The Journal of Social Sciences Research
ISSN(e): 2411-9458, ISSN(p): 2413-6670
Special Issue. 2, pp: 166-172, 2018
URL: https://arpgweb.com/journal/journal/7/special_issue
DOI: https://doi.org/10.32861/jssr.spi2.166.172

Academic Research Publishing Group

Original Research Open Access

The Critical Success Factors for the Technology Transfer in the Klang Valley Mass Rapid Transit Project

Abdul Rahman Hamdan*
Razak Faculty of Technology and Informatics, Universiti Teknologi, Malaysia

Mohamad Syazli Fathi
Razak Faculty of Technology and Informatics, Universiti Teknologi, Malaysia

Zainai Mohamed
Razak Faculty of Technology and Informatics, Universiti Teknologi, Malaysia

Abstract

The Klang Valley Mass Rapid Transit (KVMRT) Project is the most massive infrastructure project in Malaysia's history. The development of the KVMRT project requires not just local resources but as well as the involvement of foreign expertise. The government in recognising the need to reduce the dependence on foreign expertise in the local rail industry has introduced several measures for technology transfer in the KVMRT Project. The purpose of this paper is to review and identify the critical success factors in the technology transfer program in the KVMRT project. Key personnel directly involved in the planning and implementation of the technology transfer program in the MRT project were interviewed. A qualitative analysis using NVIVO 11 was done based on the findings from the interviews. Nine key success factors have been identified based on the study which are; recipient's characteristics, provider's characteristics, communication channel, coordination and monitoring, transfer environment, government's policy, learning environment, mode of transfer and planning of transfer. Findings show that even though the program is well coordinated, the initial plan is one of the critical factors that need to be improved. Proper measurement also needs to be established to measure the effectiveness of the technology transfer program.

Keywords: Technology transfer; Klang valley MRT; Critical success factors.

1. Introduction

In the process of developing the country, the government from time to time needs to conduct large procurement mainly for the construction of mega projects. The government sometimes opted for imports of technology rather than procured it locally as can be seen in the development of the Klang Valley Mass Rapid Transit (KVMRT) Line 1 project (Nee, 2013). This option is chosen due to unavailability of the technology locally, or it is the best option to speed up the development of the project to meet the time and objectives of the procurement. This approach by the government is supported by a Study that stated as the exports for Malaysia have proliferated over the last few decades, the country is also having an increase of heavy reliance on imported intermediate components (Ghani and Sofyan, 2014). The local rail industry capabilities are still lacking in the area of Rolling Stocks and Electrification, Signaling and also Maintenance, Repair and Overhaul for rail tracks and infrastructure (MIGHT, 2014a). Based on the case study of technology transfer in the Express Rail Link project by Mohamed *et al.* (2015), it was found out that there is already a pool of local skill workers knowledgeable in modern railway infrastructure. The increase of domestic skill workers was due to the previous Light Rail Transit (LRT) railway project such as KTM Komuter, PUTRA LRT and STAR LRT. However, the study also highlighted that when a new rail technology was introduced such as the ERL project that falls under the High-Speed Rail (HSR) category, there are gaps in the local industry that needs to be closed through technology and knowledge transfer (Mohamed *et al.*, 2015). Based on this hypothesis, it can be projected that a new rail development project that uses new technology such as the Klang Valley MRT project will require technology transfer. The need for the technology transfer is to address specific gaps in Malaysia's local capability and capacity to support the first Mass Rapid Transit railway development project which is new to Malaysia.

1.1. Research Background

The railway infrastructure in Malaysia is now being considered as one of the critical elements for the economic transformation program as outlined by Pemandu (2012). However, in developing the rail infrastructure, Malaysia's dependency on foreign know-how in rail technology is still high. OEMs are still needed as the local companies are not yet capable of delivering the technology required especially in the rail system (MIGHT, 2014). Most of the rail system such as rolling stocks and signalling system are mostly sourced from foreign OEMs as in the case for KVMRT Line 1 project (MRT, 2013). The massive outflow of money can be avoided if the local industry players can design, manufacture and sustain specific critical rail systems and this can be done through technology transfer. A study revealed that technology transfer from OEMs does improve the capacity and capability of local contractors to a

*Corresponding Author

certain extent (Bakar, 2006). Regarding technology transfer in the rail industry, the opportunity for technology transfer usually comes during the development of the rail infrastructure itself (Mohamed *et al.*, 2015) 2015). However, proper planning and structure must be in place to enable the technology transfer to happen (Waroonkun, 2007); (Khan, 2011).

In the case of the KVMRT Project, the government opted for imported technologies in some of the critical procurement of the rail systems (MRT, 2013); (Nee, 2013). Importing technology can be a faster solution in completing a project but can be costly in the short term. However, introducing new technology can increase activities that will lead to economic growth Safdari *et al.* (2012). The government in realising the need to upgrade the local capability and localise key rail technology, an Offset Program has been introduced in the KVMRT Project. The objective of the KVMRT Offset Program is to enhance the capacity and capability of the local players, in particular, the Rolling Stock, Signaling and Control System, Power Supply and Distribution System, Track Work, Automated Fare Collections and also Tunneling Works (MRT, 2013). However, the current approach of measurement is still insufficient to determine a successful technology has been appropriately transferred to the local recipients or not. The project was chosen as a case study due to the significant contract value of more than RM20 billion for Line 1 (MRT, 2013). It is also the first railway development project that falls under the Metro Mass Rapid Transit category that ever being built in Malaysia. The project provides a suitable platform to study and analyse the critical success factors for the technology transfer process that occurred during the development of the project.

1.2. Problem Statement

In modernising the rail infrastructure in Malaysia, rail operators and rail owners such as KTMB and Prasarana Berhad have invested more than RM50 billion in upgrading the rail systems (SPAD., 2014). The modernisation phase includes the purchasing of new locomotives, electric trains and also other critical rail systems such as signalling and control system. There also have been several rail extension project that has been done by Prasarana in recent years such as the Kelana Jaya and Ampang Line extension that was just completed in the second quarter of 2016. However, as can be seen in Table 1, the local contents for local rail projects in recent years is quite low especially on the rail systems and also rolling stocks. The rail operators, as well as rail owners, are still heavily dependent on foreign OEMs systems and technologies.

Table-1. Local Contents in Major Rail Infrastructure Projects in Malaysia (2010 – 2016) (Hamdan A. R., 2015b; MIGHT, 2014b)

Rail Projects	Local Contents (Percentage)		
	Rolling Stocks	Systems	Infra (Civil Works)
Kelana Jaya Line Expansion	30%	0 – 19%	100%
Ampang Line Expansion	Nil	Nil	100%
MRT Sg Buloh to Kajang Line	30%	30%	100%

2. Literature Review

2.1. Rail Industry Development in Malaysia

Rail industry can be defined as activities that consist of design and development, construction, operation, maintenance and final disposal of any rail-related vehicle (MIGHT, 2014a). The rail industry in Malaysia have started way back before independence with the Malayan Railway began in 1885 as can be seen in Figure 1 below.

Figure-1. Malaysia's Railway Development Timeline (1885 – 2020)(Lee and Sipalan, 2018; MIGHT, 2014; SPAD, 2014)

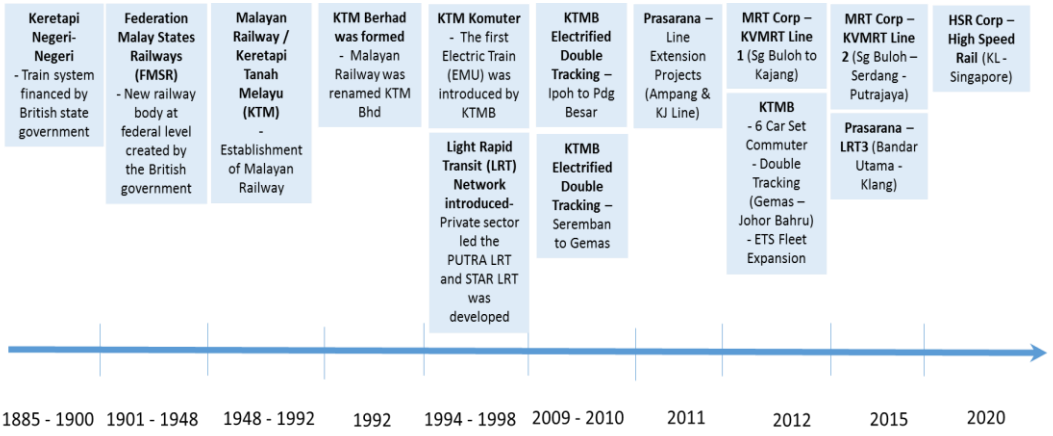

Figure-1. Malaysia's Railway Development Timeline (1885 – 2020) ((Lee and Sipalan, 2018); (MIGHT, 2014a)
As can be seen in Figure 1, the modernisation of the rail industry began with KTMB first electric train project in 1995. The upgrading of Malaysia's metro rail infrastructure was then led by private sectors such as PUTRA LRT and STAR LRT from 1994 to 1998. The government then introduced the electrified double-tracking project from 2009 to 2010 and several extension line project by Prasarana in 2011. In 2012, the Government announced one of the most significant rail infrastructure projects to be developed in Malaysia and known as the Klang Valley Mass Rapid Transit (KVMRT) Line 1 project running from Sg. Buloh to Kajang. The KVMRT Line 1 project started in

2012 and was completed by in 2017 (Ahmad and Sivanandam, 2017). As the demand for efficient public transportation growing in the future, the government have envisioned almost RM160 billion worth of investment will be made in upgrading the rail infrastructure in Malaysia (SPAD., 2014). Rail development projects in progress such as Klang Valley MRT Line 2, LRT3 and plan future project such as High-Speed Rail will open up new opportunities for our local companies to not only receive work packages contract but as well as to develop their capability to a higher level through technology transfer (Lee and Sipalan, 2018; SPAD., 2014).

2.2. Technology Transfer Definition

Technology transfer has been the main topic of many studies throughout the years. There have also been many studies to define the technology transfer as well as determining the factors and sub-factors that have an impact on the technology transfer process and output. Waroonkun (2007) defined technology transfer as when all types of knowledge relating to the field (e.g. design, operation, material use, equipment utilisation) are transferred from a foreign party that acts as the transferor to a host party that serves as the transferee that arranges to receive it. Technology transfer can also be stated as a process of knowledge transfer from a provider to a recipient. Haghirian (2003) noted that the meaning of 'transfer' in a technology transfer is the knowledge flows from its primary source to the secondary holder. Technology transfer can also be defined as when the process has achieved the introduction of new techniques, improvement of existing methods and even the generation of new knowledge (Carina and Teixeira, 2014).

2.3. Technology Transfer Factors and Sub-Factors

In the effort to measure the effectiveness of the technology transfer process in the local rail projects, there is a need to identify the factors and sub-factors of the technology transfer process first. Through literature review, there have been numerous studies that identified these factors and sub-factors in various industries as well as countries. Multiple researchers have also studied the effectiveness of technology transfer. The efficiency of technology transfer very much depends on the type of relationship that is being formed between the technology provider and the technology recipient (Khan, 2011) further explained in his study, recipients that have a collaborative relational technical governance with the technology provider will have a satisfactory technology transfer arrangement compared to recipients who are under contractual or commercial technical arrangements. Studies have also shown that governance mechanism plays a vital role in the effectiveness of the technology transfer process (Khan, 2011); (Rogers *et al.*, 2000). The study did by Waroonkun (2007) for example managed to model the technology transfer process by examining the relationship of this factors to each other. Table 2 shows the summary of the literature review on technology transfer factors and sub-factors.

Table-2. Literature Review on Technology Transfer Factors and Sub-Factors

Author/Year	Scope/Field	Findings
(Waroonkun, 2007)	Modelling International Technology Transfer in Thai Construction Projects	The five factors in TT are:- ▪ Transferor Characteristics ▪ Transfer Environment ▪ Learning Environment ▪ Transferee Characteristics ▪ TT Value Added
Lai and Chao (2006)	The Challenge of Technology Transfer in a Cross-cultural environment – From the U.S. to the Greater China Region	Influence factors for a Technology Transfer project are:- ▪ Knowledge specification ▪ Experiences ▪ Organisation specification ▪ Complexity ▪ Person specification ▪ Technical background ▪ Culture specification
Phan and Siegel (2006)	The Effectiveness of University Technology Transfer: Lessons Learned from Quantitative and Qualitative Research in the U.S. and the U.K.	Factors influencing the effectiveness of Technology Transfer process are:- ▪ Consistency and congruency of organisation design ▪ Incentive Systems ▪ Information process capacity ▪ Organisation-wide values
(Khan, 2011)	Technology Transfer Effectiveness through International Joint Ventures (IJVs) to their component suppliers: A Study of the Automotive Industry of Pakistan	Technology Transfer effectiveness:- ▪ Breadth and depth of learning ▪ Exploitative and exploratory innovation Factors affecting TT includes:- ▪ Technological knowledge characteristics ▪ Sender's willingness to transfer technology ▪ Recipient learning intent ▪ Recipient absorptive capacity

		▪ Inter-organisational dynamics, social ties and trust
(Carina and Teixeira, 2014)	Determinants of International Technology Transfer: an Empirical Analysis of the Enterprise Europe Network	Determinants of international technology transfer in a Government-Industry-University collaboration is related to ▪ Human capital ▪ Absorptive capacity ▪ Network connectedness ▪ Trust ▪ Prior experience

From Table 2, it can be observed that one of the critical factors that were identified for the effectiveness of technology transfer in almost all of the studies made is the organisation structure of both the transferors and transferee during the technology transfer process. The organisation structure factor has been highlighted as an essential factor by Lai and Chao (2006) and Phan and Siegel (2006). This element is also identified by Waroonkun (2007) in which the study highlighted that the transferor and transferee characteristics are a significant factor in ensuring the technology transfer process meet its intended objectives. The willingness of technology providers to transfer their technology is also identified by Waroonkun (2007); (Khan, 2011). The study shows that the willingness intent to transfer is also as important in determining the effectiveness of the technology transfer process. However, from all the technology transfer model reviewed, only Phan and Siegel (2006) stated that incentive systems are a significant factor in the technology transfer process. Another critical factor that has been highlighted in studies by; Khan (2011) and Carina and Teixeira (2014) are the absorptive capacity of the recipients. The absorptive capacity of recipients can be determined based on variables such as employee's level of education, provision of formal training in the company and also the frequency of research and development done by the company (Carina and Teixeira, 2014).

2.4. Technology Transfer Factors and Sub-factors in Malaysian Railway Development Project

2.4.1. Government Influence

Based on the Study on the effectiveness of the technology transfer for KVMRT Line 1 (Hamdan, 2015b), government influence has a direct correlation to the 'Transfer Environment', 'Learning Environment' and 'Transferor Characteristics'. (Hamdan, 2015a) also stated that the government policy and enforcement do have a positive impact on the willingness of the technology providers to transfer technology. The technology transfer environment in the KVMRT project is still profoundly shaped and driven by government intervention via the Offset Policy. However, government influence has low significance in making sure the recipients are willing to learn the technology. Government influence also does not have direct importance concerning the added value gain from the technology transfer to the recipient (Hamdan, 2015b). A study also highlighted the success of Shinkansen, the Japan high-speed rail project in developing the technical capability of Japanese engineers was through the intervention and facilitation of the Japanese government (Dinakar, 2001).

2.4.2. Characteristics of Technology Providers and Recipients

Technology providers and technology recipient's behaviour are crucial in making technology transfer success and remain one of the critical success factors (Khan, 2011); (Hamdan, 2015b; Khan, 2011); (Waroonkun, 2007). It was also observed in the KVMRT Line 1 Offset project, some of the recipients only consider the technology transfer project as a one-off project, and no proper technology transfer structure is in place for the company to sustain the technology received. Some of the recipients who are involved also view the technology transfer process as a short-term commitment without really planning on maintaining the technology acquired by the company (Hamdan, 2015b).

2.4.3. Complexity Level of the Technology

To have an efficient technology transfer, a project that has complex or state-of-the-art technology must be done in a properly structured platform. The technology transfer includes having an appropriate technical and legal agreement with related parties Mohamed *et al.* (2015) study show that in the ERL project, assimilation of technology and knowledge transfer of high technology from the OEM to the local recipient is done through incremental improvement, learning and imitation. Therefore, it is critical that a proper mutual platform for technology transfer to be coordinated between the technology provider and local recipient to ensure this incremental improvement is being made throughout the project. Hamdan (2015a) also stated that the local recipients must be clear on the type of technology they consider the higher value to them so that they can collaborate openly and efficiently with the technology providers.

3. Research Methodology

Due to the completion of the KVMRT Line 1 project on 17th July 2017 (Ahmad and Sivanandam, 2017), this paper is aim to review and identify the critical success factors in the technology transfer program that was implemented during the planning, construction, and testing and commissioning of the KVMRT Line 1 project. A case study approach was used in understanding the technology transfer process in the project. As stated by Yin (2003) Case study approach used as a pilot study can help to identify important variables in a complicated situation and develop hypotheses for further research.

The KVMRT Line 1 project was implemented with a structured technology transfer program that is put in place by the government (Nee, 2013). Based on the implementation of the technology transfer program in the project and the successful completion of the rail infrastructure project on July 2017 (Ahmad and Sivanandam, 2017), it is selected as the suitable project for the study. The study was conducted with the objectives to identify the critical success factors for the technology transfer program.

The study uses the criterion sampling, in which the participants of the survey are selected based on pre-determined criteria. The target respondents in a criterion sampling are likely to have vast information that can add to the critical qualitative data and analysis (Patton, 1990). For the study, eight (8) personnel have been identified from MRT Corp as a potential respondent for the study. The designated staff was selected based on their crucial involvement in the technology transfer program for the KVMRT Line project. All of the identified respondents have at least four years of experience in the technology transfer program. The stated criteria sets as a critical basis in the selection of the sample of respondents for the study.

From the eight (8) key personnel that was contacted, five (5) staff from MRT Corp agreed to participate in the study. An open-ended question was developed for the study. The questions formulated for the study was examined by two (2) experts from academia and industry. One expert represents the academic aspect of the study questions and the second expert was involved heavily in the technology transfer program in both the government side as well as in MRT Corp. After the questions were validated and amended by the two (2) experts, the questions were emailed to each of the identified personnel before a face-to-face interview. The reason that the questions were emailed earlier on is to prepare the respondents beforehand so quality answers can be obtained during the face-to-face interview.

The interview session for all of the five respondents average of about 1 hour per session. The interview session was recorded using a digital voice recorder. The detail of the interview was then transcribed into a word sheet. Based on the transcribed data, NVIVO 11 is the software that was used to analyse the data further and to produce the output of the study.

4. Results and Findings

4.1. Participant's Characteristics

The five (5) participants that have agreed to be interviewed consists of key people in the MRT Corp Sdn. Bhd. that was involved in the monitoring and implementation of the technology transfer program in the KVMRT Line 1 infrastructure project. The details of the participants are shown in Table 3 below.

Table-3. Participant's Characteristics

Participant's ID	Position	Department	Experience in TT
A1	General Manager	Procurement	4 Years
A2	Assistant Manager	Procurement	4 Years
A3	Head of Department	Systems Package	10 Years
A4	Head of Department	Systems Package	5 Years
A5	Head of Department	Systems Package	4 Years

From the table, it can be seen that all of the participants have sufficient experience regarding the technology transfer program. The personnel also are from the department that is involved in the critical operation of the KVMRT project.

4.2. Critical Success Factors

From the analysis of the interview, about nine (9) key success factors have been identified that affect the overall implementation of the technology transfer program in the KVMRT Line 1 project. The frequency of the factors mentioned in the interviews and evidence of the identified critical success factors are shown in Table 4 below.

Table-4. Identified Critical Success Factors for the KVMRT Technology Transfer Program

Theme	Frequency	Meaning	Evidence
Planning of Transfer	10	The initial preparation and planning for the Technology Transfer Program	"For MRT's TT requirements, respective systems team provide what are the requirements such as at what level, what subject and what scope" (A2)
Modes of Transfer	13	The channel for the technology transfer to be implemented	"Most technology transfer happens during the manufacturing phase" (A1)
Learning	16	The hard or soft infrastructure	"The technology transfer can happen in a

Environment		that is put in place to facilitate the learning environment for technology transfer	meeting, sometimes in a classroom or sometimes in the form of On-Job-Training (OJT)" (A4)
Government's Policy	4	Government's policy related to promoting and enforcing technology transfer in the project	"MRT follows the Offset Requirement Document (ORD) set by the government for the technology transfer" (A1)
Transfer Environment	6	The ecosystem that is put in place in the KVMRT project to promote and facilitate technology transfer	"Technology transfer environment is subjective, but if both provider's and recipients are committed, the right environment will happen" (A4)
Coordination & Monitoring	6	The coordination of related parties that are involved in the technology transfer program and the monitoring of its implementation	"We appoint dedicated consultant to monitor. We have a Committee Meeting every quarterly as well as the working committee to monitor the TT program" (A1)
Communicatio n Channel	5	The means of communication between related stakeholders for technology transfer program in the project	"Regarding the communication channel, procurement is playing the lead, and we will coordinate with the technical team and human resource. Central point and reporting is by procurement department" (A1)
Provider's Characteristics	5	The technology provider's organisation's characteristic that relates to technology transfer program	"We need to consider works package contractors limitation such as space, trainer availability and facilities" (A3)
Recipient's Characteristics	12	The technology recipient's organisation's characteristics that relate to technology transfer program	"The recipients should have one or two years' experience. So they would know what knowledge to absorb and what questions to ask" (A5)

4.3. Recommendations

From the analysis of the interview, key findings and recommendations were made based on the impact and result of the technology transfer program. Three (3) out of the five (5) respondents stated that the effect of the program is the improved salary and career progression of the trainees that was involved as recipients in the technology transfer program. Three (3) out of the (5) respondents also suggested that the middle and upper-level engineers must be included as the recipients in the technology transfer program as to create a more effective technology transfer program. From the interview findings also, the key factors that need to be improved are the technology transfer planning and measurement. All five (5) respondents highlighted that initial preparation is the most critical aspect that needs to be improved. In terms of the measurement factor, two (2) of the respondents stated that no proper measurement was established to track the effectiveness of the program.

Several recommendations can be made to further improve the technology transfer process in future local rail development projects. The first suggestion is to improve the initial preparation and planning between the government, industry and the procurement agency for the technology transfer program. This recommendation is made due to the finding that the initial planning has a deep and direct impact on the effectiveness of the technology transfer process. The second suggestion is to tighten up the selection of technology recipients as the recipient's characteristics is one of the critical factors for a successful technology transfer program. The third recommendation is to establish a structured and proper measurement system to monitor the effectiveness of the technology transfer program. By having a proper measurement system, the technology transfer program can be monitored more effectively as highlighted by the respondents.

5. Conclusion

The findings show that the technology transfer program in the KVMRT Line 1 is well coordinated. From the nine (9) key success factors that were identified, "learning environment", "modes of transfer", "recipient's characteristics" and "planning of transfer" are considered the most important critical success factors. Future studies can be recommended to investigate the relationship between these identified factors and determine which key factors contribute to the overall success of the technology transfer program.

For future work and research, it is suggested that statistical analysis methods including benchmarking and also Structural Equation Modeling (SEM) should be used to test and verify the technology transfer model and the interrelationships between the variables and factors in the local rail development project. With this method, the technology transfer process can be further improved to meet the current objectives of the government to have a sustainable domestic rail industry in the future.

Acknowledgement

This work was financially supported by Dana Razak Research Grant Scheme (UTM Grant No. 4J316) under Universiti Teknologi Malaysia.

References

Ahmad, R. and Sivanandam, H. (2017). Najib Launches Phase 2 of Sungai Buloh-Kajang MRT Line. The Star.:

Bakar, A. H. A. (2006). *capacity and capability development in indigenous construction firms through technology transfer in construction: a malaysia experience. paper presented at the cib w107 construction in developing countries international symposium,*. Santiago, Chile.

Carina, A. and Teixeira, A. (2014). Determinants of international technology tansfer, An empirical analysis of the enterprise europe network. *Journal of Technology Management & Innovation,* 9(3).

Dinakar, R. (2001). *International Technology Transfers and the Role of Governments A Study on Japanese Official Development Assistance to the Railway Sector in India.* University of Tsukuba.

Ghani, G. M. and Sofyan, J. F. (2014). Trade Variety and Export Performance of ASEAN-5. *Jurnal Ekonomi Malaysia,* 48(1): 49 - 61.

Haghirian, P., 2003. "Does Culture Really Matter? Cultural Influences on the Knowledge Transfer Process Within Multinational Corporations." In *Paper presented at the Eleventh European Conference on Information Systems, Naples. Italy.*

Hamdan (2015a). Assessment on the Effectiveness of Technology Transfer in the Klang Valley Mass Rapid Transit (KVMRT) Co-designing Offset Projects.

Hamdan (2015b). *Assessment on the Effectiveness of Technology Transfer in the Klang Valley Mass Rapid Transit (KVMRT) Co-designing Offset Projects.* Universiti Teknologi Malaysia.

Hamdan, A. R. (2015b). Assessment on the Effectiveness of Technology Transfer in the Klang Valley Mass Rapid Transit (KVMRT) Co-designing Offset Projects, (Universiti Teknologi Malaysia).

Khan, S. Z. A. (2011). *Technology Transfer Effectiveness Through International Joint Ventures (IJVs) to Their Component Suppliers: A Study of the Automotive Industry of Pakistan. (Doctor of Philosophy).* University of Birmingham, UK.

Lai and Chao (2006). *The challenge of technology transfer in a cross-cultural environment – From the U.S. to the Greater China Region.*

Lee, L. and Sipalan, J. (2018). Malaysia, Singapore agree to defer high speed rail lin. Reuters.

MIGHT (2014a). Malaysian Rail Supporting Industry Roadmap 2030: Malaysian Industry-Government Group for High Technology.

MIGHT (2014b). *Malaysian Rail Supporting Industry Roadmap 2030.* Malaysian Industry-Government Group for High Technology

Mohamed, M., Fung, H.-N. and Wong, C.-Y. (2015). Convergence Innovation in Railway Technology: How ERL of Malaysia attained its Co-evolution Structure for Systemic Development. *Asian Journal of Technology Innovation*: 92 - 108.

MRT (2013). MRT Corp Annual Progress Report 2013.

Nee, E. A. (2013). Klang Valley MRT offset scheme to contribute RM3.5b Press release. Available: http://www.thesundaily.my/news/880072

Patton, M. (1990). *Qualitative evaluation and research methods.* Sage: Beverly Hills, California.

Pemandu (2012). ETP annual report 2012. 20-39.

Phan and Siegel (2006). *The effectiveness of university technology transfer: Lessons learned from quantitative and qualitative research in the U.S. and the U.K.*

Rogers, E. M., Yin, J. and Hoffman, J. (2000). *Assessing the effectiveness of technology transfer offices at U.S. Research Universities.* Department of Communication and Journalism: University of New Mexico.

Safdari, M., Mehrizi, M. A. and Elahi, M. (2012). Effects of Imported Technology on Economic Growth in Iran. *African Journal of Business MAnagement,* 6(24): 7120 - 25.

SPAD. (2014). *National Land Public Transport Master Plan*:

Waroonkun, T. (2007). *Modelling international technology transfer in thai construction projects.* Doctor of Philosophy: Griffith University.

Yin, R. K. (2003). *Case study research: Design and methods.* 2nd edn: SAGE Publication: London.