Enrichment: Journal of Management, 13 (2) (2023)

Published by: Instiute of Computer Science (IOCS)

Enrichment: Journal of Management

Journal homepage: www.enrichment.iocspublisher.org

Analysis of the feasibility of investing in the use of electric motors in online drivers

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ARTICLE INFO

Article history:

Received Mar 25, 2023
Revised May 15, 2023
Accepted Jun 23, 2023

Keywords:

Investment Feasibility
Electric motor
Net Present Value (NPV)
Internal Rate of Return (IRR)
Payback Period

ABSTRACT

The high number of motorbike users in Indonesia in 2020 is 115,023,039 units where motorbikes contribute 45% to the pollution generated by vehicles. Based on Jakarta's air quality index (AQI) data on January 18, 2023, an AQI value of 101 was obtained which is unhealthy for sensitive groups, of course a strategy is needed to increase the use of electric motorbikes. The purpose of this study is to see the feasibility of investing in electric motorbikes by online motorcycle taxi drivers. The method used in the calculation is to see the feasibility of the investment through NPV, IRR and Payback Period. Based on the results of calculations using the daily installment payment scheme, the total return that must be paid on the investment of electric motors and electric motor batteries is Rp. 30,168,885, - and Rp. 8,021,370 where the annual interest that must be paid by online motorcycle taxi drivers is still less than the bank loan interest of 8.75%. In terms of financial feasibility, the NPV that online motorcycle taxi drivers will receive is Rp. 5,343,823, - , IRR of 18.88% and Payback Period for 6 years 11 months.

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INTRODUCTION

(Fortuna, 2020) Motorcycles are a means of transportation with the help of machines that are widely used by Indonesian people to help with their daily activities. Motorcycles were first introduced by Michaux ex Cie in 1868 where at that time motorcycles used steam engines as the propulsion of bicycles. Then in 1885, a motorcycle with a carburetor engine was first introduced to the public until now it is known by the public as a four stroke engine(Ismiyati et al., 2014).

The growth in the number of motorized vehicles in Indonesia continues to increase, based on data from bps where in 2018 there were 126 million motorized vehicles, in 2019 there were 133 million motorized vehicles and in 2020 there were 136 million motorized vehicles(Santoso, Kurniawan Budi; Hakim, Lukman; Ningrum, Esya Racha; Widyamanti, 2018). Likewise with motorcycles, there was an increase of 9% or around 9.6 million units of motorcycles in 2020 when compared to 2018 where the number of motorcycles in 2020 was 115 million units(Habibie et al., 2021).

The high growth of motorized vehicles in Indonesia has an impact on poor air quality around this because motorized vehicles produce air pollution in the form of sulfur dioxide (SO2), carbon monoxide (CO), nitrogen dioxide (NO2), oxidants (O3), hydro carbon (HC) , PM 10, PM 2.5, TSP (dust), Pb (lead), and dustfall (falling dust)(Gede & Made, 2022). The impacts of air pollution on health and the environment include: increasing the risk of heart and lung disease, causing pneumonia and asthma in children, causing depletion of the ozone layer and impacting global warming. Based on Kompas.com data, the contributors to motor vehicle pollution in Indonesia include diesel cars by 2%, petrol cars by 14%, trucks by 18%, buses by 21% and the biggest contributors are motorcycles, namely by 45%(Fitri, 2020).

DKI Jakarta is the capital city of the State of Indonesia with an area of 661.5 km2 and a population of 10,871,856 in 2021. DKI Jakarta is known as a business center so that many companies are located in the Jakarta area. This makes DKI Jakarta one of the provinces with the most densely populated vehicles in Indonesia. Based on Kompas.com data, the number of motorized vehicles in DKI Jakarta is 21 million units, with the number of motorcycles in DKI Jakarta being 16 million units. The high number of vehicles in Jakarta also contributes to the low air quality in Jakarta. The Jakarta air quality index (AQI) forecast on January 18, 2023 has a value of 101 US AQI with unhealthy pollution levels for sensitive groups(Li et al., 2017).

To reduce the impact of air pollution caused by the high number of motorcycles in Jakarta, it is necessary to transition vehicles from conventional vehicles to more environmentally friendly electric vehicles. The number of electric vehicles in Indonesia until 2022 is still relatively small, namely only 22,671 units with sales of electric motorbikes of only 19,698 units . (Sayuti, 2008)The number of electric motorbike sales is still very far from the projected number of electric motorbikes set by the government. Indonesia projects that the number of electric motorbikes in Indonesia will be 11.8 million units in 2025 and will continue to increase to 13 million units in 2030(Sulianti & Tilik, 2013).

There needs to be a strategy to increase the use of electric motorbikes, as it is known that online drivers are motorbike users with very high mobility with an average distance traveled by online drivers of approximately 230 km, of course this also contributes to the amount of air pollution produced in DKI Jakarta. It is estimated that there are around 1 million online drivers in Jabodetabek out of a total of 4 million online drivers in Indonesia(Manopo et al., 2013).

There needs to be a strategy to encourage the transition of electric motorbikes to online drivers through electric motorbike subsidies which are planned to be carried out by the Indonesian government(Wulandari et al., 2018). In addition to providing subsidies, it is necessary to provide soft loan assistance to online drivers, considering that the price of electric motorbikes in Indonesia is still quite high, around Rp. 29 million (before government subsidies) and interest on bank loans for consumption credit (non-KPR) of 8.75%(Saida et al., 2014).

Therefore, the existence of soft loans given to online drivers through daily installment payments paid by online drivers with loan interest that is lower than bank interest can certainly attract the interest of online drivers to switch from conventional motorbikes to electric motorbikes.

So that in this study, (Made & Gede, 2022)we will look at the eligibility that will be received for lenders and drivers using the Net Present Value (NPV) and Internal Rate of Return (IRR) methods and will see the Payback Period (PP) that will be received by motorcycle online.

RESEARCH METHOD

(Abuk & Rumbino, 2020)The analytical method used in this study is divided into 3 of them: 1) Net Present Value (NPV); 2) Internal Rate of Return (IRR); and 3) Payback Period

Net Present Value (NPV)

Net present value can be interpreted as the present value of the income stream generated by investing (Susilowati & Kurniati, 2018). NPV is the result of subtracting revenue at discounted costs. Mathematically, the NPV calculation can be formulated as follows :

$$NPV = \sum_{t=0}^{n} \frac{B_t - C_t}{(1+i)^t} \quad (1)$$

Information:

NPV = Net Present Value (Rp)

Bt = Benefits in the t-year

Ct = Cost in the t-year

i = interest rate used

t = t year

The feasibility indicator is: if the NPV is positive (NPV> 0) then the business is feasible to run. Conversely, if the NPV is negative (NPV <0) then the business is not feasible to run

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the maximum interest rate that can return the costs invested(Cronje, 2020). Mathematically the IRR calculation can be formulated as follows:

$$IRR = i_1 + \frac{NPV_1}{NPV_1 - NPV_2} x(i_1 - i_2) \quad (2)$$

Information:

IRR = Internal Rate of Return

i1 = the interest rate that produces a positive NPV

i2 = the interest rate that produces a negative NPV

NPV1 = positive NPV

NPV2 = Negative NPV

The feasibility indicator is: if the IRR is greater than the prevailing bank interest rate (IRR>DR) then the business is feasible to be undertaken. Conversely, if the IRR is less than the applicable interest rate (IRR<DR), then the business is not feasible to be undertaken.

Payback Period (PBP)

The payback period is a period required to cover investment expenses using cash flow(Sayuti, 2008). Calculation of the payback period mathematically can be formulated as follows:

$$Payback\ period = \frac{\mathrm{I}}{\mathrm{Ab}} x\ 1\ \mathrm{Tahun} \quad (3)$$

Information:

I = Investment value

Ab = Discounted net cash inflows

This payback period criterion does not have standard indicators and is relative depending on the age of the project and the size of the investment. The business is feasible if the payback period of the business is not too long near the end of the project or longer than the life of the project. Relatively fast payback period is preferred for investment.

RESULTS AND DISCUSSIONS

Before carrying out the calculation of financial feasibility, it is necessary to determine in advance the parameters that will be used in calculating the financial feasibility later(Imam, 2002). The following below are the parameters used in calculating financial feasibility including:

Table 1. *Financial Parameters*

Parameter	Value
United T-1800 Vehicle Prices	Rp. 29.500.000
Battery Price	Rp. 6.500.000

Electric Motor Subsidies	Rp. 5.000.000
Project Life Time	10 Tahun
Electricity Rates	Rp. 1.444,70/kWh
Battery Lifetime	3 Tahun
Mileage	65 km
Consumer Credit (Non KPR)	8,75%
Deposit Interest	2,5%
Annual Electric Motor Tax	Rp. 125.000
5 Year Tax on Electric Motors	Rp. 335.000

By using the financial parameters as in table 5 above, the daily installments that must be paid by online drivers to application providers are Rp. 27,551, -/day with a total return for 3 years of Rp. 30.168.885,-(Purnatiyo, 2014). By looking at the total returns paid and the investment costs of electric motorbikes incurred by online drivers, the interest charged by online drivers for 3 years is 19.22% or 6.41%/year where the interest is still lower than bank loan interest by 8.75%(Pujawan, 2009).

Table 2. Return of Electric Motorbike Installments

Year	Invesment	Instalment
0	Rp. 24.500.000	
1		Rp. 10.056.295
2		Rp. 10.056.295
3		Rp. 10.056.295
	TOTAL	Rp.30.168.885
	NPV	Rp. 462.288
	IRR	11,18%

By using the financial parameters as in table 5 above, the daily installments that must be paid by online drivers to application providers are Rp. 7,325, -/day with a total return for 3 years of Rp. 8.021.370,-(Manullang et al., 2019). By looking at the total returns paid and the investment costs of electric motor batteries incurred by online drivers, the interest charged by online drivers for 3 years is 23.41% or 7.80%/year where the interest is still lower than bank loan interest. which amounted to 8.75%(Husnan, 1994).

Table 3. Return of Electric Motorbike Battery Installments

Year	Invesment	Instalment
0	Rp. 6.500.00	
1		Rp. 2.673.790
2		Rp. 2.673.790
3		Rp. 2.673.790
	TOTAL	Rp.8.021.370
	NPV	Rp. 135.745
	IRR	11,30%

The feasibility of investing in this calculation is to compare the investment side of the electric motor and the operational costs that must be incurred for using an electric motor against the cost of fuel oil (BBM) when online drivers use conventional motorbikes(Putra M.Hengki Riaran, Fadah Isti, 2016). From the calculation results, it was found that the use of electric motors by online drivers provided a positive investment feasibility, this can be seen from the NPV of Rp. 5,343,823, - , IRR of 18.88% and Payback Period for 6 years 1 month(Suratman, 2000).

Table 4. Calculation of Financial Feasibility

Information	Unit	1	2	3	4	5
Motorcycle Installments	Thousand Rp	10.056	10.056	10.056		
Battery Installment	Thousand Rp	2.674	2.674	2.674	2.674	2.674
Taxes and Others	Thousand Rp	2.305	2.305	2.305	2.305	2.640
Battery Charging Fee	Thousand Rp	3.098	3.098	3.098	3.098	3.098

Gasoline Purchase Costs	Thousand Rp	13.072	13.072	13.072	13.072	13.072
Cashflow	Thousand Rp	(5.062)	(5.062)	(5.062)	4.995	4.660
Keterangan	Satuan	6	7	8	9	10
Motorcycle Installments	Thousand Rp					
Battery Installment	Thousand Rp	2.674	2.674	2.674	2.674	2.674
Taxes and Others	Thousand Rp	2.305	2.305	2.305	2.305	2.640
Battery Charging Fee	Thousand Rp	3.098	3.098	3.098	3.098	3.098
Gasoline Purchase Costs	Thousand Rp	13.072	13.072	13.072	13.072	13.072
Cashflow	Thousand Rp	4.995	4.995	4.995	4.995	4.660

Based on the table above, the cost of investing in electric motorbikes that is paid annually for 3 years by online motorcycle taxi drivers is Rp. 10,056,295, - and the cost of replacing the battery that must be paid in installments by the driver every year of Rp. 2,673,790,-. (Sururi & Agustapraja, 2020)As well as other costs that must be incurred by the driver when using an electric motorbike such as taxes and others of Rp. 2,305,000, - and Rp. 2,640,000, - and other expenses such as electricity charging fees that must be incurred by the driver of Rp. 44.81/km or Rp. 3,098,468, - per year where the cost is much lower than using a conventional motorbike where the cost of fuel oil that must be spent is Rp. 13,071,834/year(Gittinger, 1986).

CONCLUSION

Based on the calculation results, it was found that the soft loan scheme provided to online drivers provides benefits both in terms of application providers as lenders and online drivers where from the return of electric motorbike and electric battery installments paid by online drivers, an IRR of 11.18% is obtained. and 11.30% received by application providers. Meanwhile, from the perspective of online drivers, the total return that must be paid on the investment of electric motors and electric motor batteries is Rp. 30,168,885, - and Rp. 8,021,370 where the annual interest that must be paid by online drivers is still less than the bank loan interest of 8.75%. Based on the calculation of financial feasibility with a project lifetime of 10 years, it is found that the investment in electric motors that will be carried out by online drivers will provide positive benefits with an NPV of Rp. 5,343,823,- , IRR of 18.88% and Payback Period for 6 years 1 month.

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