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**Proposed Knowledge Transfer Key Factors Model in Malaysian  
Higher Education Institutions**

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**Abstract**

Knowledge transfer involves transmitting not just information, but also experience and best practices, known as tacit knowledge, enriching understanding. Effective transfer requires human capital skills, knowledge types, methods, and organizational support. This study examines factors influencing knowledge transfer projects in Malaysian higher education. Identified influencers include Higher Education Institutions Capacity, Academia Capability, Graduate Interns Capability, KT Partner Organization, Relational Elements, Technology Augmentation, External Factors, and Knowledge Transfer Mechanism. The study suggests Knowledge Transfer Mechanism and government policies mediate this model.

Keywords: Knowledge transfer; Higher Education Institutions; Knowledge Sharing

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**1.0 Introduction**

It is most meaningful in the education industry when knowledge, research outputs, and inventions can be applied by industries and communities. As a result, the Malaysian Ministry of Education (MOE) has mandated the Critical Agenda of Knowledge Transfer to take the lead in promoting a culture of knowledge sharing among Higher Institutions of Education (HIE), industries, and societies. This is one of the strategies for achieving educational effectiveness and excellence by promoting HIE research outputs and intellectual assets that have yet to be fully utilised.

The Knowledge Transfer Program Management in Malaysia revealed that current KT projects are research-based rather than shared or transferred knowledge. It is frustrating to note that many outcomes of university research are perceived by industries as lacking in innovativeness and commercial viability. Bruneel et al. (2009) stated in a UK study that current trends in successful university-industry engagement in innovative projects are heading in the wrong direction. The involvement of industry from the beginning of a research project is regarded as critical in terms of knowledge sharing and transfer.

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According to the researchers' observations and experiences, many parties perceived academics as theorists rather than practitioners; they were more rhetorical than pragmatic; and university research discoveries were only suitable for teaching and learning and did not apply to industries. The question is, how true are these criticisms? Despite significant government and institutional investment to improve academia-industry collaboration, the impact of those collaborations is still being questioned. Why? Are Malaysian academics not knowledgeable enough, and are they not capable of working with industry and the community? Are Malaysian graduates deficient in knowledge, not only of the subject matter but also of soft skills? Is the university administration clear about what it means to collaborate between academia and industry? Are there enough incentives to motivate collaborations?

The Knowledge Transfer Program (KTP) was initiated in 2010 as the 23rd Critical Agenda Programme under the Ministry of Education (MOE). With the Ministry of Education overseeing the KTP agenda, the objective is to enhance the utilization of research outcomes and product development conducted within universities. This initiative aims to elevate community living standards and boost industry earnings. From 2011 to 2017, there were 460 Knowledge Transfer (KT) projects involving collaborations among 275 industries and 185 community organizations, as reported in 2017. Among these projects, KTP attracted the involvement of 1,820 academics and 893 graduate interns, indicating an average ratio of one KTP project to four academics and two graduate interns. This highlights the level of involvement from academics in this KTP project is still deemed to be relatively minimal and KTP's significance as a beneficial platform underscores the need for continued support and encouragement from the government, higher education institutions, industries, and communities.

This study aimed to develop a model of key factors for the implementation of knowledge transfer projects in Malaysian higher education institutions. The study objective is to propose the factors of Higher Institutions of Education (HIE) Capacity, Academia Capability, Graduate Interns Capability, KT Partner Organization, Relational Elements, Technology Augmentation, External Factors, and Knowledge Transfer Mechanism as the primary factors influencing KT project performance.

## 2.0 Literature Review

The term knowledge transfer (KT) is often used interchangeably with "knowledge dialogue", "knowledge exchange" and "knowledge translation" (Lockett, 2009). In the area of organizational theory, KT is the practice of transferring knowledge from one part of the organization 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 activities aimed at fostering mutually beneficial collaborations among universities, businesses, and government agencies (Alaarj, Abidin-Mohamed & Bustam, 2016). It necessitates the parties' willingness to collaborate and focuses on connection rather than collection, with the latter ultimately determined by the choices made by individuals or organisations. In a dynamic and complex situation, it is believed that if organisations continue to successfully create, validate, and apply new knowledge to their products, processes, and services, it will eventually benefit the entire organisation.

Apart from the factors that have influenced the KT's success, there are challenges to implement this vision. Among the challenges are in terms of its impact on the organisation's stakeholders and beneficiaries where it covers both internal and external parties. The internal challenges stemmed from the organization itself such as how they utilize or manage the resources they have, enhance skills of human capital, and connect the theory and practical activities to give impact to the society. On the other hand, external challenges such as environmental conditions and local government support are seen as having a significant impact on the success of a KT project. Collaboration between universities and industries is crucial within a country's innovation framework. This partnership fosters the growth of knowledge and forms networks of collaboration between academic institutions and businesses (Wenjing Wang, Shan Lu, 2021).

The debates among researchers (Gibbons, Limoges, Nowotny, Schwartzman, Scott & Trow, 1994) regarding the evolutions of KT began with the discussion on two different 'modes' of knowledge production and its link with models of innovation namely the Triple Helix and Quadruple Helix. Gibson et al. (1994) stated that there were numerous views on the development of knowledge transfer. KT began with several "modes" steamed in knowledge production. Gibson et al. (1994) mentioned there are two modes which they labelled as "Mode 1" and "Mode 2". Later these "modes" were continued to evolve and known as the Triple Helix Model and Quadruple Helix Model. The following sections will discuss the four models of KT. "Mode 1" focuses on the traditional role of university research in an elderly "linear model of innovation" understanding. Mode 2 emphasises knowledge production that is characterized by five principles: (1) knowledge produced in the context of application; (2) transdisciplinarity; (3) heterogeneity and organizational diversity; (4) social accountability and reflexivity; and (5) quality control.

The Triple Helix Model of innovation was theorized by Etzkowitz and Leydesdorff in 2000 (refer also Etzkowitz, 2003). The model was based on the interactions between the three following elements and their associated 'initial role': universities engaging in basic research, industries producing commercial goods and governments that are regulating markets (Leydesdorff, 2010). As interactions increase within this framework, each component evolves to adopt some characteristics of the other institution, which then gives rise to hybrid institutions. Bilateral interactions exist between universities, industry and government. The Quadruple Helix Model adds a fourth component to the Triple Helix framework of interactions between government, academia, and industry which is the civil society and media. This four elements model was suggested by Carayannis and Campbell (2009) as "Mode 3" which emphasised on fractal innovation ecosystem.

The Quadruple Helix model expands upon the Triple Helix model by adding a fourth helix which is civil society based on Carayannis & Campbell, 2009. In this model, knowledge transfer is influenced by a broader range of stakeholders, including academia, industry, government, and civil society organizations. Several factors can influence knowledge transfer within the Quadruple Helix framework used in this study covering Academic Engagement, Industry Collaboration, Government Support, Civil Society Participation and Cross-Sector Collaboration. The concept of the Triple Helix Model and Quadruple Helix Model was adapted in the context of developing the proposed KT factors model for this study.

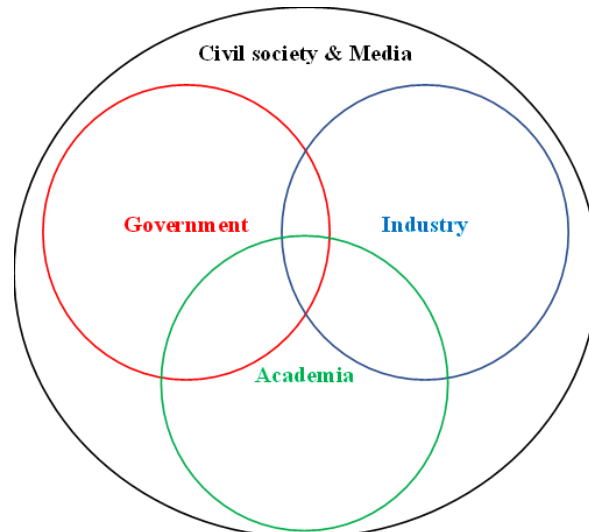


Figure 1.0 Quadruple Helix Model (Sources: Carayannis & Campbell, 2009)

Santoro and Gopalakrishnan (2000) have discovered from the collaborations of 189 firms and 21 universities in the United States (US) and have found that the success of KTP depends on the mechanistic organisation of industrial firms, stable cultures and direction-oriented, and trust of the firm towards the university partner. Additionally, Glenna, Lacy and Biscotti (2008) have conducted research with 84 scientists at nine universities and have found that university intellectual property (IP) policies are a critical factor in industry-university collaboration. Findings from 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 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 complementary 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. Benito-Bilbao, Sánchez-Fuente and Otegi-Olaso's (2015) research on KT used qualitative interviews with companies and institutions located in the Basque Country revealed four success factors that influence the success of KT: suitable design and implementation of mechanisms to perform KT; effective cooperation between players; skilled management of the mix of knowledge; and propitious organizational culture.

Ibidunni, Kolawole, Olokundun, and Ogbari (2020) outline two key factors impacting knowledge transfer within small and medium-sized enterprises (SMEs): how knowledge is conveyed and social networking dynamics. From the perspectives of developing countries, Klomklieng, Ratanapanee, Tanchareon and Meesap (2012) stated that in Thailand's 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 the cost, time and failure risk of new product development by identifying the needs of the industry acquiring the knowledge and technology from university and matching them together. Success factors that have been identified included commitments strong linkage, and information and technology sharing. 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 organizational culture and organizational structure. The effectiveness is based on market share and profit increment. Similar to Susanty *et al.* (2012), Ekore (2014) in his study on KT at Cadbury Nigeria Plc and Nestle Foods Plc has found the organizational culture, strategy, information technology, training and organizational performance to be significant and become the main factors for KTP success. Effective training has been the most influential factor of KTP in the Nigerian context.

Nor Aziati, Nor Hazana and Ping (2014) conducted research at a technical university in Malaysia with a total sample size of 30 respondents that consisted of academic staff, researchers and postgraduate students who received a KT grant sponsored by the Ministry of Education Malaysia. The research identified three main factors that influence knowledge transfer in universities: coordination factor, partner attributes and relationship and trust factor. The findings of coordinating factors include cultural compatibility, operational compatibility and flexible university policies. Partner attributes are determined in terms of staff's learning attitudes and abilities, skills of partnership management, and structural characteristics. Relationship factor refers to the degree of trust, commitment and bilateral information sharing between partners. Trust refers to every party's credibility, level of confidence and willingness to rely on their KT partners. In another perspective of knowledge transfer, Awang and Malek (2008) have researched knowledge transfer from the views of

foreign multinational corporations (MNC) to the local workforce in Malaysia and concluded that the success of KT depends on employee absorption capacities, organizational learning climate, and the willingness of foreign expatriates in MNCs to transfer knowledge.

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 the three most significant factors that had motivated KTP in South Africa from an industrial perspective. These include appropriate knowledge, the knowledge itself, and the return from the research investment.

In their study, Linda Argote, Jerry Guo, Sae-Seul Park, and Oliver Hahl (2022) conducted a review of articles about knowledge transfer (KT) published in *Organization Science* from 2014 to 2020. They identified 53 articles that made theoretical and empirical contributions to the field. These articles explored knowledge transfer through five distinct mechanisms: social networks, routines, personnel mobility, organizational design, and search. The researchers analyzed how each transfer mechanism intersected with crucial elements of knowledge transfer, including the characteristics of sources/recipients, the nature of knowledge, and the contextual factors involved. According to Abiola (2023), successful implementation of knowledge transfer within knowledge management practices relies on robust leadership support, employee endorsement, a culture of information sharing, a reliable technological infrastructure, and an organizational environment characterized by openness and collaboration.

The research gap identified in previous studies or literature reviews regarding factors influencing the success of knowledge transfer programs lies in the lack of comprehensive exploration into the nuanced interplay between organizational culture (Susanty, Handayani and Henrawan, 2012), leadership dynamics (Nor Aziati, Nor Hazana and Ping, 2014), and stakeholder engagement strategies (Susanty *et al.*, 2012). While existing research has touched upon various factors such as communication channels, technological infrastructure, and incentive structures, there remains a dearth of in-depth analysis regarding the contextual factors that either facilitate or hinder effective knowledge transfer within diverse organizational settings. Furthermore, there is limited empirical evidence on the HIE and government policy, the player's capabilities (Academia and graduate intern) and their impact on creating a conducive environment for knowledge sharing and collaboration between academia and industry, especially the mechanism approach. Addressing this research gap is essential for developing more tailored and effective strategies for enhancing the success of knowledge transfer programs across different sectors and organizational contexts.

### **3.0 Research Framework and Methodology**

A preliminary study was conducted to solicit issues and factors that affect the implementation of current KT projects in Malaysia to develop the model of knowledge transfer in Malaysia. The methodology employed in this study involved the utilization of a particular literature review technique to analyze the findings. To construct the proposed Knowledge Transfer Key Factors Model in Malaysia, a specific literature review approach known as scoping review was adopted. A scoping review is a type of research synthesis that aims to map the breadth and depth of literature on a particular topic, identify key concepts, themes, and knowledge gaps, and clarify the scope of existing evidence. Scoping reviews adopt a more exploratory and iterative approach. The scope and keywords used to develop the model are based on factors of transfer knowledge. This includes determining the main factors, the issues, and the challenges that KTP grant holders face. Prior to developing the research framework, a literature search was conducted. Early consultations were held with key stakeholders such as academics, graduate interns, and university representatives. The preliminary study's findings aid current research in identifying the true problem associated with KT practices in Malaysia.

#### *3.1 Evaluation of Research Framework*

Evidence in the review of the literature led to the development of the research framework as depicted in the model in the findings part. The research framework is proposed as the 'Knowledge Transfer Key Factors Model'. Six (6) key factors were identified to be the main contributors toward the implementation of the 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 (KT) were established as the mediating variable while KT Performance was treated as the dependent variable. In addition, external factors were recognised as moderating variables which had 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). At this level, the operational definitions for each of the constructs were established and hypotheses were developed.

#### *3.2 The Proposed Model*

Based on a comprehensive review of the literature review, a conceptual model has been proposed to model the KT factors and KT performance as presented in Figure 1.0. This proposed model has adopted the conceptual proposed by Santoro and Gopalakrishnan (2000); and Schofield (2013). However, some amendments especially on the technology augmentation, external factor and knowledge transfer mechanisms constructs have been made. A total of nine (9) variables were studied in this research. All the variables were adapted from various literature to ensure research objectives were achieved. The following are the operational concepts of each variable studied.

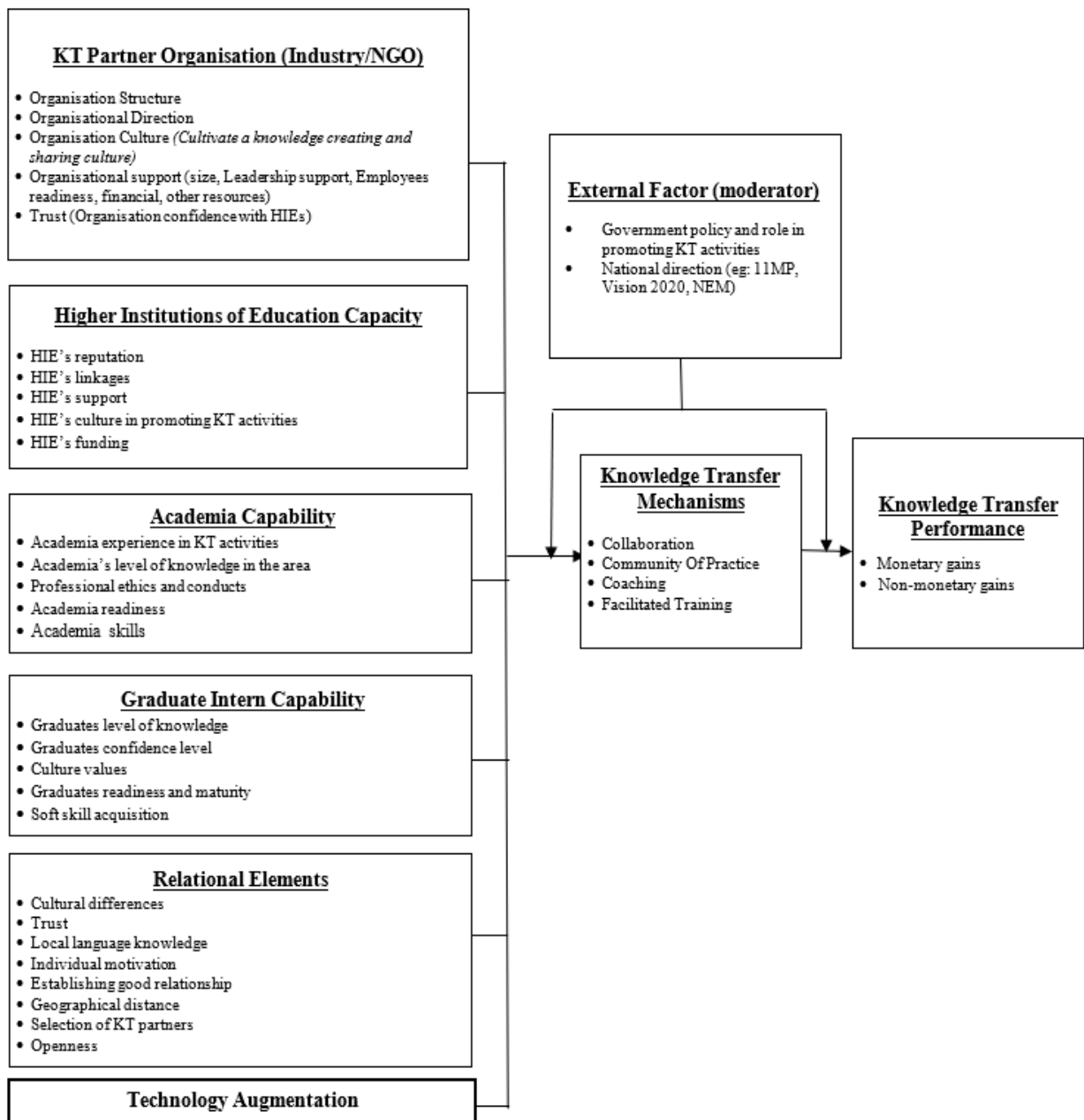


Figure 2.0 The Proposed Knowledge Transfer Key Factors Model

### 1. *KT Partner Organisation*

This refers to organisation capacity and is measured through organisation structure and culture, legal and policy direction. It is the ability of an organisation to demonstrate a clear structure, policy and support system to facilitate the KT activities (refer Schein (1995); Susanty, Handayani, & Henrawan (2012); Miller et al. (2016)).

### 2. *Higher Institutions of Education (HIE) Capacity*

The study has adopted Schofield's (2013) definition of HIE capacity as a design of a governance structure that creates the right incentives for academics to improve KT without damaging the traditional role of the university as a knowledge producer and a locus of HIE.

### 3. *Academia Capability*

The study has proposed 'academia capability' as the capability of academics in managing the KT projects which includes experience and industrial exposure, skills, ethics and readiness. This definition aligns with other scholars' definitions like Schofield (2013). In this study, the terms 'academia' and 'academics' are used interchangeably.

#### 4. Graduate Intern (GI) Capability

The present research defines graduate intern (GI) capability as the ability of GI to transfer knowledge to KT partners. This includes the level of knowledge acquired, readiness and maturity, soft skill competency, confidence level and cultural values possessed by graduates.

#### 5. Relational Elements

This variable is defined by the present researchers as to what extent the transferor of knowledge can relate his/her knowledge acquisition to the recipients under the conditions of cultural differences, trust, local language knowledge, individual motivation, establishing good relationships, geographical distance, selection of KTP partners, and openness.

#### 6. Technology Augmentation

The study has adopted Nilsen's (2016) definition of 'technology augmentation' as the extent to which technology is used as a medium or tool in transferring knowledge from one end to another end.

#### 7. External Factor

This dimension refers to the government's role and support in terms of policy in promoting KT activities, and national direction towards the KT programme.

#### 8. Knowledge Transfer (KT) Mechanism

The present study refers 'KT mechanism' as techniques or approaches taken by universities and/or academics in transferring and translating knowledge to industries and communities. The mechanisms examined in this study were collaboration, community of practice, coaching, and facilitated training as suggested by De Wit, Dankbaar, and Vissers (2007). Definitions for each of the mechanisms is defined as follows:

- a) *Collaboration* – to work together and to cooperate at the institutional/ organisational level.
- b) *Community of practice* – voluntary group of peers where members are willing to cooperate to improve performance as individuals, teams and organisations.
- c) *Coaching* – A professional relationship between the incumbent (receiver) and the leader (giver) as the coach that focuses on improving the performance and seeks to enrich the receiver's knowledge, skill set and competencies.
- d) *Facilitated Training* – A guided learning process that involves the acquisition of knowledge, sharpening of skills, concepts and rules or changing of attitudes and behaviours to enhance the performance of the receiver. This includes online learning, on-the-job learning, formal education, cross-training, seminars, workshops and internships.

#### 9. Knowledge Transfer Performance

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

## 4.0 Conclusion

A proposed model of the Knowledge Transfer Key Factors Model has discovered the importance of all key factors that always have been mentioned in past literature reviews. This proposed model has highlighted the importance of KT Mechanisms in knowledge transfer. KT Mechanisms are expected significant contribution not just as a predictor for KT performance but also mediates the association between Knowledge Success Factors and KT performance. Therefore, higher institution players must identify and 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 the government and the Ministry of Education, and the focus of KTP policy in Malaysia is somewhat important to be addressed by the stakeholders to strengthen the KTP agenda in the future.

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

This research acknowledges its limitations, primarily centring on the examination of factors impacting the execution of knowledge transfer initiatives within Malaysian higher education institutions. It advocates for a broader perspective on knowledge transfer in the future, emphasizing the correlation between theoretical frameworks and program effectiveness. Such an approach aims to bolster collaboration among all stakeholders involved.

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## Paper Contribution to Related Field of Study

The focus of this study is the knowledge transfer program (KTP) policy in Malaysia. It is an important agenda for the Ministry of Education (MOE) Malaysia as they aim to ensure that the impact of the KTP program is recognized and justifies the government's expenditure.

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