi akan dikekalkan oleh syarikat e-hailing, dengan pemandu menerima baki bayaran.

Sejarah perkhidmatan e-hailing bermula dengan pelancaran UberCab di Los Angeles pada tahun 2009 dan Aplikasi Uber di San Francisco pada tahun 2010. Sejak itu, syarikat e-hailing baharu telah berkembang dengan pantas di seluruh dunia berikutan peningkatan populariti dan permintaan untuk perkhidmatan mereka. Di Malaysia, perkhidmatan e-hailing bermula pada akhir 2013 dengan Uber dan diikuti pada 2014 oleh Grab. Kedua-dua syarikat e-hailing itu telah berkembang di pasaran pengangkutan awam di samping perkhidmatan konvensional sedia ada seperti teksi di Malaysia. Pada Mac 2018, Uber meninggalkan pasaran Malaysia. Namun, pelbagai syarikat e-hailing lain muncul dan beroperasi dengan meluas. Lebih daripada 30 aplikasi e-hailing seperti Grab, MyCar, Airasia Ride, Maxim, Idriver Malaysia, Buddy Driver, Kumppool, EzCab, Pick n Go, Gabir, Blacklane, Riding Pink, Zepp On, Quulo, Jomrides, Tumpang, Droupr, Frenz, Woom (perempuan sahaja), Bitcar, Arcade City, Deli Cabs dan Mahkota menerajui perkhidmatan e-hailing dalam negara pada masa kini (IQI Global, 2022; Lim, 2018).

E-hailing telah muncul sebagai pilihan mobiliti untuk mengurangkan perjalanan kenderaan dan kesesakan jalan raya, sambil memenuhi permintaan pengangkutan awam yang semakin meningkat serta mengurangkan pelepasan automotif (karbon, bahan zarah dan ozon). Malaysia menduduki tempat ketiga tertinggi di dunia dalam aspek pemilikan kereta, iaitu pada kadar 93%. Menurut Persatuan Automotif Malaysia (MAA), terdapat 28,181,203 kenderaan di jalan raya Malaysia pada 2017, atau 0.88 kenderaan bagi setiap rakyat Malaysia (Persatuan Automotif Malaysia, 2018). Pada tahun 2019, jumlah kenderaan di jalan raya meningkat ke 31.22 juta. Ini menggambarkan bahawa jumlah kenderaan meningkat sebanyak satu juta setiap tahun. Profesor Dr Kulanthayan K.C. Mani, pakar dalam keselamatan jalan raya, menganggarkan bahawa Malaysia akan mempunyai 33.3 juta kenderaan berdaftar pada September 2021, berbanding populasi 32.6 juta (Chan, 2022). Sistem perkhidmatan e-hailing mempunyai potensi besar untuk mengurangkan bilangan kenderaan di jalan raya. Hal ini demikian kerana perkhidmatan e-hailing membolehkan perkongsian perjalanan kenderaan. E-hailing memungkinkan lebih ramai pengguna berkongsi kenderaan (Waseem & Talpur, 2020). Faktor ini juga dapat menyumbang kepada pengurangan kesesakan lalu lintas terutama di bandar-bandar. Dengan berkongsi pengangkutan, pengguna turut dapat mengurangkan masa perjalanan dan kos perjalanan mereka (Ann & Shafi, 2022; Su & Fang, 2019).

Perkhidmatan e-hailing bertujuan untuk menjadikan perjalanan lebih mudah dan selesa untuk pengguna mereka, malah mereka boleh menjana peluang pekerjaan baharu, terutamanya untuk pemandu e-hailing. Namun begitu, industri e-hailing masih di peringkat awal dan mempunyai kelemahan. Kerajaan menghadapi cabaran untuk mengawal selia industri perkhidmatan e-hailing ini kerana pihak lain, seperti pemandu dan pengendali syarikat teksi konvensional, dilaporkan telah terjejas oleh perkembangan teknologi baharu. Walaupun begitu, kerajaan Malaysia tidak mengambil pendekatan seperti beberapa negara lain yang mengharamkan perkhidmatan e-hailing (Todd, Amirullah, & Xing, 2018), tetapi sebaliknya kerajaan telah bertindak mewujudkan undang-undang untuk sektor perkhidmatan e-hailing bagi menyediakan medan pengawalan sama rata dengan teksi tradisional (Todd, Amirullah, & Xing, 2018).

Walaupun kerajaan sering menyediakan kemudahan serta sokongan bersifat fizikal bagi perkhidmatan pengangkutan awam, seperti jalan raya yang baik, ini tidak menjamin sepenuhnya bahawa sistem pengangkutan awam akan menjadi komoditi awam yang ekonomik dan selamat. Justeru, dokongan berbentuk makro termasuk intervensi kerajaan yang sesuai, wajar dan praktikal bagi mengawal selia perkhidmatan pengangkutan awam adalah sangat penting. Kerajaan mempunyai pelbagai alat untuk campur tangan dalam kes kegagalan pasaran (Andersen, 2023; Wang et al., 2020) atau untuk mempromosikan kebajikan sosial, seperti menyediakan maklumat, mewujudkan insentif, mengenakan cukai luaran, dan mewujudkan *quasimarkets* (cthnya perdagangan pelepasan). Peraturan juga boleh berbeza dari segi tahap penyertaan atau kawalan yang dikuatkuasakan, bermula daripada keperluan pelaporan yang sangat sederhana kepada sekatan kemasukan pasaran dan kawalan harga yang jauh lebih ketat. Ramai ahli ekonomi berhujah bahawa peraturan atau undang-undang yang ketat berpotensi mendatangkan implikasi negatif kepada pasaran ekonomi. Bahkan ramai antara mereka yang sangat ragu-ragu terhadap keberkesanan peraturan "ekonomi", seperti kemasukan pasaran dan sekatan harga. Walau bagaimanapun, sekatan ini terus wujud dalam industri pengangkutan awam (Cetin & Deakin, 2019). Selaras dengan hal ini, artikel ini digarap bagi menerangkan kerangka perundangan yang mengawal selia perkhidmatan e-hailing di Malaysia dan isu perundangan dan risiko yang masih wujud dalam perkhidmatan e-hailing.

Kaedah Kajian

Artikel ini mengaplikasikan pendekatan penyelidikan kualitatif kerana tiada keperluan dalam artikel ini untuk mekanisme pendekatan kuantitatif seperti kajian tinjauan dan prosedur statistik (Silverman, 2010). Dalam pendekatan penyelidikan kualitatif, penulis lebih memfokuskan kepada kajian undang-undang, yang merangkumi kajian statut, peraturan, konsep, kes yang telah diputuskan, institusi undang-undang dan isu atau masalah perundangan (Yaqin, 2007). Antara sumber data primer yang dirujuk adalah Akta Pengangkutan Awam Darat 2010 (Akta 715) dan Akta Lembaga Perlesenan Kenderaan Perdagangan 1987 (Akta 334). Selain statistik, sumber data sekunder yang dirujuk adalah termasuk buku, akhbar, artikel ilmiah dan laporan kerajaan serta bahan dalam talian. Berdasarkan analisis tematik, data telah disusun untuk membentuk naratif perbincangan tentang ketersediaan perkhidmatan e-hailing di Malaysia, dengan mengambil kira beberapa perspektif yang berkaitan tentang perundangan kawal selia, isu perundangan dan risiko yang berkaitan dengan industri ini. Salah satu daripada banyak batasan penyelidikan penulis ialah kekurangan yang sangat ketara bagi data berkaitan perkhidmatan e-hailing dalam konteks perundangan di Malaysia. Hal ini berlaku lantaran kekurangan penerbitan berkaitan isu-isu perundangan dan risiko perkhidmatan e-hailing termasuk laporan kerajaan dan artikel jurnal. Selain itu, terdapat sedikit maklumat yang tersedia tentang penyedia atau pengendali perkhidmatan e-hailing Malaysia disebabkan oleh

kemungkinan besar syarikat e-hailing itu keberatan untuk berkongsi maklumat yang dianggap sulit dan bersifat privasi bagi mereka.

Dapatan dan Perbincangan

Kerangka Perundangan

Perkhidmatan e-hailing memperoleh permintaan yang tinggi sebagai pengangkutan awam alternatif rentetan tawaran harga perkhidmatan yang berpatutan (Izham, 2018). Ini telah membawa kepada perkembangan perkhidmatan e-hailing yang pesat dan positif. Walaupun terdapat cabaran yang perlu diatasi oleh syarikat pengendali dan pemandu e-hailing, seperti operasinya dihalang di sesetengah negara, perkhidmatan e-hailing mendapat reaksi dan sokongan positif yang meluas di seluruh dunia (Oviedo, Jaramillo, & Nieto, 2021). Di Malaysia, kerajaan juga telah menunjukkan penerimaan baik terhadap perkhidmatan e-hailing. E-hailing tidak akan ditegah di Malaysia, sebagaimana dinyatakan pada tahun 2018 oleh Anthony Loke Siew Fook iaitu Menteri Pengangkutan Malaysia walaupun mendapat bantahan daripada pemandu teksi konvensional ketika itu. Namun, kerajaan Malaysia telah mengambil pendekatan menggubal perundangan bagi mengawal selia perkhidmatan e-hailing.

Perkhidmatan e-hailing di Malaysia dikawal selia sejak 12 Julai 2018, berikutan kelulusan pindaan kepada Akta Pengangkutan Awam Darat 2010 (Akta 715) dan Akta Lembaga Perlesenan Kenderaan Perdagangan 1987 (Akta 334) pada 2017. Berikutan tamat tempoh penangguhan penguatkuasaan selama lingkungan setahun tiga bulan, undang-undang itu mula berkuat kuasa pada 12 Oktober 2019 sehingga kini. Pengesahan secara perundangan terhadap perkhidmatan e-hailing adalah bertitik tolak daripada kelulusan Akta Pengangkutan Awam Darat (Pindaan) 2017 (Tafsiran E-Hailing Pindaan Jadual Pertama (a) dalam perkara 1, Subseksyen (ii)). Beberapa pindaan dalam Akta Akta Pengangkutan Awam Darat 2010 dibuat bagi mencakupi aspek syarat-syarat dan prosedur-prosedur serta peraturan-peraturan bagi perkhidmatan e-hailing di Malaysia. Akta Lembaga Pelesenan Kenderaan Perdagangan (Pindaan) 2017 mengalami pindaan kedua berkaitan perkhidmatan e-hailing (Pindaan Seksyen 2 (a) Tafsiran E-Hailing; Pindaan Seksyen 2 (b) Tafsiran Lesen Perniagaan Pengantaraan; Pindaan Seksyen 2 (d)) Kelas dan Kategori Kenderaan Perdagangan; Pindaan Seksyen 14, Subseksyen (1b); dan Pindaan Seksyen 33 Larangan Penggunaan Kenderaan Perkhidmatan Awam Tanpa Lesen).

Undang-undang Malaysia menetapkan bahawa pengendali perkhidmatan e-hailing perlu mendaftar dengan Agensi Pengangkutan Awam Darat (APAD) (sebelum ini dikenali sebagai Suruhanjaya Pengangkutan Awam Darat, atau SPAD) dan mempunyai lesen perniagaan e-hailing yang dikenali sebagai lesen perniagaan pengantaraan untuk beroperasi secara sah. Frasa "perniagaan pengantaraan" bermaksud "perniagaan memudahkan pengaturan, tempahan atau urus niaga kenderaan e-hailing, tanpa mengira sebarang pertimbangan berharga atau nilai kewangan."

Syarikat pengendali e-hailing juga mesti mendaftar dengan Suruhanjaya Syarikat Malaysia atau Suruhanjaya Koperasi Malaysia dan perlu mempunyai modal minimum sebanyak RM100,000. Selain itu, ahli lembaga syarikat tersebut mestilah terdiri daripada sekurang-kurangnya seorang warganegara dan individu yang bermastautin tetap di Malaysia. Di samping itu, undang-undang memberikan kuasa kepada APAD untuk menetapkan beberapa keperluan atau had operasi yang perlu dipatuhi oleh syarikat pengendali e-hailing. Keperluan itu adalah termasuk yang berkaitan dengan aspek jenis perniagaan pengantaraan yang dibenarkan untuk

dikendalikan atau disediakan oleh pemegang lesen perniagaan pengantaraan, tahap perkhidmatan umum yang akan diberikan pemegang lesen perniagaan pengantaraan kepada pengguna; dan piawaian prestasi yang perlu dipatuhi oleh pemegang perniagaan pengantaraan lesen dalam operasi pengantaraan perniagaan.

Undang-undang juga menghendaki pemandu perkhidmatan e-hailing mendapatkan lesen "Kenderaan Perkhidmatan" atau "Kenderaan Perkhidmatan Awam" (PSV) dan menunjukkan kad pemandu atau kad pemandu digital di cermin depan kenderaan. Berdasarkan undang-undang, kenderaan e-hailing termasuk dalam kategori kenderaan servis. Mengikut definisi undang-undang, kenderaan servis (disingkatkan "PSV") ialah "kenderaan bermotor dengan kapasiti tempat duduk empat hingga sebelas orang (termasuk pemandu) yang digunakan untuk membawa orang dalam mana-mana perjalanan dengan mengambil kira tambang tunggal atau berasingan untuk setiap daripada mereka, di mana pengaturan, tempahan, transaksi dan tambang untuk perjalanan sedemikian dipermudahkan oleh aplikasi mudah alih elektronik yang disediakan oleh perniagaan pengantara."

Pemandu yang hendak menjalankan perkhidmatan e-hailing mesti melengkapkan prosedur untuk mendapatkan lesen PSV. Kerajaan mewujudkan prosedur biasa yang mesti dilaksanakan secara berkala oleh pemandu mana-mana pengangkutan ditambah dengan prosedur baharu yang khusus untuk pemandu e-hailing. Pemandu untuk perkhidmatan e-hailing mestilah warganegara Malaysia yang berumur 21 tahun ke atas dan dikehendaki untuk lulus kedua-dua pemeriksaan kesihatan dan pemeriksaan latar belakang jenayah individu. Pemandu tersebut juga perlu tidak disenaraihitamkan oleh Jabatan Pengangkutan Jalan (JPJ) dan Polis Diraja Malaysia (PDRM) dan mesti menamatkan kursus latihan selama enam jam. Selain itu, undang-undang menetapkan kewajipan pemandu e-hailing untuk menyediakan perlindungan insurans untuk pemandu, penumpang dan pihak ketiga. Semasa pelaksanaan awal undang-undang yang mewajibkan pengambilan lesen PSV dan sebagainya, sesetengah pemandu e-hailing mempamerkan kemarahan dan enggan mematuhi undang-undang tersebut kerana mereka melihat proses itu sebagai menyusahkan bahkan menghalang kesanggupan mereka untuk meneruskan pekerjaan sebagai pemandu e-hailing.

Dengan penguatkuasaan perundangan, e-hailing menjadi perkhidmatan pengangkutan awam darat yang sah di Malaysia. Pelbagai pihak berkepentingan dalam perkhidmatan, termasuk syarikat pengedali perkhidmatan e-hailing, pemandu e-hailing, badan dan institusi kerajaan, malah pengguna, adalah perlu mematuhi undang-undang (Todd, Amirullah, & Xing, 2018). Hal ini demikian walaupun tindakan bagi mematuhi serta memenuhi kehendak perundangan kawal selia e-hailing tidak selalunya mudah. Seperti keperluan untuk lesen PSV, keperluan undang-undang yang dikenakan ke atas perkhidmatan e-hailing adalah hampir sama dengan yang dikenakan ke atas pemandu teksi tradisional (Jais & Marzuki, 2020). Contoh yang ketara adalah kedua-dua pemandu e-hailing dan teksi dikehendaki memiliki lesen PSV bagi membolehkan kenderaan mereka digunakan sebagai teksi komersial atau kenderaan e-hailing.

Undang-undang untuk perkhidmatan e-hailing di Malaysia telah berkembang dan dikemas kini secara berkala sebagai tindak balas kepada perubahan dalam permintaan pengguna dan teknologi selama ini (Todd, Amirullah, dan Xing, 2018). Undang-undang semasa mencerminkan hasrat kerajaan untuk menyeragamkan pemandu e-hailing merentasi industri pengangkutan dan melaksanakan keperluan keselamatan untuk operasi e-hailing. Melalui

kaedah pengawalseliaan terhadap perkhidmatan e-hailing dan syarikat e-hailing, kerajaan dilihat mampu untuk mencakupi aspek hak dan kepentingan buruh melibatkan pemandu e-hailing, perlindungan pengguna dan hak harta benda (Gan et al., 2021).

Memandangkan undang-undang untuk perkhidmatan e-hailing masih baru di Malaysia dan belum banyak digubal di negara-negara ASEAN (selain Malaysia, hanya terdapat di Singapore, Philippines, Indonesia dan Vietnam), masih terdapat sebilangan besar penumpang, pelanggan, pemandu dan pengguna yang tidak menyedari atau memahami semua prosedur dan keperluan yang ditetapkan oleh undang-undang tersebut. Seperti yang ditegaskan oleh Salim dan rakan sekerja (2020), untuk menjadi pemandu e-hailing, seseorang itu mesti mempunyai pemahaman yang menyeluruh tentang undang-undang e-hailing dan perlu memahami perkaitan operasi e-hailing dan hak pemandu e-hailing di bawah syarikat pengendali e-hailing. Pemahaman tersebut adalah wajar dicapai oleh mereka sebelum mendaftar sebagai pengendali atau pemandu e-hailing.

Isu Undang-Undang Dan Risiko

Sebagaimana dinyatakan sebelum ini, perkhidmatan e-hailing masih mempunyai isu-isu perundangan dan risiko, terutama yang berkait dengan aspek status keesahan operasi, privasi data, liabiliti dan keselamatan. Hal ini demikian walaupun perkhidmatan e-hailing di Malaysia mempunyai kelebihan dan kebaikan dan telah diiktiraf oleh undang-undang Malaysia. Isu perundangan dan risiko yang wujud tidak boleh dipandang sepi kerana perundangan dan risiko itu berpotensi menyebabkan kemudaratan dan implikasi negatif kepada pelbagai pihak termasuk pemandu serta pengguna e-hailing secara khususnya dan masyarakat serta negara secara amnya. Perbincangan berkaitan isu perundangan dan risiko utama diberikan di bawah.

Status Keesahan Operasi

Pindaan terhadap Akta Pengangkutan Awam Darat 2010 dan Akta Lembaga Pelesenan Kenderaan Perdagangan 1987 pada Julai 2017 menjadi indikator signifikan kepada kesediaan kerajaan Malaysia menghalalkan secara eksplisit perkhidmatan e-hailing buat kali pertama di Malaysia. Sebelum pengesahan yang konkrit melalui perundangan pada 2017 itu, industri e-hailing di Malaysia bergelut dengan isu keesahan yang ketara (Teo & et al., 2018). Perkhidmatan e-hailing dianggap menyalahi undang-undang kerana tiada liputan perundangan atau regulatori terhadapnya. Walaupun perkhidmatan e-hailing semakin diterima secara progresif pada skala global, persoalan sama ada ia perlu diiktirafkan dan diberikan legitimasi di Malaysia menjadi subjek yang hangat diperdebatkan. Ini mengakibatkan kritikan meluas terhadap perkhidmatan e-hailing. Syarikat pengendali dan pemandu pengangkutan awam konvensional iaitu teksi menentang industri tersebut. Sebagai contoh, pada 2016, mereka telah menganjurkan perhimpunan besar-besaran untuk mengharamkan perkhidmatan e-hailing (Hwai, 2016). Tindakan mereka berkemungkinan besar adalah kesan pengaruh banyak protes dan tindakan undang-undang terhadap status syarikat e-hailing yang berlaku di negara-negara lain, seperti Amerika Syarikat (Sun & Edara, 2015).

Pemandu teksi percaya bahawa perkhidmatan e-hailing memudaratkan industri teksi kerana perkhidmatan e-hailing mewujudkan persaingan yang tidak adil dengan pemandu teksi dan pemegang permit teksi. Mereka membuat hipotesis bahawa mereka telah kehilangan pelanggan dan bahagian pasaran sebagai akibat persaingan sengit dengan syarikat e-hailing (Rayle et al., 2014) Perkhidmatan e-hailing telah maju lebih daripada pengangkutan awam tradisional kerana ia telah memenuhi jangkaan pelanggan untuk fleksibiliti, kelajuan dan kemudahan. Di samping

itu, platform e-hailing dilihat mempunyai kelebihan diskriminasi kerana perkhidmatan pengangkutan e-hailing tidak tertakluk pada kawalan penetapan harga, rakaman meter atau perlindungan pengguna. Grab, sebagai misalnya, mengenakan "harga lonjakan" dalam situasi permintaan yang kukuh. Tambang Grab di Malaysia dilaporkan meningkat 10 hingga 15 peratus selepas penggabungan syarikat Grab dengan Uber (Leng, 2018).

Dalam nada yang sama, keesahan e-hailing dari segi undang-undang masih dipertikaikan sehingga hari ini walaupun perkhidmatan ini telah dicakupi oleh undang-undang bermula 2017. Isu keesahan operasi perkhidmatan e-hailing di Malaysia masih berlegar. Hal ini demikian rentetan masih banyak pengendali dan pemandu e-hailing yang terus melanggar undang-undang yang mengawal selia operasi perkhidmatan itu. Terdapat ramai pemandu e-hailing yang masih menjalankan operasi tanpa memenuhi syarat dan prosedur perkhidmatan e-hailing yang ditetapkan oleh undang-undang terutama Akta APAD 2010. Sebagai contoh, berikutan Jabatan Pengangkutan Jalan (JPJ) Pulau Pinang menemui perkhidmatan e-hailing haram pada Jun 2020, laporan Agensi Pengangkutan Awam Darat (APAD) didedahkan bahawa syarikat InDriver tidak memohon lesen pengantaraan perniagaan untuk meneruskan operasi. Syarikat itu mempromosikan tawaran percuma untuk menarik pemandu melalui aplikasi InDriver, yang membenarkan pemandu mengambil penumpang tanpa lesen kenderaan perkhidmatan awam (PSV) atau permit kenderaan e-hailing (EVP) (Dermawan, 2020).

Lebih memburukkan lagi keadaan, pegawai kerajaan di beberapa negara, termasuk China, India, dan Malaysia, telah dituduh menerima rasuah daripada syarikat e-dagang untuk menyembunyikan aktiviti haram dan memastikan syarikat itu berdaya maju (Tokar & Kelaher, 2020). Oleh itu, kedua-dua pihak iaitu syarikat dan pemandu e-hailing dapat dikatakan beroperasi secara bercanggah dengan undang-undang. Disebabkan aktiviti haram yang berterusan oleh pengendali dan pemandu e-hailing tertentu, keesahan operasi perkhidmatan ini masih menjadi isu yang meruntun kebimbangan masyarakat. Keadaan yang berlaku ini mempunyai pertalian dengan faktor kekurangan penguatkuasaan undang-undang. Menurut Pretorius (2022), teknologi dan perkhidmatan e-hailing mungkin disalahgunakan disebabkan kelemahan peraturan dan penguatkuasaan dasar dan undang-undang sedia ada yang tidak mencukupi.

Privasi Data

Privasi data pengguna e-hailing adalah antara isu perundangan yang masih wujud dalam perkhidmatan tersebut. Maklumat peribadi pengguna seperti nombor telefon, butiran kad kredit dan data geolokasi yang dihantar kepada pengendali e-hailing mendatangkan risiko kepada privasi pengguna e-hailing. Bilangan aduan tentang penggunaan data peribadi pengguna secara tidak wajar atau tidak sesuai oleh syarikat e-hailing telah meningkat. Ini termasuk terdapat syarikat e-hailing yang telah menggunakan data pengguna untuk membangunkan perkhidmatan baharu dan menjual data pengguna untuk menjana pendapatan (Hirson, 2015). Aplikasi e-hailing mengumpul, menyebarkan dan menyimpan maklumat pengenalan peribadi pengguna. Ini memberikan kelebihan kepada pemandu e-hailing kerana mereka dapat mengakses beberapa maklumat pengguna iaitu penumpang mereka sebelum membawanya ke destinasi pilihan pengguna. Walau bagaimanapun, terdapat kemungkinan besar bahawa data ini akan dieksploitasi. Jika disoroti lembaran sejarah, Grab pernah membocorkan maklumat sulit lebih 120,000 penggunanya di Singapura pada 2017 (Vijaya, 2019). Grab telah didapati bersalah oleh mahkamah negara itu kerana melanggar undang-undang perlindungan data.

Syarikat e-hailing boleh menjejaki dan merekodkan corak pergerakan tepat pemandu dan pengguna mereka di seluruh dunia (Pham et al., 2017). Data dikumpul dan dikemaskinikan secara harian daripada pemancar yang dipasang di dalam kenderaan pemandu mereka. Tindakan ini mencetuskan perbincangan orang ramai (Chee, 2019). Data pergerakan pemandu yang dipantau mungkin meredakan kebimbangan keselamatan pengguna, tetapi pemantauan itu menjejaskan privasi pemandu e-hailing. Akta Perlindungan Data Peribadi 2010 (Akta 709) mempunyai peranan dalam melindungi privasi data individu termasuk kedua-dua penumpang dan pemandu e-hailing di Malaysia (Chee, 2019). Akta tersebut bertujuan untuk melindungi keselamatan, kebolehpercayaan dan integriti rangkaian maklumat. Ia mengawal selia pemrosesan maklumat peribadi dalam urusan niaga komersial dan melindungi maklumat peribadi kepentingan awam. Bagaimanapun, menurut Lai (2019), penguatkuasaan Akta tersebut tidak mencukupi, dan banyak kes yang melibatkan data dan pelanggaran privasi masih belum diselesaikan.

Di samping itu, terdapat kebimbangan tentang ketepatan data yang diberikan oleh pemandu e-hailing. Disebabkan fakta bahawa telefon bimbit tidak bertujuan untuk pengiraan tambang yang tepat, pemandu mungkin terpaksa berbohong tentang butiran perjalanan penumpang (Pham et al., 2017). Sebagai contoh, penipuan lokasi mungkin berlaku apabila pemandu menyebabkan peranti mudah alih menghantar maklumat kedudukan yang tidak tepat kepada perkhidmatan e-hailing atau apabila mereka memalsukan isyarat GPS/Wi-Fi yang digunakan untuk geolokasi (He et al., 2011). Isu-isu privasi yang dinukilkan wajar mendapat perhatian dan penyelesaian agar privasi pemandu dan pengguna e-hailing terjamin dan selamat.

Liabiliti

Antara isu perundangan lain yang wujud berkaitan perkhidmatan e-hailing di Malaysia ialah isu liabiliti syarikat pengendali e-hailing terhadap kemalangan yang berlaku membabitkan kenderaan e-hailing. Isu ini bertaut rapat dengan persoalan tanggungjawab pengambilan insuran. Kemalangan melibatkan kenderaan e-hailing Perodua Bezza yang terbabas lalu melanggar tiang lampu di penghadang jalan sehingga mengakibatkan salah seorang pengguna maut (Ahmad, 2019) yang berlaku di Kuala Lumpur pada 27 Disember 2019 merupakan antara contoh kemalangan tragis melibatkan kenderaan e-hailing. Insiden kemalangan yang melibatkan kenderaan e-hailing telah meningkat, sebahagiannya disebabkan oleh faktor umur pemandu yang muda dan masa pemanduan yang panjang. Syarikat pengendali e-hailing kebanyakannya menolak untuk menanggung atau mengambil liabiliti untuk kerosakan dan kecederaan yang terjadi akibat kemalangan membabitkan kenderaan e-hailing. Uber dan Grab berhujah bahawa mereka tidak akan bertanggungjawab sekiranya berlaku kemalangan yang melibatkan pemandu dan penumpang kerana, seperti yang dinyatakan sebelum ini, mereka hanya menyediakan platform untuk menyelaraskan pemandu dan pengguna (Le & De Jong, 2018). Ini menunjukkan bahawa syarikat e-hailing seolah mengutamakan keuntungan perniagaan tetapi memindahkan risiko kepada pemandu dan pengguna.

Selain kebarangkalian kemalangan, pemandu e-hailing terdedah kepada risiko masalah kesihatan dan kehilangan pekerjaan kerana keadaan kerja mereka. Berdasarkan kajian oleh Goh dan Nelleita Omar (2020), 70% pemandu e-hailing dan p-hailing (penghantaran barangan dan makanan menggunakan motosikal) bekerja (menjalankan perkhidmatan) selama 8 hingga 12 jam sehari, manakala 8% bekerja lebih daripada 18 jam sehari. Tumpuan visual, fizikal dan kognitif pemandu juga boleh terjejas secara negatif oleh penggunaan telefon mudah alih untuk mengesahkan butiran pesanan pengguna (Rashid et al., 2022; Ansar et al., 2020). Di samping

itu, pendapatan mereka sangat bergantung kepada jumlah perjalanan penghantaran pengguna yang dilaksanakan oleh mereka, yang mendorong mereka untuk memandu secara melulu (Polis DiRaja Malaysia 2022). Syarikat pengendali e-hailing tidak menyediakan atau membayar insurans kesihatan, pekerjaan atau takaful kepada pemandu e-hailing. Pemandu e-hailing mesti membeli insurans mereka sendiri, yang meningkatkan kos mereka. Ramai pemandu e-hailing teragak-agak atau tidak berminat untuk mematuhi. Kajian Goh dan Nelleita Omar (2020) terhadap 411 pemandu e-hailing dan p-hailing mendedahkan bahawa sebanyak 76% daripada responden tersebut tidak mempunyai perlindungan insurans pengangkutan, 57% tidak mempunyai perlindungan insurans kesihatan dan 38% tidak mempunyai perlindungan insurans kemalangan berkaitan pekerjaan, manakala 22% pula tidak mempunyai perlindungan insurans sosial.

Jelas bahawa pemandu e-hailing di Malaysia tidak mempunyai akses kepada insurans atau takaful melalui syarikat pengendali e-hailing. Pemandu e-hailing tidak dianggap sebagai 'pekerja' di bawah Akta Pekerjaan 1955, yang mewajarkan majikan memberikan faedah dan perlindungan yang sama seperti pekerja tradisional. Hal ini demikian walaupun terdapat keputusan Tribunal Rayuan Pekerjaan dalam *Aslam & Farrar Iwn Uber* [UKEAT/0056/17/DA] bahawa pemandu e-hailing adalah "pekerja" dan bukan kontraktor bebas. Selain itu, terdapat Garis Panduan E-Hailing Agensi Pengangkutan Awam Darat yang telah diluluskan oleh Suruhanjaya Pengangkutan Awam Darat (SPAD) yang mengkehendaki pemegang lesen perkhidmatan e-hailing (syarikat e-hailing) untuk memastikan wujudnya perlindungan insurans untuk pemandu, kenderaan, penumpang dan pihak ketiga sebelum membenarkan mana-mana pemandu untuk beroperasi.

Keselamatan

Selain itu, terdapat kebimbangan serius tentang keselamatan penumpang yang menggunakan perkhidmatan e-hailing di beberapa negara, termasuk Malaysia. Perkhidmatan e-hailing telah berulang kali menjadi paparan berita kerana gagal menyediakan keselamatan yang mencukupi untuk pengguna. Tidak semua pemandu yang menyediakan perkhidmatan e-hailing mempunyai lesen untuk membawa individu dengan pengangkutan mereka atau latihan profesional. Aspek pemeriksaan latar belakang pemandu juga seringkali diabaikan oleh syarikat pengendali e-hailing. Ini mungkin menjelaskan peningkatan dalam pendakwaan jenayah yang merangkumi jenayah rogo yang dilakukan oleh pemandu e-hailing di Malaysia (The New Straits Times, 2017). Seperti yang ditunjukkan oleh pelanggaran maut, pemanduan mabuk, gangguan seksual, dan penyeludupan dadah, kebolehpercayaan pemandu e-hailing masih meragukan (Ahmad et al., 2023). Pengguna merupakan majoriti mangsa serangan seksual pemandu e-hailing. Selain pengguna, pemandu e-hailing juga menghadapi sikap dan tindakan terlarang pengguna e-hailing. Pemandu e-hailing menghadapi isu keselamatan tambahan, seperti menjadi mangsa jenayah oleh pengguna. Terdapat insiden pengguna e-hailing menyerang, mencuri, dan menyerang pemandu e-hailing secara seksual, menurut berita dan laporan.

Kenderaan yang digunakan untuk perkhidmatan e-hailing juga tidak semuanya menjalani pemeriksaan dan pengawasan keselamatan secara rutin. Sebilangan kecil pemandu membahayakan keselamatan pengguna dengan memandu kenderaan terpakai yang tidak diselenggara dengan baik, memandu dalam keadaan keletihan rentetan masa kerja yang berlebihan atau faktor lain seperti kesihatan (Gale, 2016). Kebimbangan tentang keselamatan perkhidmatan e-hailing juga meliputi aspek ketidakpatuhan pemandu atau pengguna e-hailing

terhadap peraturan keselamatan pemanduan dan Prosedur Operasi Standard (SOP) COVID-19. Berdasarkan kajian kuantitatif yang dijalankan oleh Razali dan Daniel (2022) di Malaysia, lebih separuh daripada 200 responden percaya bahawa pemandu e-hailing lazimnya tidak memakai tali pinggang keledar dan memandu secara melulu. Di samping itu, kira-kira separuh daripada responden tersebut melaporkan bahawa terdapat pemandu e-hailing yang tidak memakai topeng muka dan sarung tangan, yang tidak menjaga jarak sosial di dalam kenderaan, dan yang tidak menyediakan pencuci tangan dalam kenderaan perkhidmatan e-hailing. Kebimbangan keselamatan yang sama mungkin timbul apabila pengguna e-hailing mengabaikan SOP, seperti tidak memakai topeng, dan terus menaiki kenderaan e-hailing walaupun menunjukkan simptom COVID 19.

Disebabkan oleh fakta bahawa perkhidmatan e-hailing disediakan oleh dua pihak yang tidak mempunyai pertalian atau hubungan, kedua-dua pemandu dan pengguna e-hailing berada pada risiko keselamatan yang besar. Potensi menjadi mangsa adalah begitu signifikan memandangkan keadaan perkhidmatan di dalam pengangkutan. Isu ini wajar diberikan perhatian dan langkah pencegahan. Hal ini demikian lantaran pelbagai implikasi negatif jangka pendek dan jangka panjang yang berlaku apabila aspek keselamatan digugah atau dilanggar. Contoh kesan negatif jangka pendek adalah kecederaan dan maut dan contoh kesan negatif jangka panjang pula adalah termasuk kebimbangan, trauma dan serangan panik (Pretorius, 2022; Roughton, 2020). Operasi haram perkhidmatan e-hailing akan memburukkan lagi isu keselamatan lantaran kepayahan untuk dijejaki dan dicakupi di bawah sistem kawal selia yang berkuatkuasa.

Kesimpulan

Terdapat dua statut utama berkaitan pengangkutan awam di Malaysia yang telah mengesahkan secara perundangan operasi perkhidmatan e-hailing. Perkhidmatan e-hailing pada mulanya iaitu pada tahun-tahun awal pelaksanaannya dianggap menjejaskan dan mengganggu perkhidmatan pengangkutan awam konvensional terutama teksi; namun, perkhidmatan e-hailing kini diiktiraf sebagai tambahan kepada sistem transit awam sedia ada oleh kerajaan dan masyarakat. Aplikasi e-hailing itu sendiri turut mewujudkan dimensi perhubungan baharu, yang dapat memberikan manfaat komunikasi pemasaran dan pengurangan kos dalam pelbagai aspek kepada semua pihak berkepentingan.

Namun, perkhidmatan e-hailing masih merupakan wilayah baharu dalam dunia perundangan. Dalam era globalisasi beroerintaskan teknologi yang semakin berkembang, kebangkitan ekonomi e-hailing memerlukan kaedah pengawalseliaan yang ampuh. Menurut penyelidikan Yang dan rakan-rakan (2020), adalah sukar bagi negara untuk mengawal selia internet dan perkhidmatan yang diselenggarakan melalui internet disebabkan kerumitan untuk mengenal pasti perantara yang mempunyai pengaruh pada rangkaian dan jenis pendekatan pemantauan yang sesuai. Hakikat bahawa syarikat teknologi maya dapat melepaskan diri daripada peraturan - contohnya, dengan beroperasi dari luar bidang kuasa perundangan - menunjukkan bahawa strategi arahan dan kawalan yang longgar atau tidak komprehensif tidak mungkin berkesan (Finney, 2015).

Selari dengan kepesatan perkembangan inovasi, undang-undang perlu bertindak pantas sebagai tindak balas kepada percambahan perkhidmatan e-hailing. Analisis mendalam terutamanya melalui kajian empirikal tentang aspek kawal selia di dalam undang-undang sedia ada dan langkah menangani isu perundangan dan risiko berkaitan perkhidmatan e-hailing yang masih

timbul, khususnya isu dan risiko status keesahan operasi, privasi data, liabiliti dan keselamatan yang menggusarkan adalah sangat mustahak. Hasil kajian literatur oleh Chalermpong dan rakan-rakannya (2023) menunjukkan bahawa terdapat hanya sedikit penyelidikan yang telah dijalankan tentang keberkesanan undang-undang untuk meningkatkan keselamatan, perlindungan pengguna atau kecekapan sistem pengangkutan secara umum. Langkah-langkah pencerakinan dan semakan terhadap perundangan relevan sedia ada adalah signifikan bagi tujuan memastikan pembinaan kerangka undang-undang yang dapat menyokong secara efektif dan mengawal selia perkhidmatan e-hailing demi kepentingan semua pihak pemegang taruh. Kepentingan ini juga ke arah menjamin daya maju dan kebolehcapaian perkhidmatan e-hailing bagi jangka masa panjang di Malaysia.

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Rujukan

- Ahmad, A. H., Masri, R., Vui, C. N., Biju, S., Shamsudin, M. F., & Malik, I. S. A. (2023). Giant Asia Pacific region e-hailing competitive position during the pandemic: A breath of fresh air for Malaysian e-hailing startups. *International Journal of Business and Quality Research*, 1(01), 23-32.
- Ahmad, S. (2019). Chinese national killed in e-hailing car crash near Cyberjaya, The New Straits Times, 27 December 2019, available at <https://www.nst.com.my/news/nation/2019/12/551361/chinese-national-killed-e-hailing-car-crash-near-cyberjaya> [accessed on 5 January 2020].
- Andersen, P. (2023). Market Failures and What to Do About It?. In *Market, Ethics and Religion: The Market and its Limitations* (pp. 41-53). Cham: Springer International Publishing.
- Ann, D. Y. H., & Shafi, M. A. (2022). Factors influencing consumer satisfaction towards e-hailing service among Malaysian. *Research in Management of Technology and Business*, 3(2), 72-84.
- Ansar, M. S., Ma, Y., Chen, S., Tang, K., & Zhang, Z. (2021). Investigating the trip configured causal effect of distracted driving on aggressive driving behavior for e-hailing taxi drivers. *Journal of traffic and transportation engineering (English edition)*, 8(5), 725-734.
- Cetin, T., & Deakin, E. (2019). Regulation of taxis and the rise of ridesharing. *Transport Policy*, 76, 149-158.
- Chalermpong, S., Kato, H., Thaithatkul, P., Ratanawaraha, A., Fillone, A., Hoang-Tung, N., & Jittrapirom, P. (2023). Ride-hailing applications in Southeast Asia: A literature review. *International Journal of Sustainable Transportation*, 17(3), 298-318.
- Chan, Dawn (2022). Vehicles outnumber people in Malaysia, New Straits Time, 10 June 2022, available at <https://www.nst.com.my/news/nation/2022/06/803654/vehicles-outnumber-people-malaysia> accessed on 20 April 2023].
- Chee, D. K. J. (2019). Regulation matters: A comparison of Malaysian-Indonesian's e-hailing regulation framework (Doctoral dissertation, UTAR).
- Dermawan, Audrey (2022). Vehicles outnumber people in Malaysia, New Straits Time, 25 June 2020, available at <https://www.nst.com.my/news/nation/2020/06/603375/illegal-e-hailing-service-busted-penang> Illegal e-hailing service busted in Penang [accessed on 20 April 2023].

- Dills, A.K. and Mulholland, S.E., 2018. Ridesharing, fatal crashes, and crime. *Southern Economic Journal*, 84(4), pp.965-991. <https://doi.org/10.1002/soej.12255>
- Feeney, M. (2015). Is ridesharing safe? Cato Institute Policy Analysis, (767).
- Gan, Y., Fan, H., Jiao, W., & Sun, M. (2021). Exploring the influence of e-hailing applications on the taxi industry—from the perspective of the drivers. *ISPRS International Journal of Geo-Information*, 10(2), 77.
- He, W., Liu, X., & Ren, M. (2011, June). Location cheating: A security challenge to location-based social network services. In 2011 31st International Conference on Distributed Computing Systems (pp. 740-749). IEEE.
- Hirson Gale, L.S. (2016). Uber drivers' working hours prompt fears over 'excessive and unsafe' 65-hour weeks, *Independent*, 1 May 2016, available at <http://www.independent.co.uk/news/uk/home-news/concerns-over-unsafe-65-hour-weeks-for-uber-cab-drivers-a7009176.html> [accessed on 5 January 2020].
- Hirson, R. (2015). Uber: The big data company. *Forbes*, 23 March 2015, available at <https://www.forbes.com/sites/ronhirson/2015/03/23/uber-the-big-data-company/#78d032ca18c7> [accessed on 4 January 2020].
- Hong, S., & Lee, S. (2018). Adaptive governance, status quo bias, and political competition: Why the sharing economy is welcome in some cities but not in others. *Government Information Quarterly*, 35(2), 283-290.
- Hwai, L.S. (2016). Malaysian taxi drivers' protest against Uber and GrabCar paralyzes central KL traffic. *The Straits Times*, 29 March 2016, available at <https://www.straitstimes.com/asia/se-asia/malaysian-taxi-drivers-protest-against-uber-and-grabcar-paralyses-central-kl-traffic> [accessed on 13 January 2020].
- IQi Global. (2022). The world of ehailing Malaysia: 5 giants in the e-hailing industry besides Grab, 30 November 2022, available at <https://www.iqiglobal.com/blog/5-giants-in-the-ehailing-besides-grab/> [accessed on 20 April 2023].
- Izham, M.I.M. (2018). Regulating e-hailing in Malaysia is there over-regulation?. *ASEAN Insiders*, 5 December 2018, available at http://zico.group/wp-content/uploads/resources/article/ZICO_10-10_December-2018_Regulating-the-E-Hailing-Industry.pdf [accessed on 4 april 2023].
- Jais, A. S., & Marzuki, A. (2020). E-hailing services in Malaysia: Current practices and future outlook. *Planning Malaysia*, 18.
- Lai, A. (2019). E-hailing frms must protect data. *The Star Online*, 10 June 2019, available at <https://www.thestar.com.my/news/nation/2019/06/10/ehailing-firms-must-protect-data/> [accessed on 20 April 2023].
- Leng, K.Y. (2018). Commentary: On both sides of the Causeway, Grab's grand ambition hits road bumps. *Channel News Asia*, 5 December 2018, available at <https://www.channelnewsasia.com/news/commentary/malaysia-singapore-grab-ride-hailing-ambitions-hit-roadbumps-10995314> [accessed on 13 January 2020].
- Li, Y., Taihagh, A., & De Jong, M. (2018). The governance of risks in ridesharing: A revelatory case from Singapore. *Energies*, 11(5), 1277-1298.
- Lim, I. (2018). Need a Grab? There are actually 31 e-hailing firms in Malaysia, so you're spoilt for choice. *Malay Mail*, 2 August 2019, available at <https://www.malaymail.com/news/malaysia/2019/08/02/need-a-grabthere-are-actually-31-e-hailing-firms-in-malaysia-so-youre-spoi/1777099> [accessed on 5 January 2020].

- Malaysia Automotive Association (2018). Market Review for 2017 and Outlook for 2018, available at http://www.maa.org.my/pdf/Market_Review_2017.pdf [accessed on 1 January 2020].
- Nurhidayah, F., & Alkarim, F. (2017). Domination of transportation network companies (TNCs) in Indonesia: An Indonesian case. *International Journal of Business, Economic and Law*, 12(3), 2289-1552.
- Oviedo, D; Perez Jaramillo, D; Nieto, M; (2021) Governance and Regulation of Ride-hailing Services in Emerging Markets: Challenges, Experiences and Implications. (IDB Technical Notes 02164). Inter-American Development Bank: Washington, D.C., USA.
- Pham, A., Dacosta, I., Jacot-Guillarmod, B., Huguenin, K., Hajar, T., Tramèr, F., ... & Hubaux, J. P. (2017). Privateride: A privacy-enhanced ride-hailing service. *Proceedings on Privacy Enhancing Technologies*, 2017(2), 38-56.
- Pretorius, H. W. (2022). An e-halfling crime and exploitation classification framework. *Proceedings of the Society*, 84, 129-139.
- Rashid, T. S. L. T. Z., Yakob, R., Redzuan, H., Abdullah, M. H. S. B., & Saukani, M. N. M. (2022). Kesan religiositi dan persepsi risiko terhadap perancangan perlindungan takaful dalam kalangan pemandu e-hailing. *International Journal of Business and Economy*, 4(3), 361-383.
- Rayle, L., Shaheen, S. A., Chan, N., Dai, D., & Cervero, R. (2014). App-Based, on-Demand Ride Services: Comparing Taxi and Ride sourcing Trips and User Characteristics in San Francisco. Berkeley: University of California Transportation Center.
- Razali, N. F., & Daniel, D. B. D. (2022). Kajian tentang impak covid-19 terhadap perkhidmatan e-hailing. *Recent Trends in Civil Engineering and Built Environment*, 3(1), 794-804.
- Roughton, 2020. Master's Thesis: A Vehicle for Crime: Ridesharing and Victimization. University of Arkansas at Little Rock: ProQuest Dissertations Publishing.
- Salim, S., Haziq, M. A., Osman, M. H., Nor, A. H. M., Zaminan, Z., Mohamad, M. Z. A. T., ... & Azman, K. S. (2020, December). A Review on the Background of E-Hailing Drivers in Malaysia and Their Awareness with Regulations. In *IOP Conference Series: Earth and Environmental Science* (Vol. 616, No. 1, p. 012046). IOP Publishing.
- Su, R., & Fang, Z. (2019). A review of studies in taxi mobility and e-hailing taxi service. *Journal of Smart Cities*, 4(1), 1-6.
- Sun, C., & Edara, P. (2015). Is getting an Uber-Lyft from a sidecar different from hailing a taxi? Current dynamic ridesharing controversy. *Transportation Research Record*, 2536(1), 60-66.
- Teo, B.C., Mustafa, M.A. and Rozi, A.M., 2018. To Grab or not to grab?: Passenger ride intention towards e-hailing services. *Malaysian Journal of Consumer and Family Economics*, 21, pp.153-159.
- The New Straits Times (2017). Grab driver nabbed over rape of student and robbery in Malaysia, The Straits Times, 4 November 2017, available at <https://www.straitstimes.com/asia/se-asia/grab-driver-nabbed-over-rape-of-student-and-robbery-in-malaysia> [accessed on 10 January 2020].
- Todd, L., Amirullah, A., & Hui Xing, C. (2018). E-hailing Regulations: Striking the Right Balance. *Institute for Democracy and Economic Affairs (IDEAS), Kuala Lumpur*.
- Uchiyama, Y., Furuoka, F., Lim, B., Pazim, K. H., Aruchunan, E., Paidi, R., ... & Omar, S. A. (2022). Adaptability of platform cooperativism in the Malaysian e-hailing sector: A Conceptual Study. *Platform: A Journal of Management and Humanities*, 5(2), 27-35.



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- Vijayan, K.C. (2019). grabCar fined \$16,000 for leaking data of 120,000 customers in marketing e-mails, The Straits Times, 11 June 2017, available at [GrabCar fined \\$16,000 for leaking data of 120,000 customers in marketing e-mails | The Straits Times](#) [accessed on 20 April 2023].
- Wang, S., & Smart, M. (2020). The disruptive effect of ridesourcing services on for-hire vehicle drivers' income and employment. *Transport Policy*.
- Waseem, H. B., & Talpur, M. A. H. (2020). An alternate to public transport: e-hail services in Hyderabad, Pakistan. *VW Engineering International*, 2(1), 15-21.
- Yang, B., Ren, S., Legara, E. F., Li, Z., Ong, E. Y., Lin, L., & Monterola, C. (2020). Phase transition in taxi dynamics and impact of ridesharing. *Transportation Science*.

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