

THE JEEPNEY DILEMMA: EXAMINING THE FEASIBILITY OF ELECTRIC PUBLIC TRANSPORTATION IN THE PHILIPPINES.

El dilema del Jeepney: examen de la viabilidad del transporte público eléctrico en Filipinas.

Jesila Mari Faustine C. Dejuras, Michael James Flipping, Michael De La Torre Lesaca, Samuel Salvador, Royce Lyssah Merana Malabonga.

Abstract

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This study addresses two key questions: 1. What differences would e-Jeepneys bring to the Philippines' transportation system? 2. How can acceptance of e-Jeepneys among transport groups be increased?

Through analyzing the current transport system and stakeholder perceptions, this study illuminates potential benefits and challenges of e-Jeepney introduction. It explores short- and long-term implications to inform policymakers and stakeholders about transitioning to e-Jeepneys and proposes interventions to address transport groups' concerns. The research contributes to sustainable transportation discourse, providing insights for policymakers, operators, and stakeholders to shape a more environmentally sustainable, efficient, and inclusive transport system aligned with sustainable development goals.

Keywords: Sustainable development, public transportation, pollution

Resumen

El transporte es un sector crítico en Filipinas, y una parte importante de la población depende de vehículos de servicios públicos como jeepneys. Sin embargo, la tecnología

obsoleta de los jeepneys propulsados por diésel contribuye a la congestión del tráfico, las emisiones de gases de efecto invernadero y la contaminación. Para abordar estos desafíos y alinearse con los objetivos de desarrollo sostenible, el gobierno filipino inició el Programa de Modernización de Vehículos de Servicios Públicos (PUVMP), con el objetivo de reemplazar los viejos jeepneys con alternativas modernas y ecológicas. A pesar de los beneficios ambientales, los altos costos de modernización plantean desafíos y generan preocupaciones sobre la pobreza, el crecimiento económico y la desigualdad (Agaton et al., 2020; Kasuma, 2023; Beltran, 2023).

Este estudio aborda dos preguntas clave: 1. ¿Qué diferencias traerían los e-Jeepneys al sistema de transporte de Filipinas? 2. ¿Cómo se puede aumentar la aceptación de los jeepneys electrónicos entre los grupos de transporte?

A través del análisis del sistema de transporte actual y las percepciones de las partes interesadas, este estudio arroja luz sobre los posibles beneficios y desafíos de la introducción del e-Jeepney. Explora las implicaciones a corto y largo plazo para informar a los responsables de políticas y a las partes interesadas sobre la transición a los e-Jeepneys y propone intervenciones para abordar las preocupaciones de los grupos de transporte. La investigación contribuye al discurso del transporte sostenible, proporcionando ideas para que los formuladores de políticas, los operadores y las partes interesadas den forma a un sistema de transporte ambientalmente más sostenible, eficiente e inclusivo alineado con los objetivos de desarrollo sostenible.

Palabras claves: Contaminación, desarrollo sostenible y transporte público.

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Resumen

El transporte es un sector crítico en Filipinas, y una parte importante de la población depende de vehículos de servicios públicos como jeepneys. Sin embargo, la tecnología obsoleta de los jeepneys propulsados por diésel contribuye a la congestión del tráfico, las emisiones de gases de efecto invernadero y la contaminación. Para abordar estos desafíos y alinearse con los objetivos de desarrollo sostenible, el gobierno filipino inició el Programa de Modernización de Vehículos de Servicios Públicos (PUVMP), con el objetivo de reemplazar los viejos jeepneys con alternativas modernas y ecológicas. A pesar de los beneficios ambientales, los altos costos de modernización plantean

desafíos y generan preocupaciones sobre la pobreza, el crecimiento económico y la desigualdad (Agaton et al., 2020; Kasuma, 2023; Beltran, 2023).

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Palabras claves: Contaminación, desarrollo sostenible y transporte público.

Resumo

Os transportes são um sector crítico nas Filipinas, com uma parte significativa da população a depender de veículos utilitários públicos, como os jeepneys. No entanto, a tecnologia ultrapassada dos jeepneys movidos a diesel contribui para o congestionamento do tráfego, as emissões de gases com efeito de estufa e a poluição. Para enfrentar estes desafios e alinhar-se com os objetivos de desenvolvimento sustentável, o governo filipino iniciou o Programa de Modernização de Veículos de Utilidade Pública (PUVMP), com o objetivo de substituir os antigos jeepneys por alternativas modernas e ecológicas. Apesar dos benefícios ambientais, os elevados custos de modernização colocam desafios, levantando preocupações sobre a pobreza, o crescimento económico e a desigualdade (Agaton et al., 2020; Kasuma, 2023; Beltran, 2023). Este estudo aborda duas questões principais: 1. Que diferenças os e-Jeepneys trariam para o sistema de transporte das Filipinas? 2. Como aumentar a aceitação dos e-Jeepneys entre os grupos de transporte? Através da análise do sistema de transporte atual e das percepções das partes interessadas, este estudo ilumina potenciais benefícios e desafios da introdução do e-Jeepney. Explora implicações a curto e longo prazo para informar os decisores políticos e as partes interessadas sobre a transição para os e-Jeepneys e

propõe intervenções para responder às preocupações dos grupos de transportes. A pesquisa contribui para o discurso do transporte sustentável, fornecendo insights para formuladores de políticas, operadores e partes interessadas para moldar um sistema de transporte mais ambientalmente sustentável, eficiente e inclusivo, alinhado com os objetivos de desenvolvimento sustentável.

Palavras-chave: Desenvolvimento sustentável, transporte público, poluição.

Introduction

Background of the Study

Transportation is a key sector in the Philippines, as a huge population of its citizens uses public utility vehicles for transport. Among these vehicles are the jeepneys that were refurbished American vehicles left after World War II. Due to the growing economic growth and population of the Philippines, the sector of transportation is expected to rise in number which will contribute to not only traffic congestion but also greenhouse gas emissions and pollution. Thus, this will help the Philippines achieve environmental, safety, and efficiency which will further address the concern of the sustainable development goal (SDG) 11 and 13, sustainable cities and communities, and climate action, respectively. The Old technology diesel PUV, like the jeepneys, contribute to 75% and 94% of total roadside emitted refractory particle number and soot mass in Metro Manila (Agaton et al., 2020). Thus, to address the problem the government signed the Clean Air Acts, which aims to maintain clean air and follow the National Air Quality Guidelines which minimizes any possible associated impacts to the economy. Following suit, this requires all motor vehicles, both private and public, to upgrade their engines. To reduce greenhouse gas emissions and pollution, the government launched an initiative

to modernize Public Utility Vehicles, PUV Modernization Program (PUVMP), that creates more efficient and environment-friendly jeepneys by phasing out the old model and replacing it with safer and sustainable alternatives. The old model, according to the Land Transportations Franchising and Regulatory Board (LTFRB), is deemed unsafe and replacing 15 years old and older for new ones will conform to the Philippine National Standard. The phase out of models demand the jeepney operators to join groups that will help apply for loans. These loans will be used to buy modern jeepneys, which will give the operators at least 5.6% subsidy with a 6% interest rate for seven years of payment (Kasuma, 2023). Nonetheless, phasing out the old model and replacing it with a brand new model can mean a hefty sum to jeepney operators and is seen as anti-poor which further counters the SDG aforementioned as it cancels out SDG 1, 8, and 10, no poverty, decent work and economic growth, and reduced inequalities, respectively. It puts a burden on those acquiring the modern jeepneys as the modern jeepneys cost around 50,000 dollars, which is over ten times the amount of the traditional jeepneys. With this being said, groups like the Piston Land Transport Coalition demand for a pro-people approach, and better policies to protect the livelihood and jobs of the people of the Philippines.

Research Puzzle and Questions

Transport groups in the Philippines, especially those based in Luzon are heavily against the modernization of the traditional jeepneys citing reasons that the costs of the new jeepneys will be too high for them to shoulder not to mention that the Philippine government is only offering to subsidize 5.7% of each of the new e-Jeepneys (Beltran, 2023).

With this in mind, the study has formulated the following research questions:

1. What differences would the transport system of the Philippines face if eJeepneys were introduced into the system?
2. What interventions should be implemented so that transport groups in the Philippines would be more accepting of the e-Jeepney?

By answering these questions, the study hopes to shed light on the current situation of the public transport system in the Philippines and also find ways to make the e-Jeepney more acceptable to transport groups.

The Objective of the Study.

The researchers of the study would like to explore how the transport system of the Philippines would react to the introduction of e-Jeepneys into the system. Would it be more beneficial to Philippine society if diesel jeepneys were replaced? In the short term, how would the transport system be affected? Would it be beneficial in the long term? These are the kind of questions that the study will hope to answer in light of the recent mandate of the Philippine government to modernize vehicles to become more environmentally friendly.

There will be two objectives of the study. The first objective would be to answer all the questions that have been raised. The second objective would be to introduce possible interventions to make transport groups more accepting of e-Jeepneys.

The study seeks to investigate the possible effects of the introduction of e-Jeepneys into the current Philippine transport system, whether they are positive or negative. If the effects are significantly positive, then the researchers will formulate ways on how to get transport groups to be more accepting of the e-Jeepneys. Hence, this research will be a policy paper.

Significance of the Study

The study will be significant to bodies:

Firstly, to the general audience. This research will help provide readers context to the current situation of the transportation of the Philippines and what differences it will face if e-Jeepneys are introduced into the system.

Secondly, to transport groups. This research will shed light on the positive and negative effects of e-Jeepneys on the transportation system of the Philippines. Considering that transport groups tend to be more against the modernization of traditional jeepneys. This study hopes to provide them new knowledge on the matter so they can weigh out the pros and cons of the eJeepney to society and their work.

Lastly, to policymakers. This research will be beneficial to Filipino policymakers for the betterment of Philippine society. One of the objectives of the study is to introduce possible interventions to help transport groups be more accepting of e-Jeepneys, which Filipino policy formulators can make use of to create policies that help transport groups with the process of modernizing traditional jeepneys.

Review of Related Literature

History and definition of EV

Electric vehicles (EVs) have been around for a long time and were one of the earliest forms of transport. However, they were largely replaced by internal combustion engine vehicles (ICEVs) until the recent resurgence of EVs as part of efforts to achieve a more sustainable future (Doyle & Muneer, 2015).

Although electric vehicles (EVs) are often associated with modern technology, they have actually been around for over a century. The first manufactured EV was made in the 1880s. However, their popularity declined for various reasons including the high cost of production and purchase compared to gasoline-powered cars; for example, in 1912, an electric car cost \$1750, while a gasoline car cost \$650. There were also improvements in the internal combustion engine technologies. The growing petroleum infrastructure that allowed for reduced gasoline prices, quicker refuelling times, mass production of gasoline vehicles, and better road systems that connected cities. These factors contributed to the lack of success of EV deployment during that time (Muneer & Illescas Garcia, 2019).

It's important to understand what an EV is, as there are different types of low-emission hybrid vehicles on the market that are also

classified as EVs but operate differently. A battery electric vehicle (BEV) runs solely on electric propulsion, with lithium-ion batteries being the most commonly used energy storage system. On the other hand, hybrid electric vehicles (HEVs) use a combination of fossil fuels and electricity as a source of traction energy. HEVs can operate in different ways, depending on the relationship between the electric motor and the engine and how they are connected, with series, parallel, or series-parallel hybrid systems being some possibilities. Ultimately, the difference between EVs and traditional ICEVs lies in the source of energy used to power the vehicle, with EVs relying solely on electricity and ICEVs relying on gasoline or diesel fuel (Doyle & Muneer, 2015).

Climate Change & Fossil Fuel Depletion

Since the end of World War II, the world's population has grown a lot, thanks in part to the discovery of antibiotics like penicillin. As the population has grown, so has the amount of energy we use. One big contributor to energy use is transportation, which accounts for 27% of all energy consumption worldwide. Passenger cars alone make up 60% of that total. The amount of energy a society uses is closely tied to its quality of life, and most of that energy comes from non-renewable fossil fuels (Muneer & Illescas Garcia, 2019).

The consumption of fossil fuels and CO₂ emissions have increased dramatically since the onset of the First Industrial Revolution. It is projected that the demand for oil will increase significantly as the global vehicle fleet is expected to double by 2050. In 2014, fossil fuels had contributed to over 80% of the world's energy consumption, with oil being the most widely used fossil fuel at 31.3%. As mentioned earlier, transportation accounts for 27% of all energy consumption worldwide. Cars consume approximately 18 million barrels of oil per day. Energy plays a crucial role in people's lives and quality of life. Given the significant impact of vehicles on daily routines, individuals are unlikely to relinquish their use of personal transportation (Muneer & Illescas Garcia, 2019).

Without action, there is a significant risk that the Earth's surface temperatures could rise beyond 2 °C, leading to irreversible changes in the climate system. The world's growing population, energy consumption, and transportation needs are contributing significantly to climate change. The transport sector is one area where public intervention is necessary to reduce CO₂ emissions and mitigate the negative impact on the environment. Decreasing the use of fossil fuels and improving fuel efficiency is vital to limit the CO₂ burden (Muneer & Illescas Garcia, 2019).

Governments around the globe are exploring the possibility of transitioning from fossil fuels to renewable energy sources like solar power, wind power, hydropower, biomass, and wave energy. By moving away from fossil fuels, this reduces our reliance on energy imports and avoids potential energy crises should fossil fuel production not meet increasing global energy demands (Muneer & Illescas Garcia, 2019).

Public Transportation Aspect

The transportation sector plays a very important role in the Philippine economy, and road transportation is by far the most dominant sub sector that accounts for 98% of passenger traffic and 58% of cargo traffic (ADB, 2012). For Metro Manila, the urban transport infrastructure is a combination of railways systems and road networks that are filled with privately-owned public transportation services, such as Jeepneys (ADB, 2012). However, for the case of Metro Manila, due to the fact that a large portion of work opportunities are centred around this region, it is natural that there is a very large percentage of people using the road networks, both private and public vehicles, and the sheer quantity of road and public transport users are simply too much and that it leads to road congestion. Furthermore, this does show the clear problems surrounding the public transportation sector in the country, in which, despite efforts in

encouraging people to use public transportation while creating measures in reducing the amount of private vehicles used, the sheer number of people in the Metro Manila area that uses the transportation system is far too many for the current transportation infrastructure to adequately accommodate. That being said, given that the country is rapidly urbanizing, this naturally further highlights the present issues in the public transport infrastructure and would further strain its capacity and can lead to posing a risk of reducing the mobility of the urban population (ADB, 2012).

Given this, as the Asian Development Bank has mentioned, the NCR and other urban regions in the Philippines need to develop and provide better public transport infrastructure in order to reduce vehicle congestion (Simeon, 2022). Understanding the need for a re-evaluation and redevelopment of the existing public transport infrastructure, the Department of Transportation (DOTr) during the Duterte administration made efforts in using this opportunity to kickstart the modernization and restructuring of the Philippine public transport infrastructure in order to make it on par with the international standards and provide Filipino citizens with a safe, reliable and economically sustainable means of public transportation (Viado, 2023). As part of this, the Public Utility Vehicle

Modernization Program (PUVMP) was established with the purpose of modernizing and organizing the fragmented PUV sector, as well as upgrading or replacing existing public transport vehicles that are more than 15 years old in order to comply with the environmental and safety standards in other countries (Asia Pacific Foundation of Canada, 2023). Nonetheless, this modernization effort also poses a number of challenges, such as in regard to the modernization of the Jeepneys.

Jeepneys Aspect

Jeepneys constitute a bulk of the Philippines transportation system, which consist of 12 to 16 seaters repurposed American military jeeps that were left behind during the Second World War. It was made due to the desire of the Filipinos to commute faster from one place to another. Due to this it has acquired social, familial, and cultural significance in the Philippines (Mateo-Babiano et. al, 2020). Many citizens in the Philippines, like Metro Manila, rely heavily on jeepneys for transportation. Jeepneys are called the “King of the Road” and a “moving icon of Philippine culture” as it reflects Filipino creativity, craftsmanship, and entrepreneurship (Cerio, 2017). Some also see that these jeepneys are a form of Filipino ingenuity and resilience. Jeepneys are considered to be cheap and easy, though

also regarded as noisy, dirty and dangerous (Mateo-Babiano et. al, 2020). According to research carried out in 2016, The Manila Observatory, a non-profit organization, conducted a research finding that jeepneys were accountable for about 15% of particulate matter emissions in Metro Manila (“A Push to Modernize Philippine Transport Threatens the Beloved Jeepney,” 2018). These jeepneys are considered to be easy as they have a highly flexible door-to-door transport service wherein passengers can get off at any point along a fixed route.

The transition from the traditional to modern jeepneys has a holistic system reform that initiates revamping of policies, business models, and practices of modern road-based vehicles. It was introduced last June 19, 2017 by the secretary of the Department of Transportation (DOTr) which highlights the programs of regulatory reform, local public transport route planning, and route rationalization, to name a few. It is expected that the PUVMP will encourage people to abandon the use of private vehicles and use public vehicles (Sunio, 2019). They aim to improve the modern jeepneys’ safety and comfortability, which will help in the lessening of air pollution and public safety. Nonetheless, jeepney operators feel that with the modernization of jeepneys, they are affected by the cost of changing their old to new. The replacement of the jeepneys amounted to over 50, 000

dollars, which is over ten times the cost of traditional jeepneys. For them, modernization is a great project, but they could not afford the cost of the new replacement (Kasuma, 2023). Although the new jeepneys are more sustainable and pursue climate action, the overall problem to modernizing jeepneys will be the loss of jobs of the jeepney operators that cannot pay for new ones. Their reluctance comes from the sudden transition of replacing the old model with the new, with rates of loan the government is willing to give them. These loans amount at least 5.6% subsidy with a 6% interest rate for seven years of payment (Kasuma, 2023).

Government Interventions for EVs in Europe

In Kolhe & Madusha's (2017) case study titled "The scenario of electric vehicles in Norway", it was said that Norway has the highest electric vehicle per capita. Compared to 2010, in the year 2016 in Norway, electric vehicle market share rose up to 100 times. The reason for this surge is because of the interventions the government of Norway has introduced. These interventions consist of financial and convenience policies, which in turn made electric vehicles more attractive than their non-electric vehicle counterparts. An example of this intervention by the Norwegian government is having electric vehicles exempted from vehicle taxes, which boosted sales of electric vehicles.

Other incentives such as being exempted from registration taxes, having free parking, charging and access to electric bus lanes all contributed to the surge.

According to the case study titled "A case study for Northern Europe" by Doyle & Muneer (2017) about EV integration in Northern Europe, governments in this region had different results in terms of getting their population to avail EVs by giving them monetary incentives. For example, in London and Ireland, introducing monetary incentives for buying EVs increased EV sales while in the Netherlands the same scheme failed to do so, even in combination with other incentives such as tax exemptions. In France, the government has initiated the "scrappage scheme" where people who own fossil fuel powered vehicles can get it replaced with a plug-in hybrid or EV, and they would also get a bonus of €10,000.

In the same case study, in Scotland, a company called Dundee Private Taxi Hire introduced Electric Taxis into the city of Dundee. The company boasts a fleet of 100 EVs. This modernization of the taxi was only possible because of the help of the Scottish Government (Transport Scotland) and Dundee City Council. Both of these associations helped in setting up 44 charging points throughout the city and also provided the

company with five rapid chargers and ten 7 kW, 32 Amp fast chargers which helped in the modernization process of the taxis. Aside from electric taxis, Scotland also has electric buses, which were funded by the Scottish Government as well. The electric bus service was installed in one of the busiest routes in Scotland. To encourage road users to avail and use the service, commuters can make use of free Wi-Fi that is installed in the electric bus and are helped by audiovisual units which display stops along said route. This service helped bus operators see 59% increase in fuel savings, which also led to 600 metric tonnes of carbon emissions being mitigated from entering Scotland's atmosphere (Doyle & Muneer, 2017). Educating the public about common misconceptions with regard to EVs through public forums is also key for further EV adoption in society. A public forum done by Evolution, a scottish-based event in partnership with the Scottish Government, where EVs full potential are on display swayed a staggering 83% of those who attended into potentially buying an EV in the future. This assumes that a close work relationship between the Government and transport companies are essential in rolling out electric public transportation (Doyle & Muneer, 2017)

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