

# The Information Technology Enabled Entrepreneurial Culture as an Antecedent of Firm's Performance of Rubber and Plastic Manufacturing Firms in Thailand: The Moderating Role of Supply Chain Technology Adoption

Natnaporn Aeknarajindawat<sup>#1</sup>, Jetsalid Anesukanjanakul<sup>#2</sup>, Pornkul Suksod<sup>#3</sup>, Kulnaree Maneechote<sup>\*4</sup>

<sup>#1,2,3</sup> Graduate School, Suan Sunandha Rajabhat University, Thailand

<sup>\*4</sup> Social Research Institute, Chulalongkorn University, Thailand

<sup>1</sup>natnaporn.ae@ssru.ac.th

<sup>2</sup>jetsalid.an@ssru.ac.th

<sup>3</sup>pornkul.su@ssru.ac.th

Corresponding author: <sup>4</sup>bifern09041992@gmail.com

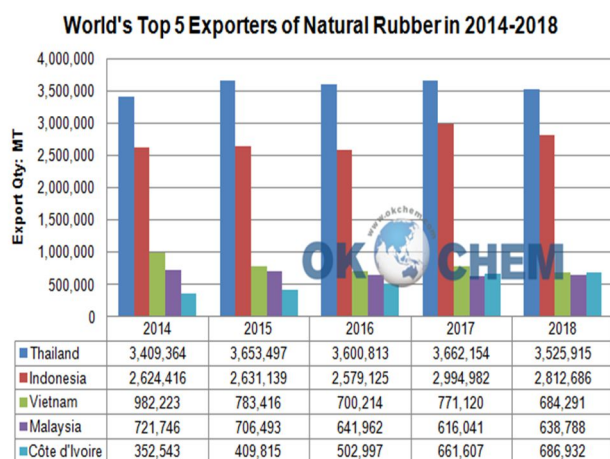
**Abstract-**This research examines the association between entrepreneurship, two types of IT (the managerial IT resources and Technology IT resources), and performance of firm. The research supports the capabilities enabled through IT for organizations. Cross-sectional survey data has been used for testing the hypotheses and proposed research model from a sample of 203 leading firms in Thailand. The results of data analysis show that the culture of entrepreneurship is an important capability, which can forecast the market performance of a firm. A positive influence is created on the establishment of entrepreneurship culture in an organization by the managerial and technological IT resources. The performance of a firm is positively influenced by the managerial and technological IT resources through the entrepreneurship culture capability. The findings of this research have important implications for the managers. It has been suggested by the results that use of managerial and technological IT resources increases the ability of firm to establish a culture that supports innovation. Another important implication is related to the intermediation capability of organization that is entrepreneurship culture. It converts both managerial and technological IT resources into the performance outcomes. The research reveals the way in which entrepreneurship culture can be developed by firms. The crucial role of IT based resources is revealed in the development of organizational culture. Moreover, the paper reflects empirically and theoretically, the way in which business value can be generated by firms from the entrepreneurship culture supported by IT. This topic has received very limited attention.

## 1. Background

It has become important for firms to incorporate innovation strategically to become successful. The significance of IT resources in supporting innovation within the firm cannot be denied. However, it has been noted that the relation between firm innovation, IT

resources, and firm's performance are important topics of research for the scholars and practitioners [1]. It has been shown traditionally by the literature of IS that there is contradiction in the studies related to the influence of IT artifact on the performance of firm. These relations have been explained by the recent research studies on IT business value through the organizational capabilities developed by IT [2]. There is an indirect influence created by IT on the performance of firm through the high-level process capabilities of firm. In this way, a key role is played by IT in shaping the capabilities of organization, which lead to higher performance for the firms through NPD (new product development), functional competencies, and dynamic capabilities [2]. The relation between firm innovation and IT has been reconsidered by researchers in the literature on IS. It is considered that IT resources drive innovation in the firms for product development or processes [1]. There has been rare research on the entrepreneurship culture supported by IT, but companies need to make investment for developing such a culture of become successful.

The ability of a firm to develop an environment conducive to working is referred as entrepreneurship culture is conceptualized in this research. It promotes innovation, creativity, and entrepreneurship in the firm [3]. In order for a firm to become innovation, there is need to develop a culture with the key objective to innovate continuously [4]. The innovation of a firm is determined through its entrepreneurship culture. Firms can experience high innovation in its products and processes through establishing an environment conducive to innovation. Therefore, the firms must possess the desire for innovation in order to innovate. Thailand is among the world top five rubber producers as evident from the figure 1.



**Figure 1.** Thailand share in global rubber production  
Data Source: Thai Rubber Association

Very few researches have been done to understand the association between entrepreneurship culture and IT resources. Lack of research on this topic, the role of entrepreneurship culture is not clear in IT enabled business value. The identified research gaps have been addressed by this research through focusing on the perspective of organizational capabilities enabled by IT.

RQ1. Can firm improve their market performance through entrepreneurship culture?

RQ2. Is there any positive relation of IT resources with the establishment on entrepreneurship culture in a firm?

RQ3. Is the market performance of a firm influenced by IT resources through entrepreneurship capability?

RQ4: Does the supply chain technology adoption moderates the relationship between entrepreneur culture and market performance

## 2. Literature Review

The performance of a firm can be determined commercially and financially in terms of innovation. It is our key interest to understand the valuable capability of entrepreneurship culture commercially. Moreover, it is important to discover the influence of IT resources on the commercial competitiveness of a firm through entrepreneurship culture. In this research, market performance has been selected as dependent variable. The level with which a firm outperform in terms of market share (product/services) and sales is referred as market performance of a firm [5]. The members of one organization can be distinguished from another through a collective programming of mind referred as organizational culture [6]. The culture may differ from one firm to another, which is because of the difference in decisions, managerial practices, and resources of every firm. Organizational culture has been stressed as the way to foster innovation. The culture supporting innovation can be developed through entrepreneurship [3]. Innovation supportive culture has been defined by Hock, Clauss [7] as a culture, which enhances the guidelines for creativity,

risk-taking, and experimentation by the members. The ability of a firm to establish an environment conducive to innovation, creativity, and entrepreneurship is referred as entrepreneurship capability of organization. The organization practically uses the new ideas, processes, practices, innovation in products. Considering these arguments, the difference in resource management by the firm leads to differences in the entrepreneurship culture.

Competitive advantage can be achieved and sustained through organizational culture, which is a key capability [8]. In the similar way, the literature on entrepreneurship is focusing on the significance of innovation for firms. Innovation is the key source, which enables firms in completeness and success. The competitiveness of a firm can be enhanced through the culture supporting innovation, which is an important antecedent of innovation. It is easier for the firms to achieve innovations in its processes and products through establishing a working environment supporting innovation [7]. When a firm innovate its products and services, it becomes competitive [9]. The development of new product ideas, quality of product, market ideas is enhanced through a supportive environment based on empowerment, experimentation, and creativity. It can be expected that firms with high product commercialization are innovative and product good quality as well as communicate with customers effectively [10].

Process innovations are developed in easier way by the firms who work n establishing entrepreneurship culture. The production methods, administrative operations, and services are improved in the process innovation. The organizational responsiveness and efficiency can be improved through effective innovation process [11]. This can increase the market share and sales of a firm. The interpretation of the proposed relation can be in the following manner. It is expected that firms have higher employee empowerment, which they possess an innovative culture. The job satisfaction level of employees is improved through greater empowerment. When the satisfaction level of employees is well management, employees are able to make efforts for increasing the commercial competitiveness of firm. The behavior of employees can be aligned with the innovation objectives of a firm through entrepreneurship culture [7]. Therefore, the implementation of a culture supporting innovation can improve employees' input in the achievement of organization objectives.

In order to explain this point, the example of a firm is expanded. Toyota Motor Corp. is one of the largest manufacturing companies of vehicles across the world. This firm has achieved commercial success through innovation of its products and processes continuously. It has fostered innovation in its business activities. The culture of the firm is innovation-supportive with high product reliability and excellent after sale services. The

firm has developed strong corporate reputation and has become a successful seller across the world. Most of the sold vehicles across the world are of Toyota Motor Corp., which were approx. 8.97 million in 2008. Therefore, it can be said that firms achieve a better competitive position in the market, when they develop a culture supportive to innovation. The market performance of a firm improves when the entrepreneurship culture is developed efficiently.

The IT-based resources define IT artifact and the significance of IT-based resources has been emphasized in the literature of IS [12, 13]. The IT resources can be classified into managerial and technological IT resources [14]. It has been indicated by the technological IT resources that they are the physical resources related to IT such as specific applications of business and IT infrastructure. The IT infrastructure includes technology services and shared technology, while the specific infrastructure includes sales tools, purchasing systems, intranet applications, email systems and internal applications. Networks, applications, software, and hardware are included in the technological IT resources [14]. The skills of IT managers to identify and support the projects based on IT, restructure processes of work, and allocate suitable resources, and work on opportunities are referred as managerial IT resources. Moreover, these skills include collaboration with the managers and development of teams to work on projects, working within the budget constraints, etc [14, 15]. Significant investments are required by firms in IT resources such as managerial and technological to establish an entrepreneurship-based culture. The innovation in firm is fostered through IT resources [16]. Firm can improve its ability to promote innovation and creativity through technological IT resources. The creativity is enhanced through freedom, encouragement, and sufficient resources of the organization [3].

It is perceived by the employees having email systems, databases, software, etc. that their organization is focused on innovation. In return, the employees will become innovative [3]. In the similar way, employees can be empowered through IT [17] and this leads to the perception that they are free to make decisions and work. Information can be accessed and collaboration can increase among the departments and employees with increased investments in IT. Employees are able to generate new ideas, improve product quality, adopt commercial techniques, and eliminate inefficient techniques to reduce cost and enhance the organizational efficiency [18]. IT applications can be used by employees such as business intelligence and information management to access the innovation projects done previously [18]. The previous projects lead to the generation of new ideas and learning. Firm can deliver innovative products/services to the customers through internet applications [16]. Moreover, the possibility of a firm to provide resources to the employees

for innovation can be supported by technological IT resources. This leads to the innovative working of employees. The firms, investing in specific IT applications and IT infrastructure are able to become innovators. Therefore, it can be hypothesized that:

Innovative firms adopt managerial IT resources as compared with the other firms using resource-based strategies [19]. There can be a positive relation between entrepreneurship culture development and managerial IT resources. The role of top management, human resource practices, and resource availability is considerable in developing a culture supportive to creativity [3]. It is perceived by employees that they have the support of managers in solving issues [3]. Both the IT managers and business are influenced by this. Therefore, there is a need for the firm to have managers possessing IT skills along with investments in technological IT resources. Sufficient managerial IT skills will lead to the generation of a suitable working environment fostering innovation. A crucial role is played by IT managers in transforming business through development of new ideas continuously.

When sufficient investments are made in research and development of IT, this develops entrepreneurship culture. Innovations in IT are made by IT professionals, when they are motivated. When IT and business managers work in collaboration to foster innovative practices, this can facilitate the implementation of an innovation supportive culture. It has been revealed by the previous literature that the development and execution of an innovation process can be influenced by IS competences including relation of IS-business, and collaboration [1].

It has been under discussion between the IS scholars that there is a direct or indirect influence of IT on the performance of a firm. This study is in line with the organizational capabilities developed through IT. According to this perspective, the performance of a firm is indirectly and positively influenced by IT through process capabilities of higher order. It has been found in previous literature that organizational capabilities including purchasing practices, knowledge management, green supply chain management, and strategic integration mediate the performance interface of an artifact firm [17, 20, 21]. Business value can be generated through a culture, which is supportive to innovation. Considering this, IT resources are highly valuable in shaping the innovation capabilities of a firm [3, 22]. The IT value generation can be mediated through organizational culture, which is a complementary organizational resource [14]. It has been proposed in this research that the influence of managerial and technological IT resources is mediated by the entrepreneurship culture on the performance of a firm. The firm may not be able to increase its market share by funding the managerial and technological resources linked with IT. These resources can be imitated by the competitors easily. Therefore, there is a need for the firms

to increase market share and sales by transforming their environment into innovation-supportive working environment using infrastructure related to IT and other business applications along with efficient IT management skills. Therefore, the following hypothesis can be formulated in this respect:

**H1: TITR has significant impact on the INCL.**

**H2: MITR has significant impact on the INCL.**

**H3: TITR has significant impact on the FMP.**

**H4: MITR has significant impact on the FMP.**

**H5: INCL has significant impact on the FMP.**

**H7: INCL mediates the relationship between TITR and FMP**

**H8: INCL mediates the relationship between MITR and FMP.**

The flow of information from the downstream to the upstream must reinforce the flow of materials from the upstream towards the downstream [23]. A set of five case studies on supplier-retailer relationship indicated that better communication and IT capabilities provide both parties a better platform for participation, solution-oriented activities, and coordination [24]. Thus, the information sharing, and technology are taken as descendent of the material flow. Therefore, the literature review of SC information integration provides two aspects namely social aspects and technical aspects. For instance, numerous researches [25] have been conducted to explore the significance of implementing e-business technologies, whereas other researches [24, 26-28] have emphasized upon the importance of communication and information sharing among the suppliers and firms. This paper considers both aspects i.e. information technology and information sharing as essential components of information integration. High technological dependence as well as unwillingness to share important information about the supply chain will lead to meaningless connection among the firms, thus, results in poor logistics integration. However, those firms which can develop social and technical aspects would be able to yield maximum advantages from the logistics integration [25, 26, 29]. Both the aspects related to information integration are discussed as follows:

The production planning, scheduling, delivery status, and inventory level allow firms in controlling and managing the activities of supply chain. Information technology also assists organizations in the alignment of scheduling and forecasting of operational activities, thus allowing improved coordination among the firms and suppliers. According to [30] the issues in coordination of supply chain activities that arise due to spatial and time constraints can somehow be minimized. Incorporating information technology has gained considerable attention by introducing various technologies for the purpose of business to business communication. These technologies include B2Bprivate, Electric Point of Sale, and web

internet. Several researches have indicated that effective implementation of IT coordination enhances the material flow integration among the partners of supply chain [28]. Hence, IT plays a crucial role in the supply chain processes namely procurement [25].

**H6: SCTA has significant impact on the FMP**

**H9: SCTA moderates the relationship between INCL and FMP**

### 3. Methodology

The study has employed the survey-based method and surveyed the 203 leading firms. The SEM-PLS is used to analyses the data

In order to measure the variables, a survey research method has been adopted. The existing scales were adapted for measuring the items. The process of standard scale development was used for new measures [31]. Annual rate of IT investment per employee was used to measure the technological IT resource. When a clear understanding is perceived by the respondents about one characteristic referred by the question, a single item measure can be used. It is asked by the respondent to indicate the approx. value of annual investment dedicated to the IT assets by him or the firm. The value is measured in Euros. Based on the information gained the 2007 database of Actualidad Económica, the amount was later converted in US dollars and divided by the total number of employees in every firm. Four items were used to measure managerial IT resources [15]. Eight items were used to measure the variable of entrepreneurship culture, which were adapted from the validated scales developed by Xie, Wu [3]. The three previously validated items were used for measuring the market performance of a firm. Primary data was used for measurement analysis, which is considered suitable by the literature of IS. There can be high correlation in the secondary data with the managerial measurement of performance in contrast to the competitors (Lee et al., 2008). An important supporting element for market performance is the implementation of quality management practices [5]. Two validated items of scale were used for measuring this variable. These scale items were developed by [32]. The development of the innovation capability of a firm is influenced by the strategic agility along with the positive influence of entrepreneurship culture on the market performance of a firm.

### 4. Results

Partial Least Squares technique is known as second generation structural equation modeling. According to the Phadernrod, Crowder [33] PLS is smore suitable with that type of structural equation models which have sequence of cause-and-effect relationships and latent variables. Moreover Ali, Rasoolimanesh [34] found that the best technique for prediction and statistical model building is

Partial Least Squares. There are many reasons of using this technique in our study the first reason of using PLS is beneficial for real world applications and more suitable for handling the complexed models [35, 36]. In this study we will define the relationship among dependent variable and independent variables. And also studying the indirect effects on them.

The second reason of using this technique is whether the data is normally distributed or abnormal PLS Path modelling can be used for both. Mostly the social science studies have issue of having abnormal data which can be addressed with the help of PLS. Third and foremost reason of using PLS is it estimates the association among constructs (structural model) and association between indicators corresponding latent constructs (structural model) at the same time [37, 38], due to these qualities PLS is known as the one of the best statistical techniques. Based on above discussion we have used PLS to evaluate the assumed relationships reliability and constructs validity.

The 1<sup>st</sup> step in PLS-SEM path model is basically the evaluation of measurement model which leads us towards structural model. Validity and reliability are the main standards for the determination of measurement model in PLS analysis. Hair, Sarstedt [39] and Henseler, Hubona [40] suggested for the evaluation of measurement model this study will use, internal consistency reliability, individual item reliability, content validity, discriminant validity and convergent validity. The outer model of current study is mapped below.

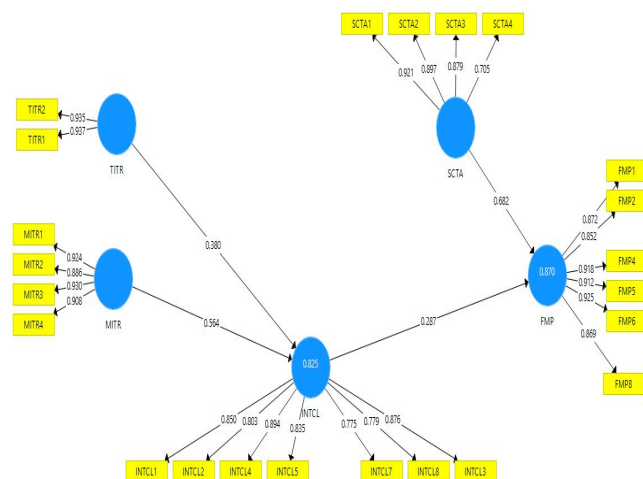


Figure 2. Measurement Model

The reliability of individual item which evaluated by determination of loading for each item has suggested by Many researchers [35, 38, 39]. The threshold for loading is 0.70 and the values below that level are omitted by following the study of Hair, Sarstedt [39].

Table 1. Outer loading

	FMP	INTCL	MITR	SCTA	TITR
FMP1	0.872				
FMP2	0.852				
FMP4	0.918				
FMP5	0.912				
FMP6	0.925				
FMP8	0.869				
INTCL1		0.850			
INTCL2		0.803			
INTCL3		0.876			
INTCL4		0.894			
INTCL5		0.835			
INTCL7		0.775			
INTCL8		0.779			
MITR1			0.924		
MITR2			0.886		
MITR3			0.930		
MITR4			0.908		
SCTA1				0.921	
SCTA2				0.897	
SCTA3				0.879	
SCTA4				0.705	
TITR2					0.935
TITR1					0.937

Composite reliability is the suitable way for the evaluation of internal reliability in PLS path model. which can be explained as a Cronbach's  $\alpha$ . According to the Lonial and Carter [41].the value of composite reliability must be greater than 0.70. Table 2 shows the information about variables of composite reliability range from 0.844 to 0.985, which are greater than the threshold of 0.70. results shows the acceptable reliability used in this study. Ngah, Zainuddin [42] describes the convergent validity at that level same variable is measured by the several items. Based on the endorsement of Tzempelikos and Gounaris [43]with the measurement of the average variance extracted (AVE) we have checked the convergent validity in this study. For all the variables the value of AVE should not be less than 0.5.so the values less than 0.5 are omitted from data for the improvement of AVE value.

Table 2. Reliability

	Cronbach's Alpha	rho_A	CR	(AVE)
FMP	0.948	0.950	0.959	0.795
INTCL	0.925	0.926	0.940	0.691
MITR	0.933	0.934	0.952	0.832
SCTA	0.874	0.898	0.915	0.730
TITR	0.859	0.859	0.934	0.876

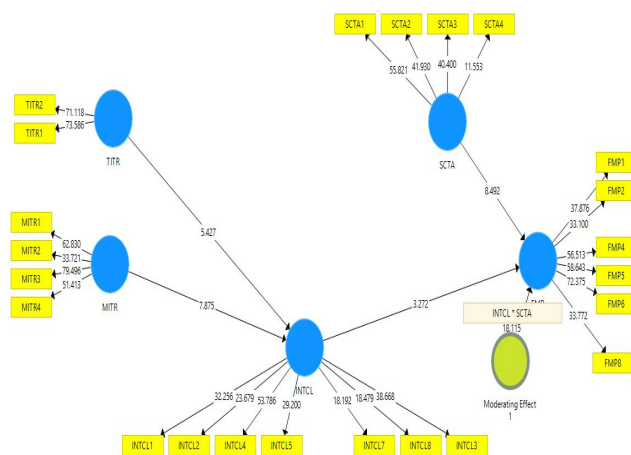
Measurement of different concepts or degree of differentiation of items between the constructs is known as Discriminant validity. Shah and Rahim [38] explain it

as the variables used in each study are different from the other studies variables. by Hair, Hult [44] have suggested the two measures for checking the discriminant validity i.e cross-loadings and the Fornell-Larcker's criterion. , the square roots of average variance extracted (AVE)for each variable must be greater than the association between all variables in Fornell-Larcker's measure [43].

**Table 3.** Validity Matrix

	FMP	INTCL	MITR	SCTA	TITR
FMP	0.892				
INTCL	0.848	0.831			
MITR	0.678	0.806	0.912		
SCTA	0.818	0.822	0.655	0.855	
TITR	0.643	0.817	0.847	0.652	0.936

The evaluation of inner structural model is the second step in PLS after measurement model assessment. By following the suggestion of Henseler, Hubona [40] this study is evaluating the implication of path coefficients, effect size, level of R-squared values, the moderating effect and the predictive relevance. The following figure shows the structural model.



**Figure 3.** Structural model

The standard bootstrapping procedure can be used for the measurement of The significance of the path coefficients which includes sample of 5000 bootstrap and 266 cases suggested by Hair, Sarstedt [39], Hair, Hult [44], and Henseler, Hubona [40].

**Table 4.** Direct relationship

	(O)	(M)	STDEV	T Statistics	P Values
INTCL -> FMP	0.286	0.292	0.088	3.272	0.001
MITR -> FMP	0.162	0.166	0.055	2.937	0.002
MITR -> INTCL	0.564	0.568	0.072	7.875	0.000
Moderating Effect 1 -> FMP	0.003	0.002	0.022	3.128	0.000
SCTA -> FMP	0.681	0.677	0.080	8.492	0.000
TITR -> FMP	0.109	0.110	0.040	2.753	0.003
TITR -> INTCL	0.380	0.376	0.070	5.427	0.000

**Table 5.** Mediation

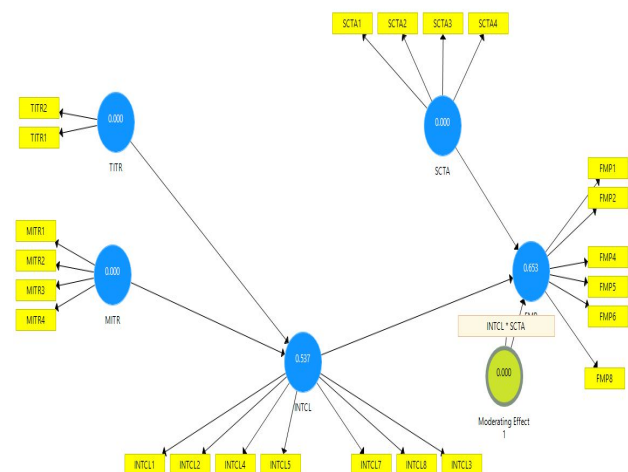
	(O)	(M)	STDEV	T Statistics	P Values
MITR -> INTCL -> FMP	0.162	0.166	0.055	2.937	0.002
TITR -> INTCL -> FMP	0.109	0.110	0.040	2.753	0.003

According to the Hair, Sarstedt [39] variance in the endogenous variable (R<sup>2</sup>) is the main criteria for the evaluation of structural model in PLS-SEM. The percentage change in dependent variable which can be described by one or more forecasted variable will be determined by value of R- square variable [39]. In structural model the values of R-square 0.25, 0.75 or 0.50 can be described as moderate, substantial or weak separately for dependent variable.

**Table 6.** R-Square

	R Square
FMP	0.870
INTCL	0.825

By following the Recommendations of Hair, Sarstedt [39] Researcher who is using PLS-SEM must apply the following measures which indicates the analytical significance for the evaluation of models quality. This study depends on Stone-Geisser's test analytical significance of by using the procedures of blindfolding.in PLS modeling we use this test for checking the goodness-of-fit [38]. The only measure for the endogenous latent variables is blindfolding procedure which have a multi-dimensional model [45].



**Figure 4.** Q<sup>2</sup>

Describes the latent variable as a reflective measurement model which create differences in set of indicators. Therefore, due to the reflective nature of study blind-fold procedure is used to the variable because of endogenous latent variable. For the evaluation of analytical significance of of research model A cross-validated redundancy measure (Q<sup>2</sup>) was applied [44, 45].

**Table 7.** Q-square

	SSO	SSE	Q <sup>2</sup> (=1-SSE/SSO)
FMP	1,302.000	451.948	0.653
INTCL	1,519.000	703.905	0.537
MITR	868.000	868.000	
<b>Moderating Effect 1</b>	217.000	217.000	
SCTA	868.000	868.000	
TITR	434.000	434.000	

## 5. Conclusions

A sample of 203 leading rubber and plastic firms in Thailand was subjected to cross-sectional survey. It was found through survey analysis that:

- The market share and sales of a firm increase by the entrepreneurship culture, which is a crucial capability
- An organizational culture can be developed through use of IT based resources (managerial and technological IT resources), which foster innovation
- The market performance is influenced through IT-based resources through a critical capability i.e. the entrepreneurship culture

Based on the above findings, two key contributions have been made by this study to the literature. The way in which entrepreneurship culture is developed by a firm has been revealed theoretically and empirically. Moreover, the study shows that entrepreneurship culture is developed through use of IT-based resources i.e. managerial and technological IT resources. The findings of the study are interesting empirically and theoretically. The way, in which firms can generate business value by developing entrepreneurship culture supported by IT, has been shown by the study both empirically and theoretically. The research findings are valuable for the practitioners and scholars aiming at analyzing the generation of business value through IT.

The research can be extended in different contexts. This study has determined the performance of firm commercially. The future studies can work on showing the influence of entrepreneurship cultural supported by IT on the other measurements of performance level of firm such as innovation performance, financial and quality improvement, etc. The focus of this study is on the entrepreneurship culture and future research can incorporate process innovation and product innovation as mediating variable between the relation of firm performance and entrepreneurship culture. The future studies can study some other IT resources as the current study has incorporated managerial and technological resources of IT only. The firms act in a highly competitive

working environment. The study can be extended by incorporating the influence of competitive aggressiveness as a moderator. Another extension of the study can be related to nature of data. The current study has focused on rubber f firms in Thailand. The future studies can be in longitudinal data and it can be determined whether there is difference of results across the business sectors in different countries.

## 5.1 Limitations

There are several limitations of this study. There is one key respondent for every firm i.e. the business or IT manager. Different indicators have been obtained for high competency of every key respondent and it was suitable to use two respondents for every firm. The IT manager should be asked about the IT resources and business manager to know about the market performance of firm, entrepreneurship culture, agility, implementation of quality management practices. Moreover, the nature of study is cross-sectional, and the results are applicable to 25 business sectors of Thailand. Another limitation is the assessment in commercial terms. Because of this, the results cannot be generalized to other measurements of the level of firm performance. The study has used static and cross-sectional methodology and the nature is exploratory and predictive. Therefore, it can only show relation among the variables but not causality.

## 5.2 Contributions

There are important implications of this research for the managers of IT and business. The study suggests that the ability of a firm to develop a culture supportive to innovation can be achieved through technological and managerial IT resources. An organizational culture can be developed through investments in specific business applications, IT infrastructure, and information management, IT management skills, which is supportive to empowerment, entrepreneurship, and innovation. The business applications include email systems, tools for sales analysis, business intelligence and information management systems. The IT management skills include motivation of team to achieve project objectives and collaboration with business managers for innovation. Expected benefits can be achieved through investment in the culture, which is supportive to innovation. An important intermediate capability is the entrepreneurship culture, which can help in achieving the benefits of performance through both managerial and technological IT resources. The managers must consider the direct and indirect effects of adopting managerial and technological IT resources on the performance of firm. The indirect effects can be revealed through intermediate organizational capabilities including entrepreneurship culture. Therefore, it has been suggested by results that the market performance is indirectly affected by the

managerial and technological IT resources through role of entrepreneurship culture as a mediator.

## References

- [1] W.W. Ko and G. Liu, "How information technology assimilation promotes exploratory and exploitative innovation in the small-and medium-sized firm context: The role of contextual ambidexterity and knowledge base," *Journal of Product Innovation Management*, 2019.
- [2] B.R. Sharma, "A comprehensive review on chemical profiling of *Nelumbo nucifera*: Potential for drug development," *Phytotherapy Research*, Vol. 31, No. 1, pp. 3-26, 2017.
- [3] H. M. Mechler and E. McCarroll, "Factors that Influence Parents' Meta-Emotion Approaches: Implications for Families," *International Journal of Emerging Trends in Social Sciences*, Vol. 1, No. 2, pp. 46-52, 2017.
- [4] R. Dubey, "Can big data and predictive analytics improve social and environmental sustainability?," *Technological Forecasting and Social Change*, 2017.
- [5] P. Ochoa-Cueva, "Spatial estimation of soil erosion risk by land-cover change in the Andes of southern Ecuador," *Land Degradation & Development*, Vol. 26, No. 6, pp. 565-573, 2015.
- [6] Y. Wang, "Individualism/collectivism, charitable giving, and cause-related marketing: A comparison of Chinese and Americans," *International Journal of Nonprofit and Voluntary Sector Marketing*, Vol. 19, No. 1, pp. 40-51, 2014.
- [7] M. T. Hock, Clauss and E. Schulz, "The impact of organizational culture on a firm's capability to innovate the business model," *R&D Management*, Vol. 46, No. 3, pp. 433-450, 2016.
- [8] W. Vanhaverbeke and M. Cloudt, "Theories of the firm and open innovation," *New Frontiers in Open Innovation*, Vol. 256, 2014.
- [9] S. Van Hemmen, "Leadership styles and innovative entrepreneurship: An international study," *Cybernetics and Systems*, Vol. 46, No. 3-4, pp. 271-286, 2015.
- [10] R. Martin-Rojas, V.J. Garcia-Morales, and N. Gonzalez-Alvarez, "Technological antecedents of entrepreneurship and its consequences for organizational performance," *Technological Forecasting and Social Change*, Vol. 147, pp. 22-35, 2019.
- [11] R. Sanz-Valle and D. Jiménez-Jiménez, "HRM and product innovation: does innovative work behaviour mediate that relationship?," *Management Decision*, Vol. 56, No. 6, pp. 1417-1429, 2018.
- [12] S. Mbulawa, and P. Mehta, "The Effect of Access and Quality of Education on Economic Development in Botswana," *International Journal of Business, Economics and Management*, Vol. 3, No. 11, pp. 144-159, 2016.
- [13] H. Wordu and K. Chinda, "E-learning systems for remedying deficiencies in teaching and learning in tertiary institutions in West Africa," 2019.
- [14] S. Vass and T.K. Gustavsson, "Challenges when implementing BIM for industry change," *Construction Management and Economics*, Vol. 35, No. 10, pp. 597-610, 2017.
- [15] E. Meida, "Analysis of Operational Management Functions of MSMEs in Indonesia," *Humanities*, Vol. 4, No. 1, pp. 138-150, 2019.
- [16] M. Z. Mohamad, S. Yusof, A. Z. Salleh, and A. Hisham, "Dialogue among Civilizations: A Historical Perspective," *International Journal of Publication and Social Studies*, Vol. 2, No. 1, pp. 34-39, 2017.
- [17] F.A. Ganjouei, A.B.A. Hamid, and I. Sukati, *Supply chain integration in Iranian pistachio industry: Intrapreneurship, information technology and firm performance perspective*: Partridge Publishing Singapore, 2018.
- [18] B. Orser, A. Riding, and Y. Li, *Technology adoption and gender-inclusive entrepreneurship education and training*, *International Journal of Gender and Entrepreneurship*, 2019.
- [19] A.B. Abdallah, A.C. Phan, and Y. Matsui, *Investigating the effects of managerial and technological innovations on operational performance and customer satisfaction of manufacturing companies*, *International Journal of Business Innovation and Research*, Vol. 10, No. 2-3, pp. 153-183, 2016.
- [20] Z. Cai, "Developing organizational agility in product innovation: the roles of IT capability, KM capability, and innovative climate," *R&D Management*, Vol. 49, No. 4, pp. 421-438, 2019.
- [21] A. Nair, J. Jayaram and A. Das, *Strategic purchasing participation, supplier selection, supplier evaluation and purchasing performance*, *International Journal of Production Research*, Vol. 53, No. 20, pp. 6263-6278, 2015.
- [22] F. Rahimi, C. Møller, and L. Hvam, *Business process management and IT management: The missing integration*. *International Journal of Information Management*, Vol. 36, No. 1, pp. 142-154, 2016.
- [23] E. Vanpoucke, A. Vereecke, and S. Muylle, *Leveraging the impact of supply chain integration through information technology*, *International Journal of Operations & Production Management*, Vol. 37, No. 4, pp. 510-530, 2017.
- [24] A.W. Mackelprang, "The relationship between strategic supply chain integration and performance: A meta-analytic evaluation and implications for supply chain management research," *Journal of Business Logistics*, Vol. 35, No. 1 pp. 71-96, 2014.
- [25] C.W. Wong, K.-h. Lai, and E.W. Bernroider, "The performance of contingencies of supply chain information integration: The roles of product and market complexity," *International Journal of Production Economics*, Vol. 165, pp. 1-11, 2015.



- [26] D. Prajogo, A. Oke, and J. Olhager, *Supply chain processes: Linking supply logistics integration, supply performance, lean processes and competitive performance*, International Journal of Operations & Production Management, Vol. 36, No. 2, pp. 220-238, 2016.
- [27] P.M. Ralston, "A structure-conduct-performance perspective of how strategic supply chain integration affects firm performance," Journal of Supply Chain Management, Vol. 51, No. 2, pp. 47-64, 2015.
- [28] P.-H. Tseng and C.-H. Liao, "Supply chain integration, information technology, market orientation and firm performance in container shipping firms," The International Journal of Logistics Management, Vol. 26, No.1, pp. 82-106, 2015.
- [29] S. Li, "Development and validation of a measurement instrument for studying supply chain management practices," Journal of Operations Management, Vol. 23, No. 6, pp. 618-641, 2005.
- [30] D. Prajogo and J. Olhager, "Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration," International Journal of Production Economics, Vol. 135, No. 1, pp. 514-522, 2012.
- [31] A.E. Helm, J.G. Moulard, and M. Richins, "Consumer cynicism: Developing a scale to measure underlying attitudes influencing marketplace shaping and withdrawal behaviours," International Journal of Consumer Studies, Vol. 39, No. 5, pp. 515-524, 2015.
- [32] B. Fahimnia, J. Sarkis, and H. Davarzani, "Green supply chain management: A review and bibliometric analysis," International Journal of Production Economics, Vol. 162, pp. 101-114, 2015.
- [33] B. Phadermrod, R.M. Crowder, and G.B. Wills, "Importance-performance analysis based SWOT analysis," International Journal of Information Management, Vol. 44, pp. 194-203, 2019.
- [34] F. Ali, "Soft modeling: The basic design and some extensions," International Journal of Contemporary Hospitality Management, Vol. 30, No. 1, pp. i-xviii, 2018.
- [35] N.S. Davcik and P. Sharma, "Marketing resources, performance, and competitive advantage: A review and future research directions," Journal of Business Research, Vol. 69, No. 12, pp. 5547-5552, 2016.
- [36] S.F. Wamba, "Big data analytics and firm performance: Effects of dynamic capabilities," Journal of Business Research, Vol, 70, pp. 356-365, 2017.
- [37] J.-G. Cegarra-Navarro, P. Soto-Acosta, and A.K. Wensley, "Structured knowledge processes and firm performance: The role of organizational agility," Journal of Business Research, Vol. 69, No. 5, pp. 1544-1549, 2016.
- [38] S.I.U. Shah and N.A. Rahim, "Effect of ethical climate on corporate financial performance in Pakistan: An application of confirmatory tetrad analysis (CTA-PLS) approach," Journal of Studies in Social Sciences and Humanities, Vol. 5, No. 2, pp. 53-67, 2019.
- [39] Hair, "Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research," European Business Review, Vol. 26, No. 2, pp. 106-121, 2014.
- [40] J. Henseler, G. Hubona, and P.A. Ray, "Using PLS path modeling in new technology research: Updated guidelines. Industrial Management & Data Systems, Vol. 116, No. 1, pp. 2-20, 2016.
- [41] S.C. Lonial and R.E. Carter, "The impact of organizational orientations on medium and small firm performance: A resource-based perspective," Journal of Small Business Management, Vol. 53, No. 1, pp. 94-113, 2015.
- [42] A.H. Ngah, Y. Zainuddin, and R. Thurasamy, "Applying the TOE framework in the Halal warehouse adoption study," Journal of Islamic Accounting and Business Research, Vol. 8, No. 2, pp. 161-181, 2017.
- [43] N. Tzempelikos and S. Gounaris, "A conceptual and empirical examination of key account management orientation and its implications—the role of trust, in the customer is not always right? marketing orientations in a dynamic business world. Springer, pp. 673-681, 2017
- [44] Hair, "A primer on partial least squares structural equation modeling (PLS-SEM), Sage Publications, 2016.
- [45] M. Sarstedt, "Estimation issues with PLS and CBSEM: Where the bias lies!," Journal of Business Research, Vol. 69, No. 10, pp. 3998-4010, 2016.
- [46] K. Jermisittiparsert and S. Rungsisawat, "The Supply Chain Management and Information Sharing As Antecedents of Operational Performance: A Case of SMEs.," Humanities and Social Sciences Reviews, Vol. 7, No. 2, pp. 495-502, 2019.
- [47] K. Jermisittiparsert and S. Rungsisawat, "Impact Strategic Sourcing, Supplier Innovativeness, and Information Sharing on Supply Chain Agility," International Journal of Innovation, Creativity and Change, Vol. 5, No. 2, pp. 397-415, 2019.