

Zainordin & Abidin, 2017

Volume 3, Issue 2, pp. 2473- 2486

Date of Publication: 10th November, 2017

DOI-<https://dx.doi.org/10.20319/pijss.2017.32.24732486>

This paper can be cited as: Zainordin, N., & Abidin, M. (2017). Sustainable Urban Transportation: Progress and Potential in Sarawak. *PEOPLE: International Journal of Social Sciences*, 3(2), 2473-2486.

This work is licensed under the Creative Commons Attribution-Non-commercial 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

SUSTAINABLE URBAN TRANSPORTATION: PROGRESS AND POTENTIAL IN SARAWAK

Nadzirah Zainordin

School of Built Environment, University College of Technology Sarawak, Sibul, Malaysia
nadzirah@ucts.edu.my

Muhd Zaihafiz Zainal Abidin

School of Built Environment, Infrastructure University Kuala Lumpur, Malaysia
mzaihafiz.zainalabidin@iukl.edu.my

Abstract

The quality of transportation service it's a main factor to increase the level of economic and social in Sarawak. By increasing the system may buzz-up all sector and may contribute the benefit to the community. This research will be conducting in four selected locations consist of Sibul, Miri, Bintulu and Kuching. The reason to choose these four locations it's because of the role that each location plays in contributing to the economic sector in Sarawak state itself. Methodology to be use to conduct this research its quantitative method. Where, 300 set of questionnaire to be distributing to the stated locations to get a perception on the concept of sustainable transportation among respondents. Questionnaire distributing to those who has knowledge towards sustainable transportation and it's limited to those who have experience in construction sector only. The objectives of this research it's to investigate the construction player's perception towards sustainability transportation in Kuching, Miri, Bintulu and Sibul; and to identify the barriers factor to implementing this concept. Expecting distribution from this

research it's to create awareness by implementing this concept it's beneficial to the routine activities as well as can generate and increase the Sarawak's economic sector.

Keywords

Sustainable Transportation, Construction Player's, Perception, Constraint Factor, Progress, Potential

1. Introduction

Transportation assumes a key part in advancing the liveability of groups (Luis et al., 2015 and Miller et al.,2013) because of its cooperation with each of the three regions of maintainable advancement (Luis et al., 2015 and Souza and Kahn, 2013). Under this condition, partner inclusion is fundamental with a specific end goal to consolidate differing points of view and inclinations (Luis et al., 2015 and Rangarajan et al., 2013). Remembering this, the goals of this examination it's to explore the development player's discernment towards supportability transportation in Kuching, Miri, Bintulu and Sibul; and to recognize the limitation component to actualizing this idea.

The transportation segment incorporates the development of individuals and merchandise via autos, trucks, trains, boats, planes, and different vehicles (Luis et al., 2015). The high development rates of transportation movement has created negative consequences for nature and on populaces (Luis et al., 2015 and Eppel, 1999) who are encountering various activity issues, for example, extreme movement blockage and street mischances combined with air and clamour contamination groups (Luis et al., 2015 and Sarkar and Tagore, 2011).

Any idea that incorporates the descriptive word reasonable stems from the root idea of feasible improvement. Understanding it has been one of the significant difficulties for maintainability scientists and specialists from the time when supportable improvement was initially instituted as an advancement that addresses the issues of the present without trading off the capacity of future era to address their own issues (The World Commission on Environment and Advancement, 1987). This definition has unmistakable implications to individuals in various settings that imagine supportability and act towards it relying upon their insight, foundation, encounter, recognition, qualities, and setting (Leal, 2000). Despite the fact that this entanglement has been discussed widely (Ayres, 1993), the base specialized prerequisites are frequently obscure (Prugh et al., 2000). In spite of errors about the significance, individuals concur that the

idea includes, at any rate, natural, social, and monetary contemplations (Dragun and Jakobsson, 1997) what is known as the triple primary concern (Hacking and Guthie, 2008).

The idea of maintainable transportation includes a similar open deliberation about significance and vulnerability, as indicated by Dark (2010), there is still no political or logical concurrence on a supportable transportation definition. It can mean the least expensive indicate point transport accessible, or dependable and unsurprising trips, or the fastest intends to move perishable cargo, or excursions that utilization minimal measure of vitality or assets to satisfy the errand (Sweeting and Winfield, 2012). Toward the end, there is likewise a rising accord that transportation framework manageability ought to catch properties of framework viability and framework impacts on monetary improvement, natural honesty, and social personal satisfaction (Jeon et al., 2013). A definition fitting in the general meaning of supportable improvement is given by the Association for Financial Participation and Advancement (OECD) (2002), characterizing a feasible transportation framework as "one that does not jeopardize general wellbeing or environments and addresses versatility issues reliable with utilization of renewable assets at underneath their rates".

2. Research Background

Transit service quality is one of the main drivers of sustainable transport policies as it increasingly steers user choices toward energy and space-efficient transport modes (e.g., European Commission 1995b, 2001, 2007). Public transport quality depends on several factors (attributes) of the service; some are quantitative (e.g., average travel time and its reliability, transit waiting time, monetary costs) while others are qualitative, whose effects on user behavior are more difficult to assess (e.g., riding comfort, information, personal security).

Assessment of service quality in Public Passenger Transport (PPT) requires methods for defining standard quality indicators and related measurement techniques. Such an assessment should be used both by service providers in presenting and monitoring their services and by local decision makers and procurement agencies in preparing tendering requirements and monitoring PPT services. In this way, customer expectations and perceptions of quality can be translated into measurable and manageable quality parameters.

There is an ongoing debate in the scientific community about what is the best quality definition and how it should be measured, while it is widely recognized that service quality is

intrinsically related to the user (Berry, Zeithaml, and Parasuraman 1990; Gatta and Marcucci 2007). There is also a continued debate as to whether quality indicators should be objective and/or subjective. It seems appropriate to define both objective and subjective measures of transit quality as suggested by EU regulations, since they are relevant to achieving different purposes. The former are direct measures of indicators perceived as significant by the customers (Transportation Research Board 1999, 2003). As an example, traditional level-of-service indicators (e.g., in-vehicle time or percentage of passengers departing-arriving) can be considered as objective performance measures from the service provider's point of view. Some critiques made to objective indicators suggest that not all quality attributes are measurable (e.g., seat comfort or aesthetic quality). By contrast, subjective measures are based on direct (statements) and indirect (choices) customer perception of service quality. In the literature many techniques for measuring subjective indicators have been proposed. Service quality and customer satisfaction can be evaluated according to different methods, for example, by asking users their perception and satisfaction or expectation also the importance on service quality.

Alternatively, it is possible to estimate a utility function, given a set of assumptions on an underlying set of preferences, that is able to measure the attribute's reciprocal substitution such as the willingness to pay for an attribute (e.g., punctuality, station aesthetics, info mobility).

Research on the different areas of mobility management has been extensive: recently published studies have focused on travel plans (Rye 2002; Dickinson et al. 2003; Fujii and Taniguchi 2006; Bonsall 2009; Roby 2010), transportation of employees (Potter et al. 2006; Vanoutrive et al. 2010), land use planning in MM (Rye et al. 2010), carpooling (Enoch and Taylor 2006; Correia and Viegas 2011), assessment of MM measures in facilities (Miralles-Guasch and Domene 2010), travel behavior change (Cairns et al. 2008; Brog et al. 2009; Stofer et al. 2009; Bamberg et al. 2010), the impact of information on the quality of travel choice (Chorus et al. 2006; Chorus, Arentze, and Timmermans 2007), congestion charging (Eliasson 2008) and so on. Furthermore, many European cities have been implementing sustainability transportation indicators in their country. The question comes when measuring into Sarawak state on the sustainability transportation implementation especially on the most targeting places like Kuching, Miri, Bintulu and Sibul.

The quality of transportation service it's a main factor to increase the level of economic and social in Sarawak. By increasing the system may buzz-up all sector whom may contribute the benefit to the community. Therefore, this research will be conducting in four elected

locations consist of Sibul, Miri, Bintulu and Kuching. The reason to choose these four locations is because of the role that each location plays in contributing to the economic sector in Sarawak state itself.

One of the reactions raised at subjective measures is that these markers are frequently constructed just in light of travel clients' assessments, overlooking non-clients' discernments. This is the situation for direct articulations and models evaluated just for travel benefit clients. By complexity, reviews could be completed on all modes clients. This is not generally the situation for direct fulfillment review, while backhanded decision display based measures regularly manage all modes explorers.

The fundamental investigate to the subjective pointers is their constrained part in outlining (arranging) administrations since they can't be dependably watched for non-existing administrations. Few reviews have examined both subjective (voyager fulfillment) and goal (transit execution) measures (Ennio Cascetta & Armando Cartenì 2014; European Committee for Standardization 2002; Nathanail 2008; Tyrinopoulos and Aifadopoulou 2008; Eboli and Mazulla 2010). Techniques to gauge benefit quality markers (both subjective and goal) can be ordered in two distinct classifications: non-behavioral and behavioral measures (for a refreshed survey see for instance: Eboli and Mazulla 2008). The principal class incorporates pointers assessed through factual investigation methods, for example, quadrant and hole examination, scramble charts, and bunch examination (Ennio Cascetta & Armando Cartenì 2014; Cronin and Taylor 1992; Swanson, Ampt, and Jones 1997; Bollen 1989; Teas 1993; Hill 2000; Hill, Brierley, and MacDougall 2003; Grønholdt and Martensen 2005).

The second classification of techniques comprises of behavioral models (Ennio Cascetta & Armando Cartenì 2014; Ben-Akiva and Lerman 1985; Cascetta 2009; Train 2009). A few cases are mode decision models considering diverse client based administration quality traits (Ennio Cascetta & Armando Cartenì 2014; Hensher and Prioni 2002; Cascetta and Papola 2003; Gatta and Marcucci 2007). In Hensher, Stopher, and Bullock (2003), a Nested-Logit model was proposed for contrasting administration quality levels inside and between transport administrators. A Mixed Logit model was likewise proposed by Hensher (2001) to investigate watched and surreptitiously heterogeneity among clients.

Parameters of behavioral models could be evaluated utilizing both reviews of real travel conduct in a genuine setting (uncovered inclination or RP studies) and studies of theoretical travel conduct in invented situations (Ennio Cascetta & Armando Cartenì 2014; Pearmain et al.

1991; Eboli and Mazzulla 2008, 2010). The significant preferred standpoint of SP information over RP information is given by the likelihood of a more broad properties space, considering speculative situations (e.g., new astounding administration lines) and characteristics (e.g., stylish nature of stations or data frameworks). By difference, the principle limitations of SP strategies concern the dependability of client reactions to speculative and, now and again, unreasonably complex situations (e.g., Bradley and Daly 1991). Along these lines, SP studies quality relies on upon how data is exhibited to respondents (Ennio Cascetta & Armando Carteni 2014; Hensher 2006).

Methodology to be use to conduct this research its quantitative method. Where, 300 sets of questionnaire to be distributing to each location's to get a perception on the concept of sustainable transportation among respondents and an interviews to be conducting among experienced construction players in that stated four locations. Questionnaire distribute to those who has a basic knowledge towards sustainable transportation and its limited to those who have experience in construction sector only. Which this its to cater for two objectives for these research; first its; to investigate the user perception towards sustainability transportation in Kuching, Miri, Bintulu and Sibui; and second its to identify the constraint factor to implementing this concept in the stated four areas. Expecting distribution from this research it's to create an awareness by implementing this concept its beneficial to the routine activities as well as can generate and increase the Sarawak's economic sector.

3. Results and Discussion

Both primary and secondary source has been use as research methodology in order to achieve clear picture and understanding of the results. The primary source consist a set of questionnaire survey while the secondary source obtain from the desk stop study. Literature review resources obtain from the form of journal, research paper and articles; relevant references books, newspaper and electronic data – also known as desktop study. Almost of the time in order to conducting this research it's to do the desktop study in order to obtain the sources in order to support the literature review for this research

The questionnaire has been designed to achieve the finding of results for the objectives such as to capture the potential buyers' perception towards implementing green building concept in Malaysia particularly in Sarawak. However, this research having its limitation where the

research area coverage only at Sibul, Bintulu, Kuching and Miri only. The rationales by choosing these four areas are because of the functioning of each areas contributing to the movement of Sarawak's economies. About 300 numbers of respondents responded to the questionnaire. The data collections for the study its through structured questionnaire which send to 200 respondents which are consists of those who having a good profession because the result from this group will affect the level of accuracy of the data collection.

The structured questionnaire scale on answer limited to five point likert scale; strongly agree, agree, neutral, disagree and strongly disagree it's a choice of answer expecting from the respondents. Also, the frequency analysis has been used too to analysed the data for structured questionnaire which focusing to get respondents simple answer either 'yes' or 'no'. Furthermore, the analyzing of the data it's based on the frequency or by percentage analysis. The highest percentage indicates the higher indicator or momentum to the point of description tested to the respective respondents.

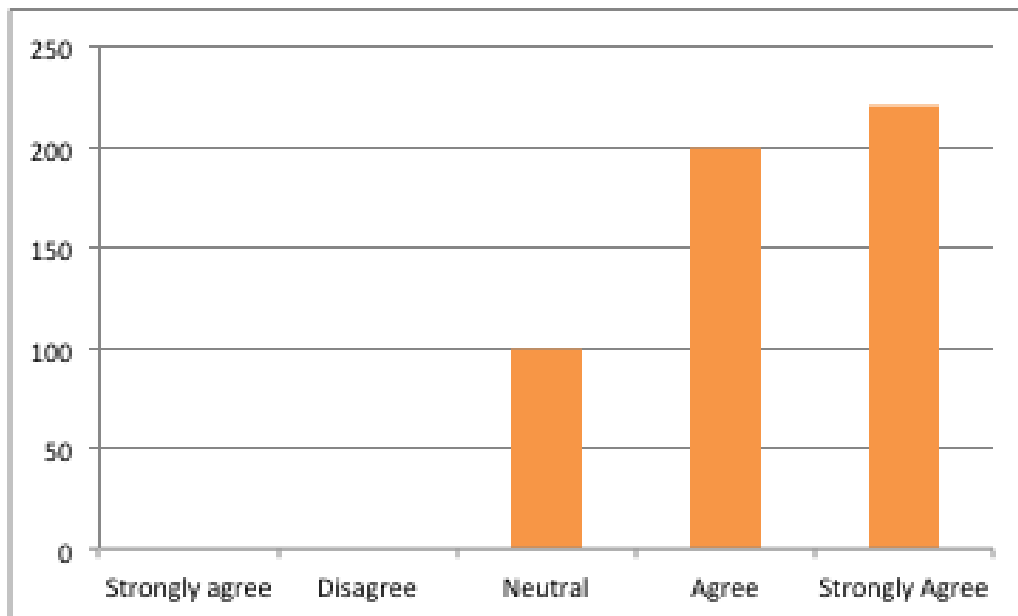


Figure 1: Respondent's perception on the momentum of sustainable transportation in Sarawak

Figure 1 stating about the respondents perception on the momentum of sustainable transportation in Sarawak. Where 200 numbers of respondents stick with the neutral and 100 numbers of respondents saying agree that Sarawak actually having a momentum towards

sustainable transportation implementation and only 80 numbers of respondents strongly agree on the stated statement.

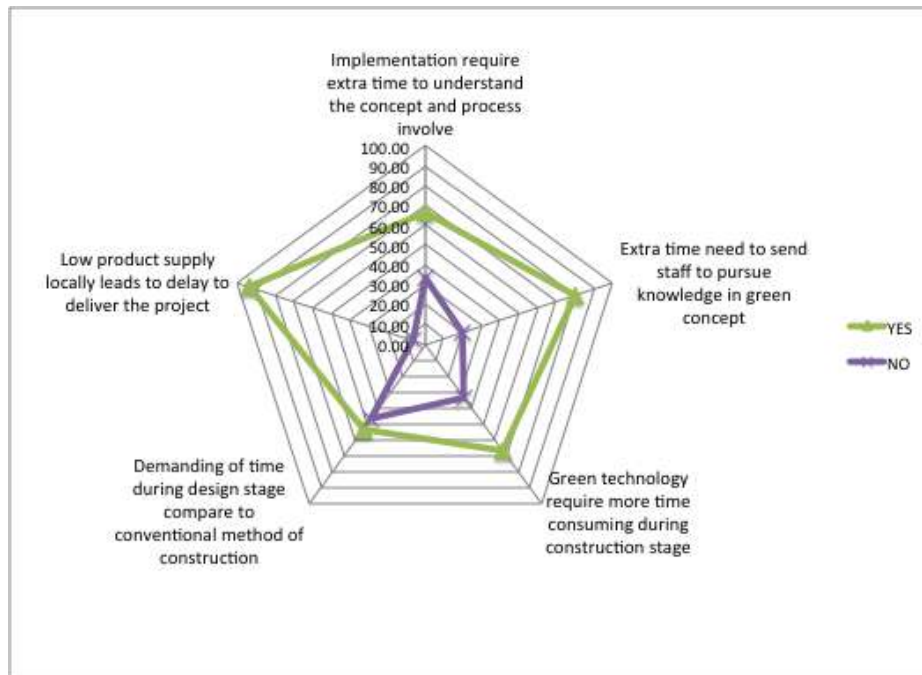


Figure 2: Perceived Barriers in Perspective of Time

Figure 2 stating on the results of perceived barriers of time. There are five elements or description has been tested to the respective respondents. The description include low product supply locally leads to delay to deliver the Project, implementation require extra time to understand the concept and process involve, extra time need to send staff to pursue knowledge in green concept, green technology require more time consuming during construction stage and demanding time during design stage compare to conventional method of construction. Out of five questions, the most score its on the description of low product supply locally leads to delay the deliver the project with 93% said 'yes'. Follow by 80% said 'yes' on the extra time needed to send staff to get a knowledge on green concept itself. 67% of respondents agree on implementation require extra time to understand the concept and process involve as well as the respondents also agree with the same percentage on green technology require more time consuming during construction stage. Furthermore, 53% said that demanding of time during design stage compare to conventional method of construction.

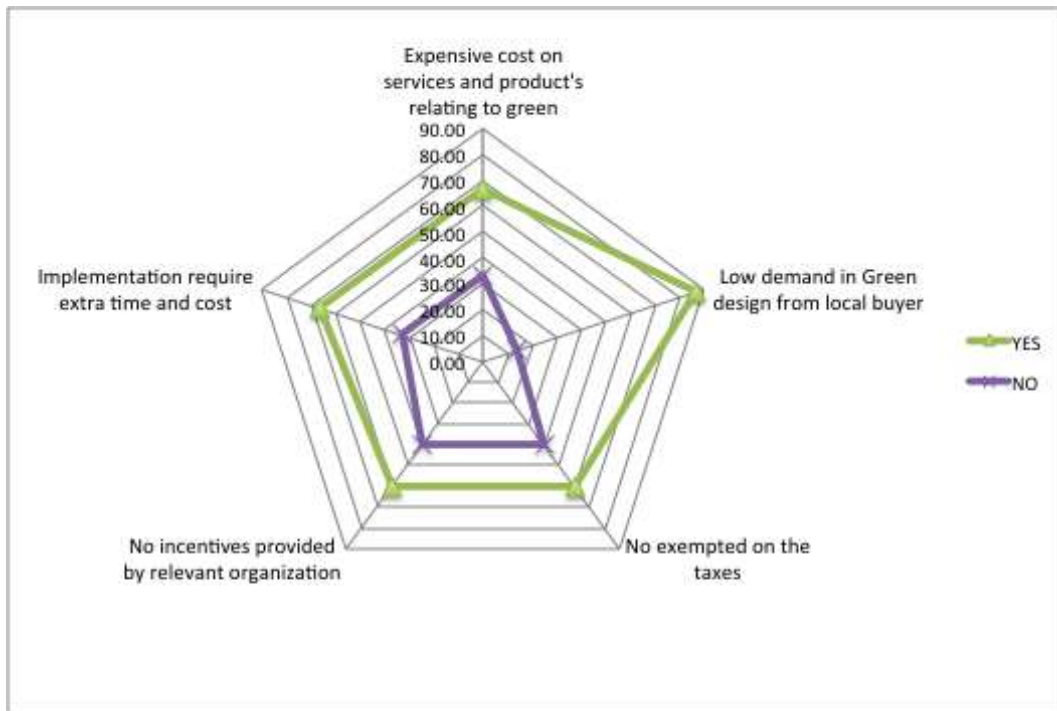


Figure 3: *Perceived Barriers in Perspective of Cost*

By referring to the Figure 3 stating the perceive barriers in perspective of cost. There are five question has been tested to the respondents and the question as follow: expensive cost on services and product's relating to green, low demand in green design from local buyer, no exempted on the taxes, no incentives provided by relevant organization and implementation require extra time and cost. Out of five questions has been tested among respondents, most of them agree with 87% said that low demand in green design from local buyer its a perceive barriers in perspective of cost to implementing the green building concept in their project. Others four description having almost the same percentage 60% to 67%. With 67% agree that expensive cost on services and product's relating to green and implementation require extra time and cost. With 60% agree that no exempted on the taxes and no incentives provided by relevant organization.

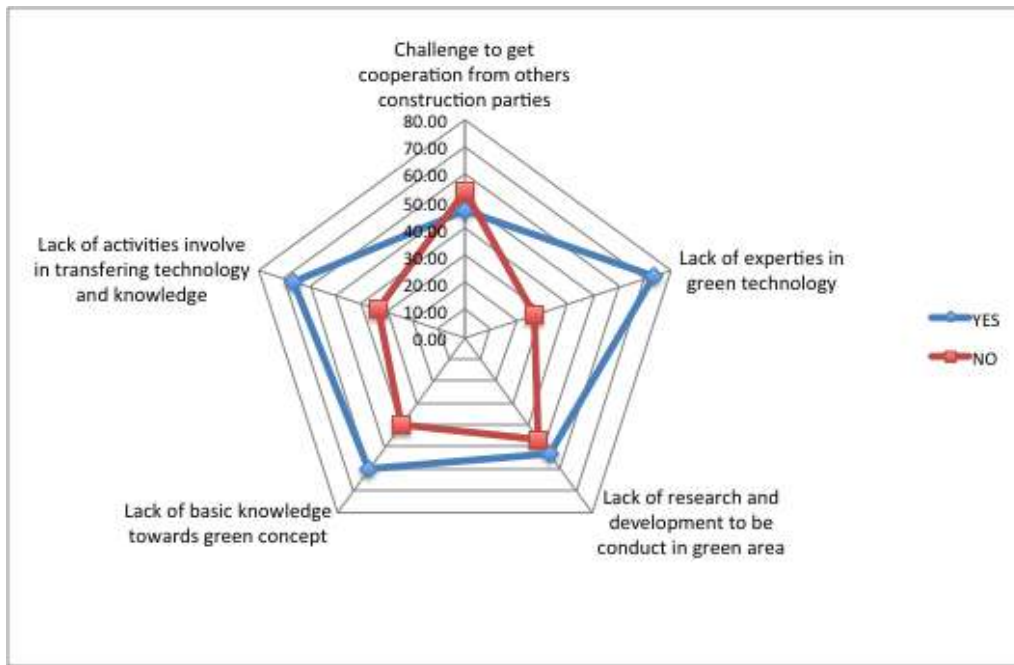


Figure 4: *Perceived Barriers in Perspective of Knowledge*

Figure 4 stating about perceive barriers in perspective of knowledge. There are five questions under these factors leads to the barriers in implementing green concept among Sarawal construction's players. The questions has been tested to the respondents as follow: challenge to get cooperation from others construction parties, lack of experties in green technology, lack of research and development to be conduct in green area, lack of basic knowledge towards green concept, and lack of activities involve in transferring technology and knoweldge. The highest percentage goes to lack of expertise in green technology with 74% follow by 67% for lack of activities involve in transferring technology and knowledge. 60% said that lack of basic knowledge towards green concept, 53% said lack of research and development to be conduct in green area. Unfortunately, 53% said 'no' to the statement of challenge to get cooperation from others construction parties.

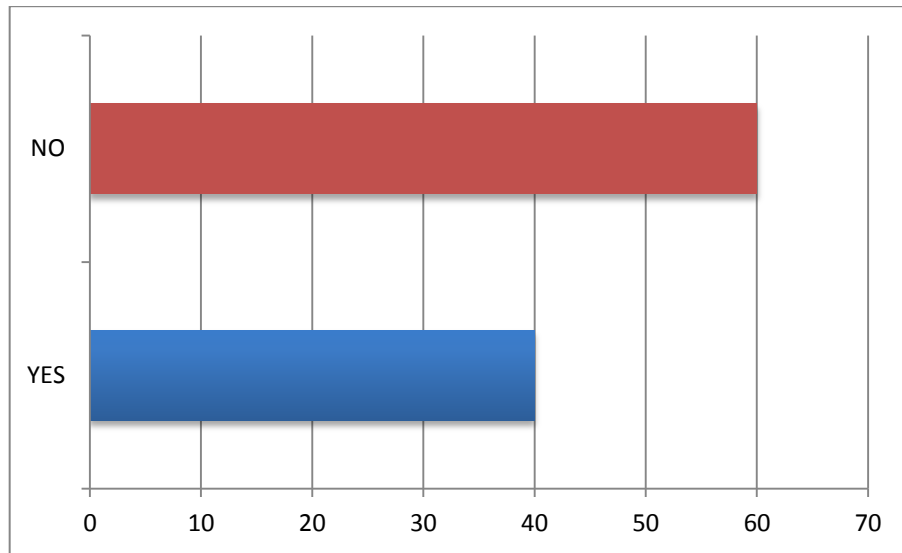


Figure 5: *Respondent's opinion on the potential of sustainable transportation to be implementing in Sarawak*

Figure 5 stating about the respondent's opinion on the potential of sustainable transportation to be implementing in Sarawak. 60% from 300 numbers of respondents agrees that Sarawak having low potential towards sustainable transportation due to the barriers has been hidghlighted in previous figure.

With a better approach to overcome all the stated perceives barriers in time, cost and knowledge perspective, this concept can be successfully implementing to all project in Sarawak. The green building project especially in residential types of project still in minimum number, an awareness on the principle, criteria and benefits on green residential must be spread among all especially to the potential buyer.

4. Conclusion

Several recommendations that can be speed up to overcome the stated issues; providing knowledge and training like organizing seminar, talk or workshop and conferences to educating the and offering to the targeted construction's players on sustainable transportation principles on the concept and the benefits can be generated from implementing this concept in their project and at the same time may increase the potential in implementing the concept in Sarawak state itself. Actions must be initiated to enable this concept to be applied efficiently in future construction projects. Provide as assistant to government, contractors and consultants in incorporating the sustainable issues at the project conceptual stage and planning stage. Even

sustainable concept in transportation field it's a slightly higher investment at initial stages, but then, it is still a good investment to be consider for long-term and by implementing this concept its bring different character and interpretation from normal practices.

Furthermore, government's representative actions are influenced by the market situation and budget approve from the federal government as in Malaysia all the transportation matters are fully control by government. To increase the momentum in order to implementing the sustainable concept, a little bit of pushing factors must be acting upon to the government representative and also contractors to improve the specification of the current practices, method and technology may use for future project as what sustainable concept may offer to that future project. The modern and modest design and technology must be play in the design of the transportation so that can fulfill the need and to enhance to potential of sustainable transportation itself.

In summary, more efforts are necessary to enhance the level of environmental awareness and civic consciousness among the Sarawak's people to build sustainably and greener project in the future. These are the point that should put into an account to make them ready to implementing this concept. It's should start from the most important people in that particular state so that this concept can be successfully implementing in their area.

5. Acknowledgement

This research was supported University College of Technology Sarawak (UCTS) Research Grant. We thank our colleagues, who provided insight and expertise that greatly assisted the research, although they may not agree with all of the interpretations/conclusions of this paper. We would also like to show our gratitude to the DirectorCentre of Research and Development University College of Technology Sarawak for sharing their pearls of wisdom with us during the course of this research, and we thank 3 "anonymous" reviewers for their so-called insights. We are also immensely grateful to all very supportive colleague for their comments on an earlier version of the manuscript, although any errors are our own and should not tarnish the reputations of these esteemed persons.

References

- Anthony D. May (2013) Urban Transport and Sustainability: The Key Challenges, *International Journal of Sustainable Transportation*, 7:3, 170-185, DOI:10.1080/15568318.2013.710136
- Ennio Cascetta & Armando Cartenì (2014) A Quality-Based Approach to Public Transportation Planning: Theory and a Case Study, *International Journal of Sustainable Transportation*, 8:1, 84-106, DOI: 10.1080/15568318.2012.758532
- Eppel, J. (1999), "Sustainable development and environment: a renewed effort in the OECD", *Environment, Development and Sustainability*, Vol. 1 No. 1, pp. 41-53.
- Ela Babalik-Sutcliffe (2013) Urban Form and Sustainable Transport: Lessons from the Ankara Case, *International Journal of Sustainable Transportation*, 7:5, 416-430, DOI: 10.1080/15568318.2012.676152
- E. Eric Boschmann & Mei-Po Kwan (2008) Toward Socially Sustainable Urban Transportation: Progress and Potentials, *International Journal of Sustainable Transportation*, 2:3, 138-157, DOI: 10.1080/15568310701517265
- Konstantinos Kepaptsoglou , Vincent Meerschaert , Karin Neergaard , Stratos Papadimitriou , Tom Rye , Roman Schremser & Ilse Vleugels (2012) Quality Management in Mobility Management: A Scheme for Supporting Sustainable Transportation in Cities, *International Journal of Sustainable Transportation*, 6:4, 238-256, DOI: 10.1080/15568318.2011.587137
- Luis Velazquez Nora E Munguia Markus Will Andrea G Zavala Sara Patricia Verdugo Bernd Delakowitz Biagio Giannetti , (2015), "Sustainable transportation strategies for decoupling road vehicle transport and carbon dioxide emissions", *Management of Environmental Quality: An International Journal*, Vol. 26 Iss 3 pp. 373 – 388
- Miller, H., Witlox, F. and Tribby, C. (2013), "Developing context-sensitive livability indicators for transportation planning: a measurement framework", *Journal of Transport Geography*, Vol. 26, pp. 51-64, doi: 10.1016/j.jtrangeo.2012.08.007.
- R. H., Spud, P. T., & Psychologist, R. M. (2002). Title of journal article goes here. *Journal of Research in Personality*, 22, 236-252. doi: 10.1016/0032-026X.56.6.895*
- Rangarajan, M., Long, S., Tobias, A. and Keister, M. (2013), "The role of stakeholder Engagement in the development of sustainable rail infrastructure systems", *Research in Transportation Business & Management*, Vol. 7, pp. 106-113, doi: 10.1016/j.rtbm.2013.03.007

Souza, A. and Kahn, S. (2013), “The use of sustainability indicators in urban passenger transport during the decision-making process: the case of Rio de Janeiro, Brazil”, *Current Opinion in Environmental Sustainability*, Vol. 5 No. 2, pp. 251-260.

William H. K. Lam & Agachai Sumalee (2013) Introduction: Modeling for Sustainable Urban Transportation, *International Journal of Sustainable Transportation*, 7:3, 167-169, DOI: 10.1080/15568318.2013.71005