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Investigating the Role of Influencers for Open Innovation and Its Impact on Sme Performance

Dr. Harleen Kaur, Vishav Kirti
University of Jammu

Abstract:

Purpose: The aim of this research paper is to explain the role of various influencers for execution of open innovation in SMEs. Additionally, the purpose of this plan is to investigate that how the SMEs uses open innovation and various collaborations (national and) for increasing their performance.

Methodology: Probability and Census method is used for data collection and 200 SMEs were chosen as target context. Further, SPSS and AMOSS Version (16.0) are used for testing hypothesis.

Findings: The results of this study indicates that the size & age of the firm, organisation culture and government support impact the implementation of open innovation. Further, it is viewed that the firms adopting open innovation increases their performance.

Implications: This research extends the insights about open innovation and the factors that have impact on its implementation. Further, study provides the knowledge about the strategic use of open innovation for increasing the performance of the firm. The findings of this study will help the SMEs to understand how the open innovation can be used for reducing the risk of balance forcompetitive advantage.

Keywords: Organisation Culture, Government Support, Open Innovation, SME Performance

INTRODUCTION

Rogers, (2004), states that innovation is an approach for channelising the ideas into reality. In the recent years, the application of innovation is experiencing considerate ways in which it is managed. According to Chesbrough, firms adopting innovations are required to follow any of the two approaches- open innovation or closed innovation. Open innovation is a large and increasing body of research (Chesbrough et. al., 2006). Open innovation is often termed as extension of closed innovation. The firms that imply closed innovation uses only the internal in- house resources for improving their products and services. On the other hand, open innovation treats both internal and external resources equally for enhancing its products and services (Chesbrough, 2003). On the similar grounds, an organisation is required to bring the balance between external and internal resources for the success of innovation.

Research on open innovation has largely emphasised on large and technology intensive firms (Chesbrough, 2003). Whereas, studies on open innovation in small and medium sized enterprises (SMEs) has received considerably lees attention (Lee et. al., 2010 and West et. al., 2006). Small and medium Enterprises have rendered a crucial role in the transition period of all changing economies. According to (MSME External Report, 2016-2017), MSME contributes almost 17 percent to the country's GDP. Hence it becomes important to study the relationship between open innovation and SMEs.

Joining this line of research, the present study focuses on explaining the contribution of different influencers for open innovation in SMEs. In other words, according to de Paris Caldas & de Oliveria Paula, (2019), it has been viewed that industry level collaboration moderates the relationship between firm innovation and performance. Hence, the current study aims to examine the relationship between open innovation and SME performance along with studying the moderating impact of collaboration levels at regional level between open innovation and SME performance. To verify the results of studies discussed on practical use of open innovation, an empirical study on 200 SMEs of Jammu district were conducted.

The remnants of the paper is structured as follows. In literature review, we will discuss about open innovation in SMEs, evaluates the studies about organisation culture, firm age and government support for open innovation. Then, the role of open innovation for SMEs will be discussed and how the SME uses different collaboration levels for increasing its performance and innovation. In the research design section, we will present the research design regarding the selection of SMEs, reliability and validity and generation of scales. In the empirical analysis and results of the study, we will first discuss whether the organisation culture, firm age, firm size and government support is significant for implementation of open innovation or not. Along with it, the role of open innovation and collaboration at regional level by SMEs for its performance will be discussed. The final section of the study will include conclusions and discussions of the research plan.

2. REVIEW OF LITERATURE

Firm Size and Open Innovation

The resources, turnover or the headcount of the firm is defined as the size of firm (Leal- Rodriguez et. al., 2015 and Lee, 2009). In the present study, the firm size is termed as the turnover of the organisation. Past researchers showed different perception in regard to the relationship of firm size and open innovation. For example, the researchers like Lichtenthaler, (2008) explains the size of the firm positively impacts open innovation practices of the organisation. Likewise, Sondergaard and Burcharth, (2011) experiences the same results. On the contrary, there were few researchers which contradicts the results given by above scholars. According to Van de Vrande et. al., (2009), firm size has no contribution for the implementation of open innovation practices. Following the same path, Lazzarotti et. al., (2011) also viewed that size of the firm has no role to play in the adoption of open innovation. In addition to it, the research conducted among Turkish firm by Gumus and Cubukcu, (2011) also noticed that open innovation is not influenced by firm size. Hence these contradictions contributed to the thoughtto examine the relationship between firm size and open innovation.

Firm Age and Open Innovation

The duration of the firm operating in the industry is defined as the age of the firm. Only few empirical studies justify the relationship between the firm age and open innovation. The opinions of the researchers differ from one another. According to Sondergaard and Burcharth, (2011) the open innovation is not influenced by the age of the firm. Furthermore, Mazzola et. al., (2012) explains that firm age negatively affects the open innovation. The study conducted by Heimonen (2012) induces that age of the firm is not statistically significantly in discriminating between growing innovative SMEs and their non- innovative counterparts. But these results are contradicted by Hungund and Mani, (2019) which says that firm age positively influences the open innovation of the firms. According to him, the firm which are relatively new to the industry adopts open innovation more effectively as compared to the firms which are older in the industry.

After reviewing the above literature, it was found that very less literature is available that justify the relationship between firm age and open innovation in SMEs. Hence this study focuses on explaining the relationship of firm age and open innovation in SMEs.

Organisation Culture and Open Innovation

The beliefs, values and the way of interaction among employees is termed as the culture of the organisation. In other words, the criteria and the procedure of performing the activities is defined as the organisation culture (Sun, 2008). Organisation culture and its practices promotes the innovation among the employees. Employees are the key factor for any kind of innovation. The poor response of employees towards innovation despite of high -tech resources and other financial resources leads to poor implementation of innovations. The relationship between innovations and organisation culture directly affects the SMEs performance. According to Rivarii et. al., (2012) it is seen that organisational culture can be more or less ethical and more or less innovative. The employees of the firm that focus on new learning and don not resist the technological changes are more forwards towards any kind of innovation as compared to the employees of the organisation which are rigid (Hurley & Hault, 1998). On the contrary, study carried by de Araujo Burcharth et. al., (2014) specifies that organisation culture has negative influence on the adoption of open innovation. The difference in the opinion of the researchers throws importance to study the impact of organisation culture for open innovation.

Government Support and Open Innovation

Every business operates within an economic environment and are therefore, susceptible to the changes that take place in economic policies overtime. Hence, government supports the SMEs by formulating the various policies that promotes growth. Government uplifts SMEs by providing financial support for R&D, liberalises the export tax policies and offers loans & grants. There are various schemes introduced by government in India for SMEs such as PMEGP, TCSP and Make in India. Previous studies proved that the rules, regulations and policies made by the government enhances the open innovation practices of the SMEs. But these results are contradicted by Hungund & Mani, (2019). According to him, the policies initiated by the government do not induce the SMEs to implement innovations. Further, he concluded that the government agencies are required to introspect the existing policies that are weak and should focus on framing the new polices to foster the SMEs growth. The difference in the conclusion of the researchers give rise to examine the influence of government support for adopting open innovation.

Open Innovation and SME Performance

Performance refers as to how the employees of the organisation reach to the final conclusion to achieve the organisation goals. Business performance can have various aspects like economic, financial, social and technical performance. Business performance is defined as the extent of which the target tasks of the business is accomplished in comparison to the final output (Yildiz *et al.*, 2014). The business environment is changing at a rapid pace, hence adopting innovations in the organisation bring new directions to the performance and become important for all aspects of operations & work systems (Rosenbusch *et al.*, 2011). Schumpeter, (1934) in his study stated that innovation is carried out continuously by the firm for its long-term success. The study conducted by Herlinawati *et al.*, (2019) and Rosenbusch *et al.*, (2011) attests that SMEs performance is affected by the innovation. They concluded that if the practice of adopting innovations in the organisation is low, the SMEs performance of the firm will also be low. Further, Hungund & Mani, (2019) clinched that a company should focus on adopting innovation more than merely focusing on the performance because the product cycles are becoming smaller and the competition is elevating. In the present scenario, innovation has become the strategic goal of all companies (Herlinawati *et al.*, 2019). In addition to it, innovation also helps the firm in gaining competitive advantage and to guarantee high quality of worklife to employees (Olughor, 2015). Hence, it becomes important to study the impact of innovation on SMEs performance.

Moderating Role of Collaboration at Regional and National Level between Open Innovation and SME Performance

Adopting new ideas of doing work, launching new products in the markets, etc. have a direct influence on the SMEs performance. Different researchers explained that the business which adopt innovations has a positive relationship with SMEs performance (Olughor, 2015 and Herlinawati *et al.*, 2019). If the innovation level of the organisation is low, the performance of the business will also be low. According to de Paris Caldas & de Oliveira Paula, (2019) the collaboration by the firm at regional level moderates the relationship between innovation and performance. Leal Rodriguez, (2015) explains that firms collaborate with different partners at distinct levels of geographical distance for enhancing the SMEs performance. Firms collaborate at discrete levels in order to get technological expertise because effective technology helps in making the innovation more effective. The present study enquires whether regional, national and international level collaboration increases the innovation effects in the SMEs or not. Hence, it becomes important to study the moderating role of collaboration through regional, national and international levels in relationship between innovation and SMEs performance.

Conceptual Framework

The conceptual framework for the study includes organisation culture, firm age, firm size, government support, open innovation, SME performance and different collaboration levels(regional and national level).

INSERT APPENDIX A1

RESEARCH DESIGN

Two step process was adopted for the research design. Firstly, the factors that affects the open innovation are determined through literature review and expert panel. Additionally, the data is collected through structured questionnaire. The target participants for the study were the managers of 200 SMEs which adopt open innovation for their growth and survival. Hence, probability sampling and census method was adopted. The MSMEs report (2016-2018) was used to classify the

firms as small and medium enterprises in the present study.

At the same time, we prepared questionnaire with the help of expert panel and pre- test conducted by various academicians. The interaction with academicians and expert panel helps in constructing the reliable questionnaire. After that pilot survey was carried on 50 SMEs of Jammu district, JK UT. On the basis of the reviews gained, the scales for variables were constructed orreframed.

After this process, total 250 SMEs were contacted. Amongst which, 215 SMEs participated. Thetotal of % of SMEs participated in the survey.

Further the data was analysed through SPSS 21 & AMOS version (16.0) and the results werecomputed.

Research Hypothesis

H1- Open innovation is affected by firm age and size.

H2- Organisation culture has significant impact on open innovation.H3- Government support significantly influences open innovation.
H4- There is significant relationship between open innovation and SMEs performance.

H5- Collaboration at regional levels and national level moderates the relationship between openinnovation and SME performance.

In the present study, the variables are measured through various previous studies.Variables and easures :
The scales for all the constructs are generated though proper research literature and with the helpof expert, academicians and practitioners.

INSERT TABLE B1

Reliability and Validity

The reliability of the research data is measured through Cronbach Alpha for each construct which is found to be above 0.8 and the composite reliability of every variable is above 0.6. The reliability values are within the threshold values accepted by Hulin et. al., 2001 depicted in the Table 1.2.

The validity of the constructs has been measured through content validity and construct validity. Content validity has been thoroughly examined through extensive literature review and discussions with subject experts as well as sector specific managers. Construct validity is examined through factor loadings and Average Variance Explained (AVE). The Average Variance Explained of each construct is above 0.5 as shown in Table B2 and the factor loading values for each construct is more than 0.5 which establishes the convergent validity as shown in Table B2.

EMPIRICIAL ANALYSIS AND RESULTS

Firm age and firm size

Firm age and firm size are defined as the demographic variables of the present study. The relationship of firm size & age and open innovation is examined through One-Way ANOVA. The fallouts shows that firm age is a key factor for the success of open innovation practices in the organisation (Table C1). Further, Post- hoc analysis was used to analysis which age group is significant for the implementation of open innovation. The results indicate that the firms ranging in the age group of 0-5 years and 5-10 years (p value is below 0.05) are move forward towards open innovation as compared to the firm of age group 10-15 years and 15 years above (Table C3) (c). On the other hand, the firm size has no role to play for the effective implementation of open innovation (Table C5).

INSERT TABLE C1, C3 (c), C5

Organisation Culture

Firstly, EFA was applied on twelve items that got reduced to six items under two factors. These two factors were named as Resources Available to Employees (3 items) and Motivation to Employees (3 items). The KMO value for this construct is 0.703 which is within the threshold limits. All the scales of this construct have positive factor loadings. Communality values for all scales are above 0.5. The variance explained for this constyruct is 62% and the eigen values for all items are above 1 (Table D1).

Afterwards, CFA was introduced to all the remaining factors. While performing CFA, two modifications were introduced. After that the construct model of organisation culture proved to

INSERT APPENDIX D

be fit (Figure D2 and Table H1) ((χ^2/df = 2.321, GFI = 0.977, AGFI = 0.928, RMR = 0.036, CFI = 0.970, RMSEA = 0.074).

Government Support

The variable comprised of 14 items that got reduced to 7 items under two factors namely Financial Support (3 items) and Offer support (3 items). The items of this construct have positive factor loading and the communality value is above 0.5. The KMO value for this concept is 0,747 and the variance explained is 74%. The eigen value is above 1 which shows the relativesignificance (Table E1).

Afterwards CFA was introduced on the remaining 7 items. In the initial stage, the model for government support was not proved to be fit. Hence, the application of two modifications yield the model to be fit (Figure E1 & Table H) (χ^2/df = 1.866, RMR = 0.032, GFI = 0.965, AGFI = 0.910, CFI = 0.991, RMSEA = 0.059).

INSERT APPENDIX E

Open Innovation

This construct comprises of 6 items which got reduced to only four items falling under two factors. The factors emerged were named as Accession of New Ideas (2 items) and Reinforcement of Ideas (2 items). The KMO value for this construct is 0.55 which is within the acceptable range. The retained items yield communalities value above 0.5. the total variance explained for this construct is 69% and the eigen value is above 1 (Table F1).

Furthermore, CFA was applied on these retained items. the model for innovation proves to be fit as all the values are within the threshold values (Figure F1 & Table H) (χ^2/df = 1.345, RMR = 0.013, GFI = 0.995, AGFI = 0.985, CFI = 0.995, RMSEA = 0.034).

INSERT APPENDIX F

SMEs Performance

EFA decreased the twenty items to nine items which got encompassed under three variables as Effect on Productivity (4 items), Social Responsibility (3 items) and Effect on Market Share (2 items). This construct showed the reliable limit of KMO i.e. 0.7. The remaining factors of this construct showed the communality values above 0.5. The eigen values of each factor is above 1 and the total variance explained is above is 63% (Table G1)

Initially, the model fit was not good. Therefore, the modification e5 to e9 (0.08) was made. After making adjustment, the model fit confirmed to be good fit (Figure G1 & Table H) (χ^2/df = 2.62, RMR = 0.033, GFI = 0.951, AGFI = 0.983, CFI = 0.951, RMSEA = 0.081).

Results

INSERT APPENDIX G

H2- Organisation culture influences open innovation

From the figure (I1), it is observed that H_2 "Organisation culture significantly influences the open innovations (SRW=0.56 & p<0.05). The model explaining the relationship between organisation culture and innovations is proved to be fit as all the values are within the limits (χ^2/df = 3.21, RMR=0.042, GFI=0.999, AGFI=0.899, RMESA= 0.079.

INSERT APPENDIX I

H3- Government support impacts open innovations

From the figure (J1), the results display that government support has significant impact on the implementation of open innovations as the SRW value is 0.77 and p value I<0.01. The model justifying the relationship between government support and open innovation is proved to be fit as all the values are within the threshold limits (χ^2/df = 2.931, GFI = 0.903, AGFI = 0.837, CFI = 0.949, RMSEA = 0.88, RMR = 0.049). Hence, H3 is said to be accepted.

INSERT APPENDIX J

H4- Open innovation influences SME performance

The relationship of open innovations and SMEs performance is studied on each factor derived after the application of CFA. The figure (KI) (SRW=0.65, p<0.01) depicts the relationship between open innovation and productivity of SMEs. Considering this, the model depicts to be a fit model with all values within the threshold limits ((χ^2/df = 2.408, RMR = 0.026, GFI = 0.946, AGFI = 0.917, RMESA = 0.75). Hence it is proved that the firms implementing open innovation shows an increase in their productivity.

Further, the figure (K2) (SRW=0.75, p<1) depicts the relationship between open innovation and social responsibility of SMEs. Following this the model proves to be a fit model as all the values the within the threshold limits ((χ^2/df = 2.504, RMR = 0.029, GFI = 0.966, AGFI = 0.920, RMESA = 0.77). the findings explain that innovations not only helps in economic benefits but also help the SMEs to curb with their social responsibility.

In the figure (K3) (SRW=0.50, p<0.01), it is conquered that innovation affects the market share of the SMEs (χ^2/df = 2.631, RMR = 0.015, GFI = 0.980, AGFI = 0.931, RMESA = 0.081). hence
it is proved that open innovation helps in increasing SMEs performance.

INSERT APPENDIX K

H5- SMEs collaboration (Regional and National levels) moderates the relationship between open innovation and SMEs performance.

From the tables (L1 to L3), it is comprehended that collaboration through regional level is stronger as compared to the collaboration through national level. Therefore, hypothesis 5 is also accepted.

INSERT APPENDIX L

DISCUSSIONS AND FINDINGS

The findings indicate that the employees of the SMEs are very much concerned about organisational goals and shows the positive attitude towards the innovative ideas in the firm. In these firms, employees are given the authority to control day to day activities. Not only the employees but government also provides the financial and offer support to the SMEs for successful implementation of open innovations. Government provides financial assistance that helps in enhancing the IT infrastructure of the firm. In addition to it, various forms of incentives and tax benefits such as R&D funding scheme, Global Innovation etc. These types of incentives and other benefits help the SMEs to aid the constructive ideas of employees so as to implement them as possible course of actions. The effective implementation of open innovation helps the SMEs to increase their productivity, fulfil social responsibility and increase their market share. SMEs usually lack skilled labour and financial problems are most often seen. Hence, they can collaborate at regional and national level to attain the best advantage of open innovations.

CONCLUSIONS AND IMPLICATIONS

At the end it is concluded that the firm age, organisation culture and government support help the SMEs to implement open innovations. The firms incorporating open innovation for their growth and survival increase their market share, productivity that helps in fulfilling their social responsibility. Further, it has been seen that employees are motivated towards their organisational goal but managers should continue to motivate their workforce to interact with each other and with the employees of other organisations so that they can become much more familiar with the different segments of the market. Not only this but the employees of the SMEs should be given the opportunities to attend the training sessions, workshops, conferences organised by the government. This will help the employees to become competent as the employees of large firms. There is no deny to the fact that collaboration through national and regional level helps the SMEs to enhance their performance. Apart from this, the SME should focus on international collaborations with the large firms so that employees and mangers can get the advantage of latest technology.

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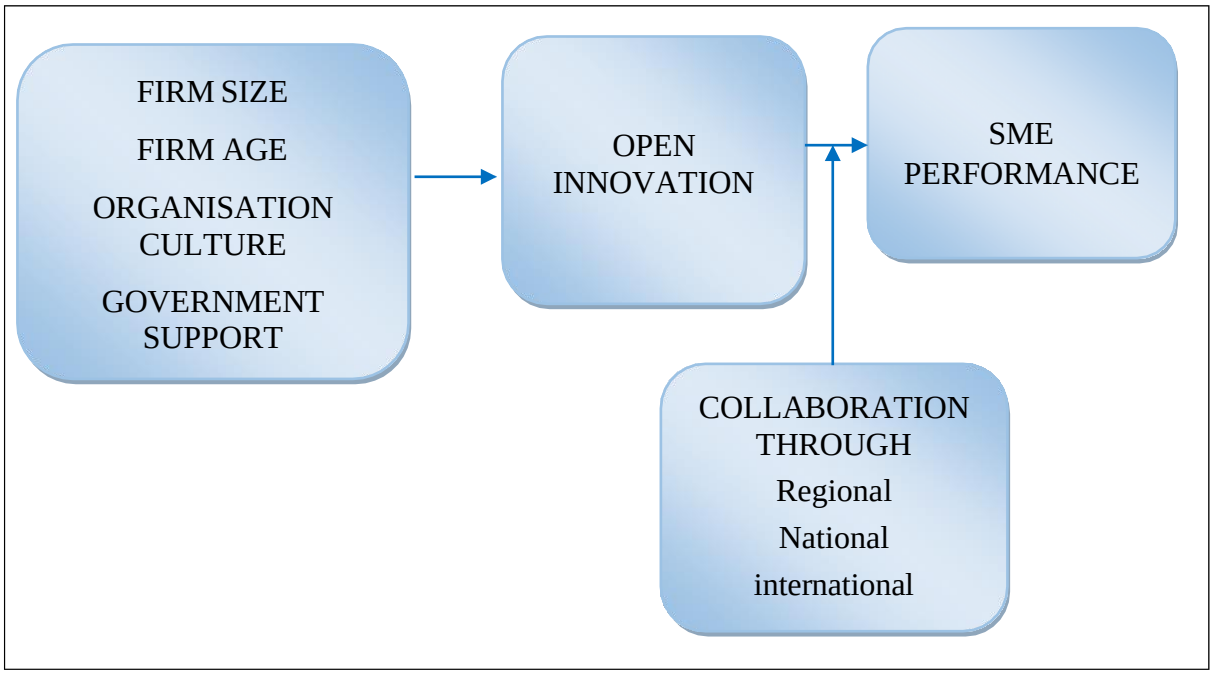
APPENDIX A

Figure A1 Conceptual Framework



APPENDIX B

Table B1 Generation of Scale Items

S.No.	Constructs & Variables	Sources
a)	Firm Age & Firm Size	Hungund & Mani, (2019)
b)	Organisation Culture	Hungund & Mani, (2019)Hurley & Hult, (1998)
c)	Government Support	Hungund & Mani, (2019)
d	Open Innovation	Hungund & Mani, (2019)Herlinawati *et al.*, (2019)
e	SMEs Performance	Rosenbusch *et al.*, (2011)
f	Collaboration Level	Leal-Rodriguez *et al.*, (2015) de Paris Caldas & de Oliveira Paula, (2019)

Table B2 Summary of AVE and CR

Factors	AVE	Composite Reliability
Organisation Culture	0.68	0.71
Government Support	0.68	0.84
Open Innovations	0.51	0.56
SMEs Performance	0.65	0.69

APPENDIX C

Table C1 Impact of Firm Age on Innovation

Table C1(a): One-Way ANNOVA of Impact of Firm Age (Item-Wise)

		Sum ofSquares	df	Mean Square	F	Sig.
i1	Between Groups	5.059	3	1.686	4.179	0.007
	Within Groups	79.096	196	0.404		
	Total	84.155	199			
i2	Between Groups	9.244	3	3.081	9.862	0.000
	Within Groups	61.236	196	0.312		
	Total	70.480	199			
i5	Between Groups	4.171	3	1.390	3.903	0.010
	Within Groups	69.809	196	0.356		
	Total	73.980	199			
i6	Between Groups	8.599	3	2.866	6.290	0.000
	Within Groups	89.321	196	0.456		
	Total	97.920	199			

Table C2(b): One-Way ANNOVA for Firm Age (Combined)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.797	3	1.932	12.976	.000
Within Groups	29.190	196	.149		
Total	34.987	199			

Table C3(c): Post-HOC Analysis of Firm Age

(I) age of the firm	(J) age of thefirm	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	UpperBound
0-5 years	5-10 years	-.88942*	.14656	0.000	-1.1785	-.6004
	10-15 years	-.74265*	.14675	0.000	-1.0321	-.4532
	above 10 years	-.68118*	.14244	0.000	-.9621	-.4003
5-10 years	0-5 years	.88942*	.14656	0.000	0.6004	1.1785
	10-15 years	.14678	.07605	0.055	-.0032	0.2968
	above 10 years	.20824*	.06736	0.002	0.0754	0.3411
10-15 years	0-5 years	.74265*	.14675	0.000	0.4532	1.0321
	5-10 years	-.14678	.07605	0.055	-.2968	0.0032
	above 10 years	.06147	.06778	0.366	-.0722	0.1951
above 15 years	0-5 years	.68118*	.14244	0.000	0.4003	0.9621
	5-10 years	-.20824*	.06736	0.002	-.3411	-.0754
	10-15 years	-.06147	.06778	0.366	-.1951	0.0722

* The mean difference is significant at the 0.05 level.

Table C4(d): Descriptive Analysis of Firm Age

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0-5 years	8	3.3750	.35355	.12500	3.0794	3.6706	3.00	4.00
5-10 years	52	4.2644	.36519	.05064	4.1628	4.3661	3.25	5.00
10-15 years	51	4.1176	.44540	.06237	3.9924	4.2429	3.50	5.00
above 15 years	89	4.0562	.36298	.03848	3.9797	4.1326	3.25	4.75
Total	200	4.0988	.41930	.02965	4.0403	4.1572	3.00	5.00

Table C5: Impact of Firm Size on Innovation

Table C5(a): One-Way ANNOVA for Firm Size (Item Wise)

		Sum of Squares	df	Mean Square	F	Sig.
i1	Between Groups	1.002	4	0.250	0.587	0.672
	Within Groups	83.153	195	0.426		
	Total	84.155	199			
i2	Between Groups	1.078	4	0.269	0.757	0.555
	Within Groups	69.402	195	0.356		
	Total	70.480	199			
i5	Between Groups	1.809	4	0.452	1.222	0.303
	Within Groups	72.171	195	0.370		
	Total	73.980	199			
i6	Between Groups	4.828	4	1.207	2.528	0.042
	Within Groups	93.092	195	0.477		
	Total	97.920	199			

Table C5(b): Impact of Firm Size on Innovation

ONE-WAY ANNOVA FOR FIRM SIZE (COMBINED)

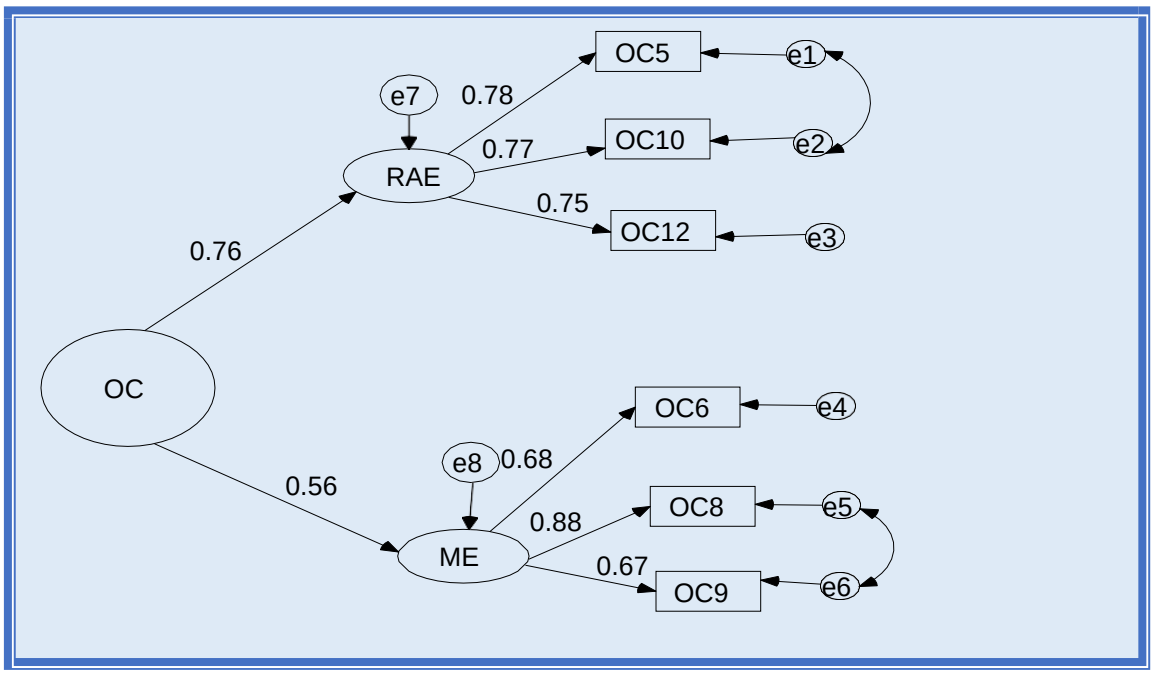
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.046	4	0.261	1.502	0.203
Within Groups	33.942	195	0.174		
Total	34.987	199			

APPENDIX D

Table D1: Summary of Exploratory Factor Analysis for Organisation Culture

Factor	Mean	F.L.	CV	EV	VE (%)	KMO	Cronbach Alpha
OC- Organisation Culture	**3.96**					**0.668**	**0.703**
RAE- Resources Available to Employees	**3.82**			**2.458**	**40.963**		**0.724**
OC5	3.77	0.787	0.620				
OC10	3.78	0.837	0.721				
OC12	3.93	0.752	0.608				
ME- Motivation to Employees	**4.11**			**1.237**	**20.612**		**0.621**
OC6	4.02	0.744	0.554				
OC8	4.10	0.728	0.600				
OC9	4.21	0.751	0.591				
TOTAL					**61.575**		

Figure D1: Model of Organisation Culture



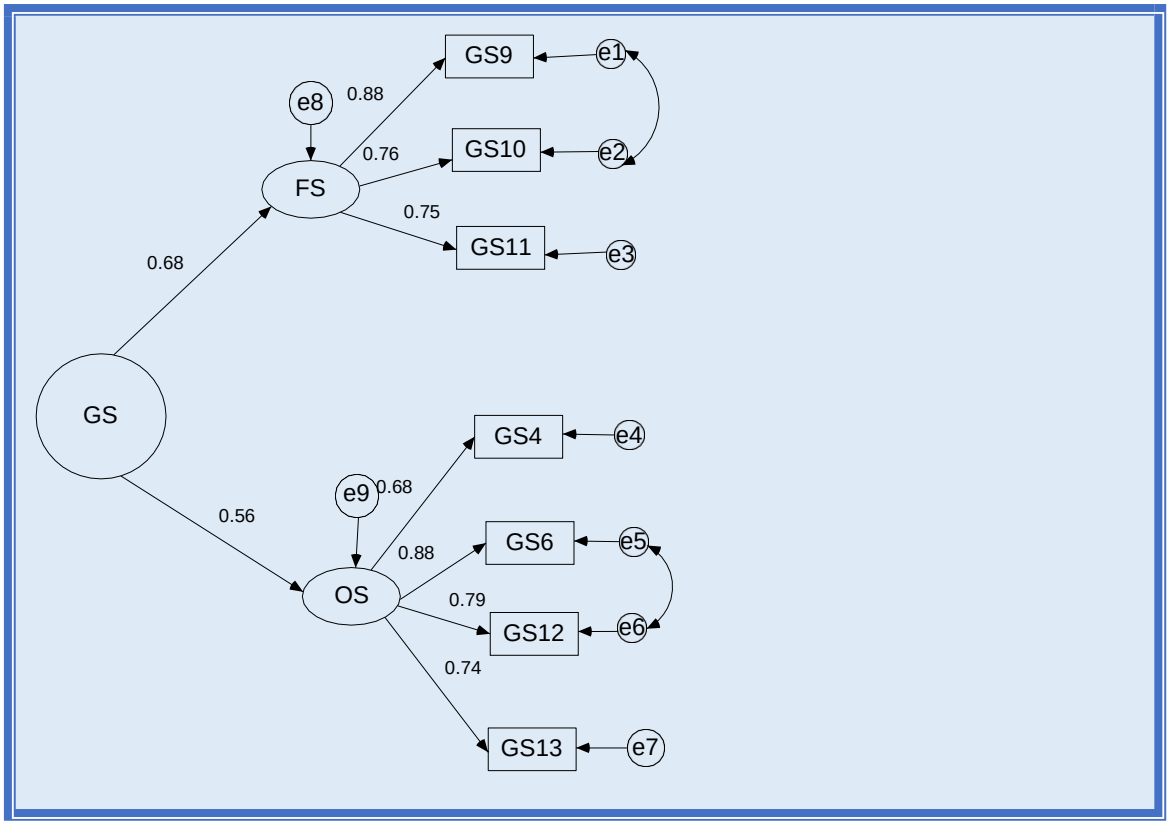
Keywords: *OC- Organisation Culture, RAE-Resources Available to Employees, ME- Motivation to Employees, OC1to OC12 are the manifest variables and e1 to e8 are the error items of these variables.*

APPENDIX E

Table E1: Summary of Exploratory Factor Analysis for Government Support

Factor	**Mean**	**F.L.**	**C. V.**	**E.V.**	**V.E**	**KMO**	**Cronbach Alpha**
GS- Government Support	**4.2**					**.747**	**.797**
FS- Financial Support	4,22			2.079	29.693		0.713
GS9	4.27	0.811	0.658				
GS10	4.24	0.809	0.662				
GS11	4.17	0.646	0.698				
OS- Offer Support	4.18			2.443	34.693		0.760
GS4	4.23	0.758	0.576				
GS6	4.16	0.801	0.649				
GS12	4.13	0.655	0.660				
GS13	4.20	0.714	0.619				
TOTAL	3.50	0.090	0.557		64.38		

Figure E1: Model of Government Support



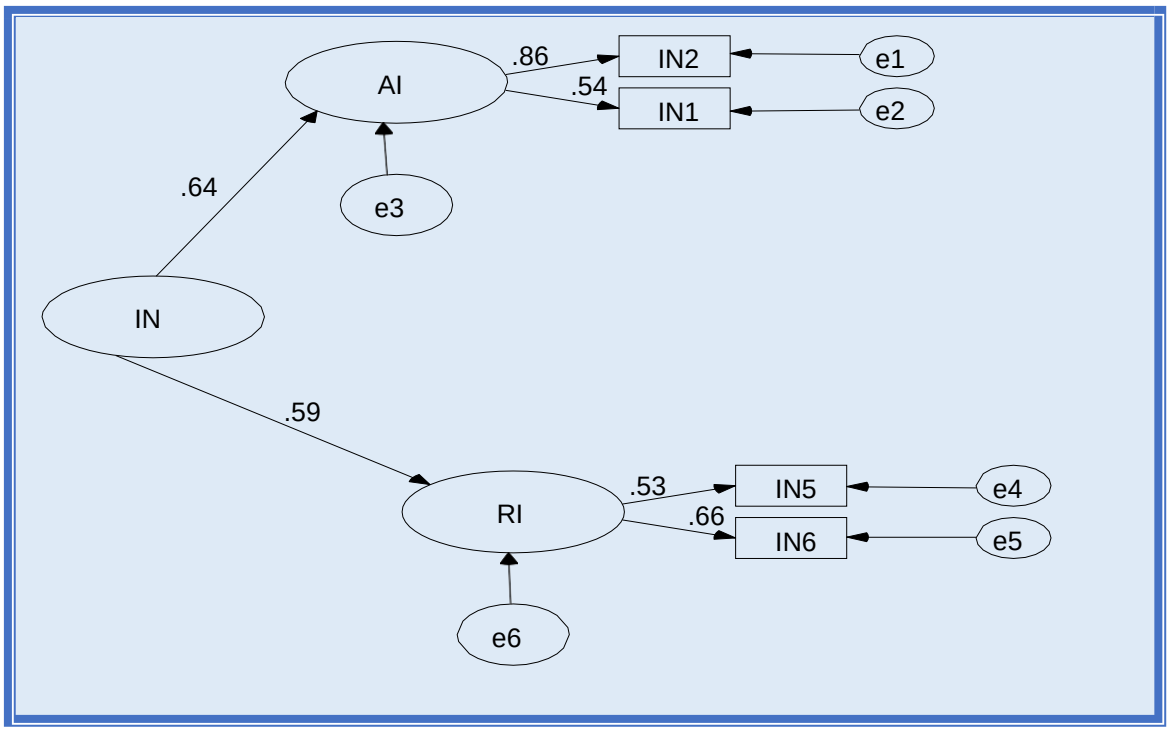
Keywords: *GS- Government Support, FS- Financial Support, OS- Offer Support, GS4 to GS13are the Manifest variables and e1 to e9 are the error items of these variables.*

APPENDIX F

Table F1: Summary of Exploratory Factor Analysis for Open Innovation

Factor	Mean	F.L.	C. V.	E.V.	V.E	KMO	Cronbach Alpha
IN- Innovation	**4.09**					**0.550**	**0.615**
AI- Accessionof New Ideas	**4.21**			**1.388**	**34.709**		**0.601**
IN1	4.19	0.860	0.671				
IN2	4.24	0.793	0.740				
RI- Reinforcementof Ideas	**3.98**			**1.401**	**35.018**		**0.611**
IN5	3.99	0.841	0.714				
IN6	3.98	0.807	0.664				
TOTAL					**69.727**		

Figure F1. Model of Open Innovation



Keywords: *IN-Innovation, AI- Accession of New Ideas, RI-Reinforcement of Ideas, I1 to I6are the manifest variables and e1 to e6 are the error items of these variables.*

APPENDIX G

Table G1: Summary of Exploratory Factor Analysis for Results of Open Innovation on SMEs Performance

Factors	Mean	S.D.	F.L.	C. V.	E.V.	V.E	KMO	Cronbach Alpha
SMEs- SMEs Performance							0.771	**0.784**
EP- Effect on Productivity	**3.98**	**0.801**			**2.276**	**25.290**		**0.740**
P8	3.88	0.865	0.771	0.646				
P7	3.86	0.756	0.741	0.582				
P15	3.91	0.818	0.700	0.555				
P11	4.28	0.765	0.661	0.566				
SR- Social Responsibility	**4.03**	**0.737**			**1.963**	**21.811**		**0.713**
P13	4.10	0.720	0.802	0.704				
P14	4.10	0.673	0.785	0.729				
P19	3.91	0.818	0.710	0.590				
EMS-Effect on Market Share	**4.005**	**0.685**			**1.487**	**16.519**		**0.601**
P1	3.95	0.685	0.800	0.686				
P2	4.06	0.685	0.781	0.668				
TOTAL						**63.62**		

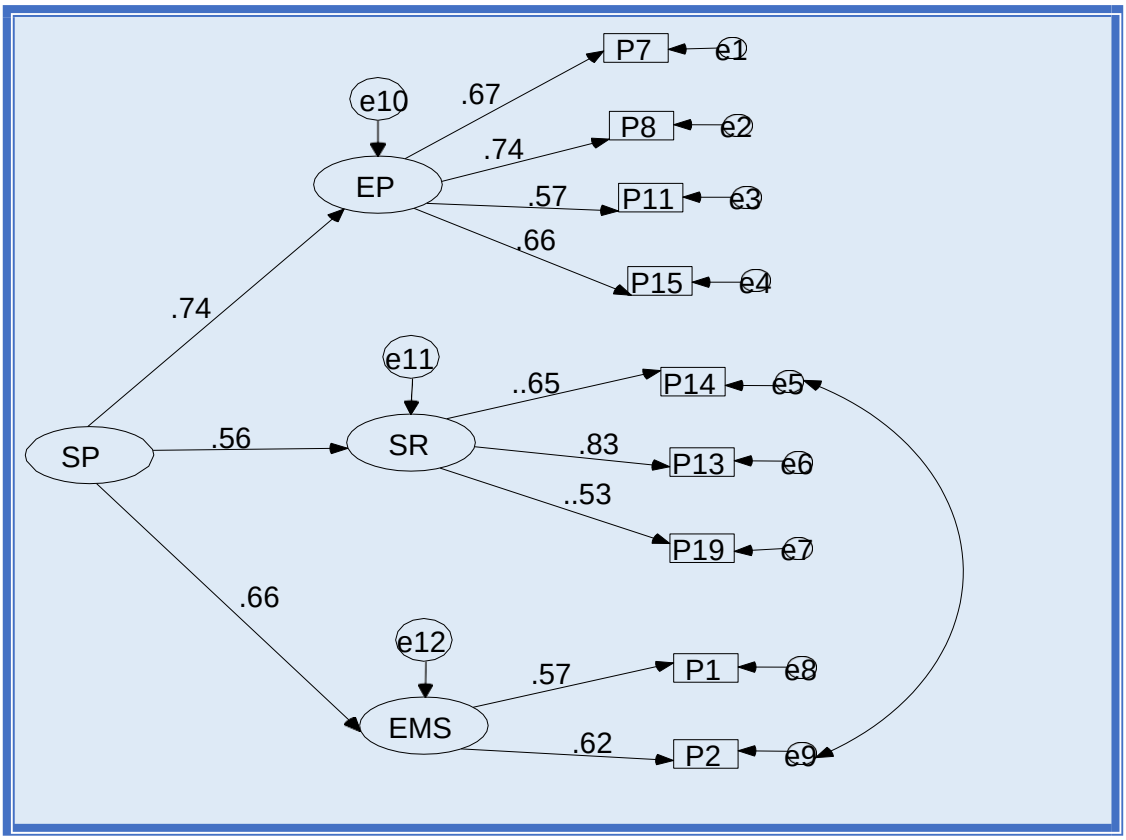


Figure G1 Model of SMEs Performance

Keywords: *SP-SMEs Performance, EP-Effect on Productivity, SR-Social Responsibility, EMS-Effect on Market Share, P2 to P19 are the manifest variables and e1 to e12 are the erroritems of these manifest variables.*

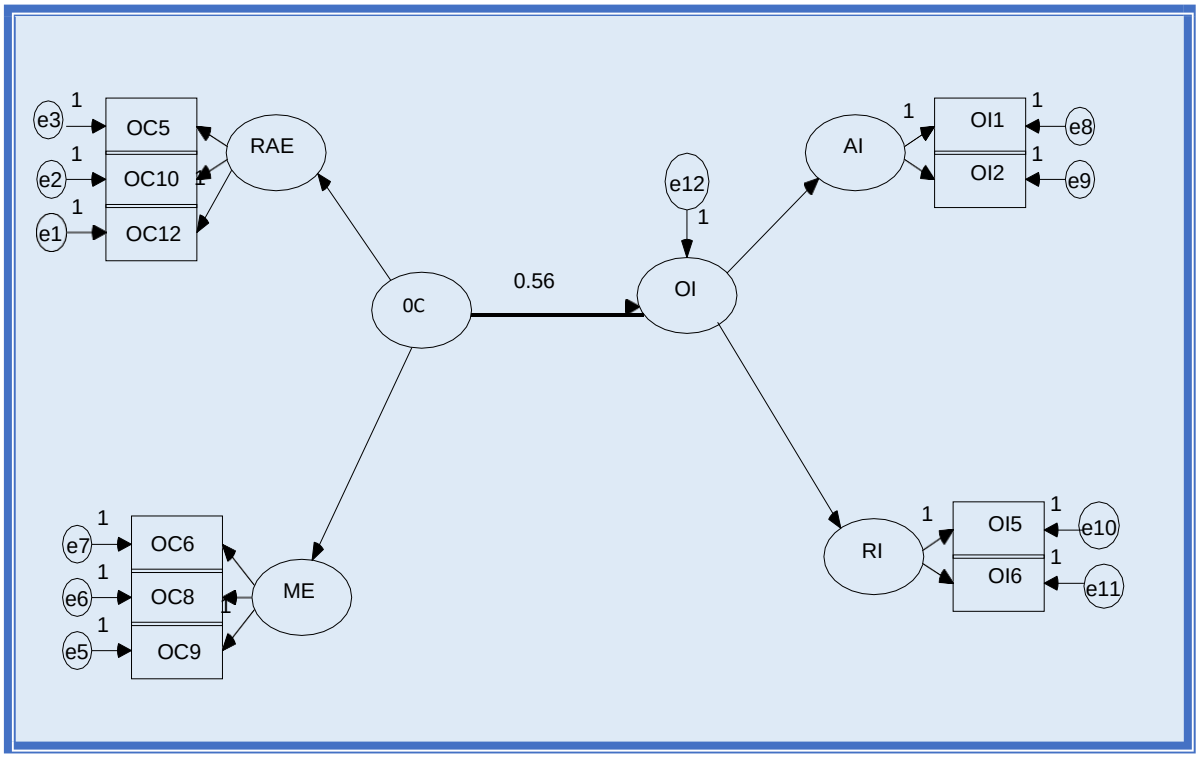
APPENDIX H

Table H1 Summary of Confirmatory Factor Analysis

S.No.	Constructs	$\chi 2$/df	GFI	AGFI	CFI	RMR	RMSEA
(a)	Organisation Culture	2.321	0.977	0.928	0.970	0.036	0.074
(b)	Government Support	1.866	0.965	0.910	0.991	0.032	0.059
(c)	Open Innovation	1.345	0.995	0.985	0.995	0.013	0.034
(d)	SMEs Performance	2.62	0.951	0.983	0.951	0.033	0.081

APPENDIX I

Figure I1: Organisation Culture has significant impact on Open Innovation



***Keywords**: OC=Organisation Culture, RAE=Resources Available to Employees, ME= Motivation to Employees, OC1 to OC12 are the manifest variables, OI=Open Innovation, AI=Accession of New Ideas, RI=Reinforcement of Ideas, OI1 to OI6 are the manifest variables, e1 to e12 are the error items.*

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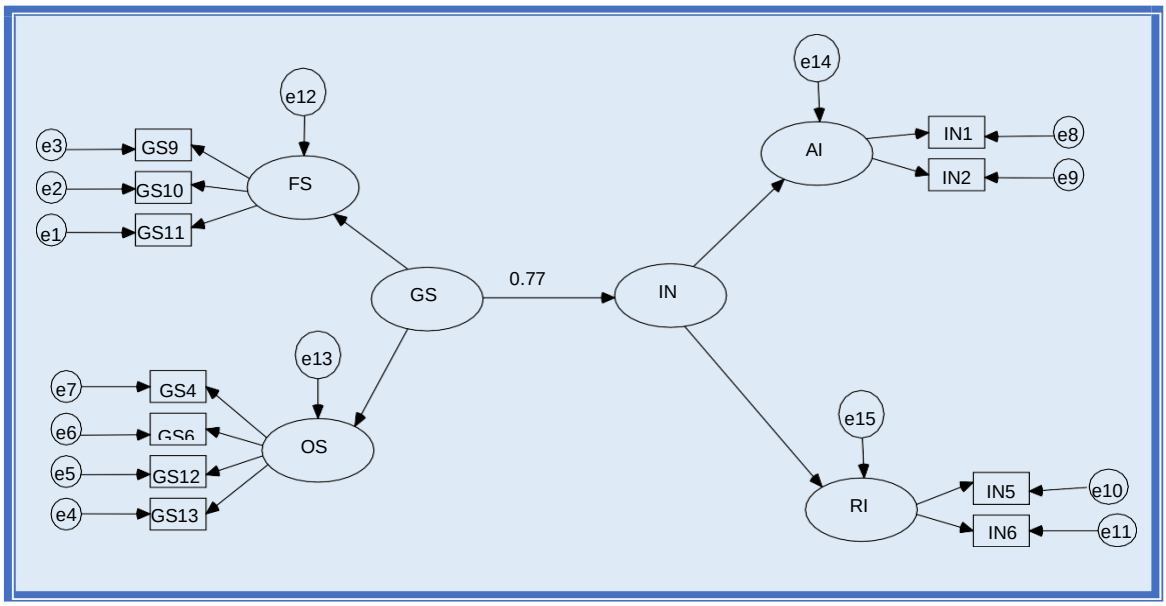
APPENDIX J

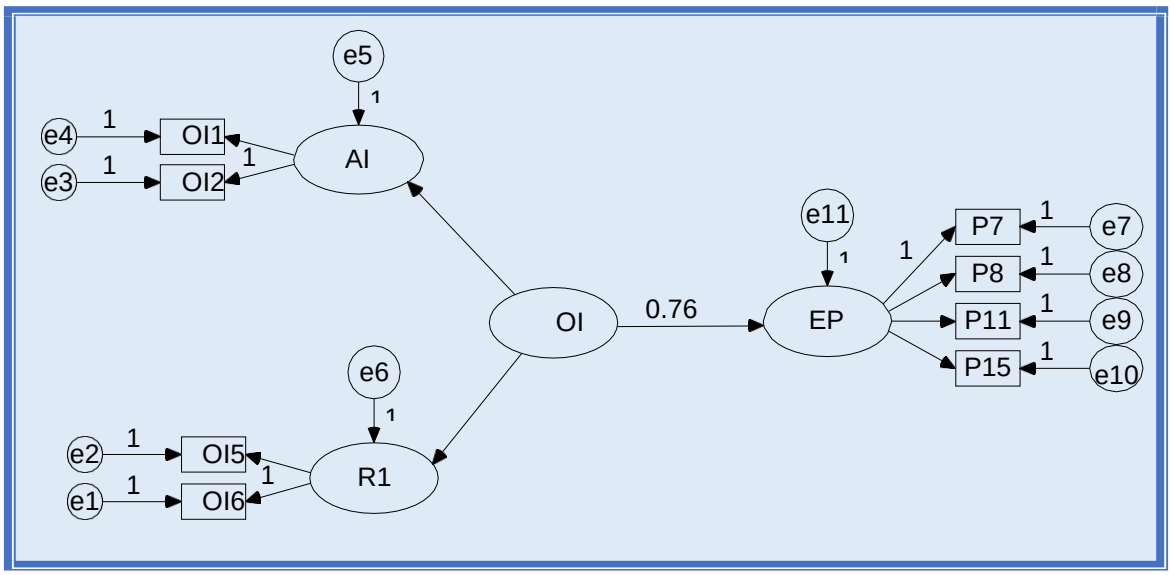
Figure J1 ***Government Support Influences the Adoption of Open and Closed Innovation***



Keywords: *GS=Government Support, FS=Financial Support, OS=Offer Support, IN=Innovation, AI=Accession of New Ideas, RI= Reinforcement of Ideas, I1 and I2 are the manifest variables of Accession of New Ideas, I5 and I6 are the manifest variables of Reinforcement of Ideas ande1 to e15 are the error items.*

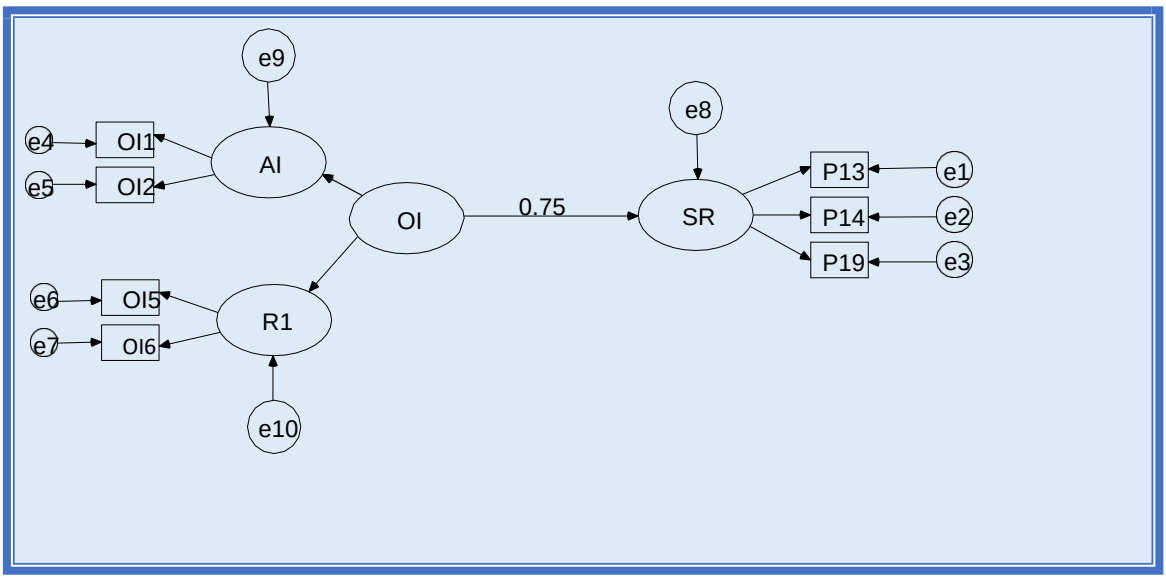
APPENDIX K

Figure K1 ***Open Innovations Affect the Productivity of the SMEs***



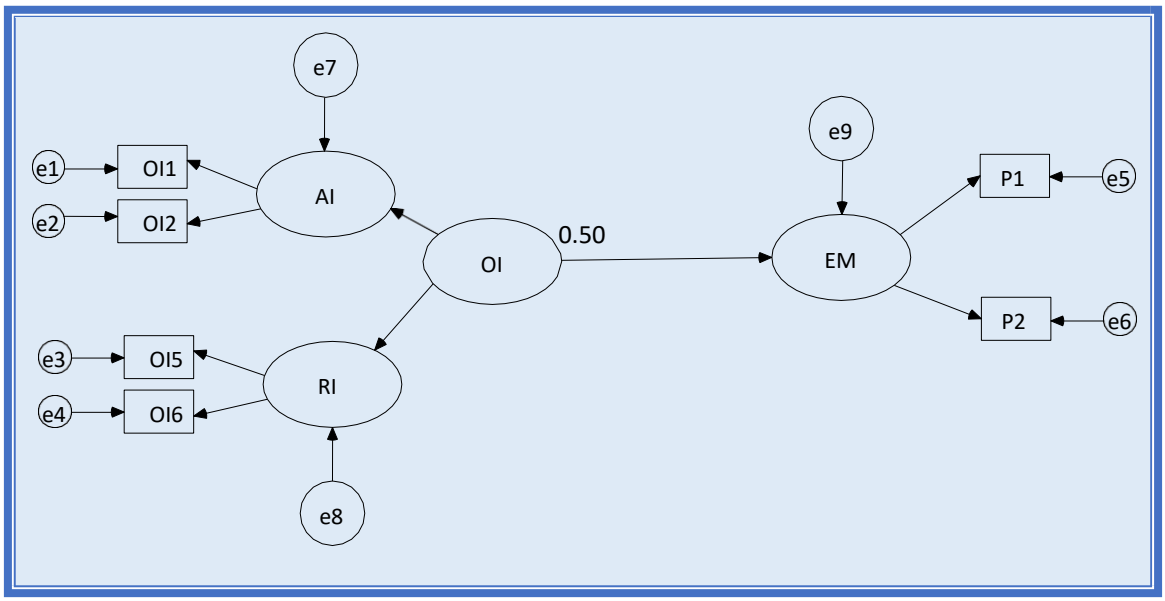
Keywords: *OI=Open Innovation, AI= Accession of New Ideas, RI=Reinforcement of Ideas, OI to O6 are the manifest variables, EP= Effect on Productivity, P8 to P15 are the manifest variables and e1 to e11 are the error items*

Figure K2 ***Innovations Affect the Social Responsibility of the SMEs***



Keywords: *OI=Open Innovation, AI= Accession of New Ideas, RI=Reinforcement of Ideas, OI to OI are the manifest variables, SR=Social Responsibility, P13 to P19 are the manifest variables and e1 to e11 are the error items.*

Figure K3 Innovations Affect the Market Share of the SMEs



Keywords*: OI=Open Innovation, AI= Accession of New Ideas, RI=Reinforcement of Ideas, OI to O6 are the manifest variables, EM= Effect on Market Share, P1 to P2 are the manifest variables and e1 to e9 are the error item*

APPENDIX L

Table L1 Moderating Effect of Collaboration Levels (Regional and National) BetweenInnovations and Effect on Productivity

Relations	Levels	
	Regional	National
Innovation-> Effect on Productivity	0.945***	0.691**
Constrained Model	392.3	392.3
Unconstrained Model	388.0	388.0
Chi-Square	4.3	4.3
*p<0.05		

Table L2 Moderating Role of Collaboration Levels (Regional and National) BetweenInnovations and Effect on Market Share

Relations	Levels	
	Regional	National
Innovation-> Effect on Market Share	0.817***	0.503**
Constrained Model	419.1	419.1
Unconstrained Model	413.3	413.3
Chi-Square	5.8	5.8
*p<0.05		

Table L3 Moderating Role of Collaboration Levels (Regional and National) BetweenInnovations and Social Responsibility

Relations	Levels	
	Regional	National
Innovation-> Social responsibility	0.833***	0.164**
Constrained Model	241.8	241.8
Unconstrained Model	237.9	237.9
Chi-Square	3.9	3.9
*p<0.05		