Facilitators and Barriers to Innovation Adoption: An Investigation

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Abstract: Innovation is at the heart of competitive advantage of organizations. Firms, irrespective of their sizes, need to engage in continuous innovations to survive and succeed in the market place. This research measured the impact of pre- innovation adoption variables on the innovation adoption of the firms. The study was conducted at the knitwear manufacturing cluster of Tirupur district that operate in a highly competitive hosiery market. The final results indicated that the facilitators have positive influence on innovation adoption, while barriers negatively influence innovation adoption. The research establishes the need for a strong innovation climate within organizations, facilitated by leadership, which will drive innovations significantly.

Keywords: Innovation adoption, Facilitators, Barriers, SMEs, Knitwear cluster

I. INTRODUCTION

The buzzword in 1990s used to be "globalization". In the second decade of 21st century, the word that has acquired sudden prominence, and with reason is 'innovation'. The President of India has declared the decade 2011-2020 to be the "Decade of Innovation" (Dutta, 2011). Organizational innovation is a vast multi-disciplinary area of research and is relatively a new area of inquiry. While most researchers agree upon the definition of innovation, the research is fragmented from different perspectives with efforts being made towards a cumulative body of research and a general theory (Read, 2000). The growing interest in innovation and its relationship to economic growth has resulted in a body of specialised literature on various facets of the process of innovation starting with simple linear "technology push" and "need pull" models in 1960s and 1970s, through the "coupling models" of late 1970s to early 1980s to the integrated model of Rothwell (Alwis, Hartmann, & Gemünden, 2004).

Joseph Schumpeter is often thought to be the first economist to draw attention to the importance of innovation (Rogers, 1998). According to Rogers (2003), innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Cooper (1998) states that a firm's propensity to adopt innovation is influenced by several characteristics and that the uni-dimensional perspective is simply too narrow to capture them all.

Innovations occur as a consequence of triggers happening in the external environment surrounding an organization. Innovation is said to be initiated by a need felt by the organization that it can do much more than what it is actually doing at present. This need may be felt by the members in the internal environment or by the change agents in the external scenario (Rogers, 1971).

Accordingly, the facilitators or drivers of innovation can be broadly grouped into internal and external facilitators. These may be related to environment, organizational capabilities, organizational structures and demographics (Russell, 1990). In the external environment, competition is regarded as an important incentive to promote innovation and thereby firm performance. Turbulence also creates uncertainty in the environment leading the firms to involve in innovations in order to guard against uncertainly prevailing. An organization's innovation capability is significantly increased by its intra-organizational network that provides opportunities for knowledge transfers and information exchange.

Internally, a firm's organizational structure can influence its innovation activities. It has been empirically proved that flexible and adaptive structures outperform the rigid ones in terms of success rates (Panne, Beers, & Kleinknecht, 2003). Organizations that are more oriented towards customers are more likely to receive ideas and information from the customers that can stimulate innovations. The age of the organizations can also impact innovation. Past research shows that older organizations are very rigid and less open to change when compared to the relatively younger ones. However, some other researchers have proved that older organizations have a well defined resource base and potential for survival that allows them to pursue innovations. Innovation and leadership are closely related. Leadership always has focus on bringing about betterment in the organization (Gumusluoglu & Ilsev, 2009). The motivation to innovate is the augmentation in profit that a firm can make if it invests in Research and Development (Gilbert & Weinschel, 2005). Climate for innovation is the apparent manifestation of a pro-innovation culture that has a positive impact on innovation (Nybakk, Crespell, & Hansen, 2011).

OSLO manual identifies and differentiates between four types of organizational innovations. These are product innovation, process innovation, marketing innovation and organizational innovation (OECD, 2005). Technological innovations (product & process innovations) involve adoption of a new idea pertaining to a new product or service, or the introduction of new elements in an organization's production process or service operations. Administrative innovations are intended to increase firm's efficiency in performance by reducing administrative expenses, improving workers' satisfaction and developing access to knowledge. Marketing innovation refers to introduction of new marketing methods involving significant changes in product designs, packaging, promotion, pricing and the like. The objective is to better address the   customer needs and thereby improving firm's sales.

Though it has been proven by experience and through research that innovation adoption can

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lead to better firm performance and competitive advantage, not all firms undertake innovation. A number of studies show that firm differences in barriers to innovation were related to cost, institutional constraints, uncertainty, market imperfections, availability of human resources, organizational culture, flow of information and Government policy (Baldwin & Lin, 2002). In most of the studies relating to barriers of innovation, cost involved had been identified as the major barrier.

In India, statistics reveal the increasing significance of innovation among the firms today. India is emerging as global hub for innovation-low cost as well as high value products and services. Tirupur, the foremost garment cluster in India, accounts for 80% of knitwear exports from the country (Sachitanand, 2007). The phenomenal growth rate of the knitwear industry in Tirupur can be attributed to the region's unique export culture, easy availability of raw materials, and labour as well as flexible attitude of entrepreneurs in meeting the demands of the buyers. Tirupur cluster has demonstrated the ability to go up the value chain, however in a limited manner. (Nelliyat, 2007). The SME cluster of Tirupur district is a matured industrial cluster. But being a naturally developed cluster, it suffers from the shortcomings in professionalism. The pace of innovation adoption and diffusion by the cluster members is therefore not up to the level of sustainability. This study is the first of its kind in the knitwear cluster of Tirupur. In the light of the development of future research, this research identifies the factors relevant for the innovativeness of SMEs which may provide them with advantages in facing international competition. The awareness and sensitization of these factors is the only way by which both firms and policy makers take them into serious consideration and promote them in the future.

II. REVIEW OF LITERATURE

An extensive review of literature revealed that strong presence of facilitators can promote innovations (Hadjimanolis, 2000). Studies have also found significant negative influence of barriers on innovation adoption. Yahya et al (2011) studied process innovations among a sample of 54 manufacturing SMEs operating in Malaysia and found that leadership and culture were prominent among the drivers for innovation. The major barriers to innovation were lack of knowledge and skills, networking and training due to perhaps lack of adequate financial resources. Lynch (2007) found that employers with more external focus and broader networks were more inclined to invest in organizational innovations. Investment in human capital, information technology, R & D and physical capital were complementary with investments in organizational innovations. Liu (2005) developed and tested an organizational innovation (OI) model in the high-tech industries of Taiwan and identified product innovation, process innovation, organizational structure and climate for innovation as major dimensions of the model. Jung et al (2004) investigated the influence of top manager's leadership style on firm's innovation in 32 Taiwanese companies in the electronics and telecommunication industry and established a direct and positive linkage between the style of leadership labelled as 'transformational leadership' and organizational innovation. Damanpour and Gopalakrishnan (2001) examined the dynamics that governed the adoption of product and process innovations at the firm level over time on a sample of 101 commercial banks in the United States. The study revealed that product innovations were adopted at a greater rate and speed than process innovations and that a product-process pattern of adoption was more likely than a process-product pattern.

Galia et al (2012) compared the perception of obstacles faced by French and Italian firms and analyzed that perception varied across countries. For French firms, the most frequent obstacle to innovation was the lack of internal financial resources while Italian firms were more hampered by external financial resources and the perception of high innovation costs. Tiwari and Buse (2007) conducted a survey at Metropolitan region of Hamburger in Germany to identify the barriers to innovation among SMEs and observed the prominent barriers to be financing issues, problems in finding suitable and qualified personnel, bureaucratic hurdles and difficulties in finding cooperation partners from outside. The most prominent internal barriers were found to be, amongst others, in the areas of marketing, conceptualization of innovative products and internationalization. The challenges for international innovations were a general concentration on home markets, lack of resources and know-how and fear relating to uncertainties in the target markets. Studies reveal that the rate of adoption of innovation by a firm is significantly influenced by the interplay between the facilitators and barriers. The internal facilitator constructs identified after the review of literature are leadership, innovation climate, market orientation, organizational structure and focus on R & D. The external facilitator constructs identified are competition and turbulence and collaboration. The constructs of barriers are associated with cost, lack of qualified and skilled personnel, lack of information on technology and market, lack of collaboration with Universities and research institutions, lack of demand and lack of incentives. Hence the following hypotheses have been generated:

- $H1_a$: Internal facilitators of innovation will have a positive impact on firms' propensity to adopt innovations
- $H2_a$: External facilitators of innovation will have a positive impact on firms' propensity to adopt innovations
- $H3_a$: Barriers to innovation will have a negative impact on firms' propensity to adopt innovations
- $H4_a$: Facilitators and barriers to innovation adoption together can predict a firm's innovation adoption significantly

III. OBJECTIVES OF THE STUDY

The primary objective of this research is to conceptually develop and empirically test a hypothesized model that depicts the impact of facilitators and barriers on innovation adoption with respect to the SMEs operating in the knitwear cluster of Tirupur district. The secondary objectives of the study are

- To understand the significant facilitators and barriers of innovation adoption among the SMEs
- To study the impact of facilitators and barriers on the firms' propensity to adopt innovations

IV. RESEARCH METHODOLOGY

The research adopts positivism as the primary research approach as the study relies on well established theories and research related to innovation and develops a conceptual model with a set of hypotheses that links the various construct in the model in a logical fashion. The model has been assessed using quantitative data and statistical applications. The research design adopted is descriptive. The population for the present study is 6250 SMEs operating in the Tirupur knitwear cluster. Researcher adopted stratified random sampling method for selecting sample from the major strata of the population. The total valid sample comprised of 384 respondents, who are entrepreneurs in the cluster. Data were collected using a validated questionnaire. Reliability of the constructs was assessed and data were purified to improve reliability. Confirmative factor analysis helped to determine the discriminant and convergent validity of the constructs in the hypothesized model. Regression analyses were conducted and the structural model was analysed using multiple regression analysis.

V. RESULTS AND DISCUSSION

The impact of independent variables on the dependent variable conceptualized in the model was tested using multiple regression analysis.

Table 1: Regression Analysis

Causal Path	Entire sample estimate	Mean of subsamples	Standard error	t-statistics
External facilitators -> Innovation adoption	0.12	0.15	0.063	2.9058
Internal facilitators -> Innovation adoption	0.519	0.5121	0.0568	9.1309
Barriers -> Innovation adoption	-0.161	-0.1037	0.0717	-2.2451

Source: primary data

From the results, it can be observed that the causal relationships among the latent constructs are significant for all the paths. The regression coefficients for all the causal paths, except that for the causal path between 'barriers' and 'innovation adoption', are positive and substantive. The regression coefficients reveal that the relationship between 'internal facilitators' and 'innovation adoption' is the most robust (B=0.519). In case of the path between 'barriers' and 'innovation adoption', the relationship is negative and substantive (B= -0.161). The t-statistics of causal paths between all the constructs are above the threshold limit of 1.96. The t-values of the paths between 'external facilitators' and 'innovation adoption' (t=2.9058) and between 'internal facilitators' and 'innovation adoption' (t=9.1309) are statistically significant. The t-statistics of the path between 'barriers to innovation adoption' and 'innovation adoption' is negative and significant (t=-2.245), showing that there is a significant inverse relationship between the two constructs.
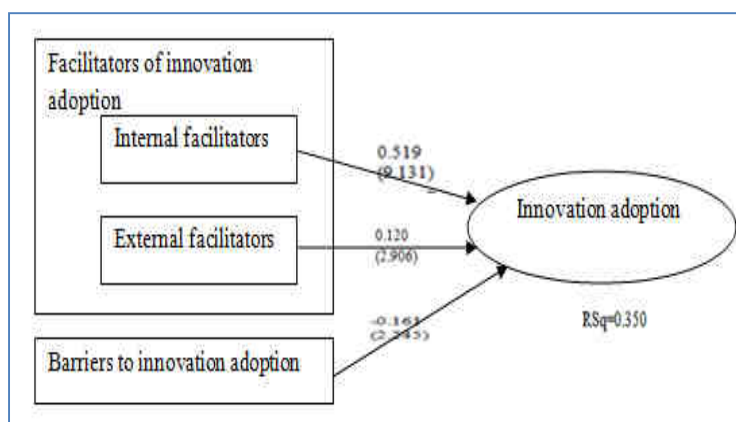

Figure 1: Path Significance and Regression Coefficients

The validity of the hypothesized model is verified on the basis of R-Sq values of the individual paths. The facilitators and barriers together can predict 'innovation adoption' to the extent of 35 %. Hence the model has a practical value as the independent constructs can predict the dependent construct significantly. Hence the hypothesized model is statistically significant, proven empirically.

Table 2: Regression Results of Causal Paths between 'Internal Facilitators' and 'Innovation Adoption'

Relationship among constructs	B	t	Remarks
Leadership → Innovation adoption	0.523	22.576	significant
Innovation climate → Innovation adoption	0.718	39.344	significant
Market orientation → Innovation adoption	0.658	29.113	significant
Organizational structure→Innovation adoption	0.667	27.307	significant
Focus on R & D → Innovation adoption	0.385	15.113	significant
Internal facilitators → Innovation adoption	0.746	49.348	significant
Internal facilitators → Technological innovation adoption	0.689	35.230	significant
Internal facilitators → Administrative innovation adoption	0.736	46.549	significant
Internal facilitators → Marketing innovation adoption	0.690	38.150	significant

Source: primary data

The results reveal that 'internal facilitators' have positive and substantive influence on the adoption of innovations (B=0.746). Among the 'internal facilitators', 'innovation climate' seems to have more influence on 'innovation adoption' (B=0.718) followed by 'organizational structure' (B=0.667) and 'market orientation' (B=0.658). The 'internal facilitators' seem to have more influence on the adoption of 'administrative innovations' (B=0.736) followed by adoption of 'marketing innovations' (B=0.690). The causal paths are all statistically significant (t>1.96). The regression results reveal that stronger the presence 'internal facilitators', higher will be the rate of 'innovation adoption'. The 'external facilitators' that are considered within the scope of this research are 'competition and turbulence', 'collaboration with other cluster members' and 'focus on external R & D'. The causal relationships between each of these facilitators and 'innovation adoption' are calculated for the purpose of testing hypotheses set for the study.

Table 3: Regression Results of Causal Paths between 'External Facilitators' and 'Innovation Adoption'

Relationship among constructs	B	t	Remarks
Competition and turbulence →Innovation adoption	0.185	4.633	significant
Collaboration → Innovation adoption	0.259	7.099	significant
External facilitators → Innovation adoption	0.260	10.019	significant
External facilitators →Technological innovation adoption	0.262	8.459	significant
External facilitators → Administrative innovation adoption	0.187	4.298	significant
External facilitators → Marketing innovation adoption	0.290	7.052	significant

Source: primary data

The regression results shown above reveal that 'external facilitators' have a significant (t=10.019) and positive impact on the adoption of innovations (B=0.260). However, when compared to the causal relationship between 'internal facilitators' and 'innovation adoption', the regression coefficients of relationship between 'external facilitators' and 'innovation adoption' is lower. This means that 'internal facilitators' are more forceful than 'external facilitators' in promoting innovative business practices among the organizations. 'External facilitators' have more significant influence on the adoption of 'marketing innovations' (B=0.290) followed by the adoption of 'technological innovations' (B=0.262). Among the 'external facilitators', 'collaboration' with external parties have more strong impact on 'innovation adoption' (B=0.259).

The barriers or obstacles to innovation are those which may be external or internal to the firm, but obstruct the firm's propensity to adopt innovations. It has been hypothesized that barriers will have significant negative impact on firm's innovativeness. This proposition is tested using regression analysis, the results of which are presented in the table below:

Table 4: Regression Results of Causal Paths between 'Barriers' and 'Innovation Adoption'

Relationship Among Constructs	B	t	Remarks
Barriers → Innovation adoption	-0.456	-12.485	significant
Internal barriers → Innovation adoption	-0.395	-9.710	significant
Internal barriers → Technological innovation adoption	-0.444	-11.665	significant
Internal barriers→ Administrative innovation adoption	-0.374	-6.707	significant
Internal barriers → Marketing innovation adoption	-0.319	-8.159	significant

External barriers ➤ Innovation adoption	-0.377	-10.216	significant
External barriers ➤ Technological innovation adoption	-0.398	-7.927	significant
External barriers ➤ Administrative innovation adoption	-0.324	-6.206	significant
External barriers ➤ Marketing innovation adoption	-0.191	-4.276	significant

Source: primary data

The results show that there is significant inverse relationship between the 'barriers to innovation' and the extent of innovation adoption by the firms. The regression coefficients calculated support all the hypotheses set for the relationship between 'barriers to innovation adoption' and 'innovation adoption'. Among the internal and external barriers of innovation, the 'internal barriers' seem to have more significant negative impact on the innovativeness of the firms (B=0.395). The results of the study show that 'internal barriers' have higher significant and negative impact on 'technological innovation adoption' (B= -0.444) followed by 'administrative innovations' (B= -0.374). The 'external barriers' related to innovations also have higher significant negative impact on the adoption of 'technological innovations' (B= -0.398) followed by the adoption of 'administrative innovations' (B= -0.324). The t-values show that all the relationships are statistically significant.

VI. CONCLUSION

The research has enabled to empirically establish the causal relationship between the facilitators and barriers on the rate of innovation adoption. It can be observed that facilitators, both internal and external, have a positive impact on innovation adoption, whereas barriers have a negative impact on innovation adoption. Among the facilitators, internal facilitators can predict innovation adoption more significantly than external facilitators. Among the internal facilitators, climate for innovation is a significant predictor of innovation adoption followed by market orientation. In comparison with the facilitators, the influence of barriers on innovation adoption is felt at a lesser degree. Among the external facilitators, collaboration purpose has more significant influence on innovation adoption. Among the barriers, internal barriers have more negative impact on innovation adoption. The most prominent internal barriers are lack of information on technology and lack of qualified personnel.

The interplay of facilitators and barriers significantly predicts the propensity of firms to adopt innovations. If suitable facilitators are present, innovativeness of the firms can be enhanced. The research contributes to the existing body of knowledge on innovation adoption among SMEs in the context of industrial cluster pertaining to the textile industry, specifically the knitwear industry. The study also contributes to practice by providing explanation on the mechanism that promotes innovation adoption based on the model. The model helps to predict the outcome of specific conditions that can be developed in the firms to promote a suitable climate of innovation, in turn enhancing firms' innovativeness and performance in the light of international competition. It also predicts the requirements in the external environment that can support the innovativeness of the SMEs in the cluster. As Tirupur is a closely knit cluster, the successful innovation diffusion experiences of one firm will spread swiftly in the cluster and it can help in developing and sustaining the competitive advantage of the cluster as a whole.

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