The Internal and External Factors Influencing the Higher Institutions of Education (Hie) and Knowledge Transfer Program in Malaysia

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ABSTRACT

Knowledge management is a fundamental requirement for continuous survival of an organisation. An effective knowledge transfer process can contribute to business and economic development and to sustaining the nation well-being. The knowledge transfer programme agenda is believed to be one of the successful initiatives by the Malaysian government in bridging the gap between higher education institutions, industries, and communities. The involvement of all parties – the government, universities, industries, and communities has played significant roles in developing the country economy. The New Economy Model has inspired the Ministry of Education (MOE) Malaysia to embark on Knowledge Transfer Programme (KTP). Since the inception of KTP in 2010, the collaborations between the Malaysian local universities, industries and communities continue to flourish. There were 460 KT projects implemented in Malaysia by all the 20 public universities. This Study was conducted with the vision to identify the key factors for knowledge transfer projects' implementation. The study has outlined Higher Institutions of Education (HIE) Capacity Capability, Academia Capability, Graduate Interns Capability, KT Partner Organisation Capability, Relational Elements, Technology Augmentation, External Factor and Knowledge Transfer Mechanism as the main factors affecting the KT project

performance. Findings of this study has confirmed Academia Capability, Higher Institutions of Education (HIE) Capacity, KT Partner Organisation and External Factor to have positive and significant relationships with KT project performance. These findings imply enriching human capital values of academia, students and employees; and strengthening organisational role and support system (both HIE and KT Partners) are necessary in ensuring the success of a KTP project. The study has also suggested the importance for both academia and KT project partners to understand the various mechanisms that can be adopted in transferring the knowledge.

Keyword: Knowledge Management, Knowledge Transfer, Human Capital.

INTRODUCTION

Knowledge transfer (KT) is defined as a movement of meaningful information, technical knowledge, and innovative ideas or technologies from one organisational setting to another (Nilsen & Anelli, 2016). Agrawal in 2001 indicated universities and industries agreed that KT is a general concept classifying a wide set of interactions between industries and universities focusing on the exchange of knowledge related to research, science and technology. Malaysia has announced the Malaysia Education Development Plan (Higher Education) or PPM (PT) 2015-2025 whereby the government has introduced various measures to strengthen university–industry links. This includes two (2) key measures for the endeavour: 1) providing public funds to encourage collaborative research between universities and industry; and 2) strengthening the role of business units at universities to promote interactions with industry (Malaysia Education Development Plan (PPM) 2015 - 2025, Kementerian Pelajaran Malaysia).

The Knowledge Transfer Programme (KTP) was implemented during the Tenth Malaysia Plan (2011-2015) to support and to encourage collaboration between universities and industries. The KTP aims to transfer knowledge and results of research conducted by academia to industries and community. According to the KTP Policy (2011), the specific objective of KTP is to recognise and promote the transfer of knowledge via the exchange of creative and innovative ideas, research findings, experiences and skills between IPTA, industries, government agencies and the wider community. KTP was set forth in 2010 as the 23rd Critical Agenda Programme of the Ministry of Education (MOE). The Ministry of Education (MOE), which is responsible for KTP agenda, hopes that KTP will be able to optimise research results and product development carried out at universities to improve the living standards of the community and to increase the industry earnings.

All the twenty public universities in Malaysia have embarked on KT projects. The KTP agenda hopes to test the capability of academics and graduate interns in translating the theory or knowledge that they have acquired at the universities to meaningful values which the society would appreciate or benefit from. This implies there will be an emphasis on social entrepreneurship development; expecting a boost in tourism and hospitality sector; further development in retail and logistic industry; and enhancement in financial institutions and services sector. Between 2011 and 2017, the total grant allocated by KTP has amounted to RM63.8 million with the highest allocation for KTP project grants is RM 15.8 million

(Rolling 3) compared to RM5 million (Rolling 1) during the initial stage of KTP. A total of 460 KT projects with collaborative involvements of 275 industries and 185 communities' organisations were recorded in 2017. Within these 460 projects, KTP has gained the participations of 1,820 academics and 893 graduate interns. This implies an average ratio of one (1) KTP project to four (4) academics and two (2) graduate interns. KTP can be regarded as a valuable platform and should be further encouraged by the government, higher education institutions, industries and communities.

The role of knowledge as the key source for competitive advantage in companies has become a fervently debated topic. The increasing demand from both companies and communities to work with higher institutions of learning implies that education is not only to be shared but must continuously be developed by enterprises, academicians, students and communities. Despite several initiatives and policies established by many government agencies to foster collaborations between industries, communities and higher institutions of learning, the outcomes of such collaborations are still not satisfying to some or considered less impactful. The recent interest in this concept of 'knowledge transfer' reflects an important aspect that organisations, either a company or a Non-Governmental Organisation (NGO), must deal with. The outcomes of KT may influence the perceptions on increased competition, rapid business development, market turbulence, increase in literacy, and increase in wellbeing.

In the education industry, it is most meaningful when knowledge, research outputs and inventions can be applied by the industries and communities. As such, the Critical Agenda of Knowledge Transfer in Malaysia under the Ministry of Education (MOE) has been mandated to take the lead to promote the culture of knowledge sharing between Higher Institutions of Education (HIE), industries and the societies. This is one of the strategies to achieve effectiveness and excellence in education, by promoting research outputs and intellectual assets of the HIE that are yet to be fully utilised. The KTPM in Malaysia (2014) revealed that evidently, the current KT projects are very much research-based rather than shared or transfered the knowledge. It is frustrating to note that many outcomes of the university researches are perceived by industries as lacking in innovativeness and are not commercially viable. Such views were also highlighted by Bruneel et. al. (2009) in a UK study, stating that the trends in relation to successful university-industry engagement in innovative projects are heading towards the wrong direction. The engagement of industry from the beginning of a research is perceived to be vital considering knowledge sharing and transferring.

From the present researchers' observations and experiences, many parties perceived academics as theorists rather than practitioners; being more rethoric than pragmatic; and university research discoveries are only suitable for teaching and learning not applicable to the industries. The issue is, to what extent are these criticisms true? Despite a substantial investment by the government and institutions to enhance academia-industry collaboration, the impact of those collaborations are still being questioned. Why? Aren't the Malaysian academics knowledgeable enough, and competent in working with the industry and the community? Are Malaysian graduates lacking in knowledge, not only on the subject matter but also on the soft skills? Does university management provide a clear direction on what it means by academia-industry collaborations? Are there sufficient incentives to drive the

collaborations? These questions imply there are numerous factors that need to be addressed in implementing KT programmes. Several scholars (eg. Lambert, 2003, Bruneel et al. 2009, Schofield T., 2013) have highlighted several factors or barriers in implementing KT programmes. Hence, what are the factors or barriers and how are they contributing to the success of a KT project? Can those factors affect the KTP mechanism and strategy?

The factors are basically stemmed from the academics and graduates capabilities, universities' support system, KT partners ability, and external factor like goverment policy and support. These key factors are sought to be important to esure success implementation of KT projects. The present study thus, is determined to identify the key factors that contribute to the implementation and success of knowledge transfer programme in Malaysia. It also looks into areas that can be strengthened through the KT programme. Based on the issues described above, several pertinent questions have been established as follows: (1) What are the key success factors (KSF) that contribute to the success of knowledge transfer (KT) programme in Malaysia?, (2)To what extend the knowledge mechanism is required and mediates the relationship between KSF and KTP performance?

This research aims to answer the following objectives.

1. To identify the KSF that contribute to the KT programme in Malaysia.

2. To investigate the mediating effect of KT mechanism towards the relationship between the KSF and KTP performance

REVIEW OF LITERATURE

The term knowledge transfer (KT) is often used interchangeably with "knowledge dialogue", "knowledge exchange" and "knowledge translation" (Lockett, 2009). In the area of organisational theory, KT is the practice of transferring knowledge from one part of the organisation to another (Nilsen & Anelli, 2016). Like knowledge management (KM), KT seeks to organize, create, capture or distribute knowledge and ensure its availability for future users. Furthermore, KT typically refers to a wide range of initiatives aimed at fostering mutually beneficial cooperation among universities, corporations, and public sectors (Alaarj, Abidin-Mohamed & Bustam, 2016). It necessitates the willingness of the parties to collaborate and focuses on connection rather than collection, with the latter ultimately determined by the decisions made by individuals or organizations. Knowledge is divided into two types – tacit knowledge and explicit knowledge (Nonaka, 1995). Tacit knowledge refers to among others experience, feelings, skills and culture values which are not "physically" seen or documented while explicit knowledge is the knowledge that can be seen or "tangible". This include among others written documents, practicing manual, algorithm and written policies.

According to a report by the University of Cambridge (2009), there are three key factors that contribute to the success of KT in an organisation or inter-organisation. First, it takes effort and time to make it works. Thus, KT is not a 'zero cost' activity; people need to sacrifice both financial and non-financial matters to realise it. Second, KT works best when people can exchange ideas and spot new opportunities for future benefits. Third, KT needs full support at

all levels of an organisation and from the external parties that have potential collaboration. In this context, KT should allow a culture of open access and open innovation within and among the organisations. Apart of these factors, most of the researchers from various angle of studies have explained that among the factors which enable KT programs to achieve its success are human-centric factors, knowledge characteristics, organisational factors, power relationships and network characteristics (Miller, Mcadam, Moffett, Alexander, & Puthusserry, 2016).

Hansen (2002) emphasized that effective information transfer has a positive impact on a company's innovations, but that knowledge has inherent complexity, making it the most challenging resource to manage. In today's highly competitive business world, innovation and collaboration are important challenges. According to the firm's knowledge-based perspective, knowledge is viewed as a tactical resource that enables competitive advantage in highly competitive environments. As a result, in order to achieve comprehensive knowledge that is beneficial to all, it must be properly transferred from one unit to another. This is critical for the success of organizational cooperation and the development of innovative ideas.

KTP has been applied in a variety of countries, including both developed (such as the United States of America, the United Kingdom, Korea, and Japan) and developing countries (such as Malaysia, Thailand, Indonesia, Philippines, India and Nigeria). Santoro and Gopalakrishnan (2000) revealed from collaborations of 189 enterprises and 21 universities in the United States that the success of KTP is mostly dependent on the mechanistic organization of industrial firms, stable and direction-oriented cultures, and corporate trust in the university partner. Findings from a cross-country and cross-continent KT projects involved in the European Commission and Europe Aid Asia Programme (EAAP) by Duan, Nie and Coakes (2010) identified 10 highly rated factors: relationship, culture awareness, language, motivation, knowledge distance, objectives and focus, transfer channel, selection of appropriate partners, trust, and openness. They also detected other factors comprising of objectives and focus; selection of appropriate partners; respect; use of expert trainers; project flexibility; institutional collaboration; expert subject knowledge; policy framework/bureaucratic procedures; and topic timeliness.

Barnes, Pashby and Gibbons (2002) conducted a study on six collaborative research projects by Warwick Manufacturing Group (WMG) in the United Kingdom (UK) and found several key success factors related to KT. Among them include mutual trust, commitment continuity, project management, managing the cultural gap, ensuring equality, the role of the lead researcher, the role of graduate interns, industrial partners shared vision/strategic importance, collaboratives experience complimentary expertise/strengths, patent/intellectual property, propriety benefits and papers published. In Denmark and Norway, researchers Nielsen and Cappelen (2014) found that lack of time, distinct goals, communication, confidentiality and intellectual property rights, trust, mutual interest, clarification on intentions and a common understanding of the project collaboration, are the critical factors to KT.

From the perspectives of developing countries, Klomklieng, Ratanapanee, Tanchareon and Meesap (2012) stated that in Thailand poultry industry, their research cooperation uses a modified triple helix model of Industry-University and Intermediary body. The researchers
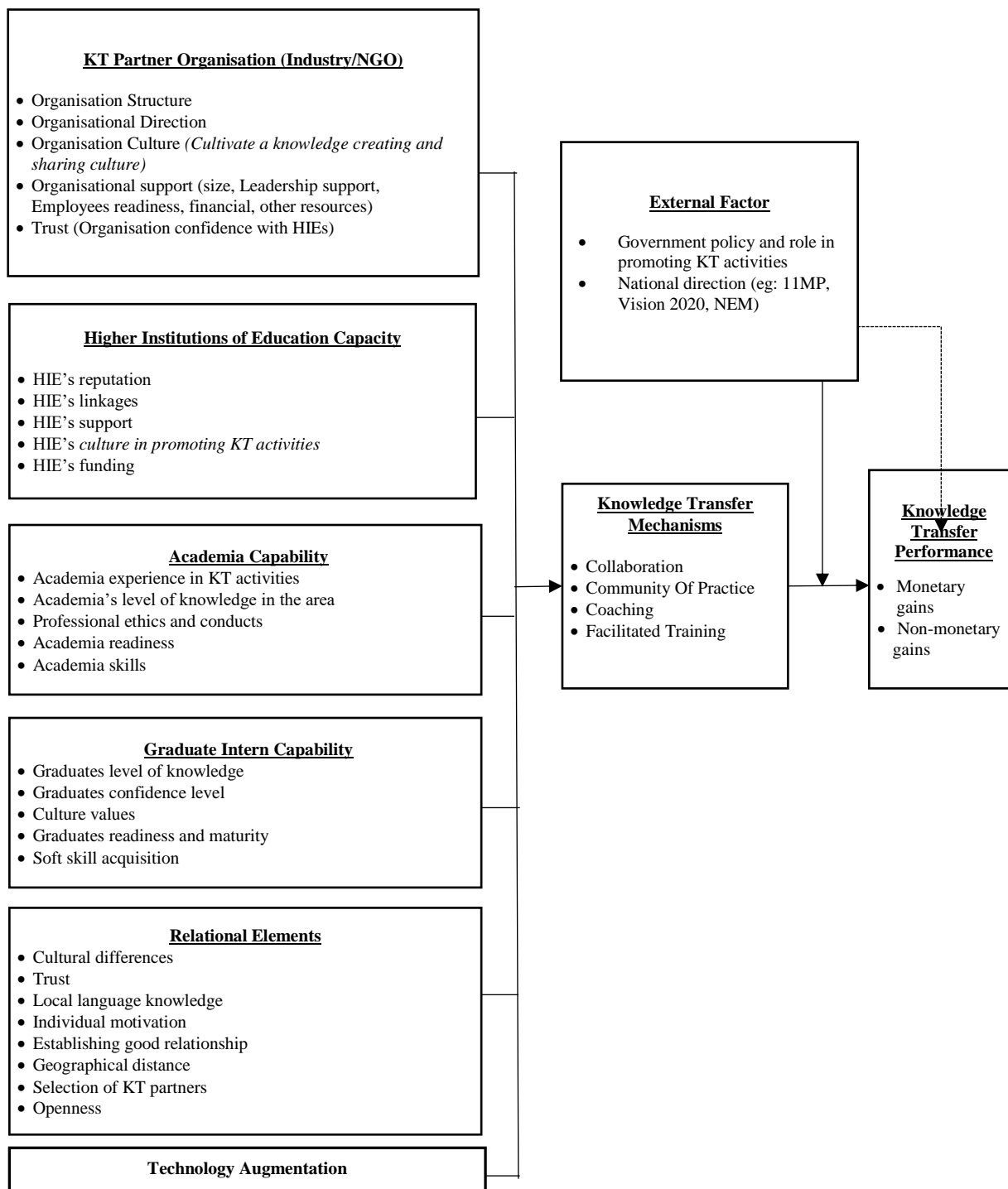
claimed that the intermediary body helps industries to reduce cost, time and failure risk of new product development by identifying the need of the industry and acquiring the knowledge and technology from university and matching them together. Success factors that have been identified including commitments and strong linkage, and information and technology sharing. In a study by Susanty, Handayani and Henrawan (2012) in Garment Sentra in Kabupaten Sragen, Indonesia involving small and medium enterprises proved that knowledge transfer effectiveness is mainly influenced by two factors which are organisational culture and organisational structure. The effectiveness is based on market share and profit increment.

Ankrah and Al-Tabbaa (2015) identified several factors that can facilitate or impede KT. They are capacity and resources; legal, institutional policies and contractual mechanisms; management and organizational; technology; political; and social. Much earlier, Schofield (2013) discovered the factors that have significantly contributed to KT were organizational context, project management, relational, and cultural context. Amadi-Echendu and Bothma (2007) found three most significant factors that had motivated KTP in South Africa from an industrial perspective. These include the appropriate knowledge, the knowledge itself, and return from the research investment. In sum, most of key factors on KT focus on organisational issues, learning culture and technology. Competency and abilities of human factor is relatively less explored by previous scholars.

RESEARCH METHODOLOGY

Evidence in the review of literature led to the development of the research framework as depicted in Figure 1 At this Stage, the research framework is proposed as 'Knowledge Transfer Key Factors Model'. Six (6) key factors were identified to be the main contributors toward the implementation of Knowledge Transfer Programme (KTP) in Malaysia. The key factors are KTP Partner Organisation, Higher Institutions of Education Capacity, Academia Capability, Graduate Intern Capability, Relational Elements and Technology Augmentation. Mechanisms of knowledge transfer (KTM) were established as mediating variable while KT Performance was treated as the dependent variable. In addition, external factor was recognised as moderating variable which has been examined to influence the relationship among the key variables. The main studies that governed the framework are Santoro and Gopalakrishnan (2000); and Schofield (2013).

Knowledge Transfer Performance refers to the achievement level of the KT project. This research outlines performance measure to be included monetary and non-monetary gains. The indicators are sales, productivity, operational cost, motivation attitude improvement, ability to improve organisation problem, ability to achieve KT project objective, and knowledge development.

KT Partner Organisation (Industry/NGO)

- Organisation Structure
- Organisational Direction
- Organisation Culture *(Cultivate a knowledge creating and sharing culture)*
- Organisational support (size, Leadership support, Employees readiness, financial, other resources)
- Trust (Organisation confidence with HIEs)

Higher Institutions of Education Capacity

- HIE's reputation
- HIE's linkages
- HIE's support
- HIE's *culture in promoting KT activities*
- HIE's funding

Academia Capability
- Academia experience in KT activities
- Academia's level of knowledge in the area
- Professional ethics and conducts
- Academia readiness
- Academia skills

Graduate Intern Capability
- Graduates level of knowledge
- Graduates confidence level
- Culture values
- Graduates readiness and maturity
- Soft skill acquisition

Relational Elements
- Cultural differences
- Trust
- Local language knowledge
- Individual motivation
- Establishing good relationship
- Geographical distance
- Selection of KT partners
- Openness

Technology Augmentation

External Factor

- Government policy and role in promoting KT activities
- National direction (eg: 11MP, Vision 2020, NEM)

Knowledge Transfer Mechanisms

- Collaboration
- Community Of Practice
- Coaching
- Facilitated Training

Knowledge Transfer Performance

- Monetary gains
- Non-monetary gains

Figure 1: Knowledge Transfer Key Factors Model

Hypotheses Development

Hypotheses have been developed based on the research questions, objectives and the framework.

Hypothesis A: There are significant relationships between the six (6) key success factors (KSF) and KT Performance.

Hypothesis B: There are significant relationships between the six (6) key success factors (KSFs) and KT Mechanisms.

Hypothesis C: There are significant relationships between KT Mechanisms and KT Performance.

Hypothesis D: There is a significant mediating effect of KT Mechanisms between KSF and KT Performance.

Hypothesis E: There is a significant moderating effect of External Factor on the relationship between KT Mechanisms and KT Performance.

Sampling design is a procedure or process to get a sample size from the population frame prior to data collection. Sample size is important to support the statistical validity of the study. In quantitative research, there is a different technique can be used for selection of sample size. This study employed the stratified sampling technique. Sekaran and Bougie (2016), suggested that a sample size is determined by the content of precision and confidence desired. The first level (or strata) was to identify the number of KT projects to be involved in this study. However, from the population of 352 KT projects, only 152 projects (92 KT-Industry; and 60 KT-Community) have agreed to participate in this study which gives a response rate of 43.2 percent.

Since the unit of analysis is at individual level, five targeted groups of respondents were identified – academia, graduate interns, and industry, community and university representatives. Perspective and views from the five groups are expected to provide a holistic view on the key factors and how KT projects were managed by the university fraternity. Data were gathered from at least one (1) academia, one (1) graduate intern, one (1) industry representative or (1) community representative, and one (1) university representative for each project. The research questions of this study focused on the relationships of the key factors that effecting KTP mechanisms and KTP projects performance from the perspective of the individuals who have involved in the KT projects between 2011 and 2016. Thus, the scope of the investigation is limited to individual's perception towards both KT factors and KT performance.

For quantitative design, the study seeks to examine the correlations amongst the variables based on the research objectives and hypotheses. The questionnaires were distributed with aims to obtain data from three different respondents (academia, graduate intern, industry/community representative) to represent each of the 352 projects. While one university representative from each of the twenty public universities. A total of 272 was collected and analysed. As for the academia group, the researchers were able to send to all the

1332 academics who had involved in the KT projects through their university management. However, only 152 academics had responded and usable for data analysis which gave a response rate of 11.4%. For graduate interns, out of 672, 78 had responded which gave a response rate of 11.6 %. For the industry representative, the research was only able to get 11 responses (5 % response rate) while 26 responses from the community group (21.1 % response rate). Only 5 responded from the 20 public universities which gave a response rate of 25 percent

Reliability Analysis

Table 2 represents the result of reliability analysis that measures the internal consistency of the instruments employed in this study. The analysis was conducted based on 272 quantitative respondents. There are six (6) independent variables presented by HIE Capacity, Academia Capability, Graduate Intern Capability, KT Partner Organisation, Relational Elements, and Technology Augmentation. The mediating variable was presented by KT Mechanisms whilst the moderator variable was presented by External Factor. KT Performance was presented as the dependent variable. The Cronbach's Alpha values suggest that all variables have scored above minimum requirement for internal consistency as suggested by Nunnally (1978); Hair, Black, Babin, and Anderson (2010) that alpha value at 0.70 or above indicates high reliability.

Table 1: Reliability Analysis

Latent Variable	No. of Original Items	No. of Final Items	Cronbach's Alpha
HIE Capacity	22	14	0.951
Academia Capability	24	13	0.959
Graduate Intern Capability	20	16	0.914
KT Partner Organisation	7	6	0.809
Relational Elements	6	3	0.926
External Factor	6	3	0.776
KT Mechanisms	10	7	0.804
Technology Augmentation	10	4	0.942
KT Performance	6	5	0.928

ANALYSIS OF DATA

Collected data was analysed using SPSS version 23 and SMART PLS Version 3.0. Construct validity was performed on the variables based on 263 quantitative data to examine the fitness of the measures. Variables were initially defined based on previous literature and in the context of present study. Pilot study was conducted, and every variable was tested on the data obtained from pilot study. Finally, correlational analysis was used to ensure the validity of the measure.

The quantitative data analysis begins with descriptive analysis, correlation, and regression analysis of 267 respondents from four groups - Academia, Graduate Interns, Industry and

Community representatives. However, the five respondents who represented the 20 public universities were requested to only evaluate their respective university's capability in terms of university linkages, readiness and support system provided for the KTP. Thus, this brings a total of 272 respondents who have participated in this study. Analysis of data was conducted using SPSS ver.23 and SmartPLS ver3.0.

Profile of the 272 respondents is presented in Table 2 according to five groups – HIE representatives (n=5), academia (n=152), graduate interns (n=78), industry representatives (n=11), and community representatives (n=26).

Table 2: Profile of Respondents (n=272)

HIGHER INSTITUTIONS OF EDUCATION REPRESENTATIVES (HIE) (n=5)			
VARIABLE	**CATEGORIES**	**FREQUENCY**	**PERCENTAGE (%)**
University	UA 1	1	20
	UA 2	1	20
	UA 3	1	20
	UA 4	1	20
	UA 5	1	20
	Total	**5**	**100%**
Department	RMC	3	60
	IRD	2	40
	Total	**5**	**100%**
Position	Director	1	20
	Deputy Director	1	20
	Asst. Officer	2	40
	Research Officer	1	20
	Total	**5**	**100%**
Academia (n= 152)			
Variable	**CATEGORIES**	**FREQUENCY**	**PERCENTAGE (%)**
Age	21 - 30 Years Old	4	2.6
	31 - 40 Years Old	56	36.8
	41 - 50 Years Old	52	34.2
	51 - 60 Years Old	40	26.3
	Total	**152**	**100%**
Race	Malay	132	86.8
	Chinese	10	6.6
	Indian	2	1.3
	Bumiputera Sabah	4	2.6

	Bumiputera Sarawak	2	1.3
	Others	2	1.3
	Total	**152**	**100%**
Gender	Male	63	41.4
	Female	89	58.6
	Total	**152**	**100%**
Marital Status	Single	12	7.9
	Married	140	92.1
	Total	**152**	**100%**
Level of Education	Master	31	20.4
	Ph.D	110	72.4
	Others	11	7.2
	Total	**152**	**100%**
Working Experience	1-5 Years	11	7.2
	6-10 Years	35	23
	11-15 Years	60	39.5
	16-20 Years	37	24.3
	20 Years and Above	9	5.9
	Total	**152**	**100%**
Industrial Working Experience	Have Experience	99	65.1
	Don't Have Experience	53	34.9
	Total	**152**	**100%**

Graduate Interns (n=78)			
Variable	**Categories**	**FREQUENCY**	**PERCENTAGE (%)**
Working Experience	No Experience at All	24	30.8
	1 Year and Below	22	28.2
	1-2 Years	25	32.1
	3-4 Years	6	7.7
	5 Years and Above	1	1.3
	Total	**78**	**100%**
Age	21 - 25 Years Old	27	34.6
	26 - 30 Years Old	39	50.0
	31 - 35 Years Old	12	15.4
	Total	**78**	**100%**
Race	Malay	60	76.9
	Chinese	9	11.5
	Bumiputera Sabah	6	7.7
	Others	3	3.8

	Total	**78**	**100%**
Gender	Male	45	57.7
	Female	33	42.3
	Total	**78**	**100%**
Marital Status	Single	66	84.6
	Married	12	15.4
	Total	**78**	**100%**
Level of Education	Degree	60	76.9
	Master	18	23.1
	Total	**78**	**100%**
Reasons to Become GI	Salary	48	61.5
	Knowledge Sharing	7	11.5
	Helping Community	4	7.7
	Experience	6	7.7
	Get Offer to Continue Study	8	7.7
	Other Reasons	5	3.8
	Total	**78**	**100%**

COMMUNITY (n=26)			
Variable	**Categories**	**FREQUENCY**	**PERCENTAGE (%)**
Designation	Member	7	26.9
	Manager	4	15.3
	Instructor	1	3.8
	Staff	14	53.8
	Total	**26**	**100%**
Working Years	1-2 Years	9	34.6
	3-4 Years	12	46.2
	5-6 Years	5	19.2
	Total	**26**	**100%**
Nature of Activity	Agricultural	2	7.7
	Community	5	19.2
	Education	12	46.2
	Food	2	7.7
	Cooperation	1	3.8
	Medical	2	7.7
	Tourism	1	3.8
	Entrepreneurship	1	3.8
	Total	**26**	**100%**
INDUSTRY (n=11)			

VARIABLE	CATEGORIES	FREQUENCY	PERCENTAGE (%)
Operation Years	1-10 Years	4	36.4
	11-20 Years	3	27.3
	21-30 Years	2	18.2
	30-40 Years	1	9.1
	51 And Years	1	9.1
	Total	**11**	**100%**
Designation	Manager	8	72.7
	Officer	2	18.2
	Staff	1	9.1
	Total	**11**	**100%**
Working Years	3-4 Years	1	9.1
	5-6 Years	4	36.4
	6-8 Years	4	36.4
	9-10 Years	2	18.2
	Total	**11**	**100%**
Nature of Business	Agriculture & Veterinary	7	63.7
	IT	1	9.1
	Manufacturing	1	9.1
	Services	1	9.1
	Tourism	1	9.1
	Total	**11**	**100%**
University Partner	USM	3	27.3
	UTM	1	9.1
	UUM	1	9.1
	UMS	3	27.3
	UNIMAP	1	9.1
	UITM	1	9.1
	UPSI	1	9.1
	Total	**11**	**100%**

From the quantitative descriptive analysis, the research concludes eight (8) variables as key success factors for KT performance instead of six factors as suggested eight factors are academia capability, graduate intern capability, KT partner organisation, relational elements, external factors, technology augmentation, KT mechanism, and HIE capacity. Hence, the next stage is to rank eight factors according to the emphasis made by 272 respondents from the five groups of respondents - academia (n=152), graduate interns (n=78), industry (n=11), community (n=26) and HIE representative (n=5).

Figure 2 shows the average mean of eight key success factors (KSF). The ranking reveals all factors are deemed to be critical to affect KT performance. The data shows External Factors

ranked no.1 followed by Academia Capability, KT Partners, HIE Capacity and GI Capability. Relational Elements, and KT Mechanisms ranked 6 and 7 respectively. Technology however was not favoured by all groups. This does not mean technology is not important to drive KT projects, however it is relevant to support the transfer of knowledge from the transferors to recipients at the time the data was collected. Majority of the respondents has described that technology is no longer a driver because it is a basic element that "must have" in any activity.
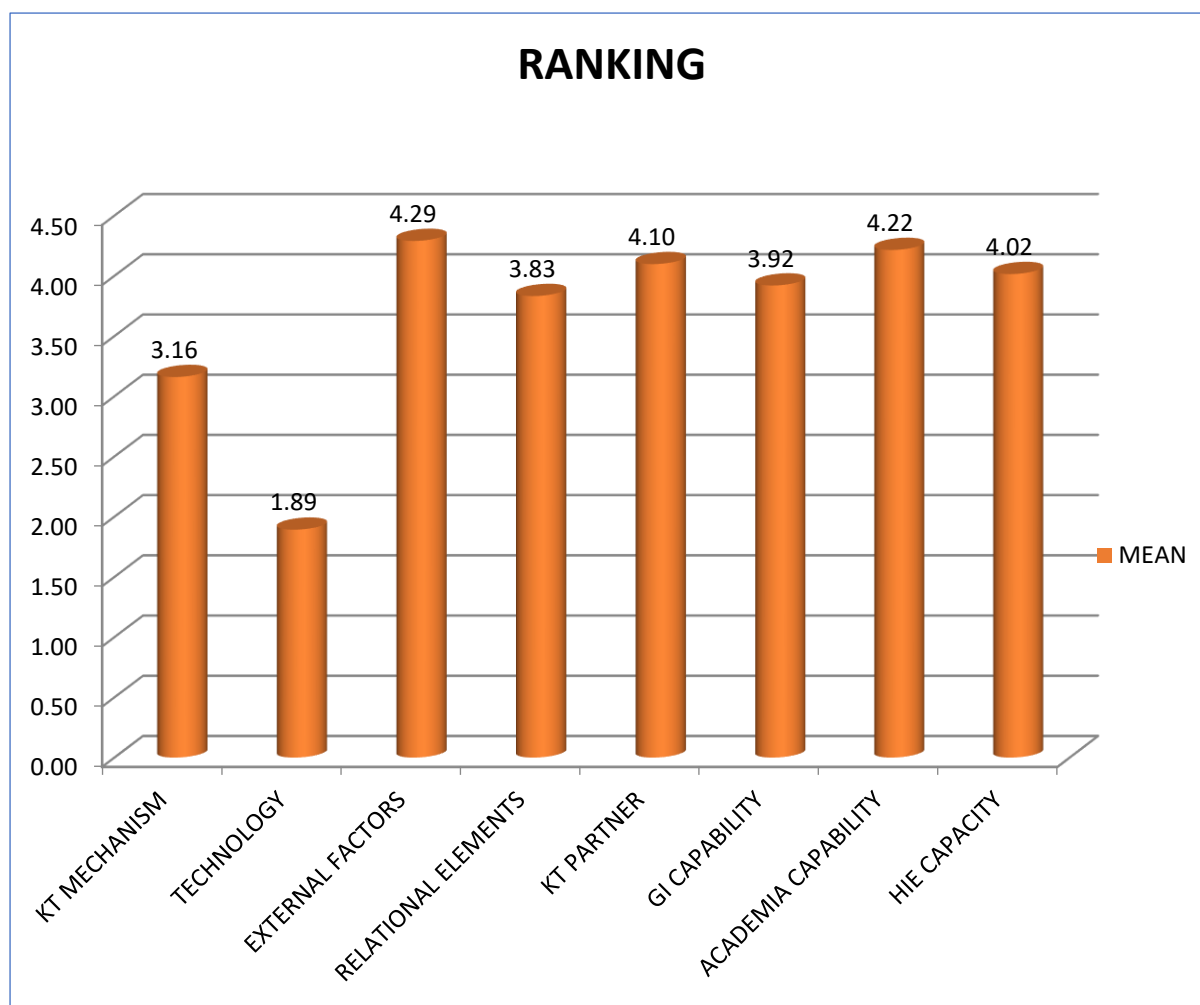
Figure 2 Ranking of Key Success Factors

For the correlation analysis and hypotheses testing, analysis was conducted upon 267 respondents. The result indicates correlations do exist between the key factors (HIE capacity, Academia Capability, GI Capability, KT Partner Organisation Analysis, Relational Elements and External Factors) and KT performance especially among the Academia and Graduate Intern groups. From the perspective of industry and community, however, there are insignificant correlations found between the key factors (except for KT Partner Organisation Analysis) and the KT Performance. Both industry and community groups agreed that their own organisational readiness and role is an important contribution towards the KT success.

These results also show that both industry and community groups did not feel significant impact on the collaboration they have established with the academia and the universities. Though at the beginning, they (industries and communities) have agreed the academia and graduate interns' capabilities are important, nonetheless, this study have not found their academic and graduate partners are contributing enough to the performance of the projects. The findings infer our Malaysian academia and graduates are less ready, less experience or less competent in the area of knowledge transfer. This result supports the remark made by the industry partners in one of the FGDs by saying that our university lecturers are very much rhetoric or theoretical and lack of ability to understand and respond appropriately to the business requirement. In addition, they have perceived many academics have treated KT project as a platform to conduct their (academics) research work rather than providing the right solution to mitigate the business and community problems.

Table 3 Correlation between Key Factors and KT Performance Among Four Respondent Groups (n=267)

KEY FACTORS & KT PERFORMANCE	ACADEMIA	GRADUATE INTERN	COMMUNITY	INDUSTRY
HIE Capacity-KT Performance	.722**	.750**	.109	.769**
Academia Capacity-KT Performance	.805**	.634**	.063	.330
Graduate Intern-KT Performance	.405**	.740**	.072	.213
Partner Factor-KT Performance	.411**	.619**	.360*	.921**
Relational Factor-KT Performance	.239**	.622**	.170	.926**
External Factor-KT Performance	.325**	.451**	.358*	.482
Technology-KT Performance	-.407**	.039	-.382*	.041
KT Mechanism-KT Performance	.173*	-.576**	-.241	.122

Note: ** significant at 1 %, * significant at 5%

4.7 Result of Regression Analysis for Hypotheses Testing

For hypotheses testing the analysis was conducted upon 267 respondents i.e. academia, graduate interns, industries and communities. These four groups of respondents have answered the same sections in the questionnaire that are the Key Success Factors, KT Mechanisms, External Factor and KT Performance. The hypotheses were tested using the Smart PLS ver30. Results are presented and discussed according to the hypotheses stated in Section 3.

Details of the regression analysis is depicted in Table 4 Four (i.e., HIE Capacity, GI Capability, Relational Elements, and Technology Augmentation) out of the six key factors were found to be significantly affected the KT Performance. While the other two factors i.e. Academia Capability, and KT Partner Organisation Analysis were not significant. Thus, Hypothesis A that states the significant relationships between the six key success factors and KT Performance is partially supported.

Table 4   Relationships between Key Success Factors and KT Performance

Relationship	Coefficient	T-Statistics	P Values	Decision
Academia -> KT Performance	-0.116	1.839	0.066	**Not Supported**
GI -> KT Performance	0.150	2.023	0.044	**Supported**
HIE -> KT Performance	0.155	1.900	0.058	**Supported**
KT Partner -> KT Performance	-0.074	0.996	0.32	**Not Supported**
Relational Element -> KT Performance	0.218	3.091	0.002	**Supported**
Technology -> KT Performance	0.285	5.679	0.000	**Supported**

The path analysis Figure 3 shows 56.6 percent of the variation in KT Mechanisms is explained by the KSFs. Thus, the model is fit to be analysed. Result indicates that only GI Capability, HIE Capacity and Technology Augmentation are significantly affect the KT Mechanisms. While the Academia Capability, KT Partner Organisational Analysis and Relational Element are not significantly influenced the KT Mechanisms. Details of the regression analysis is presented in Table 5. Therefore, Hypothesis B that states there are significant relationships between the six KSFs and KT Mechanisms is partially supported.

**Table 5 Relationships between Key Success Factors and KT Mechanisms**

Relationship	Coefficient	T-Statistics	P Values	Decision
Academia -> KT Mechanisms	-0.007	0.148	0.882	**Not Supported**
GI -> KT Mechanisms	-0.286	3.76	0.00	**Supported**
HIE -> KT Mechanisms	0.955	22.951	0	**Supported**
KT Partner -> KT Mechanisms	0.004	0.053	0.958	**Not Supported**

Relational Element -> KT Mechanisms	-0.011	0.177	0.859	**Not Supported**
Technology -> KT Mechanisms	0.184	3.126	0.002	**Supported**

Since Hypothesis C is supported therefore the mediating test for KT Mechanisms can be proceed. Figure 5 shows the significant effect between KT Mechanisms and KT Performance. The assumption underlies the mediating role of KT Mechanisms is that all partners (i.e. Academia, GI, industry and community) in the KT projects must have adopted the appropriate mechanisms in transferring the knowledge.

Results in Figure 6 displays there is a R-squared change from 0.549 (54.94 percent) to 0.263 (26.3 percent) (refer Figure 5) in KT Performance after the KT Mechanisms were included in the analysis. The difference of 28.6 percent implies KT Mechanisms are significantly mediate the relationships between KSFs and KT Performance. This study has proven that players (academia and their partners) in their respective KT projects were able to adopt the relevant techniques to transfer their knowledge/expertise/skills to the KT projects recipients. These results also infer that the outcomes of KT Performance can be further improved if all partners are able to adopt the appropriate KT strategies or methods in transferring the knowledge. Hence, Hypothesis D that states there is a significant mediating effect of KT Mechanisms between KSF and KT Performance is well supported.
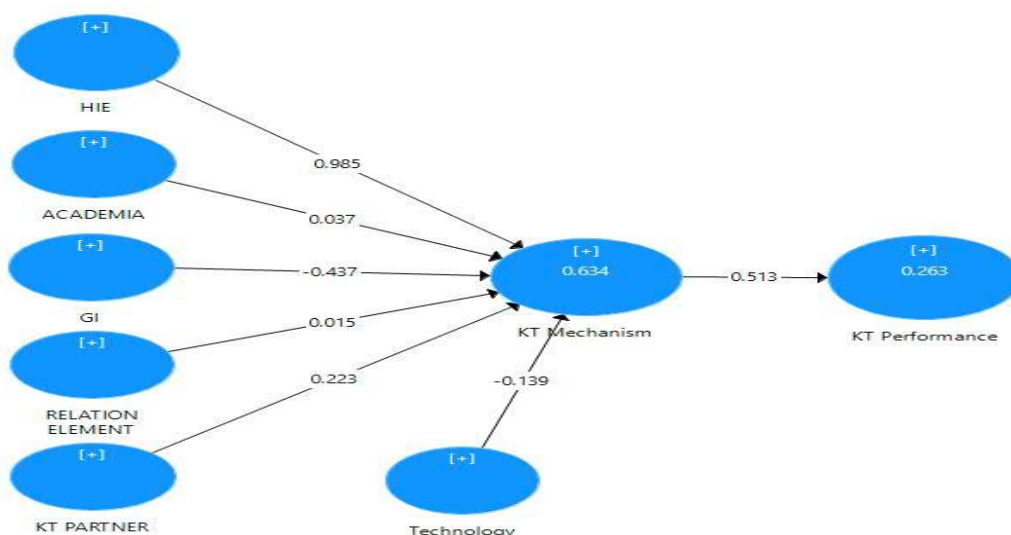
Figure 3 Path Analysis for Mediating Effect of KT Mechanism

SUMMARY

The summary of the findings is presented in Table 6. The hypotheses were analysed upon 267 data which derives from the academia, graduate interns, industry and community respondents who have involved in the KT projects between 2011-2016.

From the mean analysis, the study has discovered all four groups of respondents have in principle agreed that HIE Capacity, Academia Capability, Graduate Intern Capability, KT Partner Organisation Analysis, and Relational Elements are significantly important to affect the performance of knowledge transfer projects. However, Technology Augmentation is not a critical factor for KT project to succeed. These findings are consistent with Santora (2000), Barnes et. al (2002), Kathoefer (2012) and Schofield (2013) studies that these factors are crucial for the success of knowledge transfer and in any collaboration between university and the industries or communities.

Table 6 Summary of Results for the Hypotheses Testing

Hypotheses No.	Hypotheses Statements	Results
Hypothesis A	**There are significant relationships between the six (6) key success factors (KSFs)and KT Performance.**	**Partially Supported**
Hypothesis B	**There are significant positive relationships between the six (6) key success factors and KT Mechanisms.**	**Partially Supported**
Hypothesis C	**There are significant relationships between KT Mechanisms and KT Performance**	**Supported**
Hypothesis D	**There is a significant mediating effect of KT Mechanisms between KSFs and KT Performance.**	**Supported**

Nevertheless, through the hypotheses' analysis, only HIE Capacity, Graduate Intern Capability, Relational Elements and Technology Augmentation were found to be significantly influenced the existing KT projects' performance. Meanwhile, Academia Capability and KT Partner capability were found not significant to affect the performance of the existing KT project. The insignificant relationship between Academia Capability and KT Performance was contradict to Schofield (2013) study. This result can be quite alarming to the Malaysian higher education system which infers our Malaysian academics are relatively lack of experience and skills in working with the industry and community fraternity which can greatly affect the project performance. Academics in Malaysia must, therefore, be well trained not just in terms of knowledge but to possess strong skills and competency in knowledge transfer activities. It must be clearly understood by all academics and graduates that working on a research project and working on a KT project is two different situations. The study suggests a revision of training and development programme for the academics and for the students which will be discussed in Section 5.

The study has discovered the importance of KT Mechanisms in knowledge transfer. KT Mechanisms are found significant not just as predictor for KT performance but also mediates the association between KSFs and KT performance. Therefore, it is crucial for project members to identify and to be able to adopt the appropriate techniques or methods in transferring their knowledge, ideas and research findings. Nonetheless, the study has revealed the role of government and the Ministry of Education, and the focus of KTP policy in Malaysia are somewhat important to be addressed by the stakeholders to strengthen the KTP agenda in the future.

In sum, the findings of this study are noteworthy to many stakeholders including the industries, community organisations and the people of Malaysia. The findings infer there is a strong need for all stakeholders to understand and leverage on any knowledge transfer or knowledge sharing activities especially in working together with the education institutions. Vis-à-vis, academics and graduates must be exposed to the industry and community environment. Thus, the study calls for a revisit on the vision and framework of knowledge transfer programme in Malaysia.

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