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The Impact of Autonomous Vehicles in Parcel Industry in Kedah

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Abstract: Autonomous vehicles are promising vital advantages for parcel industry that facing obstacles with growing labor shortage and the demand increases to deliver in short time period. Marketers have found that consumers increasingly prefer a product that be deliver on time with faster time period by the parcel sectors. This study eager to know the impact of autonomous vehicles especially in parcel activities. There were 251 consumers who have been involve as respondents in this study. As such, the finding indicates that all hypotheses are accepted and meet the objectives of the study. This study is expected to provide readers with an understanding of the packaging industry, the technology used and its autonomous vehicle activities in ensuring the sustainability in the industry.

Keywords: Courier, Express And Parcel (CEP) Companies, Autonomous Driving, Urban Delivery

1. Introduction

Courier, Express, and Parcel (CEP) services in Malaysia are the most challenging and productive areas of the economy of the transport industry. The companies in this market segment must resolve a lot of challenges in order to keep up with the market quick transformations. Transportation plays crucial role in our daily activities and nation economy to transport things or people from one location to another where they would like to have to be, where they would be more productive, or where their relative importance is high. Since the early 20th century, the general introduction of motorized vehicles has clearly improved the service business by narrowing the world and increasing overall cargoes, having a huge impact on many attributes of society. Digitalization, electrified automobiles, integration, and automated guided vehicles (AGVs) are all game-changing technologies that will have an impact on today's business concepts and logistical patterns (Hooper, 2004). Automated vehicles (AV) are definitely of the most well-known AI applications. Self-driving cars, which were once just a Sci-fi fiction, are now a reality.

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Automobiles are used practically every day by so many people, particularly in the 21st century, for personal and work-related purposes, businesses rely heavily upon that adoption of automated vehicles for their activities and the economic impact of transportation and automobile production is substantial. Autonomous automobiles may soon be a reality on our roads, regardless of the fact that they seemed like something out of a sci-fi movie several years ago. Nonetheless, the concept is not new. According to scientists, the rate of driving at which autonomous vehicles are adopted will have a major impact on travel patterns, mobility and exposure, pollution, governance, safety and security, energy efficiency, employment, data accessibility and corporate strategies (Papa & Ferreira, 2017).

There are many CEP sector companies facing various types of challenges specifically in managing transportation costs which is a major element of their overall costs of their production. Modes of transportation which they utilize will definitely determine the cost of transportations. Since transportation by air and water generally require some sort of land transportation to reach their destinations, land logistics, which includes rail and road transportation, includes most all logistics processes (Rushton, Croucher, & Baker, 2014). Regardless of the fact that it is not as cost-effective as other modes of transportation, transportation is however used in a small number of supply chain processes. (Riedel, 2017). Most probably, CEP sectors will be demanding transportation or they will own a transportation mode. The expenses to handover customers parcel to be done is higher by traditional T&L transportation. It tends to increase not only a company's variable costs, but also fuel fees and taxation costs.

A deficiency of trained drivers, which is attributed to the senior and a driver shortfall, is also another challenge for transport sector (Berger, 2016). In this regard, transportation companies experience a number of issues. Laws and regulations require truck and lorry drivers to take frequent breaks and limit their working hours (Gerdes, 2015). Furthermore, being a truck and lorry driver comes with many health issues. A survey of truck drivers in the United States found a connection between them job and risk factors such as obesity, smoking, hypertension, high cholesterol, insufficient physical activity, and six or fewer hours of sleep per night (Sieber *et al*., 2014). There is also a greater chance of being involved in an accident. Given that 34.500 people died in road accidents in 2009, this is a concerning statistic (Neuweiler & Riedel, 2017). Managing factors such as driver retention, wellness, distraction, and highlighting driver shortage are thus current problems for logistics service providers. They must maintain a balance between operational efficiency and concerns about health and safety. As a result, the demand for delivery sector is growing in this ecommerce era. There is a growing demand for transportation mode automation to make it more reliable, faster, and to address the challenges that e-commerce offers to businesses in order to improve transportation and meet customer expectations (Neuweiler & Riedel, 2017).

2. Literature Review

To recognize the possible impact of automated guided vehicles on the CEP sector, the terms "automated driving," "autonomous driving," and "cooperative driving" have various meanings and it is sometimes used simultaneously (Broek, van Nunen, & Zwijnenberg, 2011). According to the authors, the definition of smart, automated driving entails the operation and support of a specialized autonomous (sub)system by the driver. The most advanced type of the term "automated driving" refers to moving that does not demand human involvement. Cooperative driving, on the other hand, focuses on various technologies that are vital for gaining information and communicating in traffic congestion systems (Broek *et al.*, 2011). The deployment of AVs comes with a lot of advantages. Most of the enthusiasm for AVs is based on their capacity to massively minimize number of road accidents by decreasing mistakes. A highest avoidable of all major factors of deaths is automobile car crashes, cost the life of 1.2 million people every day around the world (WHO, 2015). AVs can make significantly faster accurate and timely judgements in appraising and reacting to varying road surfaces than them human

predictions by exploiting the better accuracy of GPS, sensors, and high-performance computing that enable real-time data processing (Meier, 2017). For example, the AV can enable instant braking with a far quicker response time than human drivers (Doecke, Grant, & Anderson, 2015). Autonomous vehicles could reduce collisions, resulting in significant cost savings from reducing hospitalization charges (Kockelman & Fagnant, 2015).

There have been no studies with practical data on expenses of autonomous vehicles can save compared to traditional driving a or human-driving automobiles because autonomous vehicles are not yet fully launched. However, there are alternative explanations that autonomous vehicles will save money in terms of fuel usage and driver labor costs. It should be noted that cost savings in terms of fuel usage and labor expenses may not always represent cost savings in terms of overall transportation costs, as there may be additional costs required when making the changes in driving an autonomous T&L (Kompas, Pham, & Che, 2018). Autonomous vehicles would minimize pollution and significantly boost fuel efficiency, demonstrating that they have been environmentally beneficial when compared to conventional vehicles (Greenblatt & Saxena, 2015). On the other hand, other researchers believe that Automated vehicles will all have higher efficiency due to empty driving, which would result in higher energy usage and pollution. It's difficult to say if high-level AVs will be more environmentally beneficial than conventional vehicles because they haven't been widely used. Individuals who care about the environment, on either hand, value this quality. indicated that customers who purchased autonomous vehicle expected AVs to be as eco- friendly as automobiles, which is one of the main motives for their adoption of AVs (Berliner, Hardman & Tal, 2019). For a single trip, autonomous driving is likely to be beneficial to the environment. The negative environmental impact of increased mileage may be largely influenced in the future by consumers' purchasing desire. Furthermore, at lower speeds, electric engines can reduce noise emissions. This could lead to roads being built closer to residential areas while also shortening travel distances.

Aside from being environmentally friendly, another benefit is the reduction in travel time. Due to the obvious autonomous system, users are free to do other things during their trips, resulting in a reduction in the value of travel time (Cairns *et al.*, 2014). However, not all users are concerned about this function. According to the study, the lower a people assessed much less people value time, the less ready they are to pay for AVs' variable expenses. Professionals who place a higher value on their time, on the other hand, would be more likely to spend money on AVs because they allow them to work while travelling, much like business people who work online on trains (Van den Berg, & Verhoef, 2011). According to (Noruzoliaee, Zou, & Liu, 2018) also found that when choosing between human- driven vehicles and AVs, users with a high value of travel time were more concerned about the saving of value of travel time of AVs than those with a low value of travel time. Furthermore, people may shift to a less expensive place outside of the city central while still being productive. In other words, the variety of people's travel time values may impact on customers are willing to spend more money in return for the value of journey time saved.

It's important to consider how autonomous vehicles could give CEP companies a competitive advantage. Using a "resource-based viewpoint," there are 4 phases to acquiring a competitive advantage: A CEP company's portfolio includes specific resources; In the second stage, the same company acquires "strategic resources," which are "beneficial, unique, inimitable, and non-substitutable"; these strategic resources should then be grouped with the other resources to gain a competitive advantage; and finally, the CEP company could generate a better portfolio for future resource acquisitions as explained in the theoretical framework (Wong & Karia, 2010).

Autonomous vehicles will enhance the improvement CEP firms' customer experience in a variety of ways. These services are generally impossible because to labour regulations in most countries limiting them, or because of worries about residential noise. When it comes to urban delivery, it's critical to understand the needs of your customers. As such, improving communication and experience will

ensure that customers' needs are fulfilled. The autonomous truck would inform the expected arrival time and another message after it arrived at the pickup location; delays, such as traffic, may also be conveyed in this manner (Myllymaki, 2013).

3. Research Methodology

This study uses a quantitative approach because it's appropriate to extend an outline of clarification of a study. Due to the covid19 pandemic, this study focuses on consumer at Sungai Petani area only known as an industrial area for parcel sectors like DHL, Ninjavan, Pos Malaysia Kampong Raja, GDEX, ABX Express Sungai Petani, and etc. As such, 251 respondents from twenty CEP companies have been selected as a respondent based on sample size. The survey is divided into three parts which are Section A, is relation to respondent profile such as demographical almost nine questions. The following Section B covers cost saving, environmentally friendly, Enhanced customer service, competitive advantage, and value of time travel. In Section C, covers the five questions of Impacts of autonomous vehicles in parcel sectors.

4. Results and Discussion

4.1 Demographic

There were 251 respondents was obtained from this study as tabulated in Table 1. The data attained section A that included questions about demographic profile of the respondents such as gender, age, race, marital status, occupation and income. The demographic profile was analyzed using descriptive statistics involving frequency and percentage. There were 168 (66.9%) of male respondents meanwhile 83(33.1%) represented female respondents. It shows that male respondents are higher than female respondents in this research. Next, Age is divided into five categories. The first highest number of respondents are from age group 20-31 years old that is 192 (76.5%) then followed by 42 (16.7%) respondents from age group 31-40, 17 (6.8%) and the lowest frequency of respondents which is only 17 (6.8%) from age group 20 years old and below. Age is divided into five categories. The first highest number of respondents are from age group 20-31 years old that is 192 (76.5%) then followed by 42 (16.7%) respondents from age group 31-40, 17 (6.8%) and the lowest frequency of respondents which is only 17 (6.8%) from age group 20 years old and below. The race of respondent’s highest race of respondents is Malay that is 99 (39.4%). For Chinese and Indian there were 78 (31.1%) and 74 (29.5%) respondents respectively.

The marital status shows that 168 respondents which are equal to 66.9 % are single. Meanwhile, there are 83 respondents which equal to 33.1 % are married. A part from that, occupation shows that the highest numbers respondents with 202 (80.5%) are private sector workers while the second highest numbers respondents with 31 (80.5%) are government sector. Meanwhile, there are students and self-employed which are 12 (4.8%) respondents and 6 (2.4%) respondents respectively. Moreover, respondents according to their income. It shows that the highest numbers respondents with 213 (84.9 %) are earning income RM 1000 - RM 1999 while the second highest numbers respondents with 35 (13.9%) are earning income RM 2000 - RM 3999. Followed by least number of respondents with are below RM 1000 incomers which are 3 (1.2%). Furthermore, respondents according to their delivery type is carried out and it shows that the highest numbers respondents with 164 (65.3 %) are standard delivery service while the second highest numbers respondents with 77 (30.7%) are same day delivery. Followed by least number of respondents with are overnight shipping services which are 10 (4.0%).

Next is the delivery type and the highest numbers respondents with 108 (43.0 %) are, minivan / van /MPV while the second highest numbers respondents with 87 (34.7%) are passenger car. Meanwhile,

there are motorcycle /scooter and SUV which are 50 (19.9%) respondents and 6 (2.4%) respondents respectively. Lastly, the question was about knowledge about autonomous vehicle. It's categorized into two which are yes and no. The analysis shows that 163 respondents were yes which is (64.9%) and 88 were no which is (35.1 %). Hence, knowledge about autonomous vehicle is contributed in this research.

Table 1: Respondent profile

Demography Profile	Characteristics	Frequency	Percent (%)
Gender	Male	168	66.9
	Female	83	33.1
Age	20 years old and below 21-30	17	6.8
	years old	192	76.5
	31-40 years old	42	16.7
	41-50 years old	0	0
	51 years old and above	0	0
Race	Malay	99	39.4
	Chinese	78	31.1
	Indian	74	29.5
	Others	0	0
Marital Status	Single	66.9	66.9
	Married	33.1	33.1
Occupation	Government Sector	31	12.4
	Private Sector	202	80.5
	Self-employed	6	2.4
	Student	12	4.8
	Retired	0	0
Income	Below RM 1000	3	1.2
	RM 1000-RM 1999	213	84.9
	RM 2000-RM 3999	35	13.9
	RM 4000-RM 5999	0	0
	RM 6000 and above	0	0
Delivery Type	Standard Delivery Service	164	65.3
	Same Day Delivery	77	30.7
	Overnight Shipping Services	10	4.0
	Others	0	0
Vehicle Type	Passenger Car	87	34.7
	Minivan / van / MPV	108	43.0
	Motorcycle / scooter	50	19.9
	SUV	6	2.4
Knowledge on autonomous vehicle	Yes	163	64.9
	No	88	35.1

4.2 Correlation Analysis

Pearson's correlation analysis will use in this research for the aims to measure the strength and significant relationships between independent variable and dependent variables. Thus, the independent variables of this study are cost saving, environmentally friendly, enhanced customer service, competitive advantages, value of time travel and the dependent variable is parcel sectors. Table 2 shows the result of Correlation Coefficient. As shown in table the relationship between environmentally friendly and parcel sectors where H0 is rejected and H1 has been accepted because the result is 0.835. Moreover, there were also positive relationship between save costs and parcel sectors where H0 is and H2 has been accepted because the result is 0.834. There was also positive relationship between enhanced customer and parcel sectors where H0 is and H3 has been accepted because the result is 0.845. Next is, Competitive Advantage has significant relationship with parcel sectors where H0 is rejected and H4 is

accepted because the result is 0.862. Finally, Value of Time Travel has significant relationship with consumer parcel sectors where H0 is rejected and H5 is accepted because the result is 0. 857.

Table 2: Correlation analysis

Hypothesis	Correlation Value	Findings
H0: There is no positive relationship between environmentally friendly and parcel sectors H1: There is positive relationship between environmentally friendly and parcel sectors	0.835 (Strong)	H0: Rejected H1: Accepted
H0: There is no positive relationship between save costs and parcel sectors H2: There is positive relationship between save costs and parcel sectors	0.834 (Strong)	H0: Rejected H1: Accepted
H0: There is no positive relationship between enhanced customer service and parcel sectors H3: There is positive relationship between enhanced customer service and parcel sectors	0.845 (Strong)	H0: Rejected H1: Accepted
H0: There is no positive relationship between competitive advantage and parcel sectors H4: There is positive relationship between competitive advantage and parcel sectors	0.862 (Strong)	H0: Rejected H1: Accepted
H0: There is no positive relationship between value of time travel and parcel sectors H5: There is positive relationship between value of time travel and parcel sectors	0.857 (Strong)	H0: Rejected H1: Accepted

5. Conclusion

In conclusion, transportation, autonomous vehicles play an important role to parcel sectors and it is an innovative approach to dealing with the potential repercussions and ramifications of autonomous vehicles on the logistics business. Discovery from this study found that a trend may be deduced from expert opinions in order to estimate the direction in which the autonomous vehicle movement is moving. It also can tackle key variables for gaining a competitive edge and lays the groundwork for future study. The outcomes of this study, however, can be used by marketers to identify the important impact of autonomous vehicles in parcel sectors. This is because the package is an overall marketing proposition that encourages impulsive transportation activity, raises market share, and enhances competitive advantages. Based on the hypothesis result, all the H0 have been rejected while H1, H2, H3, H4 and H5. have been accepted in this study. Lastly, the result of this study can enrich references and information to future researchers to know about the impact of autonomous vehicles in parcel sectors at Sungai Petani, Kedah.

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