UNIVERSITI TEKNOLOGI MARA
Cawangan Perak
Kampus Seri Iskandar

e-Proceeding

v-GOGREEN2020

29 - 30 SEPT

VIRTUAL GO-GREEN: CONFERENCE & PUBLICATION

"SUSTAINABLE ENVIRONMENT, RESILIENCE AND SOCIAL WELL-BEING"

Organiser :
Research, Industrial Linkages, Community & Alumni Network (PJIM&A)

Co-organiser :
Faculty of Architecture, Planning and Surveying (FSPU) & Centre for Post Graduate Studies (CGS)

Publication Date : 22nd February 2021

Virtual Go-Green Conference and Publication 2020

UNIVERSITI TEKNOLOGI MARA, PERAK BRANCH
February 2021

Main Committee

Virtual Go-Green Conference and Publication 2020

Advisor 1	*: Prof Sr Dr Md Yusof Hamid, AMP*
Advisor 2	*: Assoc Prof Dr Nur Hisham Ibrahim*
Chairman	*: Sr Dr Asmalia Che Ahmad*
Co-Chairman	*: 1. Sr Dr Yuhainis Abdul Talib*
	2. Sr Dr Haryati Mohd Isa
Treasurer	*: Mohamad Haizam Mohamed Saraf*
Secretary	*: Noorliza Musa*
Head of v-Conference	*: Sr Dr Nor Suzila Lop*
Head of e-Proceeding	*: Dr Junainah Mohamad*
Head of Scopus Indexed Journal Planning Malaysia Journal (PMJ)	*: Assoc Prof Gs Dr Mohd Fadzil Abdul Rashid*
Head of Scopus Indexed Journal Malaysian Construction Research Journal (MCRJ)	*: Sr Dr Natasha Khalil*
Head of Paper Reviewer	: *Dr Asniza Hamimi Abdul Tharim*

Committee Members

Virtual Go-Green Conference and Publication 2020

E-Proceeding Paper Reviewer

Noraini Md Zain
Shafikah Saharuddin
Nur Fatiha Mohamed Yusof
Farrah Rina Mohd Roshdi

E-Proceeding Formatting

Nurulanis ahmad @ Mohamed
Jannatun Naemah Binti Ismam
Najma Binti Azman

E-Proceeding Language Reviewer

Dr Hjh Shazila Abdullah
Dr Daljeet Singh Sedhu A/L Janah Singh
Zarlina Mohd Zamari
Dr Mary Thomas
Iza Faradiba Mohd Patel
Farahidatul Akmar Awaludin
Wan Faridatul Akma Wan Mohd Rashdi
Jeyamahla Veeravagu
Wan Nurul Fatihah Wan Ismail
Nazirul Mubin Mohd Noor
Noor Aileen Ibrahim
Noraini Johari
Dr Hajah Norakmarwati Ishak

Virtual Conference

Norazlin Mat Salleh	*Registration*
Shahela Mamter	*Auditor*
Mohd Esham Mamat	*Auditor*
Noor Anisah Abdullah @ Dolah	*Auditor*
Mohamad Tajudin Saidin	*Certificate & Conference Kit*
Fairiz Miza Yob Zain	*Logistic*
Mohd Firdaus Zainuddin	*Logistic*
Farah Hanna Ahmad Fuad	*Promotion & Publicity*
Mohamad Shahin Shahdan	*Promotion & Publicity*
Mohd Asrul Hassin	*Liason Officer*

Organiser:
Research, Industrial Linkage Community and Alumni Network Office (PJIM&A)
Universiti Teknologi MARA, Perak Branch, Seri Iskandar.
Malaysia

Co-Organiser:
Faculty of Architecture, Planning and Surveying (FSPU)
and,
Centre for Post Graduate Studies (CGS)
Universiti Teknologi MARA, Perak Branch, Seri Iskandar.
Malaysia

e ISBN 978-967-2920-06-9

SENIORS' OUTDOOR SURVEY: THE ENVIRONMENTAL AUDIT TOOL FOR THE ELDERLY ATTENTION RESTORATION

Wan Noor Anira Binti Wan Ali @ Yaacob[1], Dr Nur Huzeima Mohd Hussain[2], Dr Nadiyanti Mat Nayan[3], Marina Abdullah[4] and Mohd Zulhaili Teh[5]
[1,2,3,4,5]Department of Landscape Architecture, Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA, Perak Branch, Seri Iskandar Campus, Seri Iskandar, 32610 Perak, Malaysia

Abstract

Seniors' Outdoor Survey (SOS), an environmental audit instrument for determining how much green space in a long-term care environment reflects interests and outdoor usage by the elderly. The content of the leading Seniors' Outdoor Survey (SOS) items initially was based on relevant literature and preliminary studies in a variety of long-term care settings. The restoration needs are vital to the elderly well-being. Overburdening and not getting resources for healing will lead to a health problem that can lead to chronic diseases such as heart disease, exhaustion, insomnia, stress, or burnout syndrome. Therefore, the study aims to evaluate the environmental features (green space) on elderly attention restoration using the Seniors' Outdoor Survey (SOS). The features include (i) fascination, (ii) being away, (iii) extent, and (iv) compatibility components. The relationship of Seniors' Outdoor Survey (SOS) and attention restorative for the elderly are also based on the selected four domains of (i) access to the green space, (ii) outdoor comfort and safety, (iii) outdoor activity and (iv) indoor-outdoor connection at retirement homes. Overall, these findings illustrate the framework for indicating the methodological process which is helpful for future environmental audit assessment in retirement homes in Malaysia. The findings will lead to possible gains for elderly well-being (mental) and quality of life.

Keywords: *senior outdoor survey; environmental audit; the elderly; attention restoration; green space*

1.0 INTRODUCTION

Over the next few decades, there will be a growing demand for facilities for the elderly, such as nursing and continuing-care retirement services, as many of them would become weaker. In terms of physical and psychosocial wellbeing, those living in some purpose-built facilities for the elderly must have access to outdoor space specially designed to meet their needs (Cooper Marcus & Sach, 2014). Many research revealed that access to outdoor space might provide valuable health benefits for the elderly, particularly in long-term care facilities where residents seldom leave. Spending time outside can theoretically boost morale, sleep habits and vitamin D absorption, preventing spills that fracture (Detweiler et al., 2012).

Unfortunately, it is generally documented that most outdoor spaces tend to be underused in retirement homes because most of the elderly spend most all their time in the facility setting. The identified environmental barriers to outdoor use include insufficient shade and seating, unsafe walkways, and self-locking doors (Access to Nature for Older Adults, 2014; Rodiek, Lee, & Nejati, 2014). Since spending time outdoors is not mandatory, a comprehensive assessment of outdoor access remains a low priority, despite universal recognition as a significant health-promoting feature in long-term care settings. The issue of why the elderly do not use outdoor spaces has become a challenge for researchers and planners, as well as for facilities managers and corporate decision-makers, who must give priority to use less money to develop outdoor space for the happiness of the elderly (Rodiek et. al 2014).

Deprived of an acceptable assessment environmental audit tool, it is impossible to decide which ecological characteristics can easily promote outdoor use and meet the desires of the elderly at retirement homes. Therefore, this paper discusses an observation instrument's development to address the elderly need at outdoor space by using SOS (Senior Outdoor Survey) as environmental audit tools. Spending time outdoors provides significant health benefits for older adults (Detweiler et al., 2012). However, in long-term care environments, outdoor spaces cannot offer sufficient protection for the needs and interests of the elderly.

SOS (Seniors' Outdoor Survey), the environmental audit tool was created as a legitimate and accurate way to determine the community's outdoor space based on how well they meet the needs and desires of aged residents. This application-oriented method can regularly analyse and compare a wide variety of senior facilities and outdoor spaces to facilitate decision-making. A variety of evaluation tools have been created to measure the qualities of the physical condition of long-term care facilities emphasizing solely on the indoor space (Rodiek, Nejati, Bardenhagen, Lee, & Senes, 2014). Therefore, this paper adopts the Seniors' Outdoor Survey (SOS) as an environmental audit tool to demonstrate the methodological framework of the relationships among the environmental features of the elderly attention restorative.

2.0 ENVIRONMENTAL AUDIT TO THE ELDERLY

An environmental audit means auditing on different things for different people (Er, C.Y et al. ,2016). The term also carries meanings such as environmental assessment, ecological survey and green assurance. Some studies consider environmental audits only discuss ecological issues, while others use the term to describe environmental, health, safety and environmental audits. The environmental assessment tool has been created to address the need for a reliable instrument to assess outdoor access for long-term care residences (Rodiek, Lee, & Nejati, 2014). The importance of environmental audits to the elderly can improve and preserve environmental protection and respect sustainable development at retirement homes.

An environmental audit is an independent assessment of policies and principles, systems, procedures, practices and performance and other elements of elderly ecological matters. This is for verification and validation to ensure that various environmental laws are complied with, and adequate care has been taken for the elderly environment (Er et al. ,2016). Environmental audits also provide information on the preparation of emergency plans in elderly facilities and raise awareness of the management and employees of the elderly.

Lastly, an environmental audit can promote sound management of the elderly environment. Environmental audits are seen as important support tools to the health facilities at retirement homes. Also, improve the existing or new green area with well-designed for the elderly and providing a sense of belonging. As well as encouraging the elderly to be more physically active.

3.0 UNDERSTANDING SOS TOOLS AND DOMAINS

The Senior Outdoor Survey (SOS) tools are significant in measuring the effectiveness of a green space that connects outdoor space and indoor space to improve the elderly environment's quality. According to Bardenhagen, E. et al. (2015), SOS (Seniors' Outdoor Survey) method was created as a reliable and accurate way to determine the outdoor spaces of the community based on how well they meet the requirements and desires of aged residents. The key SOS elements design was initially focused on the related literature and observational research in a range of long-term care settings. This instrument is based on the characteristics of the measurable physical environment. These instruments are essential in showing the real needs of green space desired by the elderly. It can also affect the emotion and health of the elderly in browsing the rest of life. The instruments should consist of several domains to specifically target the importance of a green environment to the elderly and focused on walking and physical activities.

SOS tools and procedures are divided into 5 (five) main domains by Rodiek (2014). The study uses these 5 domains which includes *connection to the world*- an aspect that gives the

elderly contact with the nearby surrounding environment nearest with the retirement homes. This paper only focuses on 4 main parts only and does not include *connection to the world* as it specifically takes into account the differences in Malaysia's climate and cultures. The main 4 domains that have been highlighted by Er, et al. (2016) are: (i) Access to green space, (ii) Outdoor comfort and safety, (iii) Walking and outdoor activities, and (iv) Indoor-outdoor connection. All these domains help in justifying green space for the elderly at retirement homes or nursing care.

The first domain is access to green space, which defines that the green space should have a variety of species and connections between all the abiotic and biotic elements, such as flora, fauna, and water elements. All these interactions and relationships may evoke the quality of outdoor environment comfort and senior citizens' personal quality. Besides, the tools also include views and other aesthetic characteristics.

The second domain is outdoor comfort and safety which are related to the elderly outdoor facilities that are available for relaxation especially the seating area needs. Furthermore, this domain also includes climate control and comfort issues. Some of the designed seating should be comfortable for the elderly. For example, according to Er, et al. (2016), the seating should have an arm back and an overhead structure for shelter at the outdoor green space. It may improve safety, tranquil, and comfortable outdoor space.

The third domain was walking and outdoor activities in the green space environment. It should be user friendly to the elderly, especially for the elderly who use support equipment such as wheelchairs, crutches to ease their movement when having social activities such as gardening and horticultural practices among themselves. Lastly, the fourth domain, green space, should be visible and connected with indoor space to all users, starting from the entrance reception or lobby space linked with the green area. All the data from these four domains will be collected, referring to the survey results of preferences by the elderly, behavior outcomes, and expert's opinion-rated value placed on the environment features.

4.0 ASSESSING THE ENVIRONMENTAL QUALITIES FOR THE ELDERLY'S ATTENTION RESTORATIVE

The Senior Outdoor Survey (SOS) tools are also crucial in accessing the green space effectiveness on the elderly's attention restoration. As highlighted in Kaplan's Attention Restoration Theory (ART), spaces and places could "direct attention and stress in the larger context of human-environment relationships" and "provide positive human health and wellbeing benefits" (Kaplan, 1995; Ohly et al., 2016). Besides the four domains highlighted in the previous section, environmental qualities are also vital to be included in SOS. This ensures the restoration of effectiveness, especially from mental fatigue, could be dissolved through green spaces. Based on Kaplan's Attention Restoration Theory (ART), there are four environmental qualities that need to be emphasized in SOS which are; (i) fascination experience, (ii) being away, (iii) extend, and (iv) compatibility components (Kaplan, 1995; Weber & Trojan, 2018).

Fascination experience: "Fascination experience" or "involuntary experience" is usually transmitted in various ways, including sleeping, reading, and enjoying these activities. However, in the context of green spaces, this experience can be grouped as "soft fascination" or defined as "characteristic of certain natural settings" (Kaplan, 1995). This direct involuntary attention to nature helps the elderly to recover from fatigue. Most importantly, as highlighted by Er et al. (2016), this space must have easy access to increase the fascination experience from the elderly.

Being away: Being away is a feeling of "frees from mental activity," which usually involves conceptual instead of physically (Kaplan, 1995). One of being away from actions is by going to a natural space. Moreover, findings from psychological restoration have proved that "natural environments provide better restoration than urban environments" (Weber & Trojan, 2018). Hence, a suitable setting for a green space dedicated to the elderly should well be designed, including all the needed elements to certify the significant result. A compatible green setting can change the mood of one's view and experience and these indirectly enhance positive vibes to the individual (Berto, 2014).

Extend: Extend is described as a "rich and coherent environment that creates a world of its own" (Weber & Trojan, 2018). In producing a coherent environment for green space, it must stimulate both fascinating and different environments. Besides, the space created should provide exciting experience, ample to see and positively engage the mind (Kaplan, 1995). One of the simplest ways is by providing a proper path and trail. Meandering along a well-designed path or trail could create a different experience while giving a sense of connectedness with the environment.

Compatibility Components: Compatibility components are defined as "fit between the environment and a person's intentions" (Weber & Trojan, 2018). In other words, the setting must fit "what one is trying to do and what one would like to do" (Kaplan, 1995). Compatibility is a win-win situation. If the design of the new setting failed to address one's needs, space would become an unsuccessful space.

Therefore, the relationship between compatibility components and individual needs is crucial. For green space, this could be achieved by an act of gardening where the elderly could directly connect with nature-based activity. Gardening ultimately helps to increase compatibility. Through these four environmental qualities, SOS outcomes will help identify which environmental elements that dominated the findings. More importantly, SOS results can be an indicator or guidelines on designing a compatible and successful green space, especially for the elderly.

5.0 THE RELATIONSHIP BETWEEN SOS AND ATTENTION RESTORATION

By understanding both, the importance of environmental audit together with reliable tools and domains related, this paper illustrates the relationship between SOS tools and attention restorative. The intention is to strategize significant assessments for the elderly at the retirement home. This paper justifies and elaborates these related components through rating with trained and untrained raters and also experts. The rating is conducted to measure the usefulness and functionality of the outdoor physical environment related to responses from the elderly.

According to Bardenhagen et al. (2015,2017), the evaluation form is completed on-site at each outdoor space, using a 1 to 7 rating scale for each feature, where seven is outstanding, and one is extremely poor. This rating helps to give a score on the quality of the results of the elderly care home, either the quality of green space is of high quality of green space, low quality of green space or medium rate of green space. Raters (experts/researchers) need to understand the context of the facility and carefully read and apply the SOS tool. The selected components which then composes into a framework indicating the methodological process which is helpful for future environmental audit assessment in retirement homes in Malaysia.

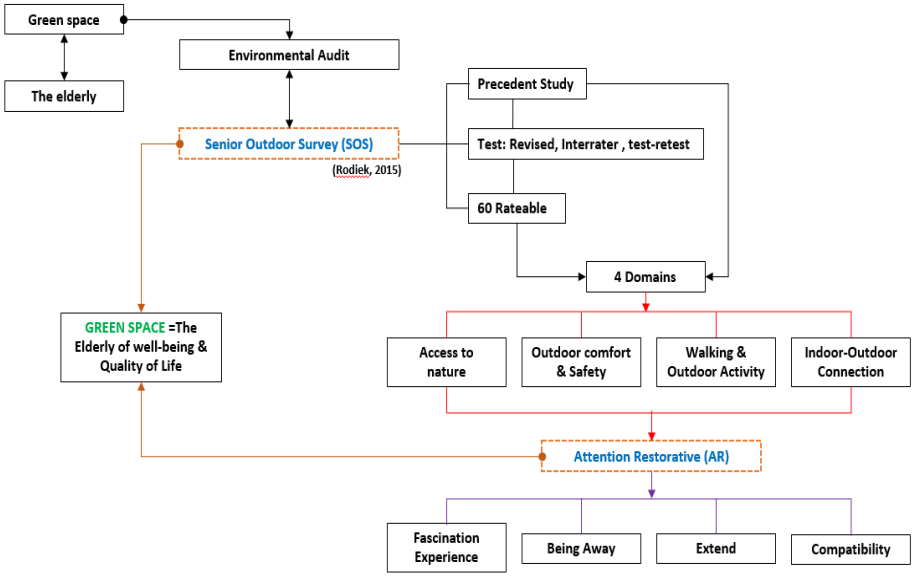

Figure 1: The framework of sos and attention restoration relationship

(Source : Author, 2020)

This framework describes the component of SOS (Seniors' Outdoor Survey) for environmental audit at the retirement homes and nursing care. The primary purpose was to establish how environmental factors and functionality affect the outdoor use of retirement home facilities. The framework explained was adapted from the previous study by Rodiek (2014) at 158 outdoor spaces in 68 retirement homes.

The precedent study version of this method had 63 items grouped into seven domains. It demonstrated reasonably good inter-rater reliability, indicating that different raters independently provided an identical rating to most things. But, this paper only concentrates on four domains related to the elderly and attention restoration at outdoor green. These 4 (four) domains were scored with the Attention Restorative Theory: Fascination experience, being away, extend, and compatibility.

The tools also identified that outdoor green space provided a link behavior-related restoration to the elderly. The validity and reliability of SOS tool were initially derived from ART theory to contribute to the knowledge base showing which environmental physical appeared to be necessary for the elderly at retirement homes. The environmental physical quality provides an excellent way for the elderly health and quality of life.

6.0 CONCLUSION

The SOS instrument of 4 (four) domains fills an essential gap in evaluating long-term care settings for older adults. It can be used without specific training to thoroughly assess natural conditions as a necessary part of the residential environment. This SOS method can be used to regularly analyze and compare a wide variety of senior facilities and outdoor spaces to facilitate decision-making. By making environmental measures more quantifiable and accurate, it is possible to measure the built environment well-being and happiness effects.

The findings of this study are able to identifying the main components of environmental audit and restoration of environmental qualities towards establishing the relationship of the elderly with the greenest environments. The relationship is illustrated into the framework as shown in Figure 1. This framework will serve valuable information and can be extended for future environmental assessment by adopting senior outdoor survey (SOS) for the elderly at retirement homes.

The tools can also promote cultural change in emphasizing the need for outdoor green space at retirement home facilities for the elderly to help them live healthier and age actively. The SOS tools can increase the health-promoting for long-term care environments as they have substantial implications for the elderly restoration and improved access to the outdoors. Besides, they are also useful for specific health-promoting environmental and physical activities at retirement homes or nursing care centres.

REFERENCES

Access to Nature for Older Adults. (2014). College Station, TX: Center for Health Systems & Design, Colleges

Bardenhagen, E., & Rodiek, S. (2015). Using the SOS Tool to Evaluate Outdoor Spaces in Seniors Housing. Seniors Housing & Care Journal, 23(1).

Bardenhagen, E., Rodiek, S. Nejati, A. & Lee, C. (2017). The Seniors's Outdoor Survey (SOS Tool): A Proposed Weighting and Scoring Framework to Assess Outdoor Environments in Residential Care Settings. Journal of Housing for The Elderly. doi: 10.1080/02763893.2017.1393489

Berto, R. (2014). The role of nature in coping with psycho-physiological stress: A literature review on restorativeness. Behav Sci (Basel), 4(4), 394-409. doi:10.3390/bs4040394

Cooper Marcus & Sach, (2014). Therapeutic Landscape: Garden for the frail elderly. Chapter 9, pp129.

Detweiler, M. B., Sharma, T., Detweiler, J. G., Murphy, P. F., Lane, S.,Carman, J.,Kim, K. Y. (2012).

Er, C. Y., & Shukor, S. F. A. (2016). Healing gardens for the elderly: A review of design guidelines and the comparisons with the existing Senior Outdoor Survey (SOS) tool. Alam Cipta, 9(2).

housing. Journal of Housing for the Elderly, 28, 63–84. doi:10.1080/02763893.2013.858093

Journal, Volume 16, Number 1.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. Journal of Environmental Psychology, 15(3), 169-182.

of Architecture and Medicine, Texas A&M University. Retrieved from www. accesstonature.org

Ohly, H., White, M. P., Wheeler, B. W., Bethel, A., Ukoumunne, O. C., Nikolaou, V., & Garside, R. (2016). Attention Restoration Theory: A systematic review of the attention restoration potential of exposure to natural environments. Journal of Toxicology and Environmental Health, 19(7), 305-343. doi:10.1080/10937404.2016.1196155

Rodiek, S. (2014). A New Tool for Evaluating Senior Living Environments. Seniors Housing & Care

Rodiek, S., Lee, C., & Nejati, A. (2014). You can't get there from here: Reaching the outdoors in senior

Rodiek. S, Nejati. A, Bardenhagen. E, Lee. C, Senes. G. (2014). The Seniors' Outdoor Survey: An Observational Tool for Assessing Outdoor Environments at Long-Term Care Settings. Gerontologist. 2016 Apr; 56(2): 222–233. Published online 2014 Jun 17. doi: 10.1093/geront/gnu050

Weber, A. M., & Trojan, J. (2018). The restorative value of the urban environment: A systematic review of the existing literature. Environmental Health Insights, 12.

What is the evidence to support the use of therapeutic gardens for the elderly? Psychiatry Investigation, 9, 100–110. doi:10.4306/pi.2012.9.2.100

Rail Transport- NIMBY or YIMBY?

Nursyazwani Abdullah Suhaimi[1] and Nurul Hana Adi Maimun[2]
[1]Department of Real Estate, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia
[2] Centre for Real Estate Studies, Institute for Smart Infrastructure and Innovative Construction, Universiti Teknologi Malaysia, Malaysia

Abstract

Rail transport is one of the factors that boosts economic growth. By increasing accessibility while saving travel costs and time, rail transport attracts foreign and local investments leading to an increase in property prices. Nonetheless, it is argued that the noise pollution coming from rail transport may also harm property prices as these areas are less desirable for occupancy occupation and investment. Hence, this research aims to critically review the magnitude of the impact of rail transport on property prices. An overview of the previous studies have shown that property prices are significantly influenced by proximity to rail transports. This indicates that the proximity to rail transports is accounted for when making property purchase decisions.

Keywords: *rail transports; house price; property market*

1.0 INTRODUCTION

By the year 2050, sixty-eight percent of the world's population will be living in cities, that is an increase of about two and a half billion people in the current urban population (UN-DESA, 2018). To cater for the needs of the growing urban travel demand, cities around the world are increasingly investing in high-capacity urban rail transportation systems, also known as metros (Anupriya et al., 2020) . According to the International Association of Public Transport, around forty-five new metros were opened in the last decade and another two-hundred new metro-lines are expected over the next five years. Rail transports are very important in addressing urban mobility requirements of the population for employment, retail, and recreation activities (Diaz, 1999; Hess and Almeida, 2007) which will eventually accelerate a nation's economy. Introducing rail transit into a region often creates expectations about the impact of the rail project on the surrounding area, especially property values. Although there is a long standing body of literature on the impact of rail transit on property values, The impact is inconclusive and uncertain as findings depend on the local conditions of the rail transit systems studied. These numerous accounts often appear as isolated anecdotes in documenting the impact of rail transit on property values. Incomplete and limited to anecdotal evidence on the impact of rail on property values left regions planning for rail investments without a firm basis to judge the future impact of such an investment. Thus, this lack of complete information limits the extent to which transit agencies can develop strategies to maximize positive property value impacts.

Thus, in this paper, we attempt to investigate the impact of rail transport on the property market. This review paper will establish whether rail transportation brings positive or negative impact on the local property market and thus bridges the gap of knowledge on the rail transport impact on property prices/rents. This paper is organized as follows: Section 2 discusses rail transport in general; Section 3 analyses the impact of rail transport on property prices; Section 4 presents a discussion on the findings; followed by conclusions and implications in Section 5.

2.0 LITERATURE REVIEW

2.1 Rail Transport

Rail transport is a means of transferring passengers and goods on wheeled vehicles running on rails. It is a safe, fast, cost effective mode of commuting people and goods over both long and short distances. Rail transport is better organized due to its fixed routes and schedules. Rail transport is an enabler of economic progress. Rail transport increases investment and attracts foreign investors due to efficient and fast service, cost savings, improved traffic safety and reduced pollution. Rail transport which originated from human hauled contraptions in ancient Greece has now evolved into a modern, complex and sophisticated system used both in urban and cross-country networks. Nowadays rail transport consists of heavy rail, Light Rapid Transit (LRT), Mass Rapid Transit (MRT), monorails, airport rail links and funicular railway lines. It is also known as metro, subway, mass transit and underground.

2.2 Rail Transport Impact on the Property Market

Property value is very sensitive to changes surrounding it. Any changes may attribute increase or decrease in property value. In general, property attributes can be grouped into locational, structural, and neighbourhood (Goodman, 1989; Williams, 1991). Structural attributes represent the characteristics and conditions of the property. Structural attributes can take place in the form of neighbourhood size, lot size, floor area, accommodations, building age, types of materials and finishes, structural quality, kitchen cabinets, and state of repairs (Adi Maimun, 2011). The condition of structural attributes may affect the property value either positively or vice versa. Meanwhile, neighbourhood attributes can be classified according to socio-economic variables, local government or municipal services and externalities (Chin and Chau, 2003) and facilities (Roe et al., 2004). Residential areas that have all facilities required will form a good property market (Nor Asmahan, 2012) as facilities provided enhance the economic activity in that area. The location factor lies in the bid-rent theory as theorized by Alonso (1964). Alonso's bid-rent theory puts forward that every agent is prepared to pay a certain amount of money, depending on the location of the land. An attractively located property or Yes in My Backyard (YIMBY) are highly sought after and pushes the prices up through the bidding process whilst unattractive location is termed as Not in My Backyard area or NIMBY. Location, as analysed through the Hedonic model plays a major role in determining property prices (Adi Maimun, 2011). The location of a property mainly influences property purchase decisions. Many people are willing to pay a premium price for a desirable location (Prasad and Richards, 2008). Properties located near the city centre, for instance, will likely fetch high prices since many economic and business activities mainly took place within the city centre area. In contrast, houses located farther from the city centre will experience a decrease in prices (Chin and Chau, 2003). It has been reported that good access to the transportation system such as rail transport will enhance the price or rent of properties nearby. This is possible due to the large number of demand for properties located close to the rail transport system (Pan et al., 2014). Properties located close to railway stations are high in demand because of its strategic location and easy access to public utilities (Alan Tong, 2010). The effects of rail transit are most acutely felt in the residential sector due to the large number of consumers (buyers and renters) within the residential market segment. Thus, much research on the impact of rail transit on property values should have focused on the residential sector. Table 1 summarizes previous research on effects of rail transit station on residential property prices/rents.

Table 1. Summary of previous studies: rail transit's station effects on property prices/rents

Author (Year)	Types of Rail Transit	Approach	Findings
Benjamin and Sirmans (1996) Washington, D.C.	Metro	Hedonic model	Rent decreased by 2.4 to 2.6% for every 100 meter further from Metro station
Lewis-Workman and Brod (1997a) New York	Rapid rail: New York City MTA	Hedonic model	Average home prices decreased by about $2,300 for every 100 feet further from the station areas
Lewis-Workman and Brod (1997b) San Francisco	Rapid rail: BART	Hedonic model	Average home prices decreased by about $1,578 for every 100 feet further from station
Henneberry (1998) Sheffield, England	Super tram (Light Rail)	Hedonic model	No effect
Delmelle and Duncan (2012) Charlotte, North Carolina	Light Rail	Hedonic model	Price increased by 0.1% for every 1 mile (1609 meter) closer to the Light Rail station
Dziauddin et al. (2013) Klang Valley, Malaysia	Light Rail Transit (LRT)	Hedonic model	Residential property located anywhere within 1,000 meters of an LRT station would generally be valued at an average rate between MYR10,560 (straight-line-distance model) and MYR6,610 (network-distance model) more than a residential property located far away from station
Pan et al. (2014) Houston, texas, and Shanghai, China	METRORail	Hedonic price model	Price increased by 1% for units located 100 meter closer to rail transit stations
Mulley, Tsai and Ma, (2018) Sydney	Light Rail Line	Geographically Weighted Regression (GWR)	Price increased by over 0.5% for every 100 meter closer to the LRT station
Pilgram and West (2018) Minneapolis, Minnesota	METRO Blue Line	Hedonic model	Price increased by about 3% for homes located within a half mile of station (relative to homes in the rest of south Minneapolis) after the operation of light-rail service

Overall, the body of research examining the relationship between rail transport and house prices tend to vary in their findings. Early research demonstrated a positive relationship between rail transit stations and property values. These include works by Boyce et al. (1972), Dewees (1976), Lerman et al. (1978), Dvett et al. (1979), Damm et al. (1980), Bajic (1983), Voith (1991), Al-Mosaind et al. (1993), Gatzlaff dan Smith (1993), Benjamin and Sirmans, (1996), Lewis-Workman and Brod (1997a; b). In recent years, researchers have also found positive effects of rail transports on property prices/rents with between 0.1% to 3% increase in prices for homes located near rail stations (Delmelle and Duncan, 2012; Pan et al. 2014; Mulley et al., 2018). Nonetheless, some studies have found negative effects of rail transport on property values. In other words, housing prices tend to decline the farther away from the station the housing property is located. Discounts which varies in strength were reported for studies based in the United States such as Philadelphia (Slater 1974), Atlanta (Nelson and McCleskey 1990; Baum-Snow and Kahn 2000; Bowes and Ihlanfeldt 2001), Portland (Al-Mosaind et al. 1993; Dueker and Bianco 1999; Chen et al. 1998), Boston, Chicago, Portland, and Washington (Baum-Snow and Kahn 2000), Dallas (Clower and Weinstein 2002), San Francisco (Weinberger 2001), Buffalo (Hess and Almeida 2007), San Diego (Duncan 2008) and in Asian countries such as Seoul, Korea (Bae et al. 2003), Bangkok, Thailand (Chalermpong 2007) and Shanghai (Pan and Zhang 2008). This negative effect is attributed to

noise pollution (Bowes and Ihlanfeldt, 2001) visual intrusion and the association of the rail right-of-way with industrial uses (Diaz, 1999). Meanwhile, there are cases where findings are less conclusive due to mixed results. Rail stations were reported to impact house prices positively and negatively in Atlanta (Nelson, 1992), San Diego, San Francisco, Sacramento, and San Jose (Landis et al., 1995), San Diego (Ryan, 2005) and Bogotá (Munoz-Raskin, 2010).

3.0 DISCUSSION

Different findings established by previous studies showed that rail transport may impact properties in various ways, either positively, negatively or mixed, depending on the type of externalities produced by the rail transport. Although there is a long withstanding body of literature examining the effects of rail transport on property prices, most of these studies were based in the United States. Only one research was based in Malaysia. Most studies also analyzed the impacts of Light Rail Transport (LRT) on the local property market. Very few have attempted to investigate whether Mass Rapid Transit will affect the local property market. This includes Malaysia. The lack of Malaysian empirical study research, particularly on the effects of MRT stations on property prices raises the question if MRT will bring impact on the property market and if so, what is the magnitude of impact? Lack and uncertainty of market information affect the property market player's decision making such as valuers in valuing property prices and developers in developing areas. Thus, there is a crucial need for a study investigating the impact of MRT on the local Malaysian property market.

4.0 CONCLUSION

This paper has established a few key findings related to the impact of rail transport on property prices/rents. The study concluded that the impact of rail transport on the property market varies depending on the situation. Positive impacts from rail transport were expected if the accessibility and attractiveness of the surrounding area is improved. In contrast, an area may experience a decline in prices if rail transport produces negative externalities such as noise, visual intrusion and the association of the rail right-of-way with industrial uses. The various impacts of rail transport on property prices highlight the need for a local based study, particularly in Malaysia. The findings of the study contribute to the clarification of the rail transport impact on property market literature. Property market players such as valuers, planners, developers and researchers may find the findings beneficial in making various decisions related to property such as research, planning, developing and valuing properties.

ACKNOWLEDGEMENT

The authors acknowledge the Research University Grant (GUP Tier 2) (vote number 16J56) received from Universiti Teknologi Malaysia. Our heartfelt thanks also go to the reviewers for their constructive comments and suggestions to enhance the quality of this paper.

REFERENCES

Al-Mosaind, M. A., Dueker, K. J. and Strathman, J. G. (1993). Light Rail Transit Stations and Property Values: A Hedonic Price Approach. Transportation Research Record, 1400: 90–94.

Alonso, W. (1964). Location and Land Use: Toward a General Theory of Land Rent. Cambridge, M. A.: Harvard University Press.

Anupriya, Graham, D. J., Carbo, J. M., Anderson, R. J. and Bansal, P. (2020). Understanding the Costs of Urban Rail Transport Operations. Transportation Research Part B, 138: 292-316.

Bae, C.-H. C., Jun, M.-J. and Park, H. (2003). The Impact of Seoul's Subway Line 5 on Residential Property Values. Transport Policy, 10: 85-94.
Bajic, V. (1983). The Effects of a New Subway Line on Housing Prices in Metropolitan Toronto. Urban Studies, 20: 147-158.
Baum–Snow, N. and Kahn, M. E. (2000). The Effects of New Public Projects to Expand Urban Rail Transit. Journal of Public Economics, 77: 241-263.
Bowes, D. R., and Ihlanfeldt, K. R. (2001). Identifying the Impacts of Rail Transit Station on Residential Property Values. Journal of Urban Economics, 50: 1-25.
Chalermpong, S. (2007). Rail Transit and Residential Land Use in Developing Countries: Hedonic Study of Residential Property Prices in Bangkok, Thailand. Transportation Research Record, 2038: 111-119.
Clower, T. L., and Weinstein, B. L. (2002). The Impact of Dallas Texas Area Rapid Transit Light Rail Stations on Taxable Property Valuations. Australasian Journal of Regional Studies. 8(3): 389-400.
Debrezion, G., Pels, E. and Rietveld, P. (2007). The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-analysis. The Journal of Real Estate Finance and Economics, 35: 161-180.
Dewees, D. (1976). The effect of a Subway on Residential Property Values in Toronto. Journal of Urban Economics, 3: 357-369.
Diaz, R. B. (1999). Impacts of Rail Transit on Property Values. Paper presented at the Commuter Rail/Rapid Transit Conference. American Public Transportation Association. Toronto, Ontario May.
Dueker, K. J., and Bianco, M. J. (1999). Light Rail Transit Impacts in Portland: The First Ten Years. Transportation Research Record, 1685: 171-180.
Duncan, M. (2008). Comparing Rail Transit Capitalization Benefits for Single-Family and Condominium Units in San Diego, California. Transportation Research Record, 2067: 120-130.
Dziauddin, M. F., Alvanides, S. and Powe, N. (2013). Estimating the Effects of Light Rail Transit (LRT) System on the Property Values in the Klang Valley, Malaysia: A Hedonic House Price Approach. Jurnal Teknologi, 61(1): 35-47.
Goodman, A. C. (1978). Hedonic Prices, Price Indices and Housing Markets. Journal of Urban Economics, 5(4): 471-484.
Gu, Y. (2007). The Impacts of Rail Transit on Property Values: Empirical Study in Beijing. Paper presented at the AsRes Conference.
Hess, D. B., and Almeida, T. M. (2007). Impact of Proximity to Light Rail Rapid Transit on Station-Area Property Values in Buffalo, New York. Urban Studies, 44(5/6): 1041-1068.
Landis, J., Guhathukurta, S., Huang, W., Zhang, M., Fukuji, B. and Sen, S. (1995). Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Transit Systems. Research Report No. 48, Institute of Urban and Regional Studies, University of California, Berkeley.
Lewis-Workman, S., and Brod, D. (1997). Measuring the Neighborhood Benefits of Rail Transit Accessibility. Transportation Research Record, 1576: 147-153.
Li, Z-C., Lam, W. H. K., Wong, S. C. and Choi, K. (2012). Modeling the Effects of Integrated Rail and Property Development on the Design of Rail Line Services in a Linear Monocentric City. Transportation Research Part B: Methodological, 46(6): 710-728.
Loo, B.P.Y., Chen, C. and Chan, E. T. H. (2010)- Rail-Based Transit Oriented Development: Lessons from New York City and Hong Kong. Landscape and Urban Planning, 97(3): 202-212.
Mulley, C., Tsai, C. P., and Ma, L. (2018). Does Residential Property Price Benefit from Light Rail in Sydney? Research in Transportation Economics, 67: 3-10.
Munoz-Raskin, R. (2010). Walking Accessibility to Bus Rapid Transit: Does it Affect Property Values? The Case of Bogota, Colombia. Transport Policy, 17: 72-84.
Nelson, A. C. (1992). Effects of Elevated Heavy Rail Transit Stations on House Prices with Respect to Neighborhood Income. Transportation Research Record, 1359: 127-132.
Nelson, A. C. and McCleskey, S. J. (1990). Improving the Effects of Elevated Transit Stations on Neighborhoods. Transportation Research Record, 1266: 173-180.
Pan, H. and Zhang, M. (2008). Rail Transit Impacts on Land Use: Evidence from Shanghai, China. Transportation Research Record, 2048: 16-25.

Pan, Q., Pan, H. and Zhang, M. (2014). Effects of Rail Transit on Residential Property Values: Comparison Study on the rail transit Lines in Houston, Texas, and Shanghai, China. Transportation Research Record, 2453: 118-127.

Pilgram, C. A. and West, S. E. (2018). The Effect of Rail Transit on Property Values: A Summary of Studies. Research carried out for Project 21439S, Task 7 NEORail II, Cleveland, Ohio.

Ryan, S. (2005). The Value of Access to Highways and Light Rail Transit: Evidence for Industrial and Office Firms. Urban Studies, 42(4): 751-764.

Slater, P. B. (1974). Disaggregated Spatial–Temporal Analysis of Residential Sales Prices. Journal of the American Statistical Association, 69346: 554-560.

The MRT Report: The Affordability of Homes Surrounding MRT Stations (2018).

The Report of the Transportation Strategies Ad Hoc Committee of the Incog Transportation Policy Committee (2008)- Rail Transit Strategic Plan.

UN-DESA (2018). The 2018 Revision of World Urbanization Prospects. Technical Report. Department of Economic and Social Affairs, United Nations. https: //esa.un.org/unpd/wup

Weinberger, R. R. (2001). Light Rail Proximity: Benefit or Detriment in the Case of Santa Clara County, California? Transportation Research Record, 1747: 104-113.

Pejabat Perpustakaan
Librarian Office

Universiti Teknologi MARA
Cawangan Perak
Kampus Seri Iskandar
32610 Bandar Baru Seri Iskandar,
Perak Darul Ridzuan, MALAYSIA
Tel: (+605) 374 2093/2453 Faks: (+605) 374 2299

UNIVERSITI TEKNOLOGI MARA

Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 20 Januari 2023

UNIVERSITI TEKNOLOGI MARA PERAK
TERIMA
25 JAN 2023
Tindakan
Universiti Teknologi MARA Perak
PEJABAT REKTOR

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak

Tuan,

PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK MELALUI REPOSITORI INSTITUSI UiTM (IR)

Perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

nar

Setuju.

27.1.2023

PROF. MADYA DR. NUR HISHAM IBRAHIM
REKTOR
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR