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Study of Supply Chain Strategy for Achieving Sustainable Transport Near National Park, Jerantut, Pahang, Malaysia

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Abstract-Bus service is the most practical sustainable transport solution for National Park. Unfortunately, there are various kinds of difficulties that prevent sustainable transport from being perfectly running, which are basically from two birthplaces, the people and the facilities. Of these, the current investigation is conducted to study the supply chain strategy for achieving sustainable transport at National Park, Jerantut, Pahang Malaysia. This quantitative study conducted by using a survey questionnaire to different groups, i.e., local community and National Park visitors. The data analyzed using the descriptive statistics analysis, which consist of frequency, percentage, mean and standard deviation. Also, this study uses graphical descriptive analysis. The results of the analysis show that the car is the most favourable method of transport followed by motorcycle. The reasons are not solely because of the lack of bus service. However, both local and tourist feel that they are more accessible, more comfortable and faster than the public bus. Thus, this study suggested that public transport facilities must be upgraded with better roads and better bus stops. Payment methods and tickets' price is merely not a big issue for National Park. For promoting a sustainability issue, the National Park required more enhancements, not just the bus, the roads around also must be facilitated with more eco-friendly infrastructures to promote walking and cycling.

Keywords— Supply Chain Strategy, Sustainable Transport, National Park, Tourist,

1. Introduction

National Park is the first and the oldest official protected area in Malaysia. The original name of the park was King George V National Park, which was declared in 1938 by the Sultans of Kelantan, Pahang and Terengganu during King George's Silver Jubilee, where the area was gazetted to preserve the land's indigenous nature in perpetuity. The park was renamed to National Park after the nation gained independence in 1957. It is one of the oldest rainforests in the world, estimated at 130 million years old. The abundance and diversity of nature here is phenomenal, making it one of the world's most complex and rich ecosystems. National Park is very delicate, with our duty to preserve for its physical ecosystem and biodiversity either flora or fauna.

National Park has seen with an increment of local and foreign tourist arrival every year [1]. Although local visitors mainly visit national Park, however Local Plan Research for Jerantut 2008-2020 and Pahang State's Tourist Action Council also had forecasted the increment of foreign tourist arrival to National Park [2]. Although the increase of population and tourists may positively influence the rural economies, however, they also create more significant impacts on its environment. The problems caused by a higher number of motor vehicles are numerous, includes air pollution, increase noise, visual intrusion, the hazard to community road users, endangered wildlife and its habitat, highlands erosion and damage to the social fabric settlements.

The bus is a practical transport alternative to reduce the higher number of motor vehicles considering ready-built roads infrastructure that already connected to highways and railways to National Park. Besides less greenhouse gas (GHG) emission from buses, there are more benefits compared to private motor transports such as a car. Running hours, bus design, its technology, type of fuel use, passenger load factor and several other variables that relate to the efficiency of the bus can be controlled much more comfortable than private transports [3]-[4].

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Although it has more environmental benefits, the existence of bus services near National Park is threatened were lesser number of bus available there against time, and it reflects with the rising number of motor vehicles. It is becoming more difficult to get bus services near National Park, and more users turn to other alternatives motor vehicles. The growing number of motor vehicles near National Park today is at an alarming rate where the right solutions are needed urgently.

National Park can be accessed by many types of transportation either by land or water. Although National Park consists of three states; Pahang, Terengganu and Kelantan, the door of National Park in Kuala Tahan in Pahang which travellers can reach the gate by road or boats. Except for charter bus which can direct travellers to National Park, there are no direct express or intercity connection to Kuala Tahan. Tourists can reach National Park via Jerantut, the nearest town to National Park or via Kuala Tembeling by boats. Table 2 shows the type of public transport that is available to National Park for passenger's travel from other cities or towns. However, within the area near to National Park, public transportation that available for travellers to directly come to Kuala Tahan are only bus, taxi or boat. The nearest railway station to Kuala Tahan is Jerantut where travellers often continue with bus or taxi to National Park.

Jerantut is the nearest town where travellers could reach National Park, and a major number of public transportations are connected to Jerantut. There are no accessible routes to National Park by roads except Jerantut to Kuala Tahan (the door of National Park). Other than this route are jungle tracks which are not suitable for motor vehicles. Consequently, the focus of the surveys and study is to solve the sustainable transportation problems of Jerantut- Kuala Tahan route.

Table 1: Profile of tourists at the National Park

International Tourists		Domestic/ASEAN Tourists		
Backpackers Approximately 36,000 per year Majority stay at chalets in Kuala Tahan	Package tour Approximately 4,118 per year the majority stay at resorts such as the Mutiara National Park Resort	Package tour Approximately 25,000 per year the majority stay at resorts such as the Mutiara National Park Resort	Daily tour Approximately 11,000 per year Most of them visit exotic places around Kuala Tahan	Backpackers Approximately 8,304 per year Majorit accommodate in chalets in Kuala Tahan

Table 2: Type of public transportation available near National Park and its entry points

Public transport	The nearest entry to the Pahang National Park/ National Park
Train	The nearest station is Jerantut station. From Jerantut train station, passengers need approximately 1-hour road journey to Kuala Tahan, National Park. Travellers can access to train services from any KTM stations.
Boat	The nearest jetty in Kuala Tahan the Travellers can obtain boat service from Kuala Tembeling jetty, and travel duration from Kuala Tembeling to Kuala Tahan takes approximately 3 hours. Travellers can reach Kuala Tembeling by road transports from Jerantut.
Bus or taxi	The nearest stations are at Kuala Tahan and Kuala Tembeling. Travellers can access from the nearest town, Jerantut or other bus stations that offer direct services.

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In conjunction with the previous discussion, the objective of this study is to improve public transportation, especially to bus services near National Park towards sustainability that leads to the reduction of unhealthy impacts in the region. The usage of other motorized vehicles other than public buses could be reduced and limited with an increment of the public buses use. The changes would be in parallel with the reduction of traffic levels and recover environmental complications, without affecting public access and enjoyment or influencing on rural economies. For achieving this objective, we investigated through a survey work near and within National Park, which is in a region within the states of Pahang, Kelantan and Terengganu.

2.   Methodology

The foundation of this study was based on the information and data obtained from the previous research in the same regional area [2]. The necessary information was developed into a complete survey for transport users within and nearby National Park, which consist of six segments of identified main issues. The basic theme of the survey is to understand how public transport can be improved near National Park. It because when the data were first collected, it was understood that both service provider and passengers do not support each other in such a way that service providers don't want to provide and passengers don't want to use.

The questionnaires were designed to achieve three main targets, namely feedback on the overall scenario of transportation usage, the goal is the feedback on bus services, and clients' feedback on their transport facilities. The quantitative surveys were divided into two groups of respondents, the local community and the tourists. The survey for the locals was conducted to 300 respondents within and nearby National Park while another survey for tourist was conducted to the same number, 300 visitors to National Park.

The number of daily tourists in Malaysia is not constant, and it is influenced by seasonal breaks such as public holidays, school holidays and organizational of large-scale events. It is somewhat similar to the number of tourists to National Park, which is also affected by seasonal breaks. The major users for the public transports near National Park are locals, and their opinions are critical to determining the success of the service. Although there are groups of tourists, use public transport to National Park. However, most of them are using charter buses from other cities and not from Jerantut-Kuala Tahan. That is the reason why the significant numbers of the survey feedbacks are planned only for locals' respondents. The feedback information from this survey would be crucial in understanding and planning for public transportation in the future.

3.   Results

Gender characteristic of the survey to local community comprises of 62.3% males' respondents or 187 of them while the rest are females with 113 respondents. For tourists' survey, it's characterized by 144 male and 156 female respondents. Age division for the survey to the local community is divided into four categories, where the major percentage or 67% of the respondents is below 30 years, 19.7% is between 31 to 40 years, 12% is between 41 to 50 years, and 1.3% of the respondents are more than 50 years. The similar age categories used to the survey to tourist, where 88% of the respondents is below 30 years, 8% is between 31 to 40 years, and 4% is between 41 to 50 years. On both surveys to the local community and tourist, none of the respondents is disabled, and that might be the reason for very small feedbacks regarding disability issues.

3.1 Transportation modes and utilization

Local community-primarily uses motor vehicles for shopping and work, as shown in Table 3, where 35.3% of them travels for shopping and 29.7% for work. For other purposes of movement, they are with lower priorities, which are less than 10% for each of them.

Most of the people in the community have access to cars about 70.7% of them and 88% of them like to use car more than other transports because of three main reasons easy, comfort and fast. Table 3 demonstrates the travelers' feedback for a question regarding type of transports and their usage frequency from most frequent to least frequent. Result from the question has proven that the most frequent transport use by people nearby National Park is car following by motorcycle, while for public bus only 6.7% of the respondent claims that it is the most frequent transport for them. More sustainable transports like bus, bicycle and even healthy walking are less frequent among the locals. The number of bus users is higher among the tourists with 25% because some of them arrives with charter bus

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directly from their hometowns. However, the usage of cars among tourists is still predominantly high with 61.7% based on the survey.

To prove firmly that the usage of the bus is very low among the locals, the feedback as shown in Table 5 has revealed that 36% from the referrals have never used the bus service and 40% of them only use bus services few times a month.

Another set of questions which was to understand the usage of the bus and which routes they are using also return with very disappointing results, as shown in Table 4. Only 13.3% among the respondents used bus that day where all of them used the same route from Jerantut to Kuala Tahan.

Results from those questionnaires indicate that the local bus service especially the Jerantut-Kuala Tahan route is less popular or is not so important for travellers both among the locals and the tourist. To

prove that, two more questions were asked to local respondents to understand how they appreciate the service as summarized in Table 3. On the first table in Table 3 which refer to the first question, more than half of the respondents are without any answers which also can be mean that bus services do not affect their daily life. Also, another group of 1.7% of respondents have voiced out that they already have cars and the absent of bus services will not affect their daily routine. Results from the second question also give a similar picture of the behaviour of the local people towards the bus service. From the second table in Table 3 which refer to the second question, approximately half of the respondent firmly say that they don't need the public bus services. In contrast, the other respondents have other negative opinions about bus services.

Table 3. Purpose of travelling near/to National Park

Activities	Percentage
work	29.7
education	9.3
shopping	35.3
visiting relatives	9.7
Tourism	0
Recreational/ free time	2.7
Private business	9.3
Others	4

Table 4: Type of transports and usage frequency

| Type of Transport	Level of Usage (Frequent)				
	1	2	3	4	5
Car	70.0	9.7	7.0	4.0	9.3
Motorcycle	64.7	21.3	7.0	1.3	5.7
Walk	50.3	12.0	4.1	5.3	28.3
Bus	6.7	5.3	4.3	3.0	4.3
Bicycle	5.3	2.7	12.3	4.0	75.7
Taxi	4.3	5.3	5.4	6.7	78.3
Train	3.0	1.3	5.3	6.7	83.7
Others	4.3	4.0	0.0	6.7	85.0

Note: 1- Most frequent to 5 - Least frequent

Table 5: Frequency of using public transport/bus

| Frequency of using public transport	Percentage
Everyday	2.7
Few times a week	17.3
Once a week	4.0
Few times a month	40.0
Never use	36.0
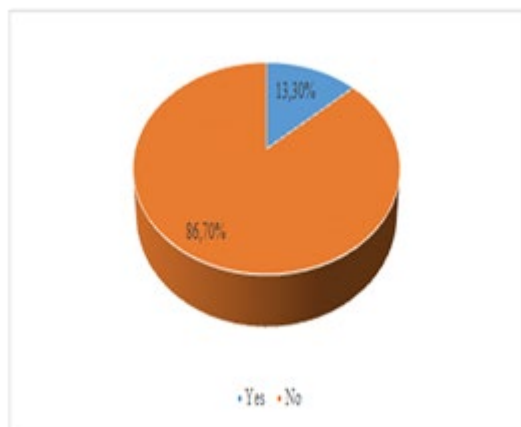
Figure 1: Bus usage and the routes near National Park

As for the tourists, public transports appear to be less favourable option with higher negative votes, as shown in Figure 2.
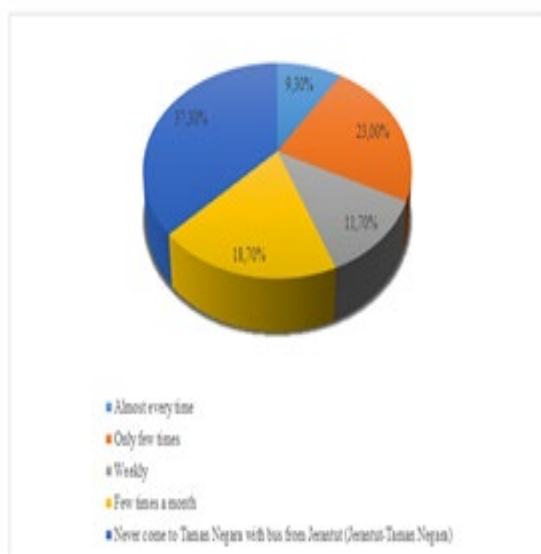
Figure 2: Usage of public transport for travel (tourism) among tourists

Although bus services appear to be not crucial for locals and tourists, however, there is a higher

percentage of supporters looking forward to bus service improvement as shown in Figure 3 where the majority of the respondents are willing to give support for public transports. Results from these questions provide a positive outlook for the future of bus services near National Park.
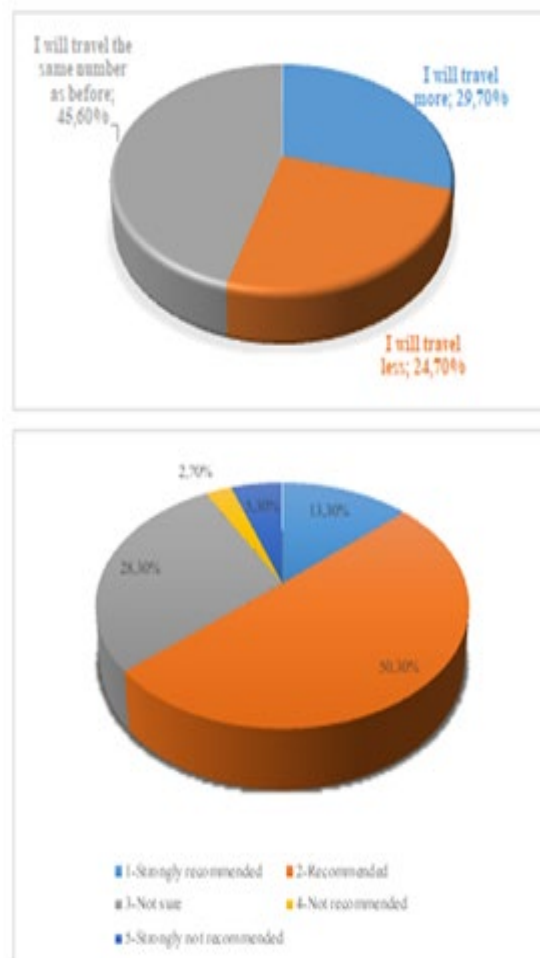
Figure 3: Support for bus services

3.2 Buses conditions and comfort

Cleanliness and the internal conditions of the buses are critical aspects for travellers' comfort, hygiene and relaxation. These factors can cause a reduction in the number of clients using bus services. Most of the bus users are aware of the "keep clean" campaign by government bodies and agencies where 91.7% from the respondents vote for that. Regrettably, 35.7% of the similar respondents stated that they have never seen any types of "keep clean" promotion posters inside the buses while oppositely 64.3% of them have seen it.

Table 6: The importance of bus services in National Park

| Can bus services affected your daily routine (work, shopping, etc.) if no bus services available in this area or being reduced? Please write your comments.	
No answers	56.7%
It will be difficult for tourists and for me	6.7%
Distance from town is very far, around 69 km	1.3%
It will affect my daily routine, become slower	28.3%
It will be difficult for me to deliver some goods	1.3%
It will not affect me because I already have a car	1.7%
My work will not be punctual anymore	4.0%
If you do not frequently use the bus services, please state the motives why you do that? (Please tick all related causes)	
No services are available from my area and to the intended destinations.	13.3%
Unsatisfied connections and exchanges	1.3%
I don't know how to take bus.	
Limited bus operations.	8%
I don't feel safe inside the bus.	6.7%
I cannot afford to use the service.	-
I don't know about the service.	-
I don't need the service.	50.7%
Others	20%

More than half of the respondents confirm that the buses seats are dirty with 55.3% votes, whereas another half of them oppose it. A major percentage of the local respondents (61%) thought that buses are unclean with garbage which can be found in buses on service. For supporting this claim as one of the major issues, 20 respondents among locals and tourist have advised that operators and users have to improve buses cleanliness for their suggestion of buses improvements and 4 respondents suggested that trash bins should be provided inside the buses. Besides that, 36% from the respondents had voted for "cleanliness/ hygiene improvement" when they were asked for" What form of changes are needed, it exists to improve our public transportation?".

Bus internal condition is a significant benchmark to attract customers where usually all users are fascinated with the neat and good-looking bus. Besides the seats, passengers' window is the next important component inside a bus. Two questions were asked to the local respondents where the synopsis is given in Figure 5. Majority of the bus users (77.4%) think that the conditions of the bus's windows are with scratches and carves where 10.7% of them believe that the marks are many. Next, roughly half of the travellers consider the buses windows are difficult to see through, which can be from dirt that accumulates on the glass windows outside the buses or could be from damages of the windows.
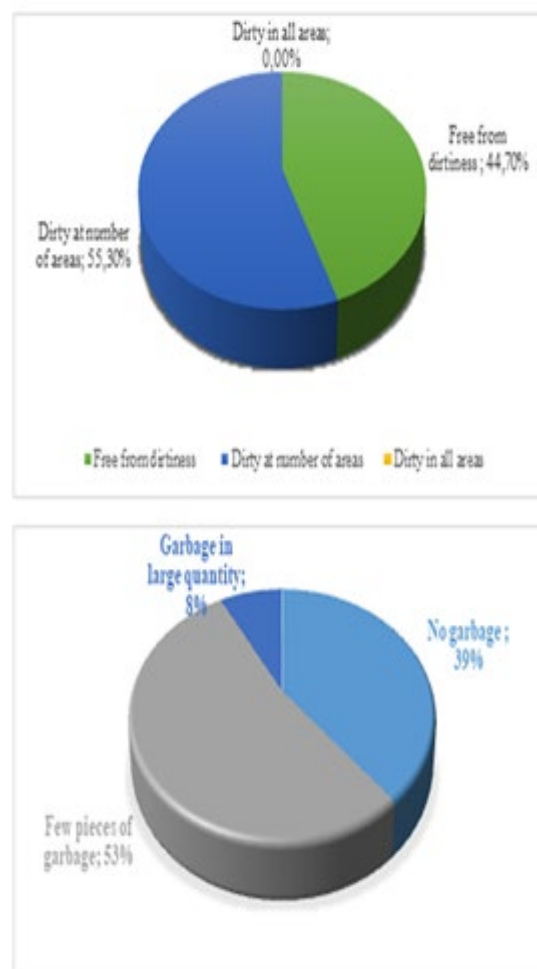
Figure 4: Bus internal cleanliness

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The number of available seats is not an issue for the bus's services in National Park since the majority of respondents strongly satisfy with that. The higher percentage of satisfactory votes also for the cooperation from drivers and bus operators. However, for "comfortable temperature" about 42.7% of the respondents are disagree and strongly disagree with the available service while the rest of them are satisfied with the current status.

Regarding the situation inside the buses with other passengers as well as treatment from drivers and bus operators' workers, all respondents give a very high positive opinion about it. A little higher percentage of unsatisfactory; which is 17.4% for "situation with teenage and young passengers" and 21.3% for "situation with adult passengers". In Table 4 is the users' feedback regarding improvements that are needed for public transport. Among those issues, only safety receive a very high vote with 43.3%.
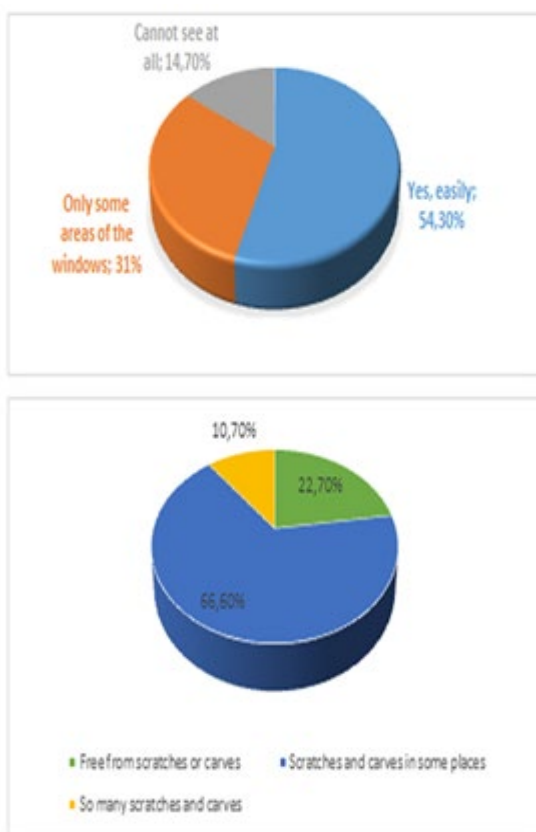
Figure 5: Conditions of the buses' windows

Besides the previous topics, respondents wrote various comments for buses improvements, which are shortened in Table 2. These comments support

the idea that improvements for buses are critical and urgently need great attention.
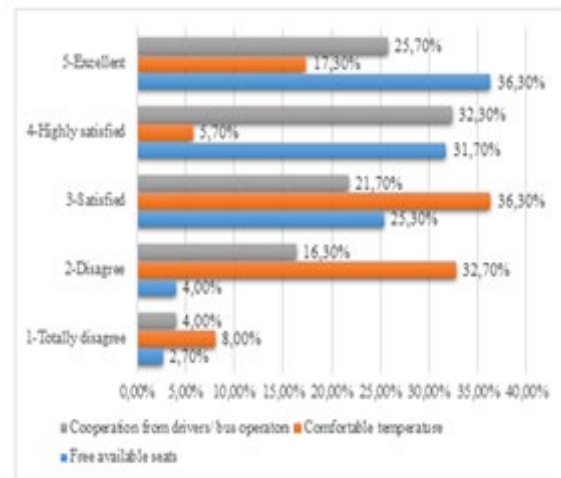
Figure 6: Clients satisfaction (other bus conditions for improvements

Table 1: Improvements for public transport

What kind of changes are needed in public transportation? Please tick the related topics.	
Less congestion inside the bus	26.7%
Bus with better conditions	25.3%
Feel safety while travelling in public transport	43.3%
Safety at bus stops	25.3%
More-quiet place	5.7%
Better access for disable people	20.3%
Better hygiene	36%

Table 2: Comments and suggestions from passengers for bus improvements

Do you have any suggestions for improvement or any comments?	Number of respondents
The bus should always be cleaned, and the bus driver should drive carefully. Ticket price should be reduced.	4
The bus must be cleaned and in good conditions at any time.	12
A bus equipped with an air-conditioning system	4
Hopefully, public bus operators would ensure that their buses always in good repair and good condition.	4
Drive carefully	20
Use new buses	8
Drivers drive too fast	4

Drivers should be more responsible, and tickets price should be reduced more.	4
Preparation of more comfortable buses would ease any works	4
Please increase more public facilities for public use	4
They need to increase their hygiene and cleanliness to ensure users comfort	4
People have to be the priority	4
Please prepare a bus that equipped with air-conditioner.	4
Better service will encourage more people to use public transport	12
The transportation system should be updated	4
Add more buses for peak time/ periods.	4
Trash bin supposed to be prepared	4
Please change to new buses and drivers should be more responsible.	13

3.3 Frequency, information and travelling time

Information and travelling time are a critical issue for bus services near National Park because of many aspects. For the bus operator's, the profitability is very important that they have to ensure that the old buses on service are loaded with enough passengers. While waiting for enough passengers on board, the proposed or official schedule also can be affected. Also, schedules and service frequency could be changed without prior notice. These kinds of services affected some of the users where some of them could not tolerate.
Feedback from local people which is shown in Figure 7 and Figure 8, suggested that although the schedules are available in the bus stations, however, they need to be improved. Improvement could be extended not only to bus stations, however to any available media or systems so that the information can be passed to the potential passengers easily.

Nearly half of the respondents are vague about the existences of schedules in bus stations as shown in the first diagram in Figure 7, with 24.3% of them are not sure whether the schedules exist, and another group of 17.7% believe that no schedules are available. In the second diagram in Figure 7, for the

feedback regarding "ease of obtaining information about routes and schedules" the total percentage for positive votes (satisfied, highly satisfied and excellent) is more than with negative votes with a total of 58%. The satisfied group is with 33.7%, highly satisfied with 13.6% and excellent with 10.7%. Further, in Figure 8 for the level of satisfaction for buses' schedule/ frequency, the total of positive votes also high with 74.3%.

As for the issue on ''information for service delay/ cancellation'', groups with negative votes is more with a total of 58% where 39% of them disagree, and 19% of them highly disagree. On the other hand, the total positive votes for "bus punctuality" is quite high, with 43.3% satisfied, 20.3% highly satisfied and 9.3% excellent. Although this issue is not critical, these results suggest that the information on service delay and cancellation has to be improved and made easily available for the users so that they could refer it quickly and plan for their journey. A system has to be created to inform the passengers about this issue. Today there are many methods, systems or technologies that can be applied and many of them are available at an affordable cost or no cost at all.

For the issue on the "frequency of the buses services", majority of the respondents gives positive votes of satisfactory; with 65% of total positive votes (satisfied, highly satisfied and excellent) as shown in Figure 7 (frequency of bus services) and 74.3% votes as shown in Figure 8 (schedule/ frequency). Although there are many negative feedbacks for this issue, especially on the comments section of the survey (Table 5), most of the users understood and satisfied with lacking numbers of service near National Park.

This issue can be improved more by understanding the user needs when is their higher demand and their low demand for bus services.

Table *3* shows the results from the respondents regarding which days in the week that the usage of bus service would be higher. Saturday is potential with the highest day of usage (44.3%) following by Monday (20.7%). To support Saturday as an important day, the respondents' feedback as shown in Figure 11 (important criteria in deciding the usage of public transports), they give very high votes 58.3% for weekend service as a "very important" criteria and 20.3% votes for "important" criteria.
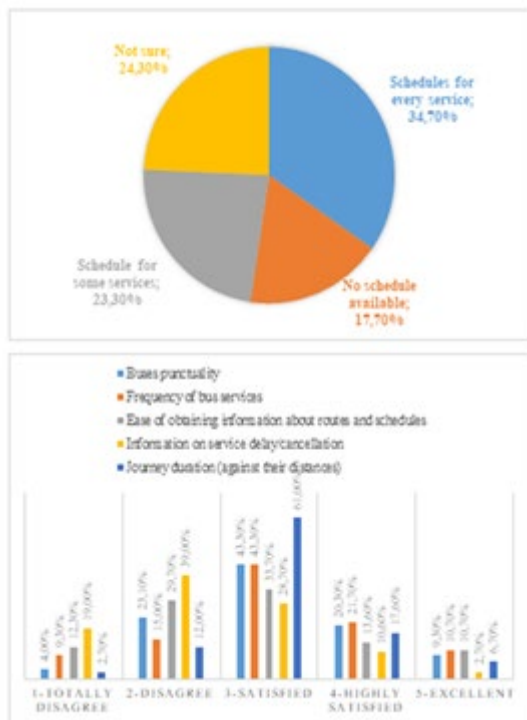
Figure 7: Information on the services, punctuality, travelling time and schedules (locals)
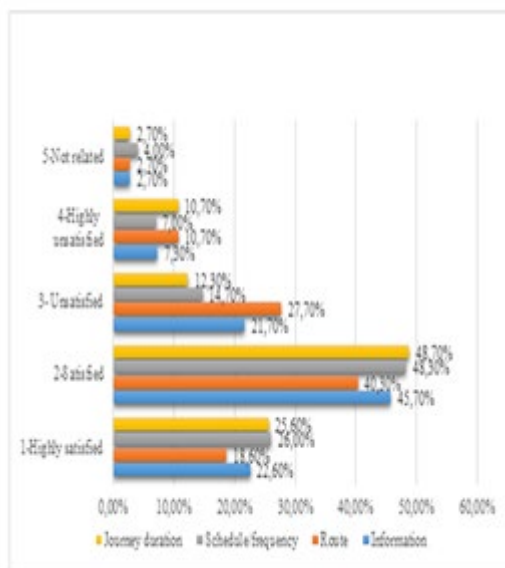

Figure 8: Level of satisfaction for journey time, schedule, frequency, route and information

Figure 9 is the feedbacks from two questionnaires regarding time and period of bus usage. From the results, it is understood that the potential period with the highest bus usage most likely will be in the morning between 9.00 am to 12.00 pm or even slightly earlier from 7.00 am.

Table 4 is the respondents' feedback regarding the usage of motor vehicles during the weekdays. These values can be used to estimate the potential of usage of public transports near National Park as well as to estimate the value of GHG emissions by motor vehicles.
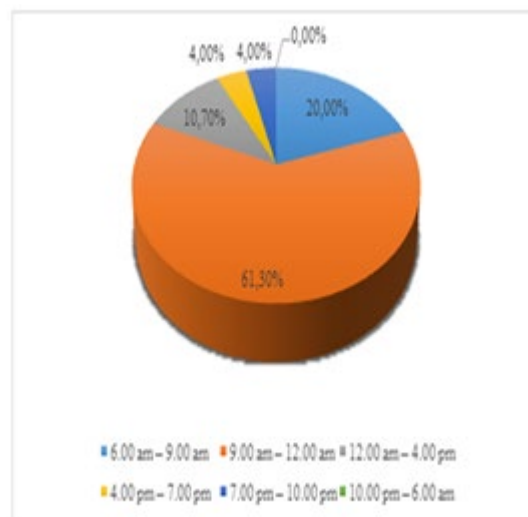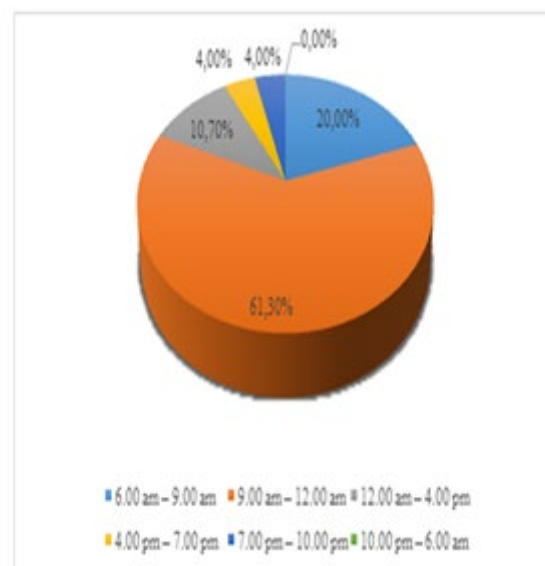

Figure 9: Time and period for high usages of bus

Table 4 is the respondents' feedback regarding the usage of motor vehicles during the weekdays. These values can be used to estimate the potential of usage of public transports near National Park as well as to estimate the value of GHG emissions by motor vehicles.

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Figure 10: Time and period for high usages of bus
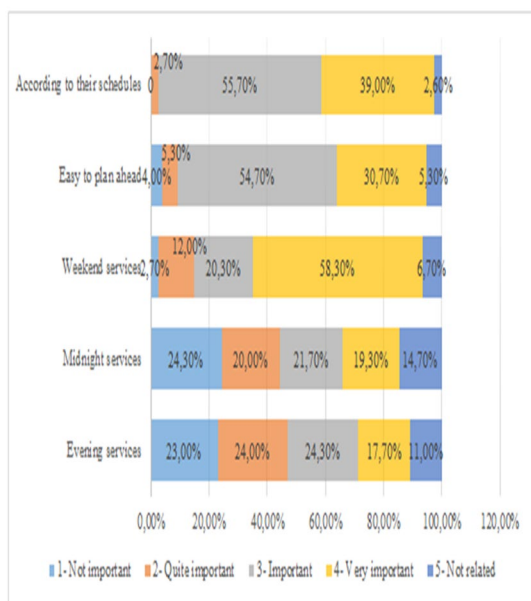
Figure 11: The feedback from "how important are those criteria for you in deciding to use the public transport."

Respondents' feedbacks in Figure 11 are to support the previous results from the issue on information and travelling time. The opinions regarding midnight and evening services are with half of the supporters while another half think that the services are not important or not related. However, the three issues; according to the schedules, easy to plan and weekend service are with very high votes for very important or important criteria which proves their reputation as important criteria for the bus users.

Table 3: High usage of the bus (days in a week)

Which days in a week the probability for you to use the public transport is high? (Please tick all related)	
Monday	20.7%
Tuesday	6.7%
Wednesday	6.7%
Thursday	8.0%
Friday	8.3%
Saturday	44.3%
Sunday	5.3%
What is the time approximately do you start you travel regularly? Morning or evening	
5.00 am	1.3%
6.00 am	1.3%

6.30 am	1.3%
6.45 am	2.7%
7.00 am	45.3%
7.30 am	4.0%
8.00 am	17.3%
9.00 am	9.3%
10.00 am	8%
11.00 am	2.7%
2.00 pm	4.0%
3.00 pm	2.7%

**Table 4:** Usage of motor vehicles by respondents (number of trips during the weekdays)

During weekdays, how many times of travelling (with vehicles) that you usually do? (Considering return as the two times travelling)	
0	6.8%
1-5	37.2%
6-10	41.2%
11-15	10.8%
16-20	2.7%
More than 20	1.4%

Table 5: Comments and suggestions from passengers for bus improvements

Do you have any suggestions for improvement or any comments? (locals)	Frequency
People have to be the priority	4
Better service will encourage more people to use public transport	12
The transportation system should be updated	4
Add more buses for peak time/ periods.	4

3.4 Public transport facilities

The conditions or built of the bus stops can be considered poor because of high negative feedback from respondents. More than half of the respondents are negative about bus stops conditions to protect them from weather, with 24.3% of them are highly unsatisfied, and 28.7% are unsatisfied (Figure 12). However, regarding the nearest bus stops distance from their home, the majority of the respondents are satisfied and highly satisfied.
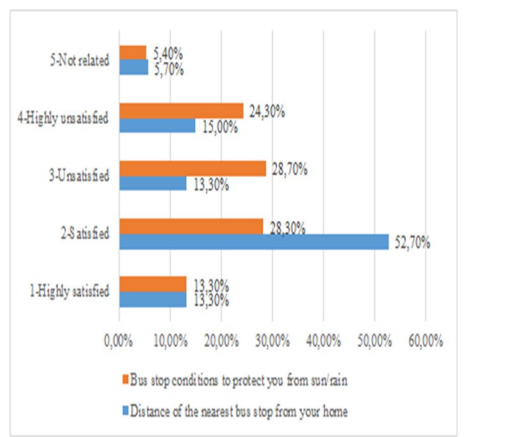
Figure 12: Level of satisfaction among locals and tourists for bus stops status

Besides the status of bus stops, the conditions of the roads are also deplorable, as shown in Table 6, the comments of respondents for the National Park infrastructures.

Table 6: Respondents comments on the infrastructure

| What are the main problems if you travel by bus to Pahang National Park? Please write your comments.	Number of respondents
The roads are small and damages/ breakdown	19
The roads are frequently breakdown/ damages	8
Roads are dangerous	4
Hot and roads are damaged/ breakdown	8
Roads are too small	4

3.5 Payment and tickets

Opinions on tickets price generally receive positive feedback with a high percentage of highly satisfied (46%) and satisfied (40.3%). Although there are some comments regarding the tickets price in the comment section, however, the number of respondents is minimal (Table 7).

Besides the tickets price, the other issues such as ease and comfort for payment and payment as general also receive positive votes from respondents.

Table 7: Comments and suggestions from passengers for bus improvements

Do you have any suggestions for improvement or any comments? (locals)	Number of respondents
The bus should always be cleaned, and the bus driver should drive carefully. Ticket price should be reduced.	4
Drivers should be more responsible, and tickets price should be reduced more.	4
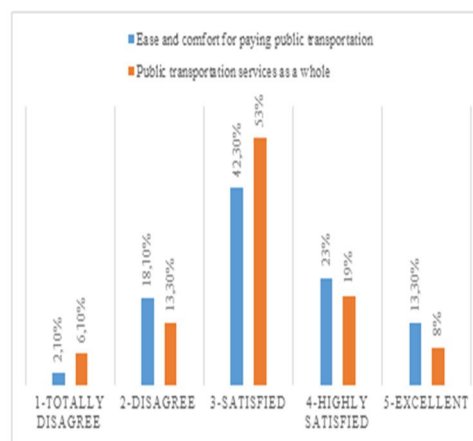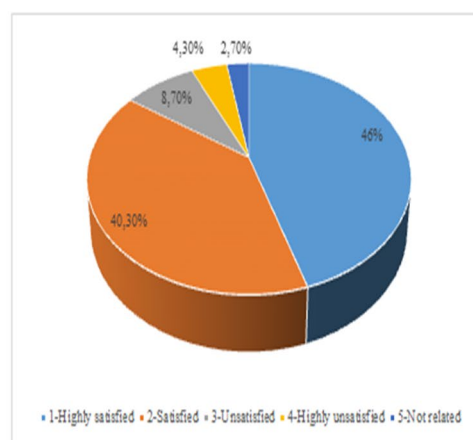
**Figure 13:** Passengers feedback on payment and tickets price
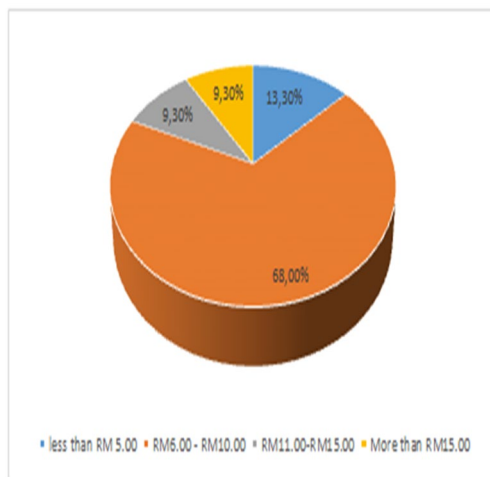
Figure 14: How much you will pay for public transport services for every journey?

3.6 Promotion

The awareness about sustainability should be promoted to the public near National Park so that more people would understand about sustainable transport such as bus service, bicycle and walk. This section intended to understand the effective method of promotions. Feedback from the respondents, as shown in

, concluded that the most effective methods are using posters with 63% following by television advertisements with 22.3%. Respondents have fairly lower opinions for other promotional methods where all of them are lower than 10% votes.
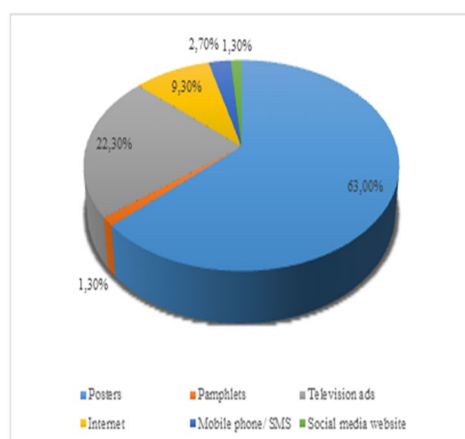
Figure 15: Public transport promotion

4.   Discussion

The usage of motor vehicles, especially car among the people and visitors to National Park considered very high as estimated from our survey approximately between 70 – 80 %. However, the real usage of motor vehicles is projected to be more than that because the number does not include other types of human activities near National Park. National Park needs more alternative solutions than just better bus transport. In other national parks outside Malaysia, many transport systems have been introduced to reduce the number of motor vehicles such as shown in Table 8. Although the number of visitors in National Park is relatively small compared to these national parks, however, the number of visitors National Park is steadily increasing.

Table 8: Prominent transport schemes operating internationally [6]

Location	Scheme type and context
Acadia National Park, USA	Island Explorer Shuttle Bus Service. Free shuttle bus employing real-time information. Revenue generated in part by the mandatory payment of a transit fee added to the Park's entrance fee. Use of the bus service is optional.
Bayerischer Wald National Park, Germany	A high-quality bus system, pedestrian and cycle routes, and the seasonal closure of selected roads to private vehicles
Yosemite National Park, USA	Yosemite Valley Shuttle System. The free network of shuttle buses providing access within and around Yosemite Valley.
Grand Canyon National Park, USA	Closure of historic Hermit Road to private vehicles between March and November. Free shuttle bus services provide allow access along the scenic route.
Zion National Park, USA	Peak time (summer) closure of Zion Canyon scenic drive to private vehicles. Canyon only accessible through use of free propane-powered shuttle bus system

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Sustainable transport issues require cooperation with all related parties, such as government departments and agencies, NGOs (non-government organizations), private sectors and communities. Nevertheless, management conflicts among the government agencies, communities and private sectors should be at the highest priority to be solved before other related issues [2]. Steiner et al. [7] have listed a number of measures for reducing the number of cars in national parks, that can be separated into two approaches, either incentives or disincentives approaches (Table 12) [6,7]. They suggested the disincentives approach, road pricing as the preferable method for reducing cars in Yorkshire Dales national park. For UK national parks however, Kendal et al. concluded that the implementation for road-pricing is a complex process and difficult to implement [6].

Zion national park has made shuttle bus services mandatory for accessing the park. Mace et al. had conducted 10 years study on visitors' assessment to understand the perception of passengers of the shuttle bus. Collectively, researchers investigating alternative transportation systems in national parks have identified several important indicators of a quality shuttle bus experience, including freedom, efficiency, accessibility, crowding, convenience, transportation perceived as an attraction, environmental values, cost, stated preference, and availability of accurate real-time information. The visitors' opinion on the service is positively growing, especially after continuous and various enhancement of the shuttle bus service [8].

As for National Park, incentives measures are at a higher priority than the disincentives measures because of the absence of necessary infrastructures and facilities [9-10]. National Park needs improvements of bus such as low emission bus, bus conditions, bus stops and stations, information such as real-time information, scheduling, reliability and service quality [10]. Besides that, to encourage people towards eco-friendly roads with cycleway and footpath also have to be provided. Sustainable measures are similar to Zion national park by road closures and prohibiting access for motor vehicles. It can also be implemented to National Park, however, at the second stage after National Park is equipped with enough infrastructures and facilities as well as eco-friendly promotions to educate the people [11]. Implementation of disincentives measures for National Park may require a separate study to understand the effect of such implementation in the future.

Table 12: Taxonomy of transport planning measures to influence the travel behaviour of visitors to national parks (Yorkshire Dales, United Kingdom) [6,7]

Measure	Description	Expected effectiveness in reducing car use
INCENTIVES		
Enhanced public transport provision	Improved frequency, reliability, coverage, service quality	Low/ medium
Public transport publicity/ campaigns	Improved marketing; improved timetabling	Low
Cycling/ pedestrian improvements	Cycle hire; Cycle routes; Cycleway and footpath improvements They are improving the signing, publicity etc.	Low
DISINCENTIVES		
Road-pricing	Charging for the use of roads, or access to National Park or specific locations within	High
Road closures	Prohibiting access for motor vehicles	High
Rationing – quantity	Access prohibited once a certain level of vehicle numbers reached	Medium
Parking control	Limiting provision, charging	Low

Route hierarchies	Advisory routes to keep vehicles on appropriate roads	Low
Speed limits	Speed limits below the norm for the type of road	Low
Traffic calming	Vehicles slowed through road capacity reduction or speed humps	Low
Signposting/ gateways	Use of signing to increase awareness of special nature of the area	Low

Table 17: Suggested sustainable measures for National Park

Suggested sustainable measures for National Park	Improvements
Enhanced public transport provision	Improvement of the bus (such as low emission electric bus), bus stops that can protect passengers from weather, bus conditions, information, schedule, reliability and service quality
Cycling/ pedestrian improvements	Roads with cycling/ pedestrians' improvements Cycle hire; cycle routes; cycleway and footpath improvements They are improving signing, publicity etc.
Promotion	Posters and advertisement to encourage people to sustainable.

5 Conclusions

In conclusion, the results of the analysis show that the car is the most favourable method of transport followed by motorcycle. The reasons are not solely because of the lack of bus service. However, both local and tourist feel that they are more accessible, more comfortable and faster than the public bus. Thus, this study suggested that public transport facilities must be upgraded with better roads and better bus stops. Payment methods and tickets' price is merely not a big issue for National Park. For promoting a sustainability issue, the National Park required more enhancements, not just the bus, the roads around also must be facilitated with more eco-friendly infrastructures to promote walking and cycling.

References

[1] Daud, N., and Rahman, S. A. (2011, August). "Tourist attitudes towards sustainable tourism: empirical evidence from Malaysian National Park, Taman Negara." In IPEDR. 2010 International Conference on E-business, Management and Economics (Vol. 3, pp. 254-258).

[2] Ibrahim, Y., and Hassan, M. S. "Tourism management at Taman Negara (national park), Pahang, Malaysia: conflict and synergy." Journal of Ritsumeikan Social Sciences and Humanities, vol. 3, pp. 109-122, 2011.

[3] Yu, Q., Li, T., and Li, H. "Improving urban bus emission and fuel consumption modeling by incorporating passenger load factor for real world driving." Applied Energy, vol. 161, pp. 101-111, 2016.

[4] Replogle, M. A., and Fulton, L. M. "A global high shift scenario: impacts and potential for

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more public transport, walking, and cycling with lower car use." California: Institute for Transportation and Development Policy, 2014.

[5] The Office of Chief Statistician Malaysia , "Domestic Tourism Survey, 2011 - Summary Findings," Purajaya: Department of Statistics Malaysia, 2012.

[6] Kendal, J., Ison, S., and Enoch, M. "UK National Parks: a role for road-pricing?." International Journal of Sustainable Transportation, vo. 5, no. 1, pp. 25-42, 2011.

[7] Steiner, T. J., and Bristow, A. L. "Road pricing in National Parks: a case study in the Yorkshire Dales National Park." Transport Policy, vol. 7, no. 2, pp. 93-103, 2000.

[8] Mace, B. L., Marquit, J. D., and Bates, S. C. "Visitor assessment of the mandatory alternative transportation system at Zion National Park." Environmental management, vol. 52, no. 5, pp. 1271-1285, 2013.

[9] Aziz, N., Muhammad, Z., Saputra, J., Ghazali, F., Talaat, W. I. A. W. "A Study of the Socioeconomic Development Trends in Central Terengganu, Malaysia: Potentials of Marine Spatial Planning." Jour of Adv Research in Dynamical & Control Systems, vol. 12, no. 6, pp. 776-785, 2020.

[10] Saat, S. A., Ghani, L. A., Alipiah, R. M., Saputra, J. A., Jamin, R. M., and Koris, R. "A Study of Solid Waste Management in Malaysia: An Ecological Modernization Perspective." International Journal of Advanced Science and Technology, vol. 29, no. 7, pp. 1716-1722, 2020.

[11] Muhammad, Z., Saputra, J., Hashim, N., Mohd Nor, M., and Mursyidin. "A study of green management practice for reducing annual budget and protecting the environment." Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision 2020, pp. 573-580.