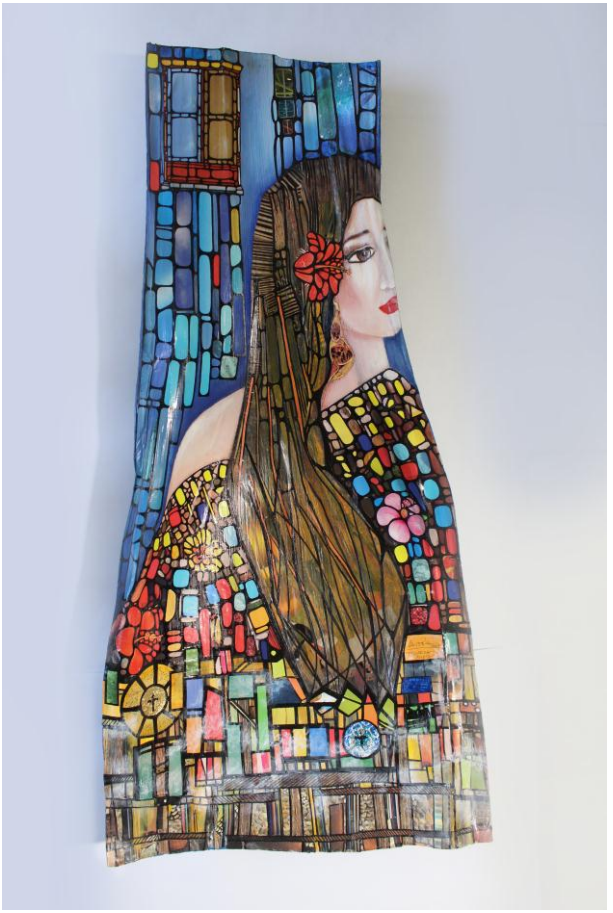
opción

Revista de Antropología, Ciencias de la Comunicación y de la Información, Filosofía, Lingüística y Semiótica, Problemas del Desarrollo, la Ciencia y la Tecnología

Año 34, 2018, Especial N° 16

Revista de Ciencias Humanas y Sociales
ISSN 1012-1587/ ISSNe: 2477-9385
Depósito Legal pp 198402ZU45



Universidad del Zulia
Facultad Experimental de Ciencias
Departamento de Ciencias Humanas
Maracaibo - Venezuela

Opción, Año 34, Especial No.16 (2018): 985-1013
ISSN 1012-1587/ISSNe: 2477-9385

Exploring Critical Effect of Knowledge Inflows and Absorptive Capacity on Product Innovation

Ismail Raisal
Management and Science University, Malaysia, Department of Management, South Eastern University of Sri Lanka, University Park, Oluvil, Sri Lanka.
Email: ismarais@seu.ac.lk

Arun Kumar Tarofder
Faculty of Business Management and Professional Studies, Management and Science University, Malaysia
Email: arun_kumar@msu.edu.my

DAC. Silva
Department of Economics, University of Colombo
suranga@econ.cmb.ac.lk

Abstract

The primary aim of this study is to measure the effect of external knowledge inflows and absorptive capacity on product innovation through innovative culture. Structural Equation Modeling was used by PLS software as a method and results indicated that all hypothesis were accepted except the direct effect of external knowledge on product innovation. In conclusion, ACAP is highly important to creating an organizational learning culture in the forms of encouraging teamwork, creativity, and innovation, doing things in new ways, individually approaching the job, and improving communication between departments.

Keywords: knowledge inflows, Absorptive capacity, culture.

Recibido: 04-12--2017 •Aceptado: 10-03-2018

Explorando el efecto crítico de los flujos de conocimiento y la capacidad de absorción en la innovación de productos

Resumen

El objetivo principal de este estudio es medir el efecto de las entradas de conocimiento externo y la capacidad de absorción en la innovación de productos a través de una cultura innovadora. El software PLS utilizó la modelización de ecuaciones estructurales como método y los resultados indicaron que todas las hipótesis fueron aceptadas, excepto el efecto directo del conocimiento externo sobre la innovación de productos. En conclusión, ACAP es muy importante para crear una cultura de aprendizaje organizacional en las formas de fomentar el trabajo en equipo, la creatividad y la innovación, hacer las cosas de nuevas maneras, abordar el trabajo individualmente y mejorar la comunicación entre los departamentos.

Palabras clave: entradas de conocimiento, capacidad de absorción, cultura.

1. INTRODUCTION

Product innovation is the foundation of competitive distinctiveness that leads to superior performance. So that firms are increasingly emphasizing product innovation. Product innovativeness can be said to be closely related to new knowledge that the firm can provide and integrate. New knowledge stems from both internal sources that a firm creates and external sources that a firm acquires from the outside. The dynamism and complexity of today's competitive landscape make it essential for companies to use the

knowledge generated by other firms (e.g., suppliers and competitors) and institutions (e.g., university, research, and government laboratories).

Successful product innovation often requires the integration of multiple capabilities. These capabilities are usually grounded in knowledge-based routines. The knowledge used to develop these routines could be internally developed or acquired from external sources. Determining the types of knowledge to bring into the organization, how to best assimilate this knowledge, and how to exploit it for competitive advantage are important decisions that are shaped by recipient companies' absorptive capacity Lane et al. (2006), which reflects a firm's abilities to acquire, assimilate, transform, and exploit external knowledge. Companies that do not have this capacity may not benefit from the rich and varied knowledge that exists in their industry and markets.

The question of how and in what way external knowledge inflows capacity and absorptive capacity impact product innovativeness remains underdeveloped. The purpose of this study is to address this key question. Specifically, because capabilities contribute through their uniqueness, their integration into effective configurations, and their deployment in response to external environment changes Lane et al. (2006), this study examines the causal effects of external knowledge inflows capacity and absorptive capacity on product innovativeness as well as how these effects vary with IC.

2. THEORY AND HYPOTHESIS

2.1 External knowledge inflows capacity and Product innovation

Accepting a strategy of open innovations in Lane et al. (2006) enters the enterprise requiring new systematic and new skills in collaborative operations. Zou et al. (2018) emphasize that the success of open innovation strategy is based on the development of specific skills and resources. This development process can identify the main sources of innovation for the company and bring competitive advantages to the organization. Generating solutions with the use and sharing of universal thinking ideas in the process of producing innovative products is very much appreciated through knowledge maximization with the assistance of knowledge inflow capacity among SMEs. The challenge is scattered around the world, not only with the creation, knowledge and technology of but with the ability to manage the relevant potential (Haseeb, Hassan, Azam, & Suryanto, 2018).

Some scholar suggests that single organization cannot successfully innovate in isolation; therefore, firms should rely on external relationships and networks in order to complement its knowledge domains, and then, develop better and faster innovations. Recent research has encouraged an exploration concentrate on researching the utilization of an external source of knowledge to upgrade the innovation performance in SMEs as they will probably look outside the association for knowledge. Furthermore, the

investigation of systems that encourage the transformation of knowledge from outside a firm into inward firm innovation culture and how SMEs can proactively enhance these instruments has been empowered (Alegre et al., 2013; Abiodun, 2014; Maes and Sels, 2014). There is an increasing consensus that firms' external knowledge inflows improve product innovative performance (Dejong and Freel, 2010; Zheng, 2018).

H1: External knowledge inflows capacity has significant positive effect on product innovation.

H2: External knowledge inflows capacity has significant positive effect on Innovative culture.

2.2 The relationship between Absorptive capacity and product innovation

Absorptive capacity is one of the main drivers of product innovation in firms. It endeavors to promote the speed, frequency and magnitude of product innovation by acting as a conduit of inter-organizational information/knowledge sharing. Assimilation enables the coordination, systematization and socialization of external knowledge. For instance; assimilation leverages cross-functional interfaces, social linkages, and participative decision making enabling the firm to respond faster to environmental demands as well as developing new products more effectively. Further, a company's

absorptive capacity energizes the new product development attempts by going about as a medium through which recently gained information is imparted between various units or divisions of the firm. Transformation, allows the communicated knowledge to be combined with the firm's existing knowledge base. Consequently, the complementary information embedded in different organizational units or departments can be translated into new products through transformation and assimilation of external information.

H3: The absorptive capacity has significant positive effect on product innovation.

H4: The absorptive capacity has significant positive effect on innovative culture.

2.3 The relationship between Innovative culture and product innovation

Innovative culture (IC) refers to a set of shared assumptions, values, beliefs, attitudes, and behaviours of organizational members that could facilitate the creation and development of new product innovation. Many prior studies utterly mentioned that organizations likely not be able to innovate product without getting full support from their employees (Ali & Park, 2016). In this regard, Zou et al. (2018) postulated that the product innovation process can only gain full potential when organizations nurture and encourage employees'

participation in that particular process. Similarly, Arun et al. (2017) mentioned that innovative organizational culture plays a vital role in encouraging employees to contribute by sharing their innovative idea. Many organizations, such as Google, Microsoft, and the name of a few gain a competitive advantage by establishing an innovative organizational culture. Stephen and James (2017) explicitly stated that one of the success factors of Google is their innovative culture, which eventually brings the best from their employees, subsequently, employees robustly contribute to the product innovation. Hence

H5: The innovative culture has significant effect on product innovation.

2.4 The mediating role of IC on the relationship between External knowledge inflows capacity and product innovativeness

Innovation is nothing but the role of corporate culture. On the one hand, organizational culture is generally viewed as the basis of large and established companies. Some researchers argue that one of the most common constraints for corporate culture is the innovation (Oregan et al., 2006). Other writers consider that an entrepreneurial culture has an implicit influence on product innovations (Ali & Park, 2016). On the other hand, it is argued that an innovative culture has a positive effect on product innovation and organizational knowledge flows, focusing on innovation culture. (Donate et al., 2010). Therefore,

culture should create effective ways to ensure that knowledge is optimal for product innovativeness.

H6: External Knowledge inflow has significant positive effect on product innovation through innovation culture.

2.5 The mediating role of IC on the relationship between absorptive capacity and product innovativeness

The company's ACAP to cope with IC can be increased. The IC is intentionally focused on and intends to compete for positive compatibility because it encourages IC to open up new ideas and develops new skills, processes or products successfully Zou et al. (2018) to develop locally capable. The final hypothesis provides a good understanding of this complex relationship. ACAP is actually a different concept, and the resulting techniques and structures can be formed. Therefore, it may have different effects on the effect of firms. The study says ACAP has a different effect on IC and product innovations. The study analyzes the different effects of IC's on product innovation, following the very aspects of ACAP, following the success of (Zou et al., 2018).

H7: Absorptive capacity has significant positive effect on product innovation through innovation culture.

Figure 1 presents the research model based on the preceding discussion. According to this model, KIC is the key determinant of their product innovation (H1); and EKIC influences IC (H2). Similarly, ACAP is the key determinant of their product innovation (H3); and ACAP influences IC (H4). IC influences PI (H5). Moreover, it is conceptualized that IC mediates the relationship between EKIC and PI (H6). Similarly, IC mediates the relationship between ACAP and PI (H7).

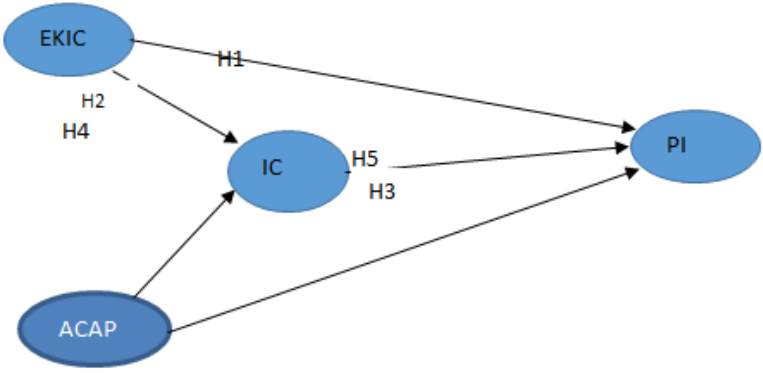


Figure 1: Conceptual model

3. METHODOLOGY

3.1. Instrument Development

A structured questionnaire was developed for this study to collect primary data and several steps were taken into consideration

before finalizing, such as operationalization and conceptualization, reliability and validity test and so on. There was three important sections in this questionnaire which facilitates both researchers and respondents for coding and responding respectively. The first section of the questionnaire was mainly emphasizing the demographic information regarding the respondents and the nominal scale was used. The second section included items related to the variables stated in the model and measured with 5 points Likert scale, subsequently last section mainly dealt with opinion based questions.

In relation to validity, this study tested four major validity, namely face, content, construct and discriminant validity. First three validity was ensured by adapting items from prior studies, for instance, To survey knowledge inflows capacity, this study adopts the five-item scale from Rezende da Costa et al., 2013 and considering the relevance to assessing ACAP, this study adopts the six-item scale from (Zou et al., 2018). This study takes uni -dimensional size of twelve items from O' Cass and Ngo (2007) to quantify IC. At last, the scale adapts three-dimensional scales from Su et al., (2013) to quantify product innovation and finally, discriminant validity was examined through the measurement model. Principles of wording and measurement were strictly followed in this study, which helps to obtain a greater amount of response from respondents. Cronbach alpha, in the pilot test, showed a greater internal consistency. Based on all these criteria, this study finalized and send an email of the questionnaire to all the respondents.

4. DATA COLLECTION METHOD AND SAMPLING STRATEGY

This study followed five steps in developing and finalizing their respondents, including, (a) defining population; (b) identifying sample frame; (c) sampling strategy; (d) determine sample size: lastly but not least (e) execution. Pertaining to population, Small and Medium Enterprises (SME's) were the target population for this study. The main reason for selecting SME's is their contribution to Sri Lanka's economy. According to July 23, 2017, The Sunday Times proclaimed that Sri Lanka's SME's contributes 53 per cent of their GDP. According to Mistry of Industry and commerce, SME's can be considered as an enterprise who has less than 300 employees and turnover is not more than RS 750 million is a year. According to Ministry of Industry and Commerce database, there were 3711 SMEs were registered till 2017. However, many SME's are not fully operated pertaining to innovation. Hence, this study selects only 413 SME's from the database of Sri Lanka's inventors' commission 2016. This study sent an invitation to all these 413 organizations and only 233 were interested to participate. In the second round, this study sent an e-mail to all those companies along with the questionnaire link developed in google form. With seven reminders and three months of effort, this study managed to get 195 responses, which considered adequate to execute multivariate analysis. Budget and cost were the two main reasons for choosing the e-mail method. Besides, the target population needs more time to read and respond as they rarely get free time.

4.1. Data Analysis

The PLS-SEM method and statistical software Smart PLS, 3.2.7 Ringle et al. (2015) was used to estimate the hypothesized model. PLS-SEM is a non-parametric, multivariate approach used to estimate path models with latent variables (Avkiran, 2017). In this study, PLS-SEM was used for several reasons. First, the exploratory nature of the research Richter et al. (2016) as the study was to investigate the interrelationship between EKIC, ACAP, IC and PI, a topic least discussed in the published research literature. Second, the PLS-SEM can deal with complex systems (Hair et al., 2017), and is prescribed for the intervening models. Given the present research has an incremental character (i.e., IC as a mediator), the PLS-SEM approach was suitable for the study, and finally, the sample size (n = 195) is relatively small.

5. RESULTS

5.1. Respondents' Profile

Table 1 provides the demographic profile of the respondents. As the SMEs sector is considered a male dominated industry, a high participation of males (69.2%) in the present study was not surprising. the majority of respondents (54%) were aged between 30 and 50, of the respondents, (38%) were aged more than 50, followed by (3%) below the age of 5. The results of descriptive statistics indicated that

respondents belong to various experience groups, such as less than 5 years (21%), 5-10 years (64%), more than 10 years (15%).

Table 1. Demographic Profile of the Respondents (n =195)

Demographic Variables	Category	Frequency	Percentage %
Gender	Male	135	69.2
	Female	60	30.8
Age (years)	> 30 years	5	2.6
	30-50	106	54.3
	<50	84	43.1
Tenure			
	>5	40	20.5
	5-10	125	64.1
	<10	30	15.4

This study follows two-step analytical procedure to analyze and interpret the PLS –SEM results. The first step involves testing the measurement model (i.e. internal consistency reliability, convergent and discriminant validity), and the second step involves examining the structural model (i.e. hypotheses testing).

5.2. Evaluation of measurement model

The measurement model was tested to assess the internal consistency reliability, convergent validity (CV) and discriminant validity (DV) of the constructs used in this study. Internal consistency reliability measures the degree to which the items are a measure of the latent constructs (Hair et al., 2014). Composite reliability was

evaluated as a measure of internal consistency (Hair et al., 2017). The measurement model with composite reliability above the threshold value of 0.7 for each construct is considered satisfactory. The results indicated that the composite reliability for all of the constructs exceeds the cut-off value (0.7) – knowledge inflow capacity (0.906), ACAP (0.920), IC (0.940) and product innovation (0.885) – thereby indicating the high internal consistency of the measures.

Another measure to be mindful of is CV, which assesses "the extent to which a measure correlates positively with alternative measures of the same construct" (Hair et al., 2017: 112). CV is assessed by checking the outer loading of the items and the average variance extracted (AVE). As a general rule of thumb, outer loadings should have a value of 0.708 or higher, while an AVE score of 0.5 is considered satisfactory (Avkiran, 2017). Items with an outer loading of 0.6 might also be considered acceptable (Chin, 1998). Hair et al. (2017) recommend retaining indicators with weaker factor loadings if other indicators with high loadings can explain at least 50 percent of the variance (AVE = 0.50). The results indicate that, with the exception of EKIC 1 & EKIC 2, all the items had adequate outer loadings. Consequently, KIC1, EKIC 2 & IC 12– were excluded due to a weak loading. Following the removal of EKIC 1, EKIC 2 & IC12 all of the constructs achieved adequate AVE – EKIC (0.763), ACAP (0.670), IC (0.578) and product innovation (0.719) – thus confirming the CV of the constructs. Table 2 presents the results of the internal consistency reliability and CV.

Table 2. Internal consistency reliability and convergent validity
Notes: CR, composite reliability; AVE, variance extracted. [a]EKIC1, [b]EKIC2 & [c]IC12 were deleted due to low loading

onstruct	Measurement item	Loading	CR	AVE
EKIC	EKIC1	Item deleted [a]	0.906	0.763
	EKIC2	Item deleted [b]		
	EKIC3	0.827		
	EKIC4	0.920		
	EKIC5	0.872		
ACAP	ACAP1	0.770	0.910	0.670
	ACAP2	0.859		
	ACAP3	0.808		
	ACAP4	0.819		
	ACAP5	0.832		
	ACAP6	0.816		
IC	IC1	0.719	0.938	0.578
	IC2	0.758		
	IC3	0.778		
	IC4	0.724		
	IC5	0.781		
	IC6	0.765		
	IC7	0.753		
	IC8	0.824		
	IC9	0.783		
	IC10	0.762		
	IC11	0.702		
	IC12	Item deleted [c]		
PI	PI1	0.854	0.885	0.719
	PI2	0.823		
	PI3	0.867		

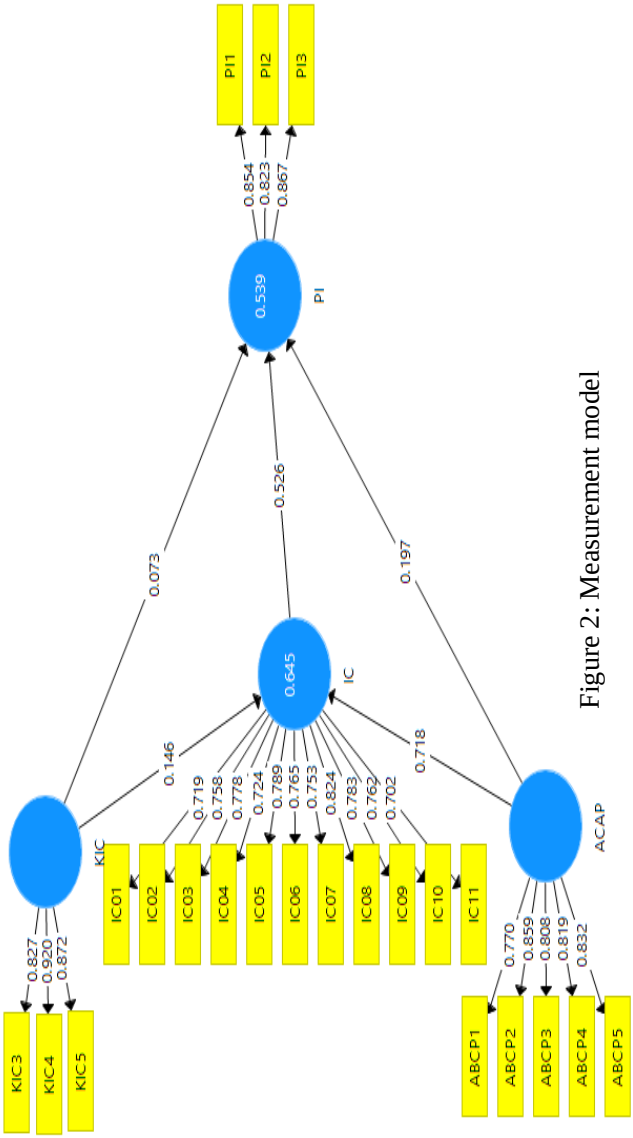


Figure 2: Measurement model

DV is the degree to which a construct is distinct from other constructs in the model (Hair et al., 2017). We used two methods to assess DV; first, we used the Fornell and Larcker (1981) criterion – comparing the correlation between the constructs and the square root of the AVE for that construct. In order to achieve DV, the square root of the AVE for each latent variable must exceed the correlation value for the same construct. As shown in Table 3, the results indicate adequate DV, with the AVE square root values being higher than the correlation values in the rows and columns. Additionally, the Heterotrait-Monotrait Ratio (Henseler et al., 2015), was used to confirm DV. An HTMT value above 0.90 suggests a lack of DV (Hair et al., 2017). A more conservative cut-off value for HTMT is 0.85. The results of the HTMT criterion were established at HTMT0.85, indicating that the present study did not violate the assumptions of DV, as illustrated in Table 4. The results of the overall measurement model demonstrate adequate internal consistency reliability, CV and DV.

Table 3. Discriminate validity (Fornell and Larcker criterion)

	ACAP	IC	EKIC	PI
ACAP	0.818			
IC	0.793	0.760		
KIC	0.512	0.514	0.874	
PI	0.651	0.720	0.444	0.848

Note: Italic values on the diagonal represent the square root of AVE, while the other entries represent the correlations

Table 4. Discriminate validity (HTMT Criterion)

	ACAP	IC	EKIC	PI
ACAP	-			
IC	0.877	-		
KIC	0.591	0.576	-	
PI	0.777	0.828	0.536	-

Note: Criteria: DV is established at HTMT0.85

5.3. Evaluation of structural model

Following the structural model assessment procedure Hair et al. (2017) before analyzing the structural model, in addition to reliability and validity, the variance inflation factor (VIF) must be assessed to compute multicollinearity. Hair et al. (2017) recommend a cut-off value of 5.0 for multicollinearity. The VIF results for each construct, which were below the threshold value of 5.0, indicating that collinearity is not a critical issue in this study. This study uses a resampling bootstrap method with 5000 along with each bootstrap sample containing the same number of observations as the original sample (i.e., 195 bootstrap cases) to generate standard errors and t-values (Chin, 1998; Hair et al., 2017). The study assesses estimated path relationships among the latent variables in the model through the sign and magnitude of path coefficients. Table 5 summarizes the results, as Fig. 3 shows. The results indicate that KIC (H1: β =0.073, p> 0.05, LL: -0.045, UL: 0.208) had no significant direct association with product innovation. Surprisingly, the results for the PLS path coefficients revealed that EKIC (H2: β = 0.145, p <0.01, LL: 0.048, UL: 0.229) is significantly positively related to IC. The ACAP (H3: β =0.195, p < 0.05, LL: (- 0.012, UL: 0.367) had significant direct relationship with product innovation. Also, ACAP (H4: β = 0.718, p <0.01, LL: 0.634, UL: 0.792) is significantly positively related with IC. Also, IC (H5: β = 0.528, p <0.01, LL: 0.330, UL: 0.729) is significantly positively related with product innovation. In summary, H1 was not supported, whereas H2, H3, H4 and H5 were supported. The results of the structural model assessment are reported in Table 4.Following the structural model assessment procedure Hair et al. (2017) before analyzing the structural model, in addition to reliability and validity, the variance

inflation factor (VIF) must be assessed to compute multicollinearity. Hair et al. (2017) recommend a cut-off value of 5.0 for multicollinearity. The VIF results for each construct, which were below the threshold value of 5.0, indicating that collinearity is not a critical issue in this study. This study uses a resampling bootstrap method with 5000 along with each bootstrap sample containing the same number of observations as the original sample (i.e., 195 bootstrap cases) to generate standard errors and t-values (Chin, 1998; Hair et al., 2017). The study assesses estimated path relationships among the latent variables in the model through the sign and magnitude of path coefficients. Table 5 summarizes the results, as Fig. 3 shows. The results indicate that KIC (H1: β =0.073, p> 0.05, LL: -0.045, UL: 0.208) had no significant direct association with product innovation. Surprisingly, the results for the PLS path coefficients revealed that EKIC (H2: β = 0.145, p <0.01, LL: 0.048, UL: 0.229) is significantly positively related to IC. The ACAP (H3: β =0.195, p < 0.05, LL: (- 0.012, UL: 0.367) had significant direct relationship with product innovation. Also, ACAP (H4: β = 0.718, p <0.01, LL: 0.634, UL: 0.792) is significantly positively related with IC. Also, IC (H5: β = 0.528, p <0.01, LL: 0.330, UL: 0.729) is significantly positively related with product innovation. In summary, H1 was not supported, whereas H2, H3, H4 and H5 were supported. The results of the structural model assessment are reported in Table 4.

The next step involves reviewing the R^2, which indicates the variance explained in each of the endogenous constructs. The R^2 ranges from 0 to 1, with higher levels indicting more predictive accuracy. As a rough rule of thumb, the R^2 values of 0.75, 0.50, and 0.25 can be considered substantial, moderate, and weak (Henseler et al., 2015). It is

important to note, however, that, in some research contexts, R^2 values of 0.10 are considered satisfactory. Following the rules of thumb, the values of R^2 of IC is 0.645 (64.5) and product innovation is 0.539 (53.9) are moderate. Hair et al. (2017) suggest that in addition to describing the significance of the relationships, researchers should also report the coefficient of determination (R^2), effect size (f^2) and predictive relevance (Q^2). Consequently, R^2, f^2 and Q^2 values were examined, as illustrated in Table 5. R^2 refers to the explanatory power of the independent variable(s) with respect to their corresponding dependent variables. The value of R^2 shows that the EKIC and ACAP of SMEs explains 66.6 per cent of their product innovation ($R^2 = 0.539$) and 53.9 per cent of their IC ($R^2 = 0.645$). Next, f^2 indicates effect size; how much an independent variable contributes to the dependent variable's R^2. F^2 can be calculated by using the equation: $f^2 = (R^2 \text{ included} - R^2 \text{excluded}) \div (1 - R^2 \text{ included})$. Cohen & Levinthal (1990) provided cut-off values for measuring effect size: $f^2 = 0.02$, 0.15 and 0.35, indicative of small, medium and large effect sizes, respectively. The results of f^2 indicate that KIC has a smaller effect on product innovation ($f^2 = 0.008$) and a small to medium effect on IC ($f^2 = 0.045$). Also, the results of f^2 indicate that ACAP has a smaller effect on product innovation ($f^2 = 0.030$) and a larger effect on IC ($f^2 = 1.069$). Further, the results of f^2 indicate that IC has a medium to a larger effect on PI ($f^2 = 0.214$).

The Q^2 is an indicator of the model out of sample predictive power or predictive relevance for the particular construct (Chin, 1998). The construct's cross-validated redundancy values, which were obtained through a blindfolding procedure, were used as a measure of Q^2. According to Hair et al. (2017), Q^2 values larger than zero for a certain

reflective endogenous latent variable indicate the path model's predictive relevance for the particular construct. The results of the assessment of IC (Q^2 = 0.347) and product innovation (Q^2 = 0.370) indicate an acceptable degree of predictive ability for EKIC on IC and PI as well as for ACAP on IC and product innovation as shown in Table 6.

Table 5. Significant testing results of the structural model path coefficients.

Hypotheses	Path	Path coefficient	T - Value	CI (LL, UL)	Conclusion
H1	KIC -> PI	0.073	1.129	(-0.045,0.208)	not supported
H2	KIC -> IC	0.145	2.962	(0.048,0.229)	supported
H3	ACAP -> PI	0.195	2.026	(-0.012,0.367)	supported
H4	ACAP -> IC	0.718	17.158	(0.634,0.792)	supported
H5	IC -> PI	0.528	4.968	(0.330,0.729)	supported

Table 6. Results of R^2 Q^2 and f^2

Path	Coefficient of determination R^2	Predict relevance Q^2	f^2	Effect size Effect
KIC -> PI			0.008	smaller effect
KIC -> IC			0.045	small to medium effect
ACAP -> PI	0.539	0.370	0.030	small to medium effect
ACAP -> IC	0.645	0.347	1.069	larger effect
IC -> PI			0.214	medium to larger effect

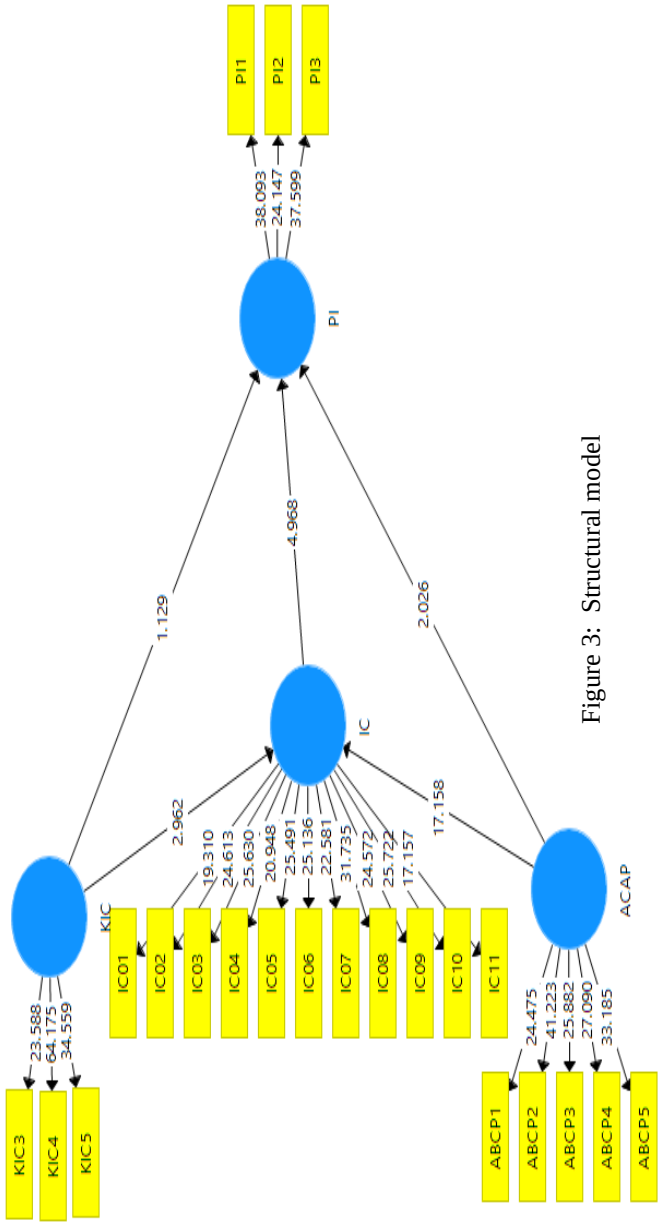


Figure 3: Structural model

5.4. Test for mediation

This study uses non-parametric bootstrapping method to evaluate the significance of the mediating effect. However, still, no mutual consensus exists on whether the relationship between the exogenous and endogenous variable has to be significant before including the potential mediator. The only requirement for mediation is that the indirect effect has to be significant. In addition, if the indirect effect is significant, the mediator absorbs some of the direct effects. In this study, the fact that direct relationship between EKIC and PI is not significant but their indirect effect is significant (H6: β = 0.077, t = 2.393) leads to conclude that indirect mediation between EKIC and PI through IC exists. Also, a direct relationship between ACAP and PI is not significant but their indirect effect is significant (H7: β = 0.379, t = 4.765) leads to conclude that indirect mediation between ACAP and PI through IC exists. The results appear in Table 7 and fulfill all the necessary conditions for the assessment of mediator using a bootstrapping procedure.

Table 7. Test of mediation by bootstrapping approach

Effect of	Specific indirect effect	Interpretation	Conclusion
EKIC -> IC -> PI	0.077 (2.399)	Partial mediation	H6 supported
ACAP -> IC -> PI	0.379 (4.846)	full mediation	H7 supported

6. DISCUSSION AND CONCLUSION

The objective of this study was to examine the causal relationship between EKIC, ACAP, and product innovation and to investigate the mediating role of IC on KIC, ACAP and product innovation among Sri Lankan SMEs. Contrary to our expectations, the findings revealed that EKIC has no significant direct effect on Product innovation (H1). These findings, however, conflict with previous studies that have found EKIC to be positively related to Product innovation. It is believed that the differences in these findings are a function of how the EKIC construct has been operationalized. The present study operationalized KIC in terms of prevailing mechanism to receive customer feedback, technological benchmarking of competitor/supplier, and purchase of external technology. However, this study found that there is a positive and significant effect between EKIC and IC (H2). However, the results also highlight that IC acts as a partial mediator in the relationship between EKIC and PI (H6). The first part of the mediating relationship from IC to PI implies that higher IC, increasing KIC, develops into more product innovation. To fully understand this phenomenon, taking into account both the direct and indirect (i.e., mediated) effects of the constructs is necessary, to have a better understanding of the way in which the EKIC influences IC, and to improve PI through the mediating effect of IC.

As expected, the results indicate that ACAP is a strong predictor of PI (H3). The ACAP has a positive and significant effect on PI. ACAP is highly important to creating an organizational learning

culture in the forms of encouraging teamwork, creativity, and innovation, doing things in new ways, individually approaching the job, and improving communication between departments. Also, the ACAP has a positive and significant effect with IC (H4). However, the results also highlight that IC acts as a full mediator in the relationship between ACAP and PI (H7). The second part of the mediating relationship from IC to PI implies that higher IC, increasing ACAP, develops into more product innovation. To fully understand this phenomenon, taking into account both the direct and indirect (i.e., mediated) effects of the constructs is necessary, to have a better understanding of the way in which the ACAP influences IC, and to improve PI through the mediating effect of IC. These insights are in line with similar consistent findings in the literature. Studies recently confirm that to survive in the turbulent environments, firms make great efforts to implement various knowledge-enhancing practices to create organizational knowledge, which increases those firms' ability to innovate in new product and services. This study contributes to this line of research by identifying and testing the antecedent roles of EKIC and ACAP. Through examining their individual effects on PI as well as how these effects vary with IC, this study elaborates the antecedent roles played by EKIC and ACAP in PI. ACAP may be particularly valuable knowledge-based resources for securing firm competitiveness because ACAP tends to be valuable, rare, imperfectly inimitable, and non-substitutable. This study adds to the growing body of knowledge inflow capacity and ACAP research that investigates the association among EKIC & ACAP, IC and PI. This association contributes to the

theory of organizational design by investigating the mediating effect of IC as an important mechanism EKIC & ACAP employs to improve PI.

REFERENCES

ABIODUN, B. 2014. **The Prospects of Accounting and Economic Systems in the Era of Global Knowledge Economy.** The Economics and Finance Letters, Vol.1, N° 2: 9-14. USA

ALEGRE, J., SENGUPTA, K., & LAPIEDRA, R. 2013. **Knowledge management and innovation performance in a high-tech SMEs industry.** International Small Business Journal, Vol. 31, N° 4: 454-470. USA.

ALI, M., & PARK, K. 2016. **The mediating role of an innovative culture in the relationship between absorptive capacity and technical and non-technical innovation.** Journal of Business Research. UK.

ARUN K., GOVINDAN, M., AVVARI. V., & PRASHANTINI, S., 2013. **Web technology in supply chain: an empirical investigation.** Business Process Management Journal, Vol. 19, N° 3: 431-458. UK.

AVKIRAN, N. 2017. **An In-Depth Discussion and Illustration of Partial Least Squares Structural Equation Modeling in Health Care.** Health Care Management Science, pp. 1-8. UK.

CHIN, W. 1998. **The partial least squares approach for structural equation modeling.** In G.A. Marcoulides (Ed.), Modern methods for business research. Mahwah, NJ: Lawrence Erlbaum Associates. USA.

COHEN, W., & LEVINTHAL, M. 1990. **Absorptive capacity: a new perspective on learning and innovation**. Administrative Science Quarterly, Vol. 35, N° 1: 128–152. USA.

DEJONG, J., & FREEL, M. 2010. **Absorptive capacity and the reach of collaboration in high technology small firms.** Research Policy, Vol. 39, pp. 47–54. Netherlands.

DONATE, M., & GUADAMILLAS, F. 2010. **The effect of organizational culture on knowledge management practices**

and innovation. Knowledge Process Management. Vol. 17, N° 2: 82–94. USA.

DUGGAN, W. 2012. **Creative Strategy: A Guide for Innovation.** New York: Columbia University Press. USA.

FORNELL, C., & LARCKER, D. 1981. **Evaluating Structural Equation Models with Unobservable Variables and Measurement Error.** Journal of Marketing Research, Vol. 18, N° 1: 39-50. USA.

HAIR, J., HULT, G., RINGLE, C., & SARSTEDT, M. 2017. **A Primer on Partial Least Squares Structural Equation Modeling (PlS-SEM).** 2nd Ed. Thousand Oaks, CA: Sage. USA.

HASEEB, M., HASSAN, S., AZAM, M., & SURYANTO, T. 2018. **The dynamics of governance, tourism and environmental degradation: the world evidence.** International Journal of Global Environmental Issues, 17(4), 340-363. UK.

HENSELER, J., RINGLE, C., & SARSTEDT, M. 2015. **A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modeling.** Journal of the Academy of Marketing Science, Vol. 43, N° 1: 115-35. Germany.

LANE, P., KOKA, B., & PATHAK, S. 2006. **The reification of absorptive capacity: A critical review and rejuvenation of the construct.** Academy of Management Review, Vol. 31, pp. 833-863. USA.

MAES, J., & SELS, L. 2014. **SMEs' radical product innovation: the role of internally and externally oriented knowledge capabilities.** Journal of Small Business Management, Vol. 52, N° 1: 41-163. USA.

OREGAN, N., GHOBADIAN, A., & GALLEAR, G. 2006. **In search of the drivers of high growth in manufacturing SMEs.** Technovation, Vol. 26, N° 1: 30–41. Netherlands.

RICHTER, N., SINKOVICS, R., RINGLE, C., & SCHLÄGEL, C. 2016. **A Critical Look at the Use of SEM in International Business Research.** International Marketing Review, Vol. 33, N° 3: 376-404. UK.

RINGLE, C.., WENDE, S., & BECKER, J. 2015. **Smart PLS 3.0 in http: //www.smartpls.com.** edited by Smart PLS GmbH. Boenningstedt. Germany.

STEPHEN, R., & JAMES, H. 2017. **Knowledge context, learning and innovation: an integrating framework.** Industry and Innovation. DOI: 10.1080/13662716.2017.1414744. UK.

ZHENG, J. 2018. **The Incorporation of Subject Knowledge in Teaching Scientific Translation.** International Journal of English Language and Literature Studies, Vol. 7, N^{o} 2: 45-49. USA

ZOU, T., ERTUG, G., & GEORGE, G. 2018. **The capacity to innovate: a meta-analysis of absorptive capacity.** Innovation. DOI: 10.1080/14479338.2018.1428105. UK.

Appendix: A

Constructs	Code	Measures	Source
Knowledge inflows capacity **(5 items)**	KIC1	Mergers between companies to optimize efforts in R& D and innovation	Rezende da Costa et al., 2013
	KIC2	Funding of research centers to gain agility in R& D and add external ideas and efforts for research activities	
	KIC3	prevailing mechanism to receive customer feedback	
	KIC4	Technological bench marking of competitor / supplier	
	KIC5	Purchase of external technology (patent or not)	
Absorptive capacity **(6 items)**	ABCP1	Identifying new and useful knowledge owned by other firms	Su et al., 2013
	ABCP2	Understanding new and useful knowledge owned by other firms	
	ABCP3	Valuing new and useful knowledge owned by other firms	
	ABCP4	Assimilating new and useful knowledge owned by other firms	
	ABCP5	Applying new and useful knowledge owned by other firms	
	ABCP6	Exploiting new and useful knowledge owned by other firms	
Innovative culture (12 items)	IC1	Encouraging creativity and innovation	O'Cass,2007
	IC2	Being receptive to new ways of doing things	
	IC3	Being an organisation people can identify with	
	IC4	Stressing team work among all departments	
	IC5	Giving high responsibilities to managers	
	IC6	Explaining reasons for decisions to subordinates	
	IC7	Allowing individuals to adopt their own approach to the job	
	IC8	Improving communication between departments	
	IC9	Delegating decision making to lowest possible level	
	IC10	Taking a long-term view even at expense of short-term performance	
	IC11	Communicating how each person's work contributes to the firm's big picture	
	IC12	Valuing effectiveness more than adherence to rules and procedures	
Product innovativeness **(3 items)**	PI1	Our products offer unique advantages over competitors' products.	Su et al., 2013
	PI2	Our products are more creative than competitors' products.	
	PI3	Our products are based on substantially different technologies never used in our industry before	

UNIVERSIDAD
DEL ZULIA

opción
Revista de Ciencias Humanas y Sociales

Año 34, Especial N° 16, 2018

Esta revista fue editada en formato digital por el personal de la Oficina de Publicaciones Científicas de la Facultad Experimental de Ciencias, Universidad del Zulia.
Maracaibo - Venezuela

www.luz.edu.ve

www.serbi.luz.edu.ve

produccioncientifica.luz.edu.ve