The Role of Social Network Theory and Knowledge-Based View in the Innovation Generation Process of a Supply Chain of Thai Agriculture Supply Chain

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***Abstract*-The main objective of the current study is to investigate the role of social network theory and knowledge-based view in the innovation generation process of a supply chain of Thai Agriculture supply. By drawing on knowledge-based view we have found the three different aspects of a firm which can affect the process of innovation generation, customer–supplier exchange relationship especially environmental, technological and organizational factors that affect the innovation. Secondly, we will examine innovation generation empirically and its link with supplier–customer relationship performance which is still ambiguous issue. Thirdly we will check the moderation effect of supplier's dependence on association among the drivers of innovation generation and the result of customer supplier relationship performance. The study found that the social capital network position of the agriculture in Thailand firm can be affected with a unit assessment of new knowledge which is dangerous for the development of new products According to the findings lodging a good position in the network has additional power its more likely to achieve desired planned resources like knowledge and information. Therefore, we suppose that relationship among innovation drivers and output performance will be formed in the context of supplier who is depending on customers-supplier association.**

Keywords: *Supply chain, Social capital, Innovation, Agriculture, Thailand*

1. Background

In competitive market for the success of the firm the main thing is innovation [1,2]. Now a days the mega trend is outsourcing of innovation, which help many companies like Dell, HP and IBM in reducing their budget of research and development(R&D), whereas they shift the responsibility for the development of product and design to their external suppliers [1]. Due to this trend suppliers are becoming the most significant source of process innovation and production. Though there are number of challenges for the development of efficient supplier-driven innovation. [2] stated that in any exchange relationship the miss use of power with suppliers from customer is the harmful for activities of supplier innovation. Additionally, in the IG relationship the cultural and geographical separation among exchanges partners increase the risk of business and cost of coordination and create the key problems innovation generation.

Moreover, within the IG in term of outcome of IG, it has been disused in detail that in IG relationship either the allotment of additional responsibilities to the suppliers for innovative activities will lead towards the benefits for buyers and suppliers. At one side outsourcing of an innovation allow companies for focusing on reducing the cost of production and their core capabilities precisely. Whereas on the other side the risk is involved for the outsourcing of high-value-adding activities for example the miss information may eventually eat away at internal abilities of a firm. Whereas IG scholars made research widely on facilitation and management of innovative activities and debated on implementation, the previous studies have focused on intrafirm as compared to the context of interfirm. [3] stated that in relationship of supplier and buyer in innovation generation there is "dearth of research". It may claim the situations which facilitates innovation in interorganizational background can be different. For instance, according to the literature the psychological and physical distance among the exchange parties, for the stimulation of innovation generation in IG knowledge-sharing routines may important [4].

Additionally, in business-to-business ER power plays an important role [5]. In an ER characterize with important power irregularity, may expert power for the exploitation of less dependent party. Whereas according to the literature power-dependence can impact innovative

activities of the firm, on this issue empirical evidences are sparse with expecting the provision of mixed results. For instance, Schwieterman, [6] stated that dependency is harmful for supplier innovation. Whereas [7] in interfirm relationships didn't find any significant association between creativity and power, so more empirical investigation is required for the association between innovation in channel relationships and power-dependence. Within the IG relationships finally we have fond another lack in literature that the concentration of most of the studies is on benefits to customers of innovative activities of suppliers [1]. Only few studies discussed implications of performance for suppliers.

This study will make contribution in the literature in three ways. Firstly, the previous studies just take the individual firms 'drivers of innovation activities whereas current study will examine the drivers of IG with customer supplier relationships. By drawing on knowledge-based view we have found the three different aspects of a firm which can affect the process of innovation generation, customer–supplier exchange relationship especially environmental, technological and organizational factors that affect the innovation. Secondly, we will examine innovation generation empirically and its link with supplier–customer relationship performance which is still ambiguous issue. Thirdly we will check the moderation effect of supplier's dependence on association among the drivers of IG and the result of customer supplier relationship performance. For this purpose, we have integrated network theory [8] with resource dependence theory [9].

2. Literature review and Hypothesis development

With drawing on KBV, and social network theory we have found environmental, organizational and technological factors as background of innovation in customer supplier relationship. As per KBV the result of acquisition of knowledge, accessing and sharing in and among the organizations is innovation [10]. The previous studies suggested that knowledge of different types included the knowledge of technology and market is required by service innovation [11]. Additionally, KBV argued that in the context of IG IG included the misuse and examination of process of knowledge. Firstly, knowledge generation and examination required IG as learning vehicle. In which for the transfer and absorption of partners knowledge every member of firm will us IG. Secondly the misuse of knowledge and applications in the form of sharing the knowledge in which every members of the firm uses their partners stock of knowledge for the exploitation of complementarities but having intensions for the maintenance of specialized knowledge of their own [10]. Study shows that IG in relationships of customer and supplier is improved attainment of market knowledge, collaborations of systems, learning relationships and uncertainty in technology as per the suggestion of KBV. Research model includes different backgrounds of misuse and examination of knowledge, including the attainment of market knowledge and process of accessing the knowledge, computer generated learnings.

According to the network theory how the positions in network and interdependence of actors affect the opportunities, behaviors and restrictions [12], for the understanding effect of power dependence on the strategic behavior of the firms offered empirical base for the current study. The previous studies for product development and innovation have used the network theory in interfirm relationship context [13]. The network position of the firm can be affected with a unit assessment of new knowledge which is dangerous for the development of new products According to these studies. Also lodging a good position in the network has additional power its more likely to achieve desired planned resources like knowledge and information. Therefore, we suppose that relationship among innovation drivers and output performance will be formed in the context of supplier who is depending on customers-supplier association. RDT highlight the importance for controlling on important resources by its exchange relationship [9]. The network position of the firm can be affected with a unit assessment of new knowledge which is dangerous for the development of new products According to these studies. Also lodging a good position in the network has additional power its more likely to achieve desired planned resources like knowledge and information. Therefore, we suppose that relationship among innovation drivers and output performance will be formed in the context of supplier who is depending on customers-supplier association. RDT highlight the importance for controlling on important resources by its exchange relationship [9].

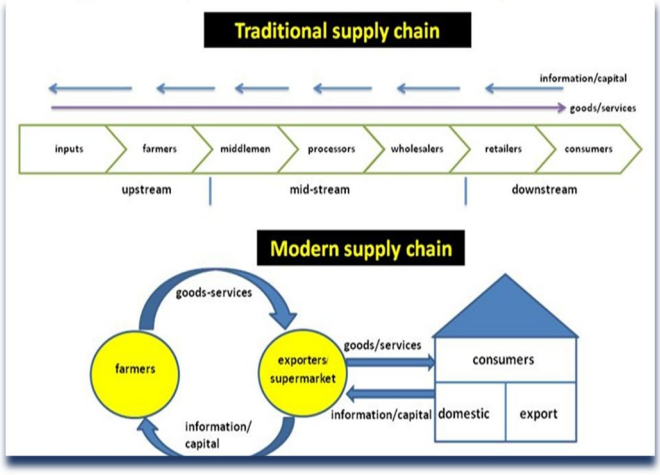

Figure1. Modern and traditional value chains of Thailand agriculture firms

The value of agriculture firms is shown in the figure1. The modern value chain is more direct but information intensive. The supplier who is less dependent is more powerful for controlling and suitable knowledge as a important resource from exchange partners and for the enhancement of base of resource in exchange relationships. Supplier may influence the relationship f power dependence for facilitation of flow and knowledge distribution among exchange partners with supporting and motivating advanced activities.

Author stated acquisition of market knowledge by the supplier is referred as strategy of a supplier getting information about customers uttered the hidden needs, strategies of market and goods and services provided by their competitors. Acquisition of supplier's market knowledge provide attention on the handwork for sale growth and product development with by developing strong relationships with main customers and understand the market development opportunities. The literature about market orientation refers as competitor and customer alignment as dangerous element for the culture of organization and for the supporting innovation of firm.as planned orientation [14, 15].

The literature about market orientation refers as competitor and customer alignment as dangerous element for the culture of organization and for the supporting innovation of firm.as planned orientation. [15, 16]. The form which closely monitor needs of customer. Incline in improving its creativity and produce the original products enhancement in innovation through whole business system. Additionally, the firm who is competitive oriented continuously have an eye on its progress as compare to main firms which may lead them to produces different and best quality products from other competitors. Innovations inclines for the sake of stay equal to the other competitors. [17] have supported this view and stated that with the involvement of supplier gathering the information about market may enable for incremental and fundamental innovation.

KBV suggested, that for the development of better product innovation knowledge of market about customer plays vital role [11]. According to author attainment of knowledge is basically mechanism of knowledge integration. Which may increase the knowledge base for number of suppliers. Attainment of market knowledge helps in the expansion of IGope searching information from markets of customers. Additionally, attainment of market information will help in enhancing identification of knowledge with explorative learning [18]. From external sources in using the new information can create new ideas and techniques for innovation. With limited and narrow base of knowledge for supplier its true. These types of supplier have to be dependent on external sources for the generation of innovations.

H1: MKA has significant impact on the SUPIG

With this point of view a characteristic process organizational learning which can include different facets for example exchanging the information combine sense making and integration of knowledge [4]. According to the previous studies that innovation can increase interorganizational learning with the increase in willingness for process of developing new products with ideas. Experience of knowledge with different point of view increase inclinations by considering different substitutes, which ultimately helps in increasing creativity. In the buyer-supplier relationship information exchange between suppler and customer allows parties to make discussed ions about strategic and operational issues being the part of interorganizational learning and for organizing different plans. Hi will comprises the firm to try to go outside the day to day exchange of operational information, with provision of long term like plans about future product, introduction of new products, changing the preferences of customers and trends of market. Totally exchange of information I customer supplier learning relationship will make the firms enable for increasing their base of knowledge and to facilitating the innovation with creation of new knowledge [19]. In this current study definition of KBV is included indirectly. The organizational level of innovation is affected by the learning relationship at that extent where the customer and supplier have absorbed volume. So, the relational learning is abstracted for capturing the attainment of knowledge, integration and alteration through interorganizational cultural development that nurtures the mechanism of inter-organization like collaboration and interaction between customer and supplier [19, 20]. The perspective of absorb volume by developing in the single loop learning and absorptive context. For exchanging whishing parties for engaging interfirm learning there is necessity of knowledge over lapping. The theory of knowledge accessing supports the relationship learning concept [10], which is there in KBV. Knowledge application in the form of sharing of knowledge in which every member of IG uses the stock of its partners knowledge for the exploitation of complementary is focused by knowledge accessing theory. So, in relationship learning engagement of supplier expected for the generation of new blends from the current available knowledge for leading towards the development of product and innovation. So, we have purposed the following Hypothesis based on the above arguments.

H2: RLL has significant impact on the SUPIG

In current study collaborative dimension of system are explained as the degree at which suppliers and customer are struggling for making compatible IG system for each other. According to Scholars this well match allow associates for collaborating in predicting and planning for

the development of new products. It is also stated that potential integrated boundaries in exchange parties can be eliminated with system collaboration, that can be arise from IG communication technology irreconcilabilities [21]. Coordination and interaction of buyers and suppliers can be facilitated with integration of IG system there is high possibility of sharing opportunities and their ideas. As per the perspective of absorptive capacity, innovation outcome is function of absorptive capacity of a firm which identify exploit the knowledge and integrate it from environment [11]. Trantopoulos, [19] suggested that common language can increase the absorptive capacity among partners and its effective use by the advance tools of communication like information technology. Whereas absorptive capacity related with knowledge attainment misuse and dissemination may facilitated with collaboration system which will enhance outcomes of supplier innovation and influence the knowledge base [19].

Literature also reveals the relationship among IT system, innovation and learning. For example, in context of new product development. Scholars found that availability and accessibility of new knowledge for the innovation can be enabled reliable, accurate and rapid with IT system. [3] further suggest that in IG generation of innovation can be facilitated by the collaboration system, because a lot of previous knowledge can be taken through IT system which will link the information of seller and buyers electronically like information regarding planning, production and forecasting. Supporting to this view our initial interviews shows that advanced IT system has Adopted by a mobile company of Taiwan that is HTC, in the process of innovation and managing the product design to make a link with foreign customer internationally. With the application of these systems now organizations are enabled for reducing the learning barrios. And can easily make improvements in their products and innovation process. So, we have predicted:

H3: ***SYCL has significant impact on the SUPIG***

In current study we have defined technological uncertainty the extent at which cross border suppliers their unpredictability, change and volatility of technology customer supplier relationship with customer globally [22]. Generally, the he literature acknowledges the importance of innovation environment of organization [23]. So, the current study argued that for taking the advantages of different available opportunities the suppliers adopt the different innovative activities which may arise technological doubts in the relationship of customer and supplier.

The existing technology can be quickly outdated with the random change in technological environment which target some customers and results in short life cycle of the product. Firms should introduce innovations that can be proceed available products services and markets. to overcome the threat of outdatedness. The firms that introduces such type of innovations may full fill he needs of developing markets. For instance, throughout our initial interviews with a smartphone manufacturing company HTC a senior's manager told us that technological uncertainty is very important in smartphone industry so we have to nurture the trends of developing technology like calculating the cloud and always a step forward from competitors with the development of innovative products. For acquiring the advanced technical knowledge firms are likely via quick product development in changing markets [11]. The absorptive capacity of the firm can be increase and their learning curve can be compressed with the acquisition of this type of knowledge, though by avoiding the need of the internal resources of knowledge [24]. Some experimental evidence demonstrates that due to the turbulent environment firms adopt innovative plans in the context of customer supplier association it suggests that more innovation will be there due to technological uncertainty [25], so we have made the following hypotheses:

H4: TU has significant impact on the SUPIG

In the current study the in-exchange relationship perceived economic performance of equally acting parties relative to performance of competitors and expectations for the measurement of market share, profitability and growth is known as relationship performance [1]. The supplier who can generate additional innovation must have a capability for creating a relationship with its customer which will ultimately helpful for its financial and market performance. Supplier must be able for the provision of best quality products and services on time. Which will increase the efficiency and effectiveness of the exchange relationship and will provide best business opportunities globally because of its innovations will have a good reputation in the market. As a result, its profit will increase with higher sales. For instance, with the new generation of smartphones HTC is known because of its innovations have the relationship with many customers internationally as a result its financial performance increased with enhancement of market. KBV has suggested that the result of integration of innovation is innovation generation reconfiguration and application which will lead towards competitive advantage, and ultimately improved performance of firm. So we have purposed our hypothesis:

H5: SUPIG has significant impact on the RPR
H6: MKA mediates between SUPIG and PRP
H7: SYCL mediates between SUPIG and PRP
H8: RLL mediates between SUPIG and PRP
H9: TU mediates between SUPIG and PRP

3. Methodology

The study has adopted the survey-based method and the response rate is 47 percent. It was stated by author that partial least square technique is also regarded as structural equation modeling of second generation. The PLS technique is appropriate for analyzing the latent variables and casual relations among the variables in structural equation models. It was claimed by [26] that PLS is most suitable for building statistical model and prediction of variable association. The approach is useful in several ways. In this study, this method has been adopted, as it is advantageous in dealing with complicated models and applicable in real world [27, 28]. The relationship among the variables (exogenous and endogenous) will be explained in this study and the indirect influences created on them. Another possible reason for using PLS method is the normality issue. Most of the times, the data is not distributed normally and PLS method can be used for both. In social science, most of the studies have to deal with abnormal data and this issue can be resolved suitably with PLS. Another significant reason behind the use of PLS is its ability to estimate the relation between the constructs in the structural model and the association among the estimates and their unobserved constructs respectively [29]. These attributes of PLS method make it best technique in statistics. Considering this discussed ion, PLS method can be used to evaluate the reliability and validity of constructs.

4. Results

The assessment of measurement model is the first step in PLS-SEM. Which is followed for the valuation of assessment model [30]. For the determination of measurement model, I PLS analysis reliability and validity both are the main criteria's [31]. With the suggestions of [32] and [30], for the assessment of measurement model, current study will use reliability of individual item, reliability of internal consistency discriminant validity, and convergent validity. Measurement model is shown in the below figure.

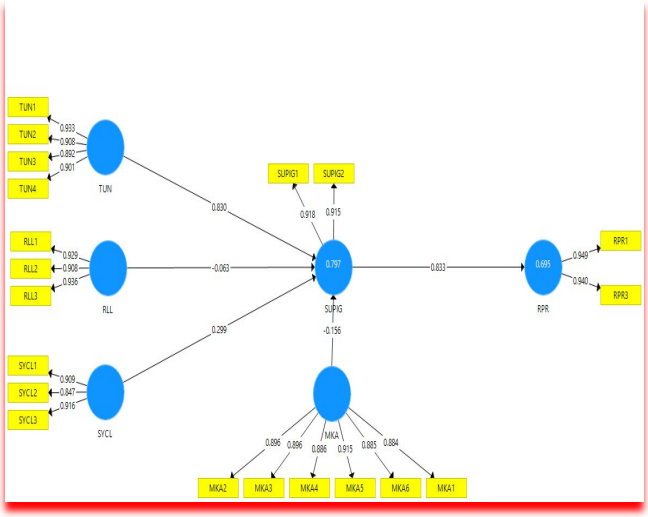

Figure 2. Measurement Model

By following the literature with the determination of loadings for each item we have assess the individual item reliability [27, 29, 32, 33]. Afterward we have omitted the loadings which were below from the threshold which is 0.70 as per the recommendation of Hair, Sarstedt [32].

Table 1. Outer loadings

	MKA	RLL	RPR	SUPIG	SYCL	TUN
MKA2	0.896					
MKA3	0.896					
MKA4	0.886					
MKA5	0.915					
MKA6	0.885					
RLL1		0.929				
RLL2		0.908				
RLL3		0.936				
RPR1			0.949			
RPR3			0.940			
SUPIG1				0.918		
SUPIG2				0.915		
SYCL1					0.909	
SYCL2					0.847	
SYCL3					0.916	
TUN1						0.933
TUN2						0.908
TUN3						0.892
TUN4						0.901
MKA1	0.884					

The appropriate way for the assessment of internal consistency reliability is composite reliability in PLS path model [34]. Which may be interpreted as Cronbach's α. In other words, value of composite reliability must be greater than 0.70. [35]. Table 2c shows the information about composite reliability for each variable. The value range of composite reliability is from 0.844-0.985which is greater than the benchmark value of 0.70. which shows

satisfactory internal consistent reliability for the measured which we have used in our study. [31] have explained convergent validity is measurement of same variable at which level by different items. With the recommendation of [36] with assessment average variance extracted (AVE) we have checked the convergent validity in current study. The enough value of AVE for each variable must be 0.50. According to this procedure for the improvement in the AVE value the values with minimum loadings are omitted from data.

Table 2. Reliability

	Cronbach's Alpha	rho_A	CR	(AVE)
MKA	**0.950**	**0.952**	**0.960**	**0.799**
RLL	**0.915**	**0.926**	**0.946**	**0.854**
RPR	**0.879**	**0.884**	**0.943**	**0.892**
SUPIG	**0.810**	**0.810**	**0.913**	**0.840**
SYCL	**0.870**	**0.877**	**0.921**	**0.794**
TUN	**0.929**	**0.930**	**0.950**	**0.825**

The degree at which items can be differentiated between constructs is called DV. According to [29] DV is the level at which reached studded variable differ from the other studded variable. We have checked the DV by using the two measures which were recommended by [32], which are cross-loadings and Fornell-Larcker's criterion. Square roots of average variance extracted (AVE)for each variable must be greater than the correlation among all variables in Fornell-Larcker's measure [36]. The square root of the average variances extracted (AVE) for each studded variable is greater than the correlation between other variables.

Table 3. Validity matrix

	MKA	RLL	RPR	SUPIG	SYCL	TUN
MKA	0.894					
RLL	0.878	0.8984				
RPR	0.758	0.756	0.895			
SUPIG	0.723	0.788	0.833	0.897		
SYCL	0.886	0.866	0.794	0.761	0.891	
TUN	0.686	0.738	0.864	0.883	0.769	0.908

The second step in PLS analysis after the assessment of measurement model is evaluation of inner structural model. By following the suggestion of [30] measures the implication of path coefficients, size, analytical relevance, level of R-squared values, moderating effect and predictive relevance. The structural model is shown in the below figure.

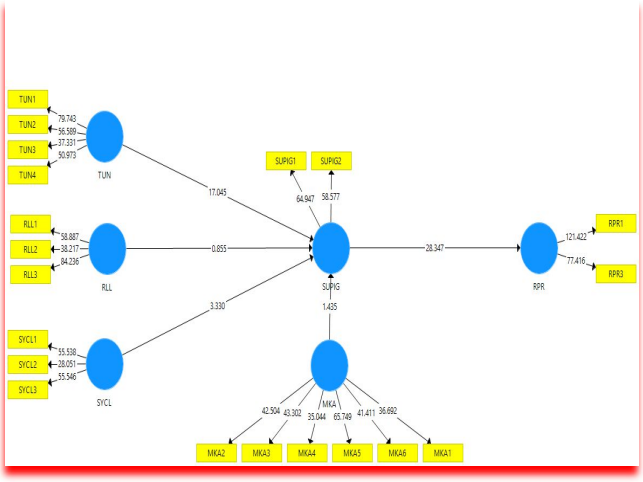

Figure 3. Structural model

We have measured the significance of path coefficients by using bootstrapping procedure, which includes 266 cases and sample of 5000bootstraps as per the recommendation of [32], and [33], According to the [37] main criteria in PLS SEM is to measure that structural model is change in endogenous variable.

Table 4. Direct results

	(O)	(M)	(STDEV)	T Statistics	P Values
MKA -> SUPIG	0.156	0.161	0.109	1.435	**0.076**
RLL -> SUPIG	0.063	0.058	0.074	0.855	**0.196**
SUPIG -> RPR	0.833	0.834	0.029	28.347	**0.000**
SYCL -> SUPIG	0.299	0.307	0.090	3.330	**0.000**
TUN -> SUPIG	0.830	0.823	0.049	17.045	**0.000**

Table 5. Mediation

	(O)	(M)	STDEV	T Statistics	P Values
MKA -> SUPIG -> RPR	0.130	0.134	0.091	1.431	**0.076**
RLL -> SUPIG -> RPR	0.053	0.049	0.062	0.855	**0.196**
SYCL -> SUPIG -> RPR	0.249	0.256	0.076	3.263	**0.001**
TUN -> SUPIG -> RPR	0.692	0.687	0.052	13.291	**0.000**

The value of R-square shows the proportionate change in dependent variable which may explained by forecasted variable [32, 37]. In structural model the dependent variable may explain the values of R^2 which are 0.25. 0.50 and 0.75 as weak, moderate or acceptable. [32] suggested, the Scholars who are using PLS-SEM must apply measures for the indication of model's analytical relevance for the evaluation of quality of model.

Table 6. R-Square

	R Square
RPR	0.695
SUPIG	0.797

By using the blindfolding procedure, the current study relies on test of Stone-Geisser analytical relevance. In PLS model we use this test for measuring the goodness of fit [29].

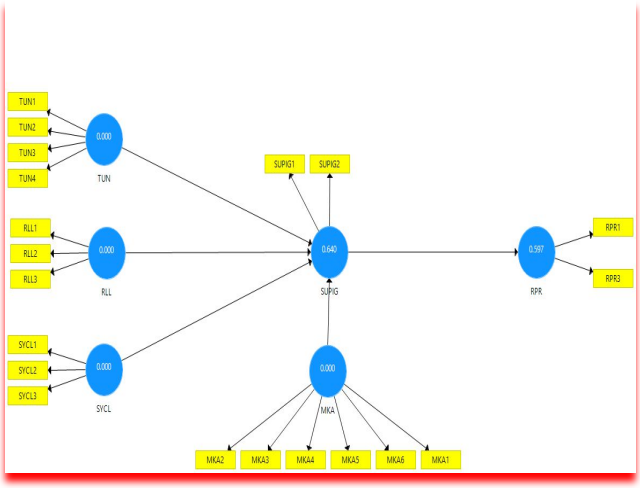

Figure 4. Blindfolding

We use blindfolding procedure only measuring to latent variables of endogenous which have reflective dimension model [26]. Earle, [38] have defined reflective measurement model as a latent variable which may create changes in indicators. Therefore, in current study endogenous latent variables by nature are reflective, and we have applied the blindfolding procedure on these variables. For the assessment of predictive relevance of research model, a measure (Q^2) of cross-validated redundancy is also applied [33].

5. Conclusion

As per the literature of organizational learning and KBV the current study has identified environmental, organizational and technological drivers of IG of suppliers. We have used the learning relationship and attainment of market knowledge as organizational context drivers. In the model system collaboration involve as technological context driver. Technological uncertainty is combined as environmental variable. The supplier innovation generation is affected by the acquisition of supplier market knowledge which is followed by relationship learning, technological uncertainty and systems collaboration. The previous research highlights the position of market knowledge abilities for facilitation of firm innovativeness [39], these finding stated information generation as market learning about competitors and customers is critical for helping the supplier for the creation of new products knowledge. The results also show that IG can work fast with learning relationship. We have provided the experimental evidences of association between innovation and inter organization learning which the most important and an unexplored issue as per literature [40]. As per literature different performance results have relationship with relationship learning like relationship value and market performance [4]. whereas the results of current study increase understanding about links of innovation outcomes to relationship learning like process innovation and product. Additionally, the recent literature highlighted the importance of research which inspect joint learning and absorptive abilities simultaneously in in ventures of collaboration. In this stream our results make a considerable contribution with the demonstration of contribution in exchange innovation relationship, by acquisition of market knowledge and learning relationship.

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