

Research Question: To what extent does the Brunei-Muara bus transportation system support the population's recreational and work demands?

Abstract

This essay analyses bus usage as well as related infrastructure in the Brunei-Muara region as well as their effect on the social and economic impacts on users. The investigation finds that the demographics of bus users is highly skewed towards ethnicities and groups that have migrated into Brunei for low-paid working jobs due to economic reasons. Filipinos, Indonesians and Southern Asians are overrepresented while Malays are underrepresented, which may be concluded to be due to a social stigma caused by the negatively perceived image of the system. This image derives from the poor infrastructure, efficiency and safety of the system, seen by bus lines that cannot meet the demand and run over capacity as a result. Furthermore, the main bus station has insufficient seating and standing areas for passengers, causing passengers to stand on bus parking stations and lanes, creating a safety hazard especially when there is congestion. These flaws of the system and its perceptions have a direct impact on the workers that use it: while the system is cheap and affordable, long waiting times reduces bus users' potential economic and social activity and insufficient spaces within buses limits the carrying load of each passenger, even with necessities such as groceries. Furthermore, the lack of timings on the buses result in the system being unreliable for deadlines and times, restricting the ability for workers to reach certain times for work. These disadvantages of the bus system are part of social sustainability, meaning that for many workers, the system is socially unsustainable, thus heavy investment from the Brunei government is required to improve the system. My interest in this topic comes from my experiences of regular usage of the bus system, I had realised that the system differed from many Western-style transportation systems, despite similar technology being used.

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Paragraph.

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Introduction

Theory – Public transport is an important factor in the social, environmental and economic development of a country. Development¹ is measured through different factors and indexes, the most frequently used being the Human Development Index (HDI)².

Social sustainability or development is particularly important as it helps to maintain and improve existing connections between people, families, youths and employers, in terms of employment, economic interactions and social relations (**Landry, 2006**). For migration, social sustainability is especially important due to the lower income levels that migrants from periphery countries receive. Lower incomes for migrants reduces disposable incomes that result in migrants using less private vehicular transport and instead more alternative transport, including public transport, thus supporting their social sustainability (**Appendix 1**).

Public transportation mobilises lower-income groups, especially in segregated, inner-city areas, allowing them to commute home, to work and other locations, helping generate incomes and ultimately support economies and countries. Therefore, most governments, as well as corporations, invest heavily in infrastructure and services related to public transport. For example, the European Union (EU) spent over €40 billion (**UITP, 2014**) on public transport and adopted fringe benefit systems in which employers are permitted to pay directly for employee transport without taxes. Alongside this, vehicular petrol taxes were introduced in the EU (**Kelemen-Erdős, Anikó, 2012**) to discourage private vehicle use. However, with a

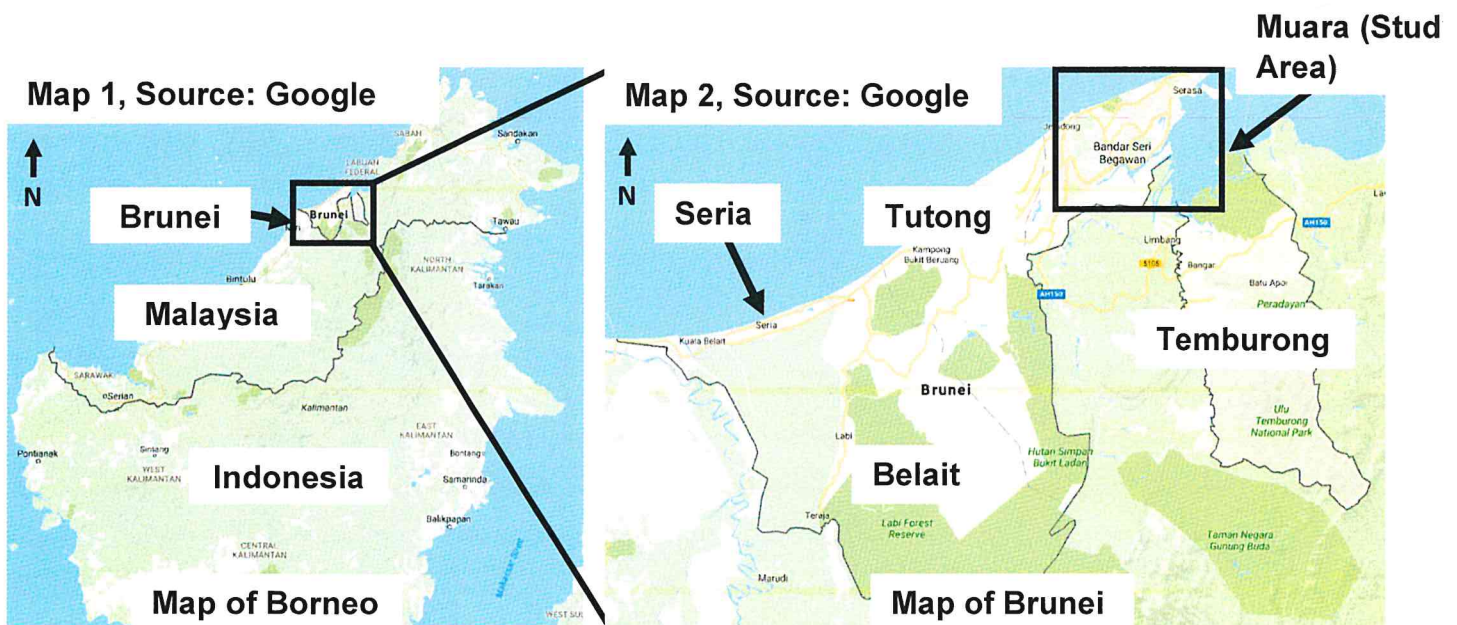
¹ Development is defined as the gradual, sustainable improvement in the quality of life over time.

² Human Development Index is a weighted statistic involving GDP per capita, life expectancy, fertility rate, education levels and other factors.

high level of wealth, Brunei's poor bus systems, especially in terms of user satisfaction, efficiency, comfortability and image, are still unresolved with many unsuccessful attempts.

Context – Brunei Darussalam is a small country (5,765km²) located in Southeast Asia with a population of around only 436,620 (**The World Factbook, 2016**). The nation's capital is Bandar Seri Begawan (BSB), with a very small population of around 27,000. The country is split into four districts: Belait, Tutong, Muara and Temburong, with Muara being the most populous at around 295,300 people, it is estimated that 71.7% of Brunei's population lives within Muara (**JPKE, 2013**).

The main bus system is located around Muara, with a completely different bus system used for the districts of Temburong, Tutong and Belait. The box in **Map 2** shows the study area of this investigation, however buses to Seria (town in the Belait district) will also be considered.



Brunei has a relatively high GDP per capita of around 36,607.90 USD (**World Bank, 2015**), along with a currency (Brunei Dollars) pegged to the strong Singapore dollar suggests that it has a high level of development in economic and social aspects. However, this may not necessarily be the case as shown by Brunei's high level of income inequality, with the

Sultan's³ holding a net worth of over US\$20 billion in the monarchy, excluding other royal members and connected individuals (**Forbes, 2011**). Phenomena such as "Taxi Sapu"⁴, show that the public are relatively poor in comparison.

GINI coefficients⁵ are difficult to find for Brunei. However, Data from the government shows decreasing inequality with a steady decrease in the GINI index from 0.534 in 1987 to 0.413 in 1997 to 0.355 in 2005 (**JPKE, 2010**). However, the reliability of this data can be put into question due to its secrecy and inaccessibility, with the data source being second-hand and unreliable. Despite previous observations of inequality, the high GDP per capita and low GINI values suggests that Brunei's bus system could have excellent infrastructure and social sustainability.

Hypotheses

From this information, the following hypotheses were derived:

1. The bus system is used disproportionately by immigrant ethnicities. (Due to certain ethnicities having lower incomes and social statuses than others).
2. The bus system runs over and under its intended carrying capacity regularly over a working week. (Due to insufficient infrastructure and funding).

³ Title for the Head of State in Brunei

⁴ "Taxi Sapu" is a Malay phrase that translates to "Illegal Taxi" in English, in which a member of the public transports customers along roads and routes typically operated by buses, without official licenses.

⁵ GINI measures inequality from a scale from 0 to 1, where 0 is complete equality (where all wealth is spread equally) and 1 is complete inequality (where all wealth is owned by one person).

- The lack of social sustainability for users results in negative perceptions of the system and alternative modes of transport being used.

Methodology

Types of Data – Secondary and primary data were used in this investigation, data from the Eastern Lines (**Image 10**) regarding bus frequency and use was taken from a bus company spokesperson, whereas all other observed lines were recorded as primary data. The data was collected on four different time periods on certain days to assess activity on a wide spread of times through the working week, showing different geographical theories. These were taken on: Monday (17:40-18:40, 28th March 2016), Wednesday (10:40-11:40, 30th March 2016), Friday (12:20-13:20, 1st April 2016) and Sunday (17:40-18:40, 3rd April 2016).

Bus Frequency and Passenger Use – For primary data, buses were observed leaving and entering the station, their line numbers and time of entry and exit were recorded on a notebook (**Image 1**), the license plate was also recorded to help identify certain buses. The number of passengers entering and exiting for each bus was also counted by eye, this was repeated over the time period assessed.

Image 1

No.	T:IN	T:OUT	P:IN	P:OUT
23	17:41	17:55	7	5
01	17:49	18:03	3	1
01	17:49	17:51	11	3
45	17:49	17:51	11	3

Table of Data

Demographics – The data was collected by counting the number of people that fall within a certain ethnicity at a given area (a bus waiting platform) and to increase accuracy, the data collected are total numbers of identified people taken at 10 minute intervals over an hour.

Interviews – Interviewing people around the station area revolved around recording responses to a specific set of questions based on the hypotheses. Ratings were asked for certain transport systems from Very Bad, Bad, OK, Good and Very Good for qualification.

Bus System Context

Bus Station Location – The Brunei-Muara public bus system is centralised mainly on a station in BSB (**Map 3**) that acts as a hub where all bus lines converge. Outlying bus stops and stations, such as Muara port do also act as hubs for particular lines (e.g. Bus lines 38-39), however most routes require a stopover at the Bandar bus station, which contributes to its inefficient and slow image.

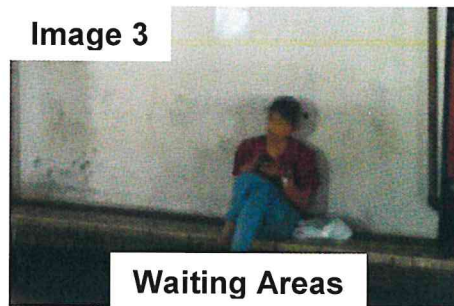


Organisation – Poor planning can be seen through the placement of benches within the bus stop. Buses are parked in two different directions, meaning that there are two different waiting sides, with one side having a higher capacity for people than others (**Image 2**) than the other (**Image 3**), providing inadequate and unhygienic seating for users. Another result of this, is that finding the correct line to take for users often requires crossing the parking lot, where there is a stream of buses at are moving at any given point, generating a safety hazard. In some cases, the differences in capacity can cause certain buses to double-park, which happens regularly.

Although commissioned by the Brunei government, the bus system is subcontracted to three different private companies⁶, while this creates competition, it also may lead to price fixing. Several other companies operate other routes, such as from BSB to Seria.

Bus Conditions – The buses have many different models: the seating quality, safety protocols and ease of use vary massively depending on the bus line taken (**Image 4, Image 6**). They are regulated by the government such that only two distinct bus sizes exist, one size has an intended capacity of around 22 and another of around 52. However, for most buses, the conditions are typically filthy compared to other nations, such as Singapore or the United Kingdom, as shown by the bad conditions of driver seats (**Image 4**). As a result of running over capacity, bottled lines can be seen at the front of the buses (**Image 5**), which often forces many bus users to stand in a small space. Not only is this uncomfortable for users and workers, considering the poor ventilation systems of the buses, but this is also unsafe as there are no seatbelts. While rails are present at the top of buses, they are rarely used by standing passengers due to their unhygienic nature with the exception of certain bus lines i.e. Line 38, Line 01A and 01C that have larger, cleaner and better renovated buses (**Image 6**). This is a negative side-effect of the privatisation and differentiation used by the operating companies of the buses, standardisation would help create consistency with passenger experience, making them easier to use

⁶ These companies are: PHLS, ADBS and Koperasi Tasamul Mukim Lumapas.



Interviews and anecdotal evidence have shown that the users of the bus system still view it very positively, which may be due to the fact that for the lower income bracket⁷ migrants, who primarily use the buses, there is no other available option as taxis and cars are too expensive and unsustainable. Therefore, any loss of quality in public transport does not reduce the positive perception of the buses from regular bus user.

Timings – Times of arrival and departure used by drivers are not visible and are often dependent heavily on capacity, meaning that buses leave whenever it is most convenient for the bus driver, or the company, or whenever profits are maximised. Therefore, times often conflict with official available timetables, as seen by the time differences and late arrivals in the main Bandar station seen on a typical Monday (data from 28th March 2016), (**Table 1**). This has the negative effect of the buses being completely unreliable for workers and users who follow a schedule. Through interviews, it is apparent that bus users model their schedule

⁷ Defined as BND\$0-7000 (Brunei Dollars)

around the bus times of an individual day, rather than the more beneficial case of the bus timings being modelled around the desired timings of the users.

Table 1, (PHLS, 2016)

Intended Time	05:40	06:10	06:30	06:40	07:10	07:40	08:05	08:35	09:05	09:30	10:00	10:30	10:55
Arrival Time	-	06:20	-	-	07:00	07:42	08:17	-	09:07	-	09:53	10:33	11:13
Time Difference	No Arrival	0:10 Late	No Arrival	No Arrival	0:10 Early	0:02 Late	0:12 Late	No Arrival	0:02 Late	No Arrival	0:07 Early	0:03 Late	0:18 Late

Lines – There is a recognisable level of organisation with the numbering of bus lines, with a numbering system that corresponds to certain bus line groups which are conveniently colour coded according to the below scheme:

Image 7 – Northern Line (Lines 20-29), Southern Line (Lines 40-49).



Image 8 – Business Central Line (Line 20 only), the nearby pillar is marked with the same colour, to help bus users identify the differing lines.



Image 9 – Circle Line (Lines 01A-01C).



Image 10 – Eastern Lines (Lines 30-39).



Image 11 – Western Line (Lines 50 and above).



The colour coding of lines was introduced in 2013 to help tackle the negative perception and stigma against the bus system (**Image 12**), as well as to fix complaints that it was unintuitive to use, showing that despite the government's neglect of the system, there were still good intentions within the government. This was co-ordinated with media interest as local newspapers called the improvement '*More than just a change of colour*' (**Image 12**) (**Brunei Times, 2013**) to help create public interest. However, the impact has been very small, with no significant improvement on the system's usability, or even the image as the demographics of the have not been changed (no changes in social status or ethnicity of bus users) since the alterations made in 2013 (**Image 12**) (**Brunei Times, 2013**).



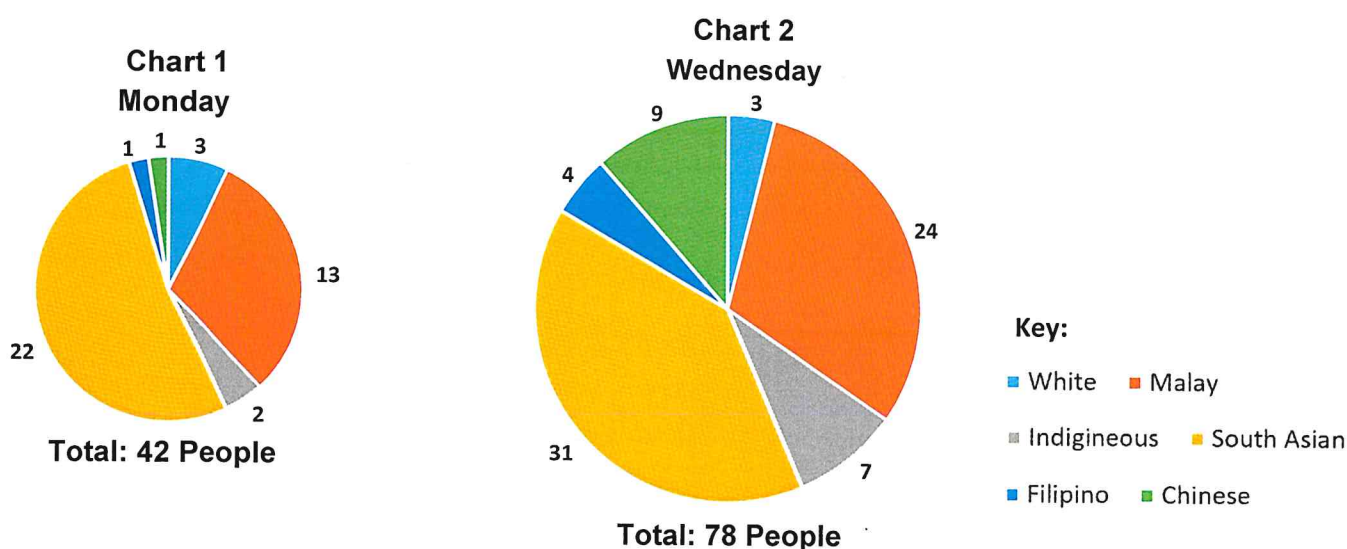
Patterns of Bus Usage

Demographics (Hypothesis 1)

The demographics of the users of the bus system directly dictates the frequency of bus use as well as the locations of travel. While a historical Friday-Sunday weekend, where Monday to Thursday and Saturday are workdays, is employed by the Brunei government. It is evident from data collection results that Friday is a working day for most bus users, with Sunday being the only free day. The Brunei government has mainly Malay employees as indigenous and other ethnicities are marginalised, these ethnicities take more presence in lower-level tertiary jobs (excluding the Chinese, who usually control businesses at higher positions), and

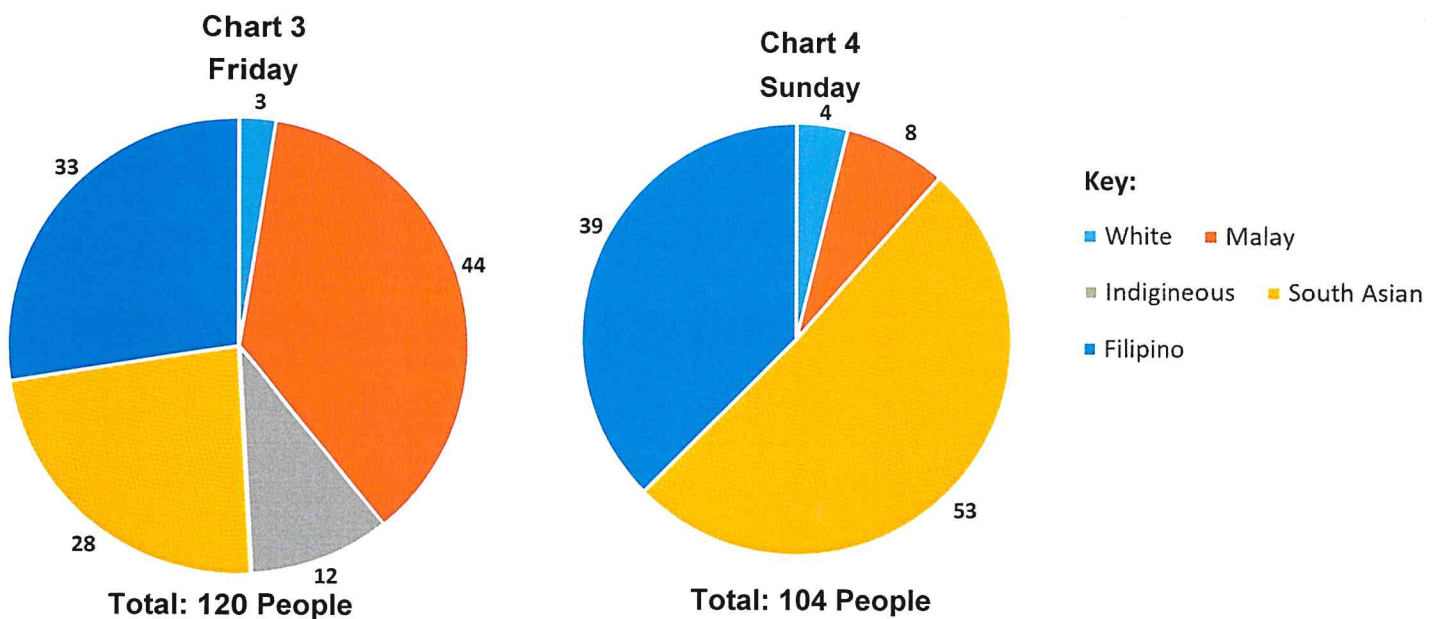
thus are more frequently seen in the bus station as the total number of Filipinos and South Asians is always higher than the number of Malays (**Charts 1-4**). This creates a social stigma within the Malays for using the bus system as it indicates a lower social status and an inability to afford cars. Cars are perceived to be cheap and accessible, with 150,000 cars on the road, almost half of Brunei's entire population (**Oxford Business Group, 2010**).

Charts 1-4 have been proportioned to the total number of bus users seen on that day. There is a high level of variation seen within the different weekdays. Workdays have very similar ethnic compositions as the proportions of South Asians, Filipinos and Malays are similar between Monday and Wednesday (**Chart 1, Chart 2**). The main difference of total numbers of passengers can be explained by the different times of the day, as during 17:40-18:40, less buses operate because the lines close down as most commuting home from work has finished. During 10:40-11:40, bus lines are fully operational and commuting to work and between workplaces is still ongoing. It can therefore be concluded that for these days, demands in terms of companies, services and the government, are similar, if not the same (**Chart 1, Chart 2**).



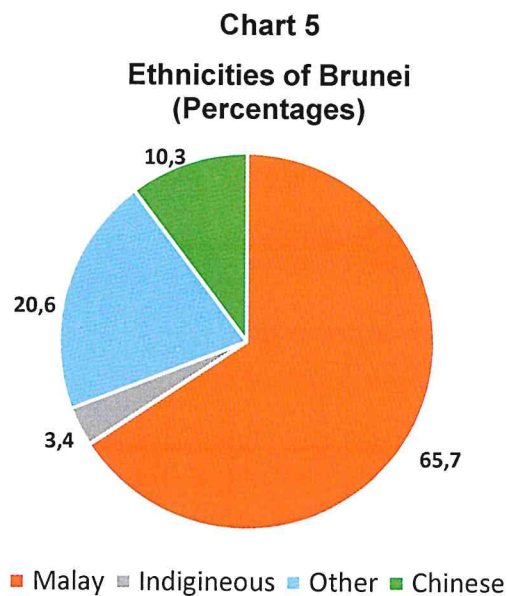
Note: The Numbers Surrounding all Pie Charts Represent the Number of People in Each Category.

Friday and Sunday (**Chart 3, Chart 4**) deviate from the pattern seen before as they are not workdays. However, during 12:00 and 14:00 on a Friday, virtually no buses operate, meaning that the people recorded on Friday were likely not using the bus system but rather only loitering. The higher proportion of Malays and smaller proportion of lower-level workers (South Asians and Filipinos) is thus explained, as the stigma seen for Malays is temporarily gone as the buses are not running. The area is used as a waiting area for work to resume for low-level jobs.



The Malay stigma against buses is most apparent when comparing the ethnic composition of Brunei itself (**Chart 5**) to that of the bus users at the bus stations (**Charts 1-4**). The percentage of Malays in Brunei is around 65.7% (**The World Factbook, 2011**) is much (35-60%) higher to that of the percentages seen throughout the week, even on Friday, where the percentage of Malays reaches 37% (28.7% difference). Extrapolating this outwards to the population of Muara would mean that 80,300 Malays (Friday estimate) to 258,000 (Sunday estimate) would not be using the bus system possibly as a result of the stigma.

Occupations – Common to Brunei is the fact that many lower-level workers live and work in the same, or very close, locations for work and home to prevent losing time at work and decreasing work output, such jobs are part of Bruneian cultures, such as being an “Amah”⁸. This explains the low number of passengers on workdays, as many workers do not even need to commute using the bus. Sunday is not affected by this as most workers still travel recreationally on their free days.



The Working Week (Hypothesis 2)

The working week has a definite effect upon the numbers of bus users and furthermore, laws instituted in 2012 by the Brunei government have also had an adverse effect on bus usage between 12:00 and 14:00 every Friday:

⁸ “Amah” is the Malay word for a maid, who lives in the house or area that he/she is paid to maintain.

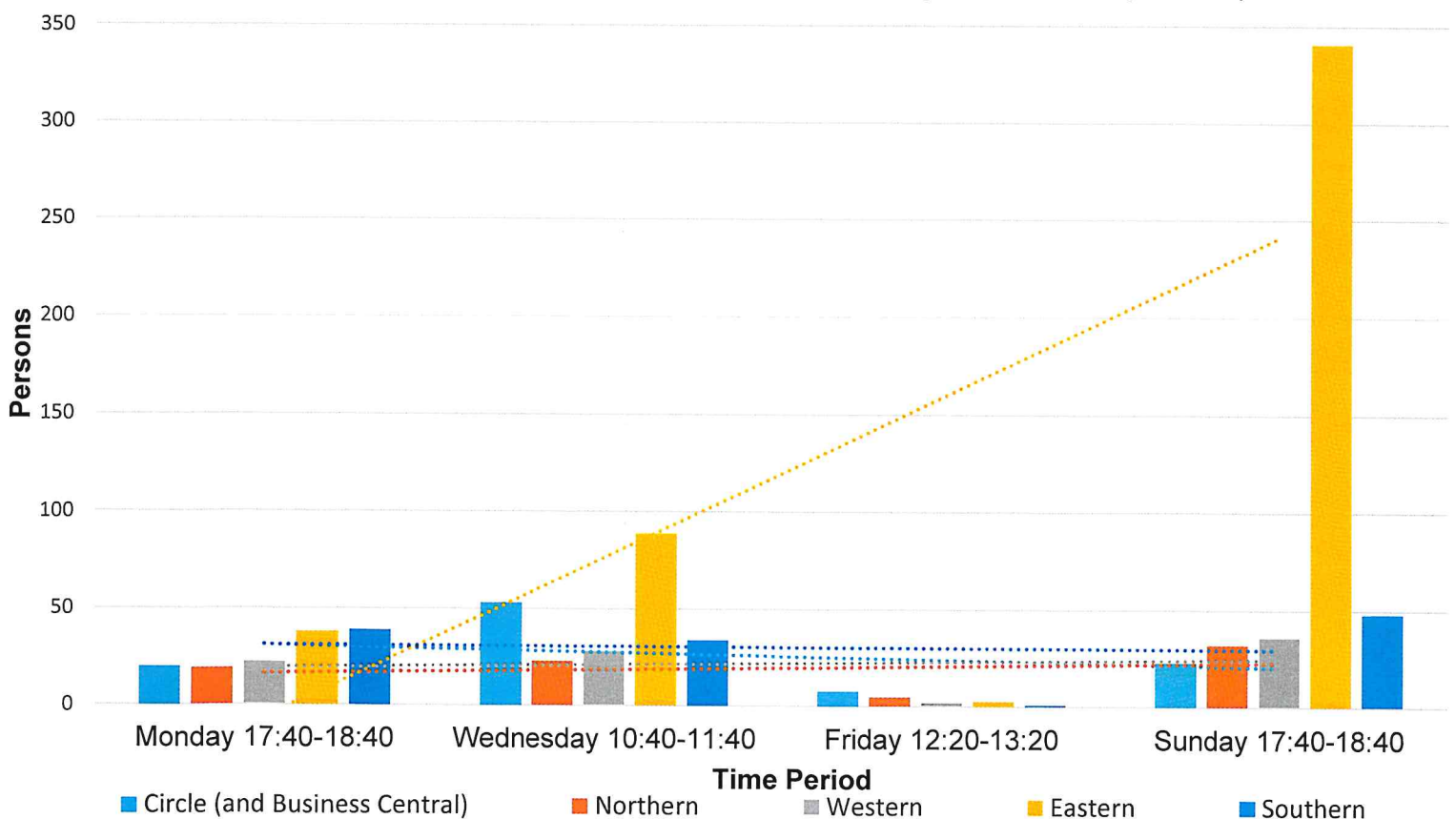
“The Ministry of Home Affairs issued a directive ... instructing "all business premises and offices, ... open markets and other business establishments" to close from 12pm to 2pm every Friday”

-Ubaidillah Masli, Reporter (**Brunei Times, 2012**)

This mandatory closure of businesses by the government (**Image 15**) is due to an ongoing transition of the Brunei Legal system from its original composition to a hybrid of Islamic Law and Bruneian laws. Its effect can be evidenced through the following graph (**Chart 6**).



Chart 6: Number of Departures in Time Periods throughout the Week (Persons)



Rather than demographics, this data shows actual departures which let us see changes in passenger load and the capacity of the station.

Bus Station Capacity – The same patterns of bus use are again seen from **(Charts 1-5)**, with around 20-40 passengers leaving on Monday and Wednesday in an hour per bus line, within the capacity of the bus station while virtually none leave on Friday, this can be evidenced by **Image 14**, taken on a Friday where the station is empty due to the business closure laws. There is, however, no hazards involved with the station being under capacity.

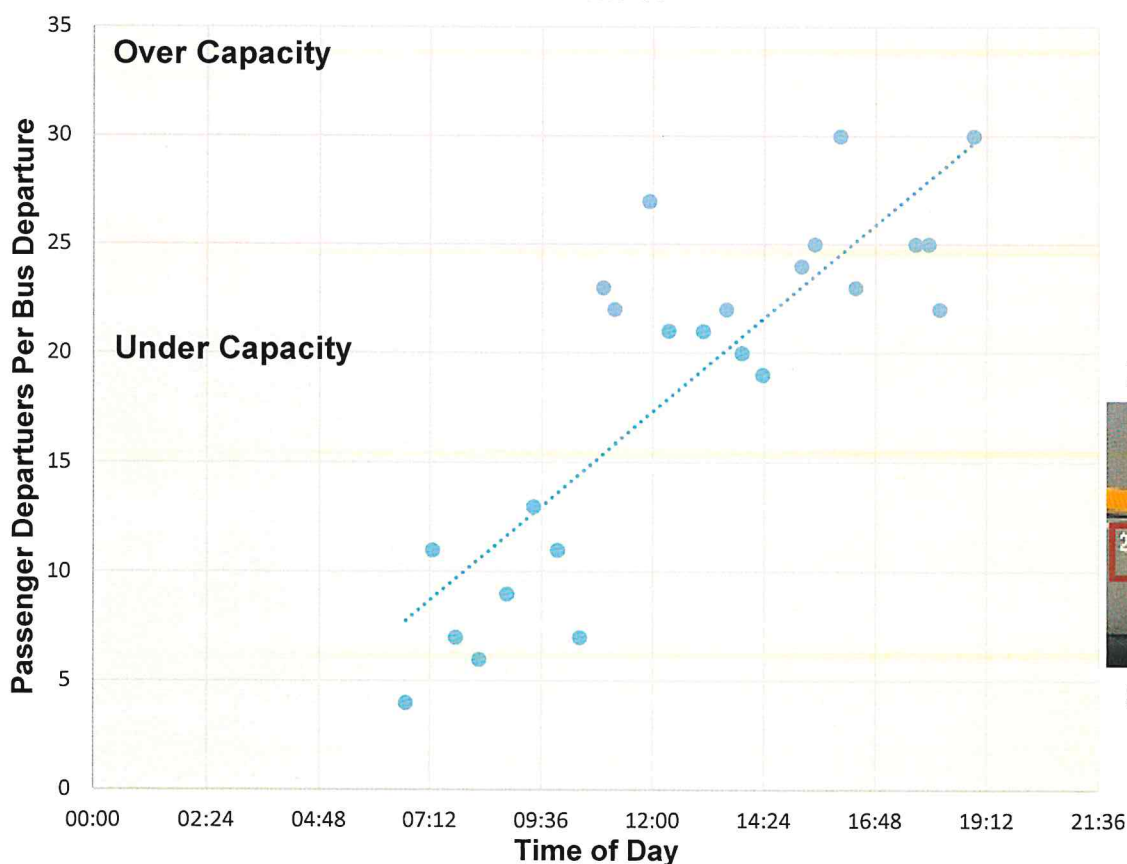
However, over 300 passengers leave the station on the Sunday period **(Chart 6)**. The station visibly cannot safely support the high capacity on Sundays, which results in the overcrowding seen in **Image 5** and **Image 15**, both taken on Sundays. Sunday has peak usage in the week as the buses are used by most workers to travel from BSB (for recreation, due to the available shopping centres and stalls) to home or work for the following work week. This creates a safety hazard relating to capacity as the passengers wait incredibly close to where buses are to be parked, accidents can occur easily **(Image 15)**. Improvements can be taken from more core or MEDC countries, such as Germany, where a curb more easily signifies where it is unsafe for passengers to stand, and where it is unsafe for drivers to drive **(Image 16)**. The paint in **Image 15** is superficial.



Bus Capacity – As the station itself is overcrowded, the buses themselves also often operate over capacity (**Chart 7**) and the station runs over its intended capacity on a weekly basis. This can be seen on Sunday evenings, where there is not enough seating or standing spaces to accommodate for the sheer number of bus users.

This can be quantified, as most buses are technically should not exceed its carrying capacity of 22 persons per bus as seen by the text on the bus written in Malay (**Image 17**). On Sunday, half of the buses leaving the station ran over capacity (**Chart 7**) (12/24 Buses) showing that the buses regularly exceed their capacity. This creates another safety hazard as the buses are not designed to support such weight, contributing to higher chances of accidents, especially when driving uphill.

Chart 7: Number of Passenger Departures on Sunday (3/4/16) on Bus Line 39



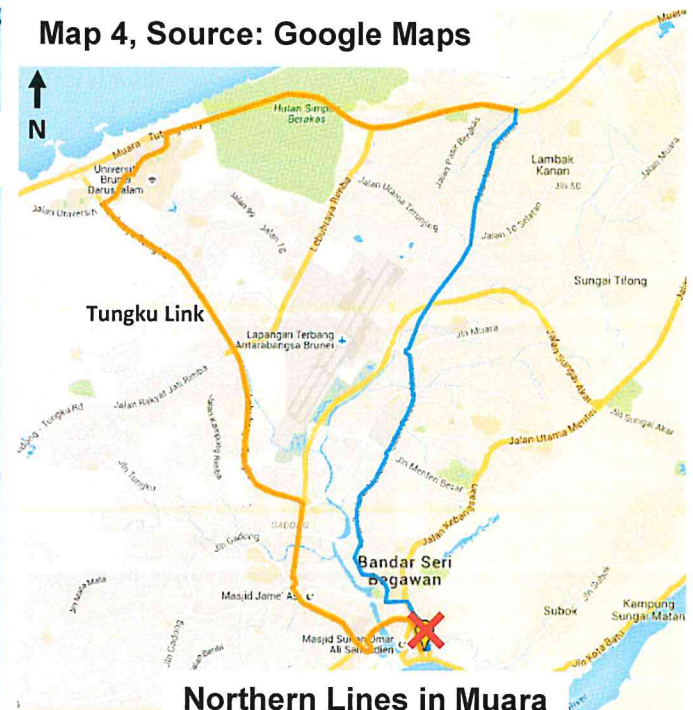
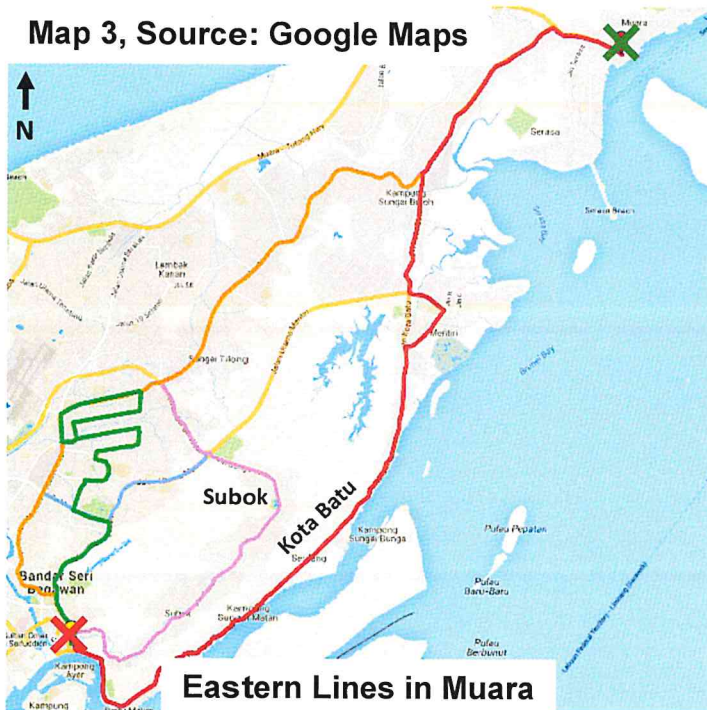
Line Capacity – From **Chart 6**, another pattern can be seen with the relative numbers of passengers using different lines, which is the heavy use of Eastern lines. At most times of the week, the Eastern lines usually carry the highest number of passengers, particularly on Sunday where it facilitated nearly 350 people an hour, as compared to the Southern line, which carried 300 less passengers in the same amount of time.

Looking at the distributions on a map explain this difference: Eastern lines firstly have a larger number of available lines, and thus more destinations to reach, however, Eastern lines also go through more residential areas than other lines (**Map 3**), such and pass through smaller roads with stops and instead of highways, which the Northern lines do along Tungku Link⁹ (**Map 4**). These smaller roads include Jalan¹⁰ Kota Batu and Jalan Subok, which often are the locations of workplaces and homes for many workers. Building developments, especially in Kota Batu, such as the bridge across the Brunei River result in construction jobs that require a large number of migrants to run. Highways (such as Tungku Link) often have few turnoffs to residential areas, where workers primarily work and live.

Despite this, the subcontracted companies often commission a disproportionate number of buses to certain lines. For example, Bus Line 55 (Northern line) has a capacity for a number of passengers far above its demand from passengers and users. While Bus Line 39 (Eastern line) has a disproportionately small capacity seen in (**Chart 7**).

⁹ Name of a highway.

¹⁰ “Jalan” is the Malay word for Road.



Key: **X** = Bandar **X** = Muara

Other forms of public transport (Hypothesis 3)

“Taxi Sapu” – Another way to see the failures of the bus system is through the prevalence of other transport systems.

Despite differences in bus usage between days, the bus system can be seen as operating over capacity for several reasons, as waiting periods are long for passengers at all locations where the system services: waiting for buses (especially Eastern lines), can take up to one hour. “Taxi Sapu” taxis usually cost only BND\$1 which is the same price for a bus ride, this indicates that the bus services do not fit the demand of the users, as many have to be unsatisfied enough to initiate this illegal system. **(Image 18)** shows an example of a “Taxi Sapu”.

Evidence of this can be seen through 14 interviews: While most respondents claimed to not take Taxi Sapu (which could be incorrect due to its illegal nature), the respondents who did claim to do so, gave very high ratings **(Chart 8)**. Respondents who gave worse ratings for

the bus system gave far worse ratings (**Chart 9**) which also confirms relative frustrations in the bus system for users in previous hypotheses.



Chart 8: Taxi Sapu Ratings

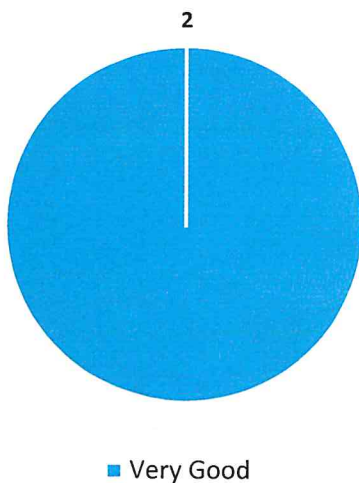
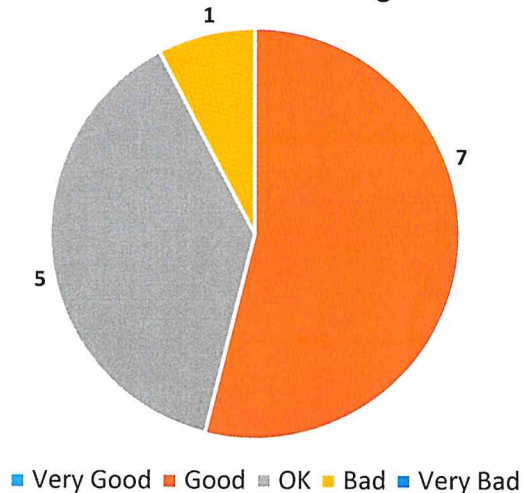


Chart 9: Bus Ratings



What can be done to improve the system?

Organisation – Most inconsistencies caused by privatising the bus system could be resolved by better communication between companies, especially on the terms of bus timings and parking locations. Bus timings could be better publicised and most importantly, followed consistently by bus companies and drivers. Improvements can be taken from MEDCs, such as the UK (**Image 19**), where timings are posted on boards within stations and on designated bus stops. This would prevent waiting times for users, which would reduce commuting time and increase the available time for workers to work and spend time at home. Co-ordination would become easier especially if the system was nationalised as it would be unified under one institution.

Updated bus routes are also very difficult to find as boards displaying routes are often inaccurate, applying the same improvements of publicising routes will enable new users of the system to better understand and learn the system quickly.

Accessibility – On bus lines and routes, the appropriate infrastructure should be built on bus stops. There are not enough bus stops to justify the demand, as many passengers request to be dropped off at unmarked locations, changing or slowing the time it takes to complete a route. Marked bus stops should be more accessible, with infrastructure such as pavements and crossings, so that potential passengers can use the system more easily, **(Image 20)** shows an inadequate bus stop on Jalan Kota Batu.

Image 19, (TripAdvisor, 2014)



Bus Timetables

Image 20

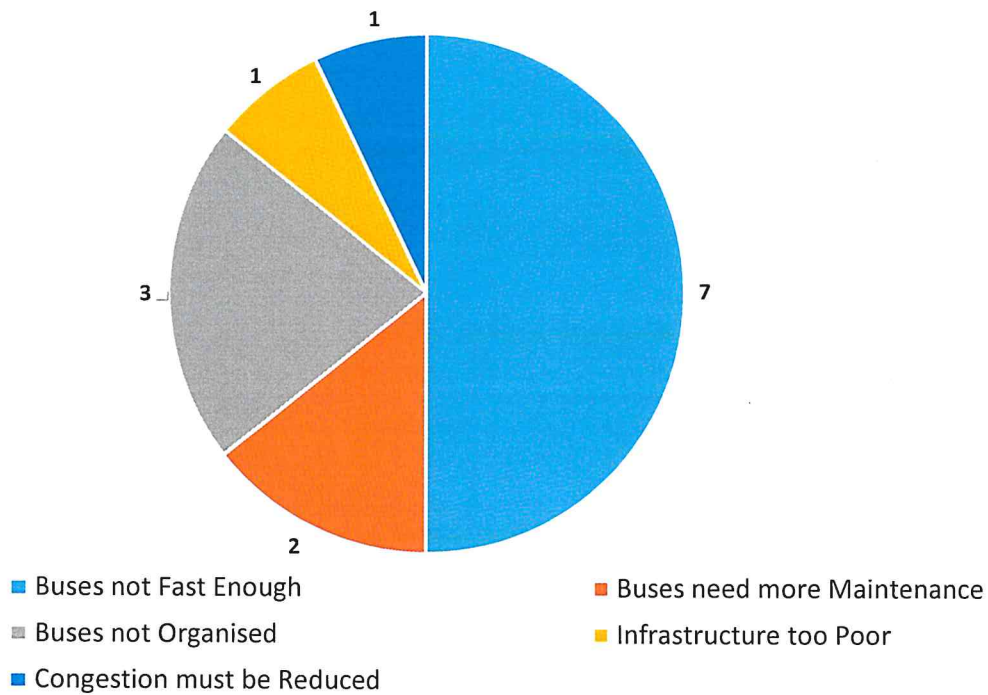


A Bus Stop

Safety – While elevated ramps and curbs be built on bus stops, simpler solutions can also be used to solve safety problems, such as expanding the seating and standing areas on both sides of the bus station to ensure that no passengers must stand on the road to wait for buses, and also to increase hygiene. Furthermore, buses could be equipped with seatbelts in case of accidents. More parking spaces would reduce congestion as well.

Chart 10 shows that many of these criticisms and suggestions have also been asked for in interviews:

Chart 10: Most Common Suggested Criticisms/Improvements



Evaluation of Investigation

Bus Frequency and Passenger Use – The primary data was reliable as the timings were recorded using the same watches and the counting of people in buses was done only when visibly seen. However, the data may be inaccurate due to the fact that counting errors may have occurred due to not seeing all the passengers or counting properly. On the other hand, the secondary data taken was far more reliable because the counting was done through counting the number of tickets given to passengers on the bus, which accounts for passengers that may not be visibly seen from outside the bus on the Eastern lines.

Demographics – The main problem with this data was the fact that certain passengers may be counted multiple times, and also that it was collected without asking for a people’s ethnicities and was based purely on appearance, which may be incorrect and inaccurate due to subjectivity and stereotypes that exist around certain.

Despite this, the data collected did present the expected patterns that supported the investigation's hypotheses.

Conclusion

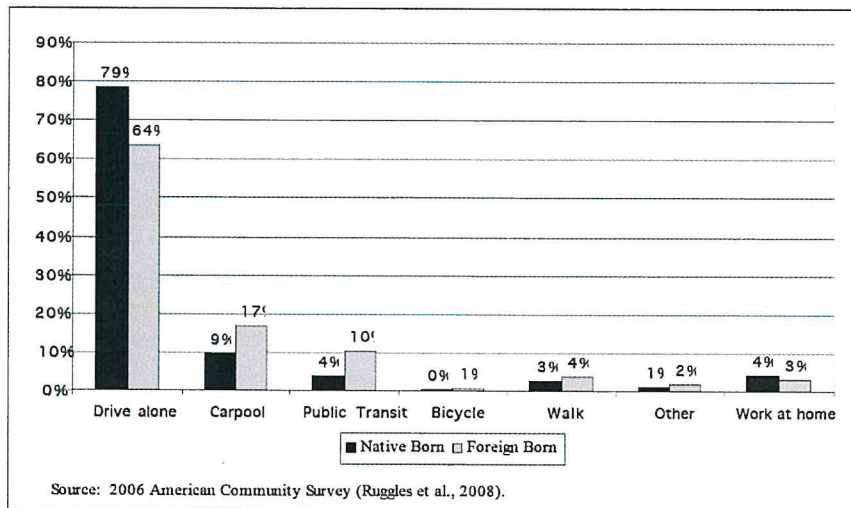
Overall, the bus system in the Brunei-Muara district is severely lacking in terms of its social sustainability, its problems range from understaffed and unreliable bus lines to unsafe and unhygienic conditions at bus stations. For many users, there is little choice with public transport even when they are heavily reliant on it (**Appendix 1**). The users' mobility is thus prohibited between locations, which helps sustain livelihoods, economies and social interactions. With Brunei's high relative wealth compared to Malaysia and other neighbouring countries (Brunei's GDP per capita is around USD\$16,600 more than Malaysia's GDP per capita), it is surprising and disappointing that it is underdeveloped. Improving the safety, efficiency and accessibility of the system takes financial input and forward planning. It will not necessarily alter perceptions and usage in the short-term, however, in the long-term and the following years, the bus system should be perceived in a more positive light by ethnicities such as the Malays and thus a positive effect on Brunei's economy and environment.

Appendix

Modes of Commuting

This graph shows results to a survey of a sample taken from the US population on the preferred modes of transport to work for natives and immigrants:

Figure 1. Commute Mode by Nativity, American Community Survey



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Note: As of November 2016, The Brunei Times has closed as a newspaper, the pages linked to the Brunei Times were accessed before they were taken down.