

ASSESSING LOCAL CAPACITY DEVELOPMENT LEVERAGING ON INDUSTRY COLLABORATION PROGRAM (ICP) USING ABSORPTIVE CAPACITY ELEMENTS

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ABSTRACT

Industry Collaboration Program (ICP) is an initiative by the Government of Malaysia that leverages on mega procurement to support local industry capacity and capability development. It is envisaged that the ICP platform can create 'value for money' in forms of economic returns based on the procurement made. It is capitalised to further enhance current national economic development activities by ensuring participation of local players in high technology industry sectors, such as transportation and security; with the aim to create employment, skills enhancement, and technology development capability within the local firms. The foundation of effective ICP implementation is availability of competent local industry players that consists of competent personnel with relevant know-how and equipped with relevant technology. Therefore, it is desirable that the outcomes of ICP implementation are measurable to assess the impact and one of the methods is by using Absorptive Capacity (AC) elements measurement. This paper had proposed a construct using the AC elements and the Confirmatory Factor Analysis method is used for its validation. Based on the conducted analysis on the stipulated hypotheses, some confirmations and gaps for further research had been obtained for conclusion.

1.0 INTRODUCTION

ICP is an initiative by the government deemed able to create more 'value for money' and protect domestic industries by finding new products that could sustain local industry needs, and at the same time able to exports to potential market through market access activities. It is based on the countertrade concept, where the initiation is triggered by major Government procurements and the implementation is based on the willingness of the seller and the buyer [1].

ICP has evolved from a simple countertrade arrangement to become a methodological trade arrangement that makes procurement programs more attractive and brings more significant value to the procuring countries. Currently, it is becoming more acceptable internationally where more countries practice this arrangement, as such the countertrade has evolved into more complex initiatives transformed into professionally managed economic transactions. It has further evolved to be more collaborative in nature to ensure mutual benefits for the trading countries and become business processes which some countries termed the as offset program, industrial collaboration program, business participation and others alike. In this perspective, ICP has gained repeated importance as an element of the 'total package', which the suppliers have to offer to stay competitive in an increasingly aggressive world market.

Based on the current implementation processes, the ICP implementers need to be 'creative' in making sure that the ICP program brings the expected value and delivers the expected outcomes. Creativity is needed due to the dynamics of ICP implementation considering current issues and local requirements,

and the fact that there is no specific and in-depth analysis that provides guidelines on how to go about each process. Therefore, the resources and expertise to support the success of ICP implementation need to be developed from time to time.

1.1 Resources Development Through ICP

From the ICP perspective, localization is important to ensure sustainable local industry growth. In achieving the goal, the underlying needs for the success are the capabilities of the country to provide competent ICP recipients to undertake the identified programs and absorb the developed knowledge, skills and technologies into operations. Caputo et al. (2019) has concluded in their research that there is a positive relationship between organisations' approach to knowledge transfer to the people and their profit levels, and it is a relationship mediated by people's willingness and training to collaborate and for value co-creation [2]. Therefore, in making sure that a country is able to develop its competitiveness, the necessary resources mainly the human capital (HC) shall be developed accordingly to drive the success of ICP implementation.

In this perspective, HC is defined as the accumulation of competencies, knowledge and skills to carry out work that can produce economic value to an organization [3]. As such, employees' experience, knowledge, competency and creativity are the main strands of HC of an organization. Booth and Bryan (2005) define HC as employees' skills, training and attitude. It is an amalgamation of expertise, competence, skills and professional knowledge of employees of an organization [4].

1.2 Absorptive Capacity (AC) As The Human Capital Development (HCD) Measurement

For ICP implementation, the capable resources that was developed through HC development programs shall be able to sustain the agreed program which mainly involve the knowledge/ skill/ technology transfer activities. In this aspect, Absorptive Capacity (AC) method is found could appropriate to be used as a technique to observe and measure the capability readiness of the ICP recipient that will affect the ICP implementation outcomes. Cohen and Levinthal (2000) viewed AC as the ability to evaluate the absorbed new external knowledge and assimilate/transform them into current products or services, which is largely a function of the organization's level of prior related knowledge [5]. Camisón and Forés (2010) mentioned that AC has become one of the most significant constructs currently because in some cases, external knowledge resources are so important for local development [6]. AC is the dynamic capacity that allows organizations to manage external knowledge to create value in the organization to gain and sustain a competitive advantage.

AC could be viewed further as the capability to acquire, assimilate and then exploit new/external information for commercial ends [6]. It has become an essential ability for companies/organizations to develop their competitive edges by creating new products/services or increasing their industrial ability. Guedes et al. (2017) state that due to the situations where the economic context of high competitiveness leads organizations to depend on their own capacity to absorb knowledge, it which is important to develop innovative environment to ensure they are moving faster than the competitors [7]. Therefore, investing in human resource to create innovative culture to explore growing unexplored sector is critical and sought for.

2.0 METHODS AND MATERIAL

2.1 Determinant Of The AC Elements

Research by Mayer et al. (2021) has concluded that HC development program shall be structured within the organization through the internalization of the related projects, which very much relevant to ICP [8]. Therefore, specific HC development programs encompass of the knowledge skills, and abilities, related to a particular industry, shall be carried out to ensure capable resources to support the ICP implementation. The HC development could be assessed using the elements of AC, which the details are defined further as follows:

- a. **Knowledge Acquisition** is defined by Cohen and Levinthal (2000) as capability to increase the knowledge by putting new knowledge into memory and use it [5].

- b. **Knowledge Assimilation** is defined by Merriem.webster dictionary as ‘the process of receiving new facts or of responding to new situations in conformity with what is already available to consciousness’. Therefore, the knowledge assimilation could be defined as the process of using the acquired knowledge and confirms it to the current environment. Further, Zahra and George (2002) added that comprehension promotes knowledge assimilation that allows organizations to process and internalize externally generated knowledge [9].
- c. Zahra and George (2002) define **Knowledge Transformation** as the ability to solve problems resulting from modified knowledge. It is the ability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge [9].
- d. Zahra and George (2002) define **Knowledge Application or Exploitation** as an organization’s ability to harvest and incorporate knowledge into its operations internally as well as to serve the commercial and competition purposes [9]. It requires the sharing of relevant knowledge among members of the organization to promote mutual understanding and comprehension. Cohen and Levinthal (2000) in this case say that the organization must be prepared to invest to permit effective exploitation of the program’s knowledge output [5].

2.2 Theoretical Construct

In this research, the AC determinants are used to measure the outcomes of the ICP the HC development. These AC elements are to be articulated in a theoretical form of concepts and model. However, for this research, another element that is the business performance is added to assess the whole impact of AC elements to the ICP implementation outcomes. As shown in Figure 1, a theoretical construct was developed as a model to analyse the data collected.

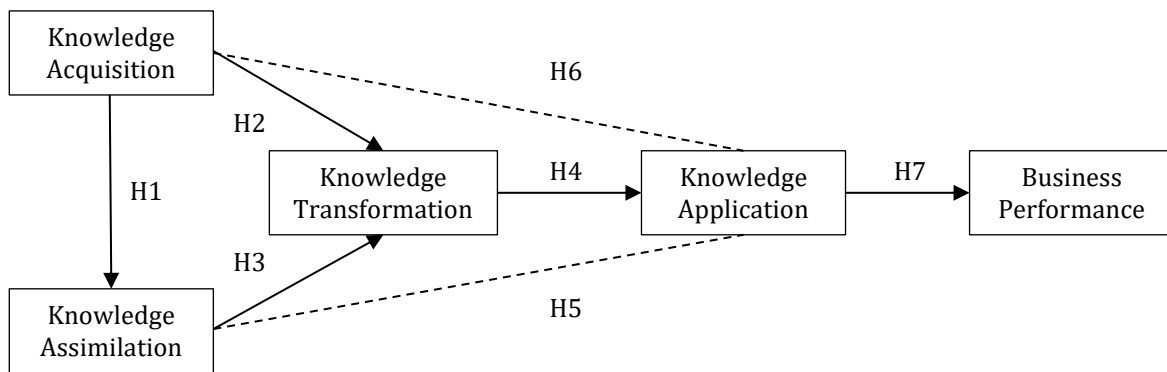


Figure 1: Theoretical construct of the research

2.3 Hypotheses Development

Based on the model in Figure 1, the following hypotheses were developed. Data collection activities (survey, interview and expert opinion) were planned, and the data obtained were used to study the hypothesized relationship between concepts and validity of the model as Table 1.

Table 1. Hypothesized relationship

H1	Needs for new knowledge for business advancement will drive the knowledge acquisition activity. Nevertheless, the acquired knowledge needs to be assimilated to the organization for its application. Therefore, as the level of knowledge acquired increases, the potential for knowledge assimilation becomes stronger.
H2	The increase in the Knowledge Assimilation capability will drive the increase in the Knowledge Transformation ability development.
H3	The increase in the Knowledge Acquisition capability development will affect the Knowledge Transformation capability development.
H4	The increase in the Knowledge Transformation capability will affect, the Knowledge Application/Exploitation capability development.
H5	As the Knowledge Acquisition ability is getting better, the Knowledge Application capability becomes greater.

H6	The effect of Knowledge Assimilation onto Knowledge Application/ Exploitation is significant to ensure productive outputs to the organization.
H7	The ICP programs can facilitate the application/exploitation of the knowledge development contributing to the business development and increase in revenue of the ICP recipients.

2.4 Items For Measurement

Using this theoretical construct shown in Figure 1, seven (7) hypotheses and 102 measurement items for survey were developed. The samples of the items for measurement were obtained from journals and some were added by the author based on experience and observation on the subject. The 102 items have gone through a validation process to ensure their relevancy to the research based on the Content Validation Index (CVI) [10] methodology as suggested by Yusoff (2019) and Zamanzadeh et al. (2015) [11-12]. The content validation was carried out by 10 experts who have participated in knowledge transfer program leveraging on ICP and at the same time has knowledge about ICP implementation in Malaysia. The measurement items were tested to determine the Content Validation Indexes, which follow the formula used in [11-12]:

$$I - CVI (\text{item}) = \sum(\text{Agreed item}) / (\text{number of panellist})$$

$$S - CVI/\text{Ave} = \sum(I - CVI (\text{item})) / (\text{number of items})$$

$$S - CVI/UA = \sum(UA (\text{item})) / (\text{number of items})$$

Rounds of items validations and eliminations processes were carried out based on the following criteria, value of I-CVI less than 0.78 is to be eliminated as in [10, 13] and fall in the categories of 'inappropriate' as defined in [12, 14].

By doing the clarification and elimination process, the CVI obtained for the measurement items are as follows:

$$I-CVI \text{ Ave} = 98.62\%$$

$$S-CVI/\text{Ave} = 98.62\%$$

$$S-CVI/UA = 86.21\%$$

The CVI above indicates that the measurements item for the model and survey instrument has a strong content to be used as questions/statement in the instrument and ready for roll-out.

2.5 Data Collection

The selected domain for the data collection is the local transport industry sector. This is due to the majority of ICP implementations in Malaysia currently involves the transport industry such as rail, maritime, and aerospace. For this survey, 134 responds out of 500 (26.80 %) respondents were obtained as shown in Figure 2. By virtue of sample calculation, with the population of 500 companies, 134 responses with 95 % confidence level have given the survey less than 7.5 % margin of error. Based on the online Margin of Error and Sample Size Calculator published by www.pollfish.com, www.raosoft.com (Inc., 2004) and survey guidelines published by Data Star (Inc, 2008), the author found that these numbers are acceptable.

The main reason the research accepts the 7.5 % margin of errors with 95 % level of confidence is owing to the ICP initiative has just recently been implemented via a systematic way i.e., with the formations of TDA as a business entity and the Transfer of Technology and Offset Unit at MOF in 2015. Therefore, it is expected that the local industry players are still amid of grasping the full idea of ICP initiative and how to reap the benefits from its implementation.

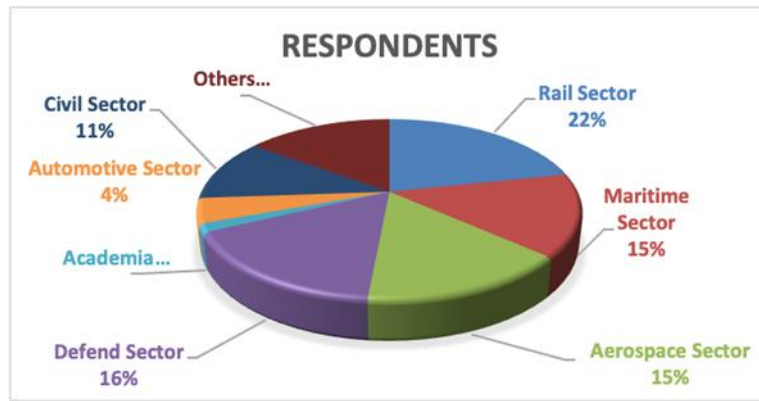


Figure 2. Respondent to the survey

3.0 RESULTS AND DISCUSSION

3.1 Confirmatory Factor Analysis

The data gathered from the survey will be initially analysed by means of the inferential statistic method (Structural Equation Modelling - SEM) using the SPSS-AMOS application. The inferential statistics method allows the author to interpret and draw conclusions or inferences from the data collected. Using this approach, the author can validate the fitness of the model and the hypotheses developed. The SEM inferential analysis techniques allow for investigation of causal relations among hidden and observed variables in a priori specified, theory-derived models.

The SPSS-AMOS application will be using the Confirmatory Factor Analysis (CFA) approach, which is a form of factor analysis, to test whether measures of a construct are consistent with the author's understanding of the nature of that construct (or factor). CFA is a crucial part for the measurement model in SEM that is used to obtain the acceptable model fit before modelling the structural model. The main advantage of CFA lies in its ability to aid authors in bridging the often-observed gap between theory and observation. As such, the objective of confirmatory factor analysis is to test whether the data collected through a survey fit a hypothesized measurement model shown by the theoretical construct as shown in Figure 1.

At this stage, the construct validity and reliability were computed by deriving their fitness indices and factor loadings, based on the collected data. The recommended value for the factor loadings and construct's reliability are 0.60 and 0.70, respectively, and the recommended value for each fitness index as discussed by Hair et al. (2017) should be reported as summarized in Table 2 below [15];

Name of category	Name of index	Level of acceptance
Absolute fit index	RMSEA	RMSEA < 0.08
	GFI	GFI > 0.90
	AGFI	AGFI > 0.90
Increment fit index	CFI	CFI > 0.90
	TLI	TLI > 0.90
	IFI	IFI > 0.90
Parsimonious fit index	Chisq/df	Chisq/df < 3.0

3.2 Pooled Confirmatory Factor Analysis On The Constructs

A study by Chong et al. (2013) has concluded that it is clearly shown that pooled CFA is easier and better than individual CFA because of time saving when to run a measurement model [16]. For this research, the input for the pooled CFA is shown in Figure 3 and the output is as shown in Figure 4. The data used as input for the pooled CFA are obtained from a survey carried out onto the local ICP Recipients using the developed measurement items.

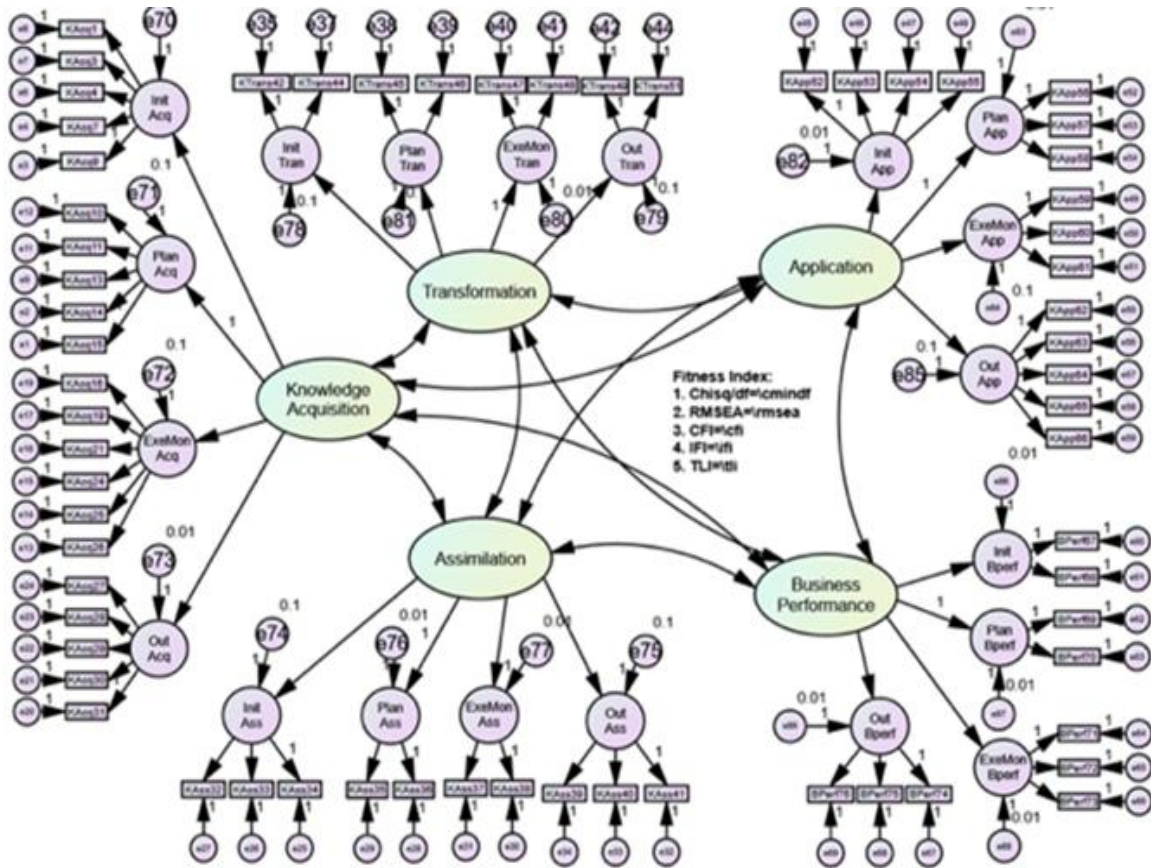


Figure 3: AMOS input for the pooled CFA

Table 2. Summary of fitness indices for pooled CFA

Name of category	Name of index	Index value	Comment
Absolute fit index	RMSEA	0.049	The required level is achieved
	CFI	0.906	The required level is achieved
Increment fit index	TLI	0.902	The required level is achieved
	IFI	0.907	The required level is achieved
Parsimonious fit index	Chisq/df	1.286	The required level is achieved

The output of the SPSS-AMOS analysis in Figure 4 shows that the model understudied satisfied its unidimensionality and fulfilled all the required level of fitness indices as shown in Table 2. In addition, the test outcomes indicated that the items factor loadings for this model surpass the minimum required values of 0.6. Moreover, this analysis also revealed that the correlation between all constructs is less than 0.85 as proposed by [15]. In compliance with the recommendations by Hair et al. (2017), there shall be at least one index from each of the three-model fitness value, namely the Absolute Fit, the Incremental Fit and the Parsimonious Fit, to prove the validity of the construct [15].

In this research, based on the outcomes of the Pooled CFA test, it is proven that the constructs used for the research adhere to all fitness indices and achieved the required level. Therefore, it is concluded that the measurement model for the construct had attained the required validity.

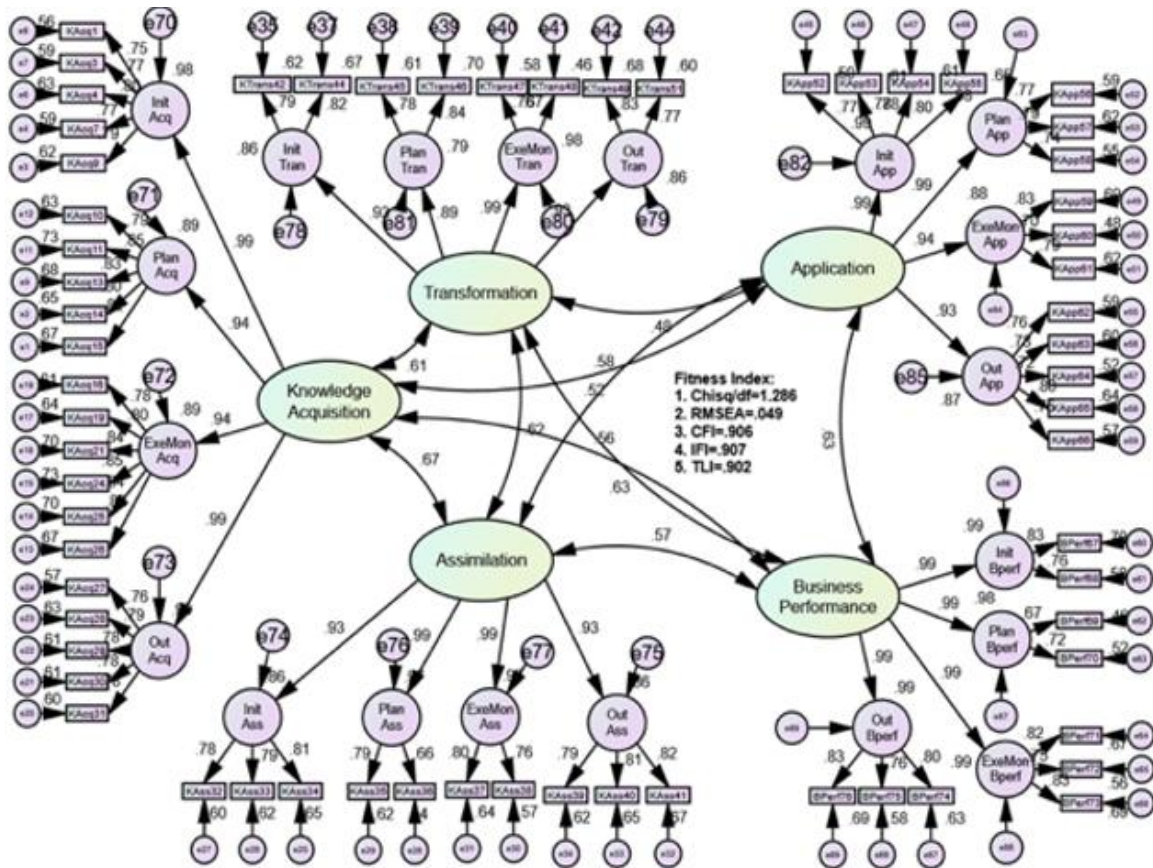


Figure 4. AMOS output for the pooled CFA

3.3 Hypotheses Tests

In testing the research hypotheses for direct effect, Table 4 exhibits the regression weight for each path analysis proposed in the research hypotheses. From this table, all constructs have a significant contribution towards its respective endogenous constructs. By looking at the estimated value, Knowledge Application (0.563) has a big impact onto Business Performance; Knowledge Assimilation (0.495) towards Knowledge Transformation; Knowledge Acquisition (0.462) towards Knowledge Assimilation; Knowledge Assimilation (0.452) towards Knowledge Application; and Knowledge Acquisition (0.313) towards Knowledge Transformation. The following tables will breakdown the interpretation for each effect:

Table 4. Regression weight from path analysis model

Causal effect	Est	S.E.	C.R.	P	Results
Knowledge Assimilation ← Knowledge Acquisition	0.462	0.079	5.868	***	Significant
Knowledge Transformation ← Knowledge Acquisition	0.313	0.103	3.040	0.002	Significant
Knowledge Transformation ← Knowledge Assimilation	0.495	0.160	3.094	0.002	Significant
Knowledge Application ← Knowledge Transformation	0.155	0.110	1.416	0.157	Not Significant
Knowledge Application ← Knowledge Assimilation	0.452	0.161	2.807	0.005	Significant
Knowledge Application ← Knowledge Acquisition	0.153	0.099	1.551	0.121	Significant
Business Performance ← Knowledge Application	0.563	0.098	5.732	***	Significant

3.4 Analysis

The following analysis will be based on the output shown in Table 4:

Hypothesis 1

Hypothesis (H1) proposes that Knowledge Acquisition has a positive and significant effect onto Knowledge Assimilation is accepted. It is known that ICP is important to support initiatives on national technology and local economic development. Therefore, new knowledge and skills need to be acquired for the organization/nation to stay competitive and progress as planned. For the new knowledge/skills to be effectively used, there must be strategic directions (such as the ones for the ICP set by the authorities and stakeholders to become a guideline for the ICP implementers to ensure the objectives are identified, managed, and achieved.

Hypothesis 2

Hypothesis (H2) proposes that Knowledge Acquisition has a positive and significant effect on Knowledge Transformation is accepted. Knowledge assimilation is defined as the process of receiving new facts or responding to new situations by absorbing them to fit into the existing knowledge. The quantitative data analysis concludes that the outcomes of knowledge acquisition are significant as inputs to Knowledge Assimilation

Hypothesis 3

Hypothesis (H3) proposes that knowledge assimilation has a positive and significant effect on knowledge transformation. Nonetheless, the amount and level of new knowledge acquired that can be assimilated to the new environment varies from one company to another depending on the experience and existing level of knowledge in the company. As such, the AC elements - acquisition, assimilation, and exploitation - will positively and significantly influence organizational innovation and business development. Moreover, the study indicates that the assimilation dimension is strongly dependant on the management to drive it forward.

Hypothesis 4

Hypothesis (H4) provides a return that Knowledge Transformation is insignificant to Knowledge Application. This research has found gaps in the current ICP implementations in Malaysia that have resulted in the low scores for the items contributing to H4. One of the examples is an item that measures job rotation has returned a low value which indicates that it is not much practiced. For this example, the author believes that the job rotation method must be practiced more to enable the employees to benefit from knowledge learning and sharing. The industry players shall ensure the new knowledge acquired is practiced rather than leave is as theoretical knowledge. Further, effective knowledge transformation will depend on the legitimacy attributed by the team and decision-maker and contributed by efficient communications with key stakeholders.

Hypothesis 5 (H5) & Hypothesis 6 (H6)

Based on the theoretical construct in Figure 1, the model shows that H5 and H6 do not have a direct relationship to the outcomes as indicated by the dashed lines. The output from the SPSS-Amos indicate that H5 is accepted while H6 is rejected. Based on the data collected, it appears that the ICP recipients are more likely to assimilate or integrate the new knowledge/skill into the current expertise within the organization in the form of processes enhancement rather than new products, which is aligned with H5. H6, which gives emphasis on knowledge utilisation such as IP exploitation, and R & D activities which need investment and placement of new products into the market are less favourable by local industry players. Therefore, several factors need to be considered when it comes to real product commercialization, such as the current business ecosystems and sentiments.

Hypothesis 7 (H7)

The hypothesis (H7) that Knowledge Application has a positive and significant effect on Business Performance is accepted. The theoretical construct shown in Figure 1 suggests that the outcomes of the

ICP implementation in the form of business performance are affected by the capacity and capability development within the organization. The capacity and capability development can be determined through other elements of absorptive capacity (Knowledge Acquisition, Knowledge Assimilation, Knowledge Transformation, and Knowledge Application/Exploitation). Moreover, the tests run on the hypotheses developed by the author and data analysis support the theoretical construct.

4.0 CONCLUSIONS

A methodology which is the AC shall have been considered to develop a model and construct instruments to measure the impact of ICP implementation onto Human Capital Development programs. In this research, the data obtained from industry players were prepared for quantitative and qualitative analysis to gauge the outcomes of the ICP implementation in Malaysia. For that purpose, a theoretical construct was developed based on AC elements and used as the basis for the hypotheses and research instrument construction. The items for measurement associated with the instrument were validated using the CVI. The findings of this research reveal that the ICP is a good platform to support technology and economic development in Malaysia. This initiative can be used as a platform, for example, to carry out activities to acquire, assimilate, and transform/exploit external knowledge. The newly acquired capability will enable the ICP recipients to develop their capacity to create new processes and products as well as redesign their business models toward process enhancements and efficiency to make them more competitive in the market. Nevertheless, based on the analysis and supported by the initial statistical analysis by SPSS-Amos application, it is concluded that the ICP implementation in Malaysia has achieved its target, however there are rooms for improvement. Authors are required to conclude the outcomes of their research by providing a concise overview of the introductory phrase, key points of the original text, and supporting arguments.

5.0 CONFLICT OF INTEREST

The authors declare no conflicts of interest.

6.0 AUTHORS CONTRIBUTION

Safari, Z. (Conceptualization; Methodology; Formal analysis; Writing - original draft; Writing - review & editing)

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